

# EGE AKADEMİK BAKIŞ

EGE ACADEMIC REVIEW

Ekonomi, İşletme, Uluslararası İlişkiler  
ve Siyaset Bilimi Dergisi

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International Relations and Political Science



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# Flexicurity: Panel Data Analysis for OECD Countries

Berna YAZAR ASLAN<sup>1</sup> 

## ABSTRACT

This study examines the changes in labor market indicators as a result of flexicurity policies applied in modern labor markets with panel data analysis for the member countries of the Organization for Economic Development and Cooperation (OECD). Flexibility policy components by the European Commission are grouped under four main headings: flexible and secure contract arrangements, lifelong learning, effective labor market policies, and modern social security system. Indicators of these policy components have been determined to monitor and evaluate the policies implemented, as each country adopts different flexicurity strategies. Using at least one indicator for each component, a data set of 35 OECD countries for the period 2008-2017 was created. The effects of flexicurity practices on the general unemployment rate, youth unemployment rate, long-term unemployment rate, and general employment rate, which are among the main indicators of the labor market, were estimated with panel data analysis models. According to the estimation results of the fixed effects model, which was determined as the most appropriate model, it can be said that the increase in the strictness of the legislation regarding the protection of employment, especially temporary employment, causes the unemployment rates to remain high while decreasing the employment rate. The relatively flexible implementation of the legislation to protect the labor force, the increase in spending on lifelong learning and modern social security practices stand out as factors that support the decrease in unemployment rates and the increase in the employment rate.

**Keywords:** Flexicurity, Labor Market Flexibility, Labor Market Indicator, Panel Data Analysis, Fixed Effect Model, Robust Estimators.

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## INTRODUCTION

Improvements in wages and additional payments, adjustments in working hours, vacation and leave periods, sickness, care and parental leave, early retirement under certain conditions are based on changes and developments in the labor market. In the event of unemployment, the guarantees provided to the individual have been included in these elements over time. However, these changes have not occurred equally in every country's economy, some labor markets have appeared to be both highly (low) flexible and security, or high (low) security and low (high) flexibility.

The implementation of the practices for flexibility and security as a whole is based on the reforms implemented in the Netherlands and Denmark in the early 1990s and later called "flexicurity" (Mandl and Celikel-Esser, 2012: 7). Regardless of development level, the very low rates of unemployment, which is a problem affecting all societies, with different social and economic dimensions, has created interest in flexible and secure labor markets

in European Union countries struggling with high unemployment rates.

High unemployment rates cause many negativities such as decreasing labor force participation rates, increasing the number of dependants of employed people, additional consumption pressure on the savings and investment resources of society and individuals with unemployment benefit practices, decreasing social security income, deterioration of income distribution, decreasing tax revenues, members of unions and bargaining power (Tokol, 2011: 96). While the prolongation of unemployment puts the unemployment problem into a structural appearance and makes its solution difficult, it deeply affects the young people, who are considered to be the most dynamic, sensitive, and important demographic group of societies, economically, socially and psychologically.

Due to the different characteristics of the labor markets in the European Union (EU) countries that want to overcome the unemployment problem and reach the

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full employment level, “common principles” have been determined so that they can design and implement their flexicurity policies.

Besides, policy components and their components were determined to monitor flexibility policies to be implemented and evaluate their results (European Commission, 2013: 37). These components are grouped under four main headings. First of these main headings is flexible and secure contract arrangements, second one lifelong learning, third one effective labor market policies and the latest one modern social security system.

With this study, these policy components developed for the labor markets in the European Union countries are examined for the Organisation for Economic Co-Operation and Development (OECD) countries, including a group of EU member countries. Thus, its applicability in countries or groups of countries other than the European Union was also examined. The analysis has also been carried out within the framework of whether having a more secure and flexible labor market increases or decreases the unemployment and employment rate, taking into account the policy components listed in the previous paragraph.

The hypothesis of this study, which aims to evaluate how flexicurity practices have taken place in OECD countries as of the current period, is that “Flexicurity practices have a significant effect on labor market indicators - among other factors determining labor market indicators - and this impact varies according to the labor market and/or flexibility indicator”. The validity of this hypothesis was examined by panel data estimation methods within the framework of regression analysis.

The study takes as a sample of OECD countries as it covers all major industrialized countries with free market economies and there is also a wealth of literature examining various aspects of flexicurity and other labor market characteristics. Data were taken from OECD and World Bank (WB) databases in the analyzes, which included 35 countries whose data are regularly available. With the data of 35 OECD countries for the period 2008-2017, there is evidence that changes in flexicurity practices have statistically significant effects on unemployment (general, long-term and youth) and overall employment rates.

This study, which deals with the effects of flexicurity on labor market indicators, consists of five chapters. The next part of the study will summarize empirical literature examining the relationship between labor regulations

and unemployment and employment. In the third part, statistical and econometric methods related to the research structure consisting of panel data analysis are explained and in the fourth part, statistical analysis and model estimation results are given. In the conclusion part, evaluations were made as a result of the findings obtained from the analyzes and suggestions were made.

## LITERATURE REVIEW

Researching the determinants of unemployment, which has many economic, social and psychological effects to achieve high levels of welfare and employment rates, has become the focus of many studies. In this study, the explanatory factors between flexible and secure institutions for the labor market and unemployment and employment in the relevant literature have been comprehensively examined.

Although it does not have a long history, there is also a rich literature OECD (1994), Elmeskov et al. (1998), Nickell et al. (2005), Scarpetta (1996), Stockhammer et al. (2014) that examines flexicurity and other labor market features from different perspectives. A significant part of these studies, some of which OECD (1994), Siebert (1997), Blanchard and Wolfers (2000), IMF (2003), Bernal-Verdugo et al. (2012), indicate that labor market rigidities caused by labor protection practices increases the rate of unemployment and this increase is the main determinant of unemployment for OECD countries.

It has revealed that by labor protection practices are the main determinant in achieving high unemployment rates and the need for structural labor market reforms such as decentralizing wage bargaining, reducing strictness of employment protection, and lowering the minimum wage. Also, it has been advocated by various analyzes and international organizations (EC, OECD, and IMF) that the causes of unemployment could be within labor market institutions.

However, recent literature like Baker et al. (2005), Arestis et al. (2007), Vergeer and Kleinknecht (2012) has shown that empirical correlations defined between labor market institutions and main indicator like unemployment are not robust to establish appropriate forecasting strategies. The reason of this result has explained by Heimberger et al. (2017) and Constancio (2018) differences such as alternative hypotheses, different country groups and time frames to explain unemployment.

Econometric research which are conducted to establish the determinants of decreases and increases unemployment rate in OECD countries, are generally

using labor market institutions as a explanatory variable. For example, legislation of employment protection, population, union density, foreign direct investment, minimum wage and tax wedge are some of the explanatory variables used. However, many studies like Heckman (2007) and Stockhammer and Klar (2011) have shown that between labor market deregulation and changes of 'structural' unemployment in OECD countries have not significant relation and also advocates establishing new regressions that include alternative explanatory variables to explain the change in unemployment rates. And also specifically, Blanchard and Wolfers (2000), IMF (2003), and Bassanini and Duval (2006), by controlling some macroeconomic shock variables such as growth rate, long-term interest rate, total factor productivity increase and labor supply/demand, there are studies that examine the relationship between these shock variables and labor market institutions

There are studies like Arestis et al. (2007) and Stockhammer and Klar (2011) arguing that the major variable to explain unemployment is the Keynesian line is the formation of capital rather than labor market institutions. Some other studies like Bassanini and Duval (2006) include the shock variable in empirical analysis as change in commercial conditions affects unemployment (Heimberger, 2019: 3-5).

Since flexicurity practices are a set of policies followed to regulate the labor market, it is important to determine the marginal effects of these practices on various labor market indicators within the framework of statistical and econometric analyzes. After the flexicurity approach, which had successful results in the labor market basic indicators with its implementation in Denmark and the Netherlands for the first time, has started to take place on the agenda of the European Union and candidate countries, with the proposal of the European Commission for each country to develop its own unique flexicurity policies. In this study, it is aimed to be a pioneer in improving the scope of the studies by including OECD countries in the analysis of flexicurity and labor market indicators of European Union countries, which are frequently performed in the literature. In addition, the diversity and diversity of the indicators used to explain flexicurity make this study different and unique from the studies in the literature in the countries covered in the study.

### Method

When examining the relationships between the panel data set and the variables, the differences between

cross-section units and between times can be taken into account.

A general panel data model with K explanatory variables in which  $Y_{it}$  shows the value for  $i$  unit ( $i = 1, \dots, N$ ) in  $t$  time period ( $t = 1, \dots, T$ ) is as given in Equation (1.1).

$$Y_{it} = \alpha_{it} + \beta_{it}X_{it} + u_{it} \quad (1.1)$$

Here  $u_{it}$  stands for the error term and has a distribution  $u_{it} \sim N(0, \sigma_u^2)$  in all time and all units.  $Y_{it}$  shows the dependent variable value at time  $t$  of the  $i$ th cross section unit,  $X_{1it}, \dots, X_{kit}$   $k$  independent variables  $i$ th unit value at time  $t$ , and  $\beta_{it}$  the slope coefficients (Baltagi, 2005:11).

Panel data models are divided into three groups, first of all classical model, second one fixed coefficient model, and another one random coefficient model. Fixed and random coefficient (homogeneous) models are divided into two groups which are fixed effect and random effect models and Swamy type and Hsiao type models respectively.

#### Fixed Effect Model (FEM)

These are models in which the constant coefficient, which is called individual effects or group effect, which has characteristics specific to the cross-section units in the error term of the model, changes from section to section or over time.

$$y_{it} = \alpha + \beta x_{it} + u_{it} \quad (1.2)$$

$$u_{it} = \mu_i + \lambda_t + v_{it}$$

$$y_{it} = \alpha + \beta x_{it} + \mu_i + \lambda_t + v_{it} \quad i = 1, \dots, N; t = 1, \dots, T \quad (1.3)$$

As seen in Equation (1.3),  $\mu_i$  denotes unobservable unit effects,  $\lambda_t$  unobservable time effects and  $v_{it}$  stochastic error term.

#### Random Effect Model (REM)

These models have no constant coefficient for each cross section and time and these effects are considered as a random variable.

$$y_{it} = \alpha + \beta x_{it} + u_{it} \quad (1.4)$$

$$u_{it} = \mu_i + \lambda_t + v_{it}$$

$$y_{it} = \alpha + \beta x_{it} + \mu_i + \lambda_t + v_{it} \quad i = 1, \dots, N; t = 1, \dots, T \quad (1.5)$$



The important point in this model is to find specific error components belonging to unit or unit and time.

To decide which of the panel data models is appropriate, Breush-Pagan Test (PM - REM), Hausmann Test (FEM - REM), Chow Test (PM - FEM) are used.

### Hausmann Test

Hausman test developed to investigate whether there is a significant difference between fixed effect and random effects model parameter estimators and determines which of the estimators are more effective.

In the  $H_0$  hypothesis of the Hausman test, it is assumed that the model is a random effect model and no relationship between the error term and the explanatory variables. Also this model is estimated by the generalized least squares method.

$$H = (\hat{\beta}_{SE} - \hat{\beta}_{TE})' [\text{Var}(\hat{\beta}_{SE}) - \text{Var}(\hat{\beta}_{TE})] - 1 (\hat{\beta}_{SE} - \hat{\beta}_{TE}) \quad (1.6)$$

The Hausman test statistic H obtained is compared with the chi-square value of k degrees of freedom and it is decided to accept or reject the hypothesis.

### Panel Data Models: Hypothesis Tests

To obtain reliable results from the analyzes performed in the study, the basic assumptions about the panel data models should be tested. In this context, assumptions about heteroscedasticity, autocorrelation and cross-sectional dependency will be examined.

### Cross-Section Dependency

Cross-section dependency is based on the assumption that other units that make up the panel will be affected by the macroeconomic shock occurring in any of the units considering today's macroeconomic conditions. Performing analysis without considering the cross-sectional dependency between the series will cause the results to be biased and inconsistent. Cross section dependency can be examined with Breusch-Pagan (1980) LM test, Pesaran (2004) CD test, Friedman test and Frees tests. Since the number of countries (N) considered in this study is larger than the period (T) dimension, cross-section dependency was tested with the Pesaran  $CD_{LM}$  test. It is assumed that there is no cross-sectional dependency in the null hypothesis established for the Pesaran CD test. The  $CD_{LM}$  test statistic is based on the estimation of the binary correlation coefficients between residuals which shown equation (1.7).

$$CD_{LM} = \sqrt{\frac{2T}{N(N-1)}} \sum_{i=1}^{N-1} \sum_{j=i+1}^N \hat{\rho}_{ij} \quad (1.7)$$

Under the hypothesis that  $N \rightarrow \infty$  and  $T$  are large enough, there is no relationship between the cross sections, the test statistic  $CD_{LM}$  shows a standard normal distribution (Pesaran, 2004: 9).

### Heteroscedasticity

While there are different tests developed to test heteroscedasticity in the panel data model, the M-Wald test is widely used within the fixed effects model, while the Breusch-Pagan Lagrange Multiplier test and Levene, Brown and Forsythe test are among the tests that are widely used within the scope of random effects models.

The modified Wald test investigates whether the variance varies by a unit under the null hypothesis that the unit variances are equal to the panel mean. Test statistics are given in W equation (1.8). The W test statistic fits the  $\chi^2$  distribution with N degrees of freedom (Greene, 2003: 323: 324).

$$W = \sum_{i=1}^N \frac{(\hat{\sigma}_i^2 - \sigma^2)^2}{f_{ii}} \quad (1.8)$$

The Breusch-Pagan Lagrange Multiplier test investigates whether the variance varies according to the units under the null hypothesis that the variance does not differ by units. Breusch-Pagan Lagrange Multiplier test statistics are given in LM equation (1.9). The LM test statistic fits the  $\chi^2$  distribution with degrees of freedom of 1.

$$LM = \frac{NT}{(T-1)} \left[ \frac{\sum_{i=1}^N (\sum_{t=1}^T e_{it}^2)}{\sum_{i=1}^N \sum_{t=1}^T e_{it}^2} - 1 \right] \quad (1.9)$$

### Autocorrelation

Among the tests used to test the autocorrelation problem in panel data analysis are Baltagi-Wu's Local Best Invariant Test, Bhargava, Franzini and Narendranathan's Durbin Watson Test and Lagrange Multiplier, Expanded Lagrange Multiplier and Wooldridge F tests. Because it is a general test, the Wooldridge F test is superior to other tests.

In the Wooldridge autocorrelation test, the presence of autocorrelation in the panel data set is investigated by using the errors obtained from the first order differences model. F test statistics for the Wooldridge test are given in equation (1.10).

$$F = \frac{\sum_{i=1}^N \sum_{t=1}^{T-1} \sum_{s=t+1}^T \hat{f}_{it} \hat{f}_{is}}{\sqrt{\sum_{i=1}^N (\sum_{t=1}^{T-1} \sum_{s=t+1}^T \hat{f}_{it} \hat{f}_{is})^2}} \quad (1.10)$$

**Table 1.** Flexicurity Indicators

Indicators	Abbreviation	
Stricness of employment protection for regular contracts <i>It covers individual and collective layoffs, including arrangements for typical contract workers.</i>	EPRC	<i>Flexible and Reliable Contract Arrangements</i>
Stricness of employment protection for temporary contracts <i>Includes arrangements for employees on temporary contracts.</i>	EPT	
The Ratio of Active Labor Market Expenditures in GDP <i>Indicates the ratio of expenditure on relevant policies to national income.</i>	ALMP	<i>Effective Labor Market Policy</i>
Number of Higher Education Graduates / Population <i>It is taken as an indicator of investments made in human capital.</i>	EA	<i>Life Long Learning</i>
Net Replacement Rate <i>It shows that (a) decrease in family income in the initial(initial) period of unemployment.</i>	NNR	<i>Modern Social Security System</i>
Inactivity Trap Rate <i>It is an indicator of the higher income that an individual who has expired unemployment benefit, cannot benefit from any assistance or benefits from social assistance, (, yok) when compared to the income he/she will earn in case of employment.</i>	ITR	

### Robust Estimator

When one or more of heteroscedasticity, autocorrelation and cross section dependency problems are detected, standard errors should be corrected without changes in parameter estimates and robust standard errors should be used. In this study, the Driscoll-Kraay Estimator (Tatođlu, 2012: 241) was used to generate robust standard errors in cases where at least one of the heteroscedasticity, autocorrelation and cross-section dependency problems exist in fixed effect models, Huber, Eicker, White Estimator was used to overcome the heteroscedasticity problem in fixed and random effect models and Arellano, Froot and Rogers Estimators were used in the presence of heteroscedasticity and autocorrelation in the fixed and random effects model.

### Sample

The hypothesis of this study is that flexicurity practices have a significant effect on labor market basic indicators – among other factors determining labor market indicators – and this effect differs according to flexicurity indicator. The validity of this hypothesis was examined by panel data estimation methods within the framework of regression analysis. The flexicurity indicators considered within the scope of this hypotheses are given in Table 1 and which is prepared from the literature studies on the instrumental variables covered in this study and the effects of these variables on employment and unemployment types are in Table 2. The data set was limited to the years 2008-2017 in order to represent more countries in the study.

Components related to flexicurity policies were determined by the European Commission and a list of indicators was created to be used in monitoring the policies of each component. In this study, the indicators used in measurement and evaluation within the framework of the concept of flexicurity are given in Table 1 together with their abbreviations and the components they belong to.

An economic model is functional structures in order to reveal the relationships between variables with their marginal effects under simplifying assumptions, and it is very important to estimate the model parameters with an appropriate estimator. Although the number of periods for flexicurity indicators is an obstacle to making separate analyzes for each country<sup>1</sup>, the right empirical estimates could be obtained within the framework of this study, considering the specific benefits of the panel data.

More country experience and a longer observation will reveal these effects more strongly. Below, the expected effects of flexicurity indicators on unemployment and employment types are presented in a Table 2 within the framework of the relevant literature.

Within the scope of this study, the economic growth rate, inflation rate, population growth rate, average wages, long-term interest rate, foreign direct

<sup>1</sup> OECD countries which are selected for panel data analysis are Australia, Austria, Belgium, Canada, Chile, Czech, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Israel, Italy, Japan, Korea, Latvia, Lithuania, Luxembourg, Mexico, Netherlands, New Zealand, Norway, Poland, Portugal, Slovakia, Slovenia, Spain, Switzerland, Turkey, UK, USA.

investments, union density, labor productivity growth rate and tax wedge are controlled in models which estimated. The level of general economic activities fluctuates depending on the increase or decrease in real incomes and unemployment of economies. Relationships between employment and real GDP, which is an indicator of general economic activities, occur according to these fluctuations. Leaving aside the peculiarities of the periods of expansion and contraction, it can be said that the ultimate goal of the regulations for labor markets is to keep the welfare conditions of individuals who supply their labor under different conditions at a certain level. In this context, with the flexicurity model - in the simplest sense - low unemployment rates are targeted if flexible hiring and firing in question. Besides, it can be aimed to create resistance to a big contraction in employment with flexicurity practices. In this framework, economic growth and labor productivity growth are used as explanatory variable in the model. This is because productivity growth is determined by savings and physical capital investments, new technology and human capital.

Inflation is a steady increase in the general level of prices, and during periods of high inflation a higher payment is made for the same amount of goods and

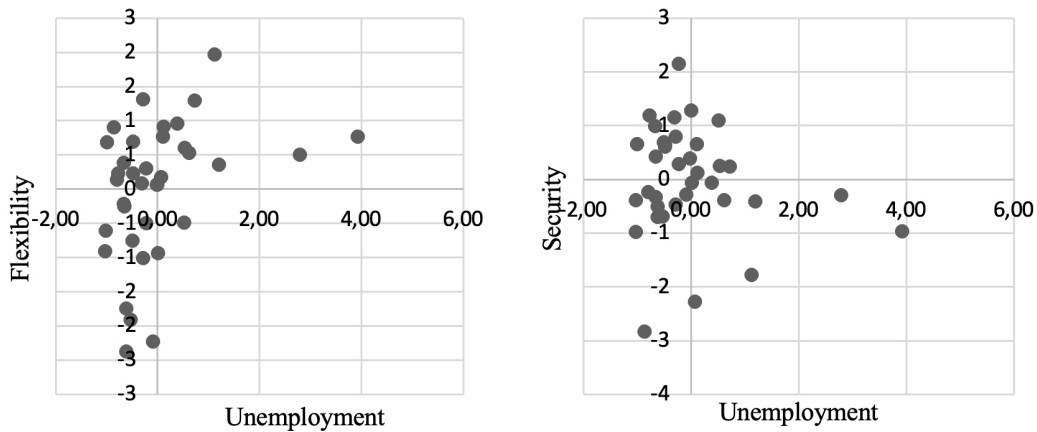
services purchased than during periods of relatively low inflation. Changes in the inflation rate cause negative effects on real GDP and therefore the whole economy with a decrease in investments, deterioration of the information distributed between prices and economic units, and less productive use of resources, etc. As long as increases in real GDP in an economy, that is, economic growth can reduce the rate of unemployment and inflation, the purchasing power of individuals in that economy tends to increase and sustainable growth can be achieved with income distribution. The relationship between unemployment and inflation is associated with increases in industrial production in the literature. This is attributed to a process in the form of prices that tend to decline when the increase in the total supply of increased employment opportunities creates a greater total demand increase than this (Şentürk and Akbaş, 2014: 5829). Therefore, the inflation rate is also included in the model.

Foreign direct investments have the potential to create new jobs and reduce unemployment in the countries they travel to. Among OECD countries such as Turkey, Hungary, Mexico, and Lithuania are implementing policies to encourage foreign direct investment. For these reasons, the ratio of foreign direct investments to

**Table 2.** Expectations of Independent Variables on Employment and Types of Unemployment

Independent Variable		Expectation Unemployment	Expectation Employment
Stricness of employment protection for regular contracts	<b>EPRC</b>	+/-	+/-
Stricness of employment protection for temporary contracts	<b>EPT</b>	+/-	+/-
The Ratio of Higher Education Graduates to Population 25-64 (%)	<b>EA</b>	-	+
ALMP Expenditures on GDP (%)	<b>ALMP</b>	-	+
Net Replacement Rate (%)	<b>NNR</b>	+/-	+/-
Inactivity Trap Rate (%)	<b>ITR</b>	+/-	+/-
Economic Growth Rate (%)	<b>GR</b>	-	+
GDP Growth Rate Per Hour Worked (%)	<b>WH</b>	-	+
Inflation Rate (%)	<b>INF</b>	-	-
Foreign Direct Investments in GDP (%), Net Inflows	<b>FDI</b>	-	+
Population Growth Rate (%)	<b>POP</b>	+/-	+/-
Average Wage (Ln)	<b>AW</b>	+	-
Union Density (%)	<b>UD</b>	+	-
Long Term Interest Rate (%)	<b>LTIR</b>	+	-
Tax Wedge (%)	<b>TW</b>	+	-





**Figure 1:** General Unemployment Rate - Flexibility - Security Scatter Plot<sup>2</sup>

GDP as entry into the country is also controlled in the model. The labor force creation potential of the country is included in the model with the population growth rate.

The union density, average wage and tax wedge which are an indicator of protective labor market practises used in the model because they are prejudiced to the bargaining position in wage negotiations in favor of workers and inhibit the functioning of labor markets and cause wage rigidity while long-term interest included in the model because an increase in long-term interest rates will increase the cost of capital and slow investments.

As stated in Table 2 which is prepared from the literature studies on the instrumental variables covered in this study and the effects of these variables on employment and unemployment, the effect of stricness of employment protection -regular and temporary- are uncertain ( $\beta_1, \beta_2 <, > 0$ ); The effect of higher education graduate rate and the ratio of ALMP expenditures in GNP is negative ( $\beta_3, \beta_4 < 0$ ); The effect of the net substitution rate and the inactivity trap rate is uncertain ( $\beta_5, \beta_6 <, > 0$ ); the growth rate, the GNP index per hour worked, the inflation rate is negative ( $\beta_7, \beta_8, \beta_9, \beta_{10}, < 0$ ) and the effect of the population growth rate is uncertain ( $\beta_{11} >, < 0$ ); tax wedge, union density, average wage and long-term interest rate effects were found to be positive ( $\beta_{12}, \beta_{13}, \beta_{14}, \beta_{15}, > 0$ ).

**EMPRICAL FINDINGS**

The variability in the flexicurity indicators and the relationships between them were first considered together with the labor market indicators and given in Table 3 for the years 2008-2017. As can be seen, while within country averages are lower than the averages across countries and for the whole data set, the standard deviations, which are a measure of the variability of the observations, are higher within the country than between countries and the whole data set. This indicates

that there is a variability of the assured flexibility indicators and that this variability can be a determinant of the variability in labor market indicators. As expected, the smallest and largest values for each elasticity indicator are smaller or larger than the others when the data set is considered as a whole.

While the average unemployment rate for 35 OECD countries is about 8.1%, these averages are about 33% and 19% for long-term and youth unemployment, respectively. When the means of these three unemployment indicators are evaluated together with their standard deviations, the coefficient of variation is 0.54, 0.51 and 0.51, respectively, and it can be said that the variability in the unemployment rate is slightly higher than the others. The OECD average for the employment rate (ER) is 66.7% and its standard deviation value is 7.33.

The correlation coefficients estimated by the panel data set (see Table 3) indicate that there is a unidirectional relationship between EPRC and EPT at the level of 45%, an inverse linear relationship at the level of 63% between EPRC and EA, and 40% between EPT and EA, and it shows that these are statistically significant at the 0.1% level. Other relatively high and statistically significant correlations were between NNR and ITR (92%), ALMP with NNR (34%), and ALMP with ITR (39%).

Unemployment and employment indicators are also linearly related among themselves, and it has been determined that there is a relatively high and statistically significant linear relationship between flexicurity indicators. Around 50% of linear relationships have been determined between EPRC and LUR, EA and LUR, and NNR and ER. These preliminary analyzes indicate that there may be evidence that flexicurity indicators have a decisive influence on unemployment and employment rates.

<sup>2</sup> While creating scatter diagrams, flexibility and asecurity dimensions obtained as a result of factor analysis and labor market indicators were used and labor market indicators were also standardized.

**Table 3.** Summary Statistics - Flexicurity and Labor Market Indicators-2008-2017

Indicator		Mean	Standard Deviation	Min	Mak
<i>Flexicurity Indicator</i>					
EPRC	All Data	2.339	0.556	0.960	3.560
	Between Country		0.544	0.960	3.293
	Within Country		0.104	1.840	2.867
EPT	All Data	2.075	1.016	0.210	4.960
	Between Country		0.998	0.210	4.914
	Within Country		0.195	1.180	2.970
EA	All Data	32.695	9.966	12.041	56.710
	Between Country		9.540	15.607	52.638
	Within Country		2.737	21.979	40.269
ALMP	All Data	0.524	0.385	0.00	2.040
	Between Country		0.368	0.009	1.892
	Within Country		0.097	-0.027	0.829
NNR	All Data	78.115	12.891	46.00	102.000
	Between Country		12.357	50.454	100.500
	Within Country		3.987	65.215	99.815
ITR	All Data	76.028	15.899	27.000	102.00
	Between Country		15.219	31.454	100.300
	Within Country		4.881	45.028	97.828
<i>Labor Market Indicator</i>					
UR	All Data	8.127	4.396	2.730	27.490
	Between Country		3.875	3.470	20.475
	Within Country		2.160	-3.768	15.951
LUR	All Data	32.816	16.716	0.220	73.500
	Between Country		15.573	0.518	61.505
	Within Country		5.915	9.154	49.248
YUR	All Data	18.920	9.727	4.830	56.230
	Between Country		8.476	7.809	45.013
	Within Country		4.818	-2.462	34.665
ER	All Data	66.758	7.333	44.230	86.530
	Between Country		7.238	48.407	81.966
	Within Country		2.325	59.635	75.235

Figure 1 allows the consideration of the general unemployment rate with the flexibility and security components. As can be seen, the decrease in flexibility in labor markets, in other words, rigid labor markets bring high unemployment rates. According to the scatter plot created between the security and the general unemployment rate, the high level of secure practices shows that there is a reducing effect on unemployment rates.

According to Figure 2, which enables long-term unemployment rate to be handled together with flexibility and assurance components, the increase in flexibility in labor markets brings along lower long-term unemployment rates. According to the scatter plot created between the security and long-term unemployment rate, the high level of secure practices

shows that there is a decreasing effect on long-term unemployment rates.

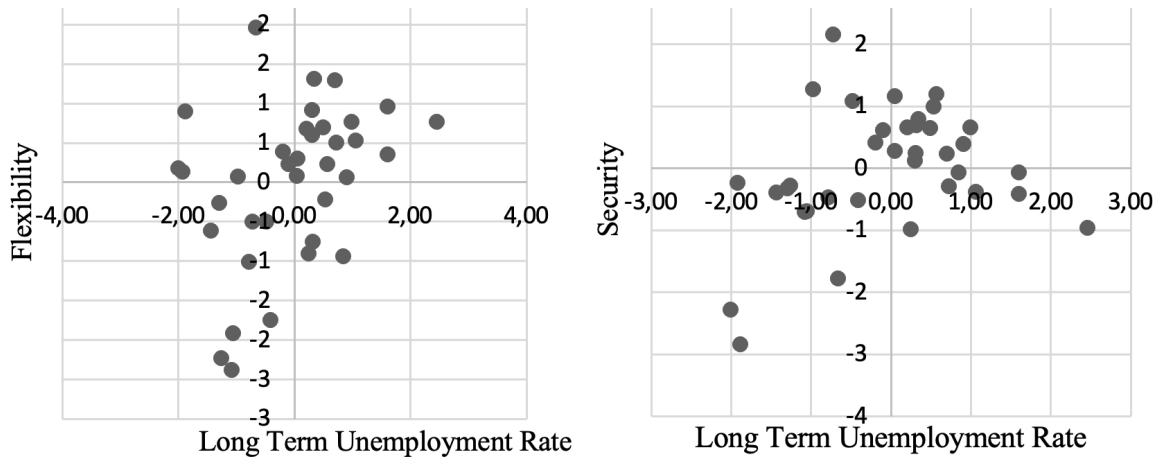
Figure 3 allows the youth unemployment rate to be considered together with the flexibility and assurance components. As can be seen, the decrease in flexibility in labor markets, in other words, rigid labor markets bring along high youth unemployment rates. According to the scatter plot created between the security and youth unemployment rate, the high level of secure practices shows that there is a decreasing effect on youth unemployment rates.

According to Figure 4, which allows the general employment rate to be handled together with the flexibility and security components, the increase in both flexibility and security in the labor market brings along high general employment rates.

**Table 4.** Correlation Matrix – Flexicurity and Labor Market Indicators

	EPRC	EPT	EA	ALMP	NNR	ITR	UR	LUR	YUR	ER
EPRC	1									
EPT	0.503***	1								
EA	-0.597***	-0.350***	1							
ALMP	0.079	0.094	-0.089	1						
NNR	0.050	0.051	0.066	0.412***	1					
ITR	0.061	0.028	0.014	0.430***	0.928***	1				
UR	0.155**	0.217***	-0.269***	0.064	-0.220***	-0.125*	1			
LUR	0.483***	0.255***	-0.566***	-0.070	-0.035	0.008	0.514***	1		
YUR	0.182**	0.286***	-0.295***	0.114	-0.218***	-0.130*	0.943***	0.458***	1	
ER	-0.275***	-0.382***	0.421***	0.150*	0.404***	0.346***	-0.647***	-0.453***	-0.707***	1

\*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$



**Figure 2:** Long Term Unemployment Rate – Flexibility – Security Scatter Plot

The forecasting model in its most general form  $Y_{it}$  - shows that  $it$ h country in period  $t$  for each labor market indicator - is defined by Equation (5.1). The reference year is 2008.

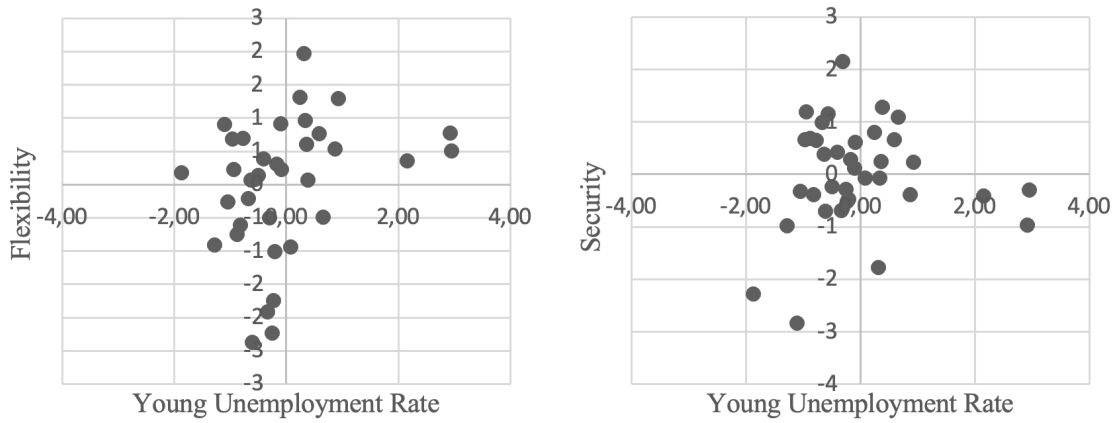
For the models established to examine the effects of flexicurity indicators on unemployment and its types and also employment, estimates were made using Pooled OLS, Fixed Effects, Random Effects methods. The F test result shows that the classical model is invalid in all models and that the model has unit and / or time effects. This situation shows that the FEM or REM is more appropriate. In the study, Hausmann test was applied and the result is that the FEM is valid for UR, LUR, YUR and ER models.

The explanatory power of the independent variables by the dependent variables in the model,  $R^2$ , and the ratio of the unit effect variance to the total variance were evaluated

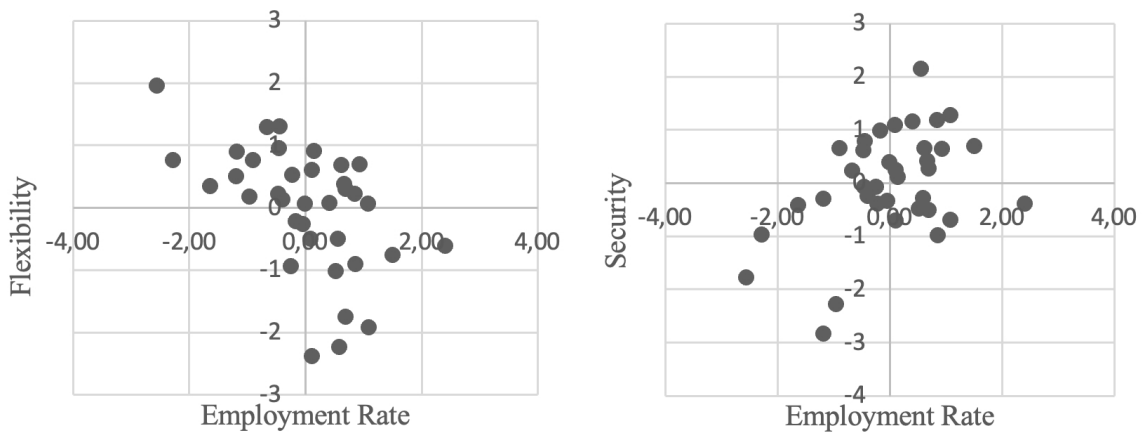
with the rho coefficient. Rho coefficient is quite high in all models and accordingly, it can be said that there is a strong unit effect in models. Also, cross-section dependency of the models was examined with Pesaran CD test statistics. There is cross-sectional dependency in general unemployment, youth unemployment and general employment models. For heteroscedasticity problem Modified Wald test was performed and the result was obtained that the variance varies according to the units. Finally, the autocorrelation test of the models was examined with the Wooldridge F Test, and autocorrelation problems were found in all models.

According to the basic assumption tests, there are autocorrelation and heteroscedasticity problems in all models. Accordingly, it was determined that the most suitable error estimation method among Robust error method estimator is Huber, Eicker, and White.

$$\begin{aligned}
 Y_{it} = & \beta_0 + \beta_1 EPRC_{it} + \beta_2 EPT_{it} + \beta_3 EA_{it} + \beta_4 ALMP_{it} + \beta_5 NNR_{it} + \beta_6 ITR_{it} + \\
 & \beta_7 GR_{it} + \beta_8 INF_{it} + \beta_9 WH + \beta_{10} FDI_{it} + \beta_{11} POP_{it} + \beta_{12} AW_{it} + \beta_{13} TW + \beta_{14} UD_{it} + \\
 & \beta_{15} LTIR_{it} + \varepsilon_{it}
 \end{aligned}
 \tag{5.1}$$



**Figure 3:** Young Unemployment Rate – Flexibility– Security Scatter Plot



**Figure 4:** Employment Rate – Flexibility– Security Scatter Plot

Against the possible explanatory endogenous variable problem in estimation models – although the fixed effects model provides some protection against the internality problem – model estimations were also obtained with Arellano and Bond (1991) and Arellano and Bover (1995) estimators and are presented in the appendix. As it is known, these two estimators have been defined for panel data models with a dynamic structure, and the related lagged labor market indicator variable is expected to accumulate a significant part of the effect. In the dynamic model estimations for each labor market indicator, the lagged dependent variable values were estimated statistically significant and positive. However, Arellano and Bond (1991) estimated the lagged dependent variable coefficients smaller than Arellano and Bover (1995). The estimates of Arellano and Bover (1995) for the effects of flexicurity indicators on the relevant labor market indicators support the estimation results given here.

Table 5 shows fixed effects estimation result for models under considerations. According to the UR estimation results, while EPT and EA had a statistically

significant effect on the unemployment rate, other flexicurity indicators hadn't. If stricness of employment protection for temporary contracts and higher education graduation rate increase by 1 point in OECD countries, the unemployment rate increases by 0.02 and 0.33 points, respectively. In the model, inflation rate, population growth rate, average wages have a decreasing and union density and long-term interest rate have an increasing effect on the unemployment rate, and these effects are statistically significant.

It can be said that the EPT and EA has a strong positive effect on the long-term unemployment rate at 1% significance level. Accordingly, 1 point increase in EPT and EA in OECD countries increases the long-term unemployment rate by 0.08 and 1.10 points, respectively. No statistically significant relationship was found between other flexicurity indicators and long-term unemployment rate. While the economic growth rate and long-term interest rate, which are labor market and macroeconomic indicators, have an increasing effect on the long-term unemployment rate, inflation rate,

**Table 5.** Estimated Model Results

Variables	UR	LUR	YUR	ER
EPRC	-0.011 (0.012)	0.016 (0.035)	-0.054* (0.029)	-0.003 (0.013)
EPT	-0.024** (0.009)	-0.084*** (0.029)	-0.068*** (0.024)	0.031*** (0.010)
EA	0.337*** (0.066)	1.102*** (0.198)	0.850*** (0.163)	-0.194** (0.073)
ALMP	0.521 (0.965)	-2.273 (2.870)	0.087 (2.369)	-0.487 (1.055)
NNR	0.003 (0.048)	-0.154 (0.145)	0.060 (0.119)	0.091* (0.053)
ITR	0.019 (0.036)	0.102 (0.109)	-0.014 (0.090)	-0.064 (0.040)
GR	-0.032 (0.045)	0.934*** (0.136)	-0.183 (0.113)	-0.023 (0.050)
WH	-0.067 (0.044)	0.001 (0.130)	-0.254** (0.108)	0.002 (0.048)
INF	-0.291*** (0.076)	-0.801*** (0.229)	-0.693*** (0.189)	0.298*** (0.084)
FDI	-0.005 (0.011)	0.016 (0.034)	-0.021 (0.028)	0.007 (0.013)
POP	-1.153*** (0.321)	-2.029** (0.955)	-2.475*** (0.788)	0.508 (0.351)
UD	0.138* (0.072)	0.108 (0.216)	0.505*** (0.178)	-0.179** (0.079)
AW	-0.079** (0.033)	-0.335*** (0.098)	-0.123 (0.081)	0.080** (0.036)
TW	-0.018 (0.112)	0.429 (0.332)	-0.212 (0.274)	-0.092 (0.122)
LTIR	0.573*** (0.124)	0.825** (0.370)	1.371*** (0.305)	-0.753*** (0.136)
Constant	0.824** (0.344)	3.511*** (1.024)	1.367 (0.845)	-0.094 (0.376)
Observation	230	227	227	230
R <sup>2</sup>	0.409	0.501	0.417	0.425
Adjusted R <sup>2</sup>	0.269	0.384	0.280	0.288
R <sup>2</sup> _between	0.012	0.014	0.051	0.023
R <sup>2</sup> _within	0.409	0.501	0.417	0.425
Rho	0.954	0.966	0.972	0.988
Corr	-0.805	-0.680	-0.888	-0.690
Sigma	0.062	0.215	0.196	0.078
sigma_e	0.013	0.039	0.032	0.014
sigma_u	0.060	0.212	0.193	0.076
U <sub>i</sub>	0.060	0.212	0.193	0.076
RMSE	0.013	0.039	0.032	0.014
F	8.538	12.24	8.713	9.121
Hausmann Test	28.09 (0.021)	47.59 (0.000)	33.69 (0.004)	45.65 (0.000)
Pesaran CD Test	6.128 (0.000)	2.728 (0.006)	6.596 (0.000)	6.279 (0.000)
Wooldridge F Test	56.799 (0.000)	25.599 (0.000)	31.438 (0.000)	86.932 (0.000)
M-Wald Test	1476.68 (0.000)	2639.67 (0.000)	676.59 (0.000)	1112.54 (0.000)

(.) robust standart errors. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.10$ .

population growth rate, and average wage variables have a decreasing effect and these effects are statistically significant.

It can be said that EPRC and EPT and EA have a negative effect on the youth unemployment rate. Accordingly, 1 point increase in EA and EPRC and EPT increases the youth unemployment rate by 0.05, 0.06, and 0.85 points, respectively, in OECD countries. Other flexibility indicators, labor market and macroeconomic indicators which are GDP change rate per hour, inflation rate, population growth rate, union density have a reducing effect and long-term interest rate variables have an increasing effect on the youth unemployment rate, also these effects are statistically significant.

It can be said that the EPT and the EA has a negative effect on employment rates, while the net replacement rate has a positive effect. Accordingly, 1 point increase on EA and EPT in OECD countries decrease the youth unemployment rate by 0.03, 0.19, respectively, while the net replacement rate increases by 0.09 points. Among other variables, inflation rate and average wages, union density increasing the youth employment rate and long-term interest rate have a decreasing effect, and these effects are statistically significant.

## DISCUSSION

Reducing labor market rigidities in OECD countries is seen as among the policies implemented to reduce the unemployment rate. However, although the relationship between the strictness of employment protection and the unemployment rate is theoretically uncertain, most of the studies in the literature show that this relationship is neutral or somewhat negative. Nickell and Layard (1999) and Bassanini and Duval (2009) have not found evidence that high unemployment rate is achieved as labor market rigidity increases. Siebert (1997) argues that making the labor market more flexible with the labor market institutions in European countries will solve the unemployment problems. Blanchard and Wolfers (2000) suggest that stricter labor market practices are determinants of high unemployment rates, especially in European countries. On the other hand, Bernal-Verdugo, Furceri, and Guillaumel (2012) have obtained results that general unemployment and thus youth unemployment and long-term unemployment rates are reduced by making more flexible labor markets more flexible. Muller and Berger (2013) conclude that the length of unemployment periods is negatively affected by the strictness of employment protection legislation with individual dismissal and typical employment contracts. The more

difficult transition from unemployment to employment or from employment to unemployment in countries where the legislation on protection of employment is stricter has a negative impact on long-term unemployment rates (European Commission, 2006: 40).

International organization like OECD (1994), OECD (2004), OECD (2006), European Commission (2006), World Bank (2006) point out that the strictness of employment protection negatively affects the labor market expectations of young people. This situation indicates that young people have problems entering the labor market and cause high youth unemployment rates. OECD (2006), Bertola et al. (2002), Jimeno and Rodriguez Palenzuela (2002) and OECD (2004) have same opinion. Besides, Esping-Andersen (2000), Heckman et al (2000), Addison and Teixeira (2003), Botero et al. (2004), Cahuc and Zylberberg (2004), Breen (2005), Allard and Lindert (2006), Autor et al. (2006), Kahn (2006), Noelke (2011)'s studies also support this view. As the strictness of the employment protective increases, it restricts employment opportunities for young people and causes high youth unemployment rates by extending the job seeking period of young people who will enter the labor market for the first time. The lack of work experience of young people and the possible difference in productivity compared to an older employee and an increase in the strictness of employment protection are expected to increase youth unemployment. Strict legislative practices applied to the protection of employment have a negative impact on the employability of young people, who are among the disadvantaged groups, due to reasons such as lack of experience, knowledge about job seeking and employment opportunities, and unclear labor market expectations (Noelke, 2011:1-5).

Strict legislative practices make termination of employment very difficult for the employer, while job switch is a difficult process for the employee. This situation reduces hiring and firing and affects the character of unemployment experiences. Individuals who are new in the labor market are also faced with the risk of unemployment due to the strict legislation (Bertola, Boeri and Cazes, 2000: 57). Boeri and Garibaldi (2007) show that the transition from a strict employment protection legislation to a "two-tier" regime increased employment growth. This regime has been defined as the more liberalization of contracts for temporary employment while maintaining unchanged protection in permanent contracts (Amine and Montreuil, 2018: 8).

Higher education level ensures stability in the labor market for individuals and thus reduces the risk of being unemployed. As the education level rises, individuals



have higher participation in the labor market and their active presence in the labor market is generally longer than those with low education. Education have a major role in enabling individuals to acquire the necessary skills in terms of entering the labor market and lifelong learning (LLL) (Ionela, 2012: 4400). However, raising the education level is not the only way to overcome the unemployment problem. Education policies should be linked to macroeconomic policies and provide attractive labor market opportunities for skilled people. In this context, Mishel (2011) thinks that the unemployment particularly in crisis conditions, is not caused by the lack of a job but from the lack of appropriate job. However, Pissarides (2003) states that unemployment rates have decreased in some countries only by associating education and employment policies with flexible labor markets and monetary reform policies. Participation of individuals who is long-term unemployed in lifelong learning activities aims to increase their competitiveness in the labor market and to re-participate in the labor market. Besides, individuals need lifelong education programs that will provide access to educational opportunities to increase their employability, increase and / or change job-related skills and competencies, and life-enhancing activities (Chapman and Aspin, 1997: 52-53). Well-designed active labor market policies, including vocational training and lifelong learning programs, can reduce skills mismatches, but will not be sufficient to significantly increase employment unless supported by the labor market and macroeconomic policies (Gbohoui, 2019: 4).

The results obtained from this study can be explained by the mismatch of qualifications and skills between demand and supply of labor in the labor market, the inability to create qualified jobs, and the incompatibility between education policies and labor market policies. As a result of the global economic crises, disinformation in labor market opportunities caused young people to stay in education for a longer time and start working after compulsory education, and high youth unemployment rates occurred. At this point, LLL policies emerge as a strategic tool developed to increase employability and solve the youth unemployment problem. However, instead of questioning the dynamics that cause increase youth unemployment, which is a structural economic problem, LLL policies focusing on educating young people and unemployed young people into education and training have turned youth unemployment into an individual problem with an educational nature. For this reason, determining target groups (such as NEET, early school leaving, social exclusion) comes to the fore

in the creation of lifelong learning policies. Assuming that continuing education of young people will lead to a decrease in youth unemployment can complicate the problem, especially in countries with high unemployment levels (Valiente, Capsada-Munsech, and Otero, 2020: 11-16).

It is concluded that the effect of the increase in unemployment benefits on unemployment is generally uncertain in the literature. However, efficient unemployment insurance/benefit practices aim to encourage the unemployed to seek suitable jobs and reduce unemployment periods. Le Barbanchon (2013) points out that unemployment benefits contribute greatly to low unemployment rates, but the skill/qualification mismatch.

Mortensen (1977) states that generous unemployment benefits can reduce work incentives and create long-term benefit dependency. Krueger and Meyer (2002) find that a 10% increase in unemployment benefits increased the average duration of unemployment by around 5%. For example, Luxembourg net replacement rate for a married couple with 2 children who previously earned 67% of the average wage is over 100%, is the highest among OECD countries. It is stated that such a high rate reduces the incentive to seek a job in case of unemployment and creates unemployment traps, especially for low-skilled low-wage workers (Gbohoui, 2019: 18). Eugster (2015) has obtained the result that the net replacement rate has no effect on employment opportunity or earnings.

Unemployment insurance / benefits are practices that encourage the unemployed to seek suitable jobs and reduce unemployment. Theoretically, generous unemployment benefits may lead to reduced employment efforts of individuals, slowing return to employment, and improved employment quality. In the literature, different results were obtained in the studies about the effect of the level of unemployment benefits on the duration of unemployment. For example, Lalive et al. (2006) and Meyer and Mok (2007) have found that the increase in unemployment benefits increases the duration of unemployment. Generally, the unemployed and long-term unemployed who are not entitled to benefit from unemployment insurance are provided with social aid income by mean-tested. If the amount of this income obtained is higher than the income to be obtained in case of employment, high rates of inactivity trap will occur. In this case, it will cause a decrease in people's interest in the labor market and an increase in the risk of structural unemployment (Stovicek and Turrini, 2012: 8). Also, a generous payment scheme can improve

the quality of employment in terms of rejoining the workforce because it encourages individuals to accept stable and well-paid jobs. This means that individuals can refuse when faced with a low-wage job offer in the hope of obtaining a better opportunity.

## **CONCLUSION AND POLICY RECOMMENDATIONS**

Labor markets are becoming more dynamic and fluid due to processes such as globalization and flexibility, and different forms of security created by each country with their own communities have faced more and more difficulties with the increase in the number of employees. With the concept of flexicurity, which has come to the fore in recent years, to eliminate this problem, at least by providing income security, it reduces the risks of those working in flexible employment forms and unemployed individuals. Successful efforts are underway to compensate through redistribution of income.

On the other hand, the concept of flexicurity has several shortcomings, such as the high burden on public finances and the fact that it is an expensive labor market policy. In addition to this, the approaches of countries regarding the problems that arise in the labor market structure and their ability to produce solutions differ considerably from each other.

Every country that implements applications for flexicurity policies should make arrangements for flexible employment forms, taking into account their own labor market dynamics. While high employment rates are among the main factors that increase the amount of GDP per capita, the increase in expenditures made within the scope of lifelong learning is one of the main factors supporting the increase in employment rates and the decrease in unemployment rates. Employment rates are relatively higher in countries where the ratio of GDP allocated to active employment policies is above the OECD average. Countries that have reached a high level of welfare protect individuals under the roof of a strong social security system.



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**APPENDIX****Arellano–Bond Estimation Results**

<b>VARIABLES</b>	<b>UR</b>	<b>LUR</b>	<b>YUR</b>	<b>ER</b>
EPRC	-0.014 <sup>*</sup> (0.006)	-0.022 (0.031)	-0.0110 (0.022)	-0.0128 <sup>*</sup> (0.006)
EPT	-0.002 (0.005)	-0.009 <sup>*</sup> (0.031)	-0.012 <sup>*</sup> (0.010)	0.004 <sup>*</sup> (0.002)
EA1	0.082 <sup>***</sup> (0.043)	0.315 <sup>**</sup> (0.200)	0.840 <sup>**</sup> (0.128)	-0.523 <sup>***</sup> (0.049)
ALMP	0.222 (0.620)	0.210 (3.105)	-2.120 (2.412)	-0.142 (0.352)
NNR	-0.024 <sup>*</sup> (0.024)	-0.002 (0.102)	-0.028 (0.089)	0.020 <sup>*</sup> (0.003)
ITR	0.009 (0.012)	0.014 (0.072)	-0.009 (0.060)	-0.011 (0.014)
GR	-0.102 (0.016)	0.910 <sup>***</sup> (0.088)	0.011 <sup>*</sup> (0.027)	-0.069 <sup>**</sup> (0.018)
FDI	-0.012 (0.006)	0.004 (0.021)	-0.002 (0.023)	0.001 (0.006)
INF	-0.008 <sup>**</sup> (0.044)	-0.132 <sup>**</sup> (0.221)	-0.036 <sup>*</sup> (0.182)	0.045 <sup>*</sup> (0.026)
POP	-0.126 <sup>**</sup> (0.218)	0.184 (0.901)	-0.419 <sup>**</sup> (0.644)	0.160 (0.152)
UD	0.023 <sup>**</sup> (0.052)	0.100 (0.197)	0.078 (0.132)	-0.040 <sup>**</sup> (0.032)
TW	0.104 (0.08)	0.822 <sup>*</sup> (0.301)	0.104 (0.229)	-0.029 (0.062)
AW	-0.014 <sup>*</sup> (0.021)	-0.241 <sup>***</sup> (0.105)	-0.037 <sup>*</sup> (0.076)	0.005 <sup>*</sup> (0.011)
LTIR	0.109 (0.072)	0.031 (0.350)	0.356 <sup>**</sup> (0.128)	-0.196 <sup>*</sup> (0.054)
WH	-0.003 (0.026)	0.042 (0.106)	0.008 (0.062)	-0.001 (0.002)
L.UR	0.532 <sup>***</sup> (0.014)			
L.LUR		0.465 <sup>***</sup> (0.033)		
L.YUR			0.623 <sup>***</sup> (0.074)	
L.ER				0.878 <sup>***</sup> (0.046)
Constant	-0.222 (0.113)	4.245 <sup>***</sup> (1.187)	-0.228 (0.745)	0.101 (0.118)
sargan	108.5	102.3	96.68	56.52
chi2	328.4	201.8	205.4	67.55
sig2	0.000	0.000	0.000	0.000

Arellano – Bover Estimation Results

VARIABLES	UR	LUR	YUR	ER
EPRC	-0.001 (0.004)	-0.035 (0.012)	-0.002 (0.024)	-0.026*** (0.003)
EPT	-0.005 (0.003)	-0.071** (0.013)	-0.014* (0.011)	0.014*** (0.004)
EA	0.115*** (0.021)	0.423*** (0.128)	0.861*** (0.112)	-0.634*** (0.026)
ALMP	1.642** (0.630)	3.785 (3.385)	-1.812 (2.326)	-1.377* (0.532)
NNR	-0.011 (0.027)	0.0308 (0.139)	-0.176* (0.091)	0.026** (0.022)
ITR	0.008 (0.018)	0.064 (0.105)	-0.024 (0.041)	-0.023 (0.012)
GR	-0.174*** (0.024)	1.076*** (0.116)	0.378* (0.089)	-0.069*** (0.001)
FDI	-0.009 (0.034)	0.044 (0.032)	-0.003 (0.022)	0.005 (0.003)
INF	-0.048** (0.004)	-0.044** (0.126)	-0.071*** (0.145)	0.048* (0.093)
POP	-0.065** (0.102)	-1.004** (1.113)	-1.195** (0.745)	0.011 (0.148)
UD	0.052** (0.035)	0.074* (0.158)	0.077** (0.087)	-0.262*** (0.089)
TW	0.065 (0.049)	0.545 (0.278)	0.004 (0.132)	-0.032 (0.048)
AW	-0.004** (0.014)	-0.348** (0.156)	-0.081* (0.014)	0.014* (0.005)
LTIR	0.148 (0.002)	0.312 (0.118)	0.237 (0.362)	-0.132*** (0.033)
WH	-0.018 (0.043)	0.106 (0.107)	0.069 (0.080)	-0.006 (0.041)
LUR	0.621*** (0.034)			
L.LUR		0.732*** (0.020)		
L.YUR			0.755*** (0.021)	
L.ER				0.921** (0.052)
Constant	0.008 (0.081)	0.341 (0.619)	0.028 (0.274)	0.015 (0.081)
Sargan	126.5	92.46	84.98	80.12
chi2	2498	532.8	999	1684
sig2	0.000	0.000	0.000	0.000



# The Factors Causing Consumer Behavior: Asymmetric Causality And Cluster Analysis For EU Countries Through Consumer Confidence Index

Özgür ENGELOĞLU<sup>1</sup> , Funda YURDAKUL<sup>2</sup>

## ABSTRACT

The main purpose of this study is to identify the variables that cause consumer behavior in 27 European Union (EU) countries and to analyze which countries have consumers with similar behavior patterns. The dataset covers the period from January 2012 to December 2019. First, we examined the causal relationship between the consumer confidence index and the variables believed to cause it. For this purpose, we used asymmetric causality tests, which consider the effect of asymmetric information by assuming that the response of units to positive and negative shocks may differ. In this way, asymmetric tests can reveal confidential information that may not be detected through symmetric tests. Second, we applied cluster analysis to the outputs of the asymmetric causality tests. We found that stock market indices are the primary indicator, causing the consumer confidence index. Also, the unemployment rate, consumer price index, and election periods also cause the consumer confidence index in various countries. Because of the cluster analysis, we identified the existence of five different country groups, some of which included countries with similar geographical conditions and cultures.

**Keywords:** Consumer Confidence Index, Economic Indicators, Asymmetrical Causality Analysis, Cluster Analysis, EU Countries.

**JEL Classification Codes:** D12, C32, C38, O52

**Referencing Style:** APA 7

## INTRODUCTION

Consumer behavior is of vital importance to decision-makers and those involved in economic forecasting. It is influenced by various factors. Some of these factors are direct, such as income, prices, and the political environment, while others are based on expectations about the future and the level of confidence among economic agents. Positive developments in expectations and confidence positively affect consumer behavior. Although it is not possible to fully measure consumer behavior, it is possible to assess the level of consumer confidence through consumer confidence indices (Ozsagir, 2017). An increase in consumer confidence leads to greater spending and a higher tendency to borrow, whereas pessimism causes consumers to reduce their expenditure and reassess their financial situation (Arisoy, 2012).

It is possible to infer whether a country's economy is performing well by analyzing the consumer confidence index. Consumer confidence indices largely indicate the state of national economies, providing a regular

assessment of consumer satisfaction with the economy. Consequently, the index has become a crucial indicator for many stakeholders, especially policymakers and politicians. An important question is what factors cause the consumer confidence index, given its significance. Identifying the key developments that shape households' perceptions of confidence will also offer valuable insights into how their confidence can be enhanced. Formulating economic policy based on this information will be a step toward increasing consumer confidence, which, in turn, will positively impact the economy.

Many factors cause the consumer confidence index. These factors may relate to the effects observable through macroeconomic indicators, as well as the political and sociological conditions experienced in the relevant country. Therefore, examining the factors that cause the consumer confidence index would help to understand how households' behavior is shaped, what issues they care about, and how their hopes and fears are determined.

This study is based on the PhD dissertation titled as "AB Ülkeleri ve Türkiye'de Tüketici ve Üretici Güven Endeksinin Belirleyicileri: Asimetrik Nedensellik Testi ve Kümeleme Analizi / Determinants of Consumer and Producer Confidence Index at EU Countries and Turkey: Asymmetric Causality Test and Cluster Analysis" written by Özgür Engeloğlu and supervised by Funda Yurdakul in Ankara Hacı Bayram Veli University Institute of Social Sciences

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The main purpose of this study is to determine the factors causing consumer behavior across all EU countries and to analyze which countries have consumers with similar behavior patterns. We used the consumer confidence index as an indicator to represent consumer behavior. Hatemi-J's (2012) asymmetric causality test was employed to analyze the causal relationship between the consumer confidence index and various variables (inflation, unemployment, exchange rate, growth, stock market index, elections, and terrorist attacks). Asymmetric causality tests consider the effect of asymmetric information, assuming that the response of units to positive and negative shocks may differ. In this way, causality can be detected between different components of some series that might not exhibit a causal relationship under symmetric conditions. Therefore, some information that cannot be detected through symmetric tests may be uncovered by asymmetric tests. Additionally, we performed cluster analysis using Ward's linkage method based on the findings obtained through the asymmetric analysis. This approach allowed us to determine how many classes EU countries are divided into according to consumer behavior and to identify which countries belong to each cluster. Our main motivation in this study is to observe how countries differ according to consumer behavior. We believe that this study will contribute to the literature in this respect.

The study covers 27 EU member countries as of 2022. The dataset spans the period from January 2012 to December 2019. We excluded the post-COVID-19 period, which significantly impacted countries' economies and consumer behavior, because our focus is on examining the effects of persistent and ongoing factors on consumer behavior, rather than new external shocks.

The following sections of the study include literature review, theoretical background, data set and methodology, empirical results, and evaluations.

## LITERATURE

In the literature, Beltran & Duree (2003) examined the effect of stock market fluctuations on consumer confidence in the United States and Belgium, while Sartell (2014) also analysed the effect of the average consumer's view of the national debt with some macro variables on consumer confidence for the United States. Paradiso et al. (2014) for Italy, Lahiri and Zhao (2016) for the United States analyzed the major determinants of the consumer confidence index and their role in business cycles. Tobbäck et al. (2018), Klopocka (2017), Karasoy Can & Yüncüler (2017), and Bildirici & Badur (2019) analyzed the consumer confidence index together with economic policy uncertainty index for Belgium, household savings and borrowing for Poland,

private consumption growth rate for Turkey and oil and gasoline prices for Turkey and the United States, respectively. In the literature, not only the relationship of the consumer confidence index with economic indicators is examined, but also its relationship with political and sociological indicators. For example, the announcement of elections, election results, and government changes for Belgium in Vuchelen (1995) and economic news published in newspapers for the Netherlands by Alsem et al. (2008) are analyzed with the consumer confidence index. Also, Ramalho et al. (2011) evaluated the Eurozone entry and election conditions for Portugal, Neisingh & Stokman (2013) estimated the impact of financial stability, price stability, and political stability for the Netherlands. Apart from these, Svensson et al. (2017) analyzed economic news and consumer confidence in Denmark.

In the studies for country groups, Celik et al. (2010) analyzed the relationship between consumer confidence and growth for six developing country economies, Kim (2016) analyzed whether consumer confidence is a leading, incidental, or lagging measure of economic activity for ten OECD member countries. In addition, Kim (2016) discussed in his study whether the relationship between the confidence indicator and economic activities differs between countries. Finally, Vanlaer et al. (2020) examined the relationship between household saving behavior and the consumer confidence index in eighteen European Union countries.

In previous studies, researchers have preferred many methods to analyze the relationship between consumer confidence index and various indicators. Beltran & Duree (2003) used ARDL and the Error Correction Model (ECM), Paradiso et al. (2014) preferred the Asymmetric Error Correction model with ARDL, and Neisingh & Stokman (2013) applied only the Error Correction model. Neisingh & Stokman (2013) and Kim (2016) used the Granger causality test, and Bildirici & Badur (2019) used the Markov Switching-Granger causality test to examine the short-term relationship. Alsem et al. (2008) utilized the Johansen cointegration test to examine the long-term relationship. Vuchelen (1995), Neisingh & Stokman (2013), Sartell (2014), Lahiri & Zhao (2016), Svensson et al. (2017), Klopocka (2017) and Karasoy & Yüncüler (2017) used the Ordinary Least Squares (OLS) method. When viewed the other methods for benefited; Alsem et al. (2008), Paradiso et al. (2014), and Vanlaer et al. (2020) used VAR models, TAR models, and panel data analysis, respectively. Last, Tobbäck et al. (2018) used data mining analysis.

Table 1 provides a summary of the studies analyzing the relationship between consumer confidence index and other variables in the literature.



**Table 1.** Summary of literature

Author(s)	Country(s) analyzed	Topics analyzed with the consumer confidence index	Method	Conclusions
Vuchelen (1995)	Belgium	Election results and changes in government	OLS	Unexpected elections and new governments affect consumer confidence, while ideology has no effect on consumer confidence.
Beltran and Duree (2003)	United States and Belgium	Stock market fluctuations	ARDL and ECM	Stock market fluctuations have an explanatory power in the development of consumer confidence in the United States, especially since the early nineties.
Alsem et al. (2008)	Netherlands	Economic news in newspapers	Johansen Cointegration and VAR	Consumer confidence is influenced not only by economic fundamentals but also by the way these fundamentals are communicated. However, this effect is short-lived.
Çelik et al. (2010)	6 developing countries	Industrial production and stock market index	Panel Cointegration	In emerging economies, there is a long-run relationship between consumer confidence and industrial production and stock market index. Moreover, consumers in emerging and developed markets exhibit similar behavior.
Ramalho et al. (2011)	Portugal	Unemployment, inflation, interest rates, entry into the euro area and election conditions	OLS	In Portugal, consumer confidence is mainly influenced by economic performance, entry into the euro area and electoral conditions.
Neisingh and Stokman (2013)	Netherlands	Price stability and political stability	ECM and Granger Causality	The decline in confidence during the Great Recession was exacerbated by the decline in public confidence in the financial sector and in Europe. Besides financial stability, price stability and political stability are also crucial for consumer confidence.
Sartell (2014)	United States	National debt, budget deficit, unemployment, inflation and stock market index	OLS	Unemployment is the most important variable to explaining consumer confidence. This is followed by national debt level, inflation rate, federal budget deficit and finally stock market performance.
Paradiso et al. (2014)	Italy	Macro indicators	ARDL, Asymmetric ECM and TAR	Good impressions on consumers are restored in 6 months and bad impressions in 3 months.
Kim (2016)	10 OECD member countries	Economic activities	Granger Causality	Consumer confidence is driven by both economic factors such as wealth and interest rates and non-economic factors such as emotional state. The causal relationship between consumer confidence and economic activity varies across countries.
Lahiri and Zhao (2016)	United States	Business cycles	OLS	Consumer confidence is significantly affected by variation in the assimilation of news from local network sources. Different interpretations of current macroeconomic conditions are more common during periods of low confidence before the peaks of business cycles.
Tobback et al. (2018)	Belgium	Economic policy uncertainty index	Data Mining	Changes in the level of policy uncertainty, especially during turbulent periods of high uncertainty and risk, predict changes in consumer confidence.
Svensson et al. (2017)	Denmark	Economic news	OLS	Exposure to ambiguous news influences changes in consumer confidence through economic uncertainty.
Karasoy Can and Yüncüler (2017)	Turkey	Private consumption growth rate	OLS	Lagged values of consumer confidence have explanatory power on consumption growth.
Klopocka (2017)	Poland	Household savings and borrowing	OLS	The consumer confidence index contains information on households' future savings and borrowing rates.
Bildirici and Badur (2019)	Turkey and the United States	Oil and petrol prices	Markov Switching - Granger Causality	While there is a bidirectional causality between oil price and confidence index in all regimes in the United States, there is a unidirectional relationship from oil price to confidence index in Turkey. In both countries, stock returns of energy companies interact with changes in the confidence index and oil prices.
Vanlaer et al. (2020)	18 EU countries	Household saving behaviour and various macro indicators	Panel Data Analysis	Households' confidence in their own financial situation has a much larger impact on household savings than confidence in the general economic situation. Moreover, the effect of consumer confidence on household savings has increased after the crisis

In the literature on indicators related to the consumer confidence index, time series analyses for individual countries or panel data analyses for multiple countries are generally used. In this study, we conducted time series analyses separately for 27 EU Member States. This approach allowed us to determine whether the variables considered for each country are causal factors of consumer confidence. Moreover, unlike other studies in the literature, we employed the Hatemi-J (2012) asymmetric causality test, which accounts for the effect of asymmetric information and separates the series into positive and negative shocks. Apart from Kim (2016), we did not find any studies that address cross-country differentiation according to variables related to the consumer confidence index. In this study, we grouped the countries using cluster analysis, which enabled us to identify which countries' consumers exhibit similar behavior and which differ. We believe that this study will contribute to the literature through the distinctions outlined above.

## THEORETICAL BACKGROUND

### Consumer Behaviors

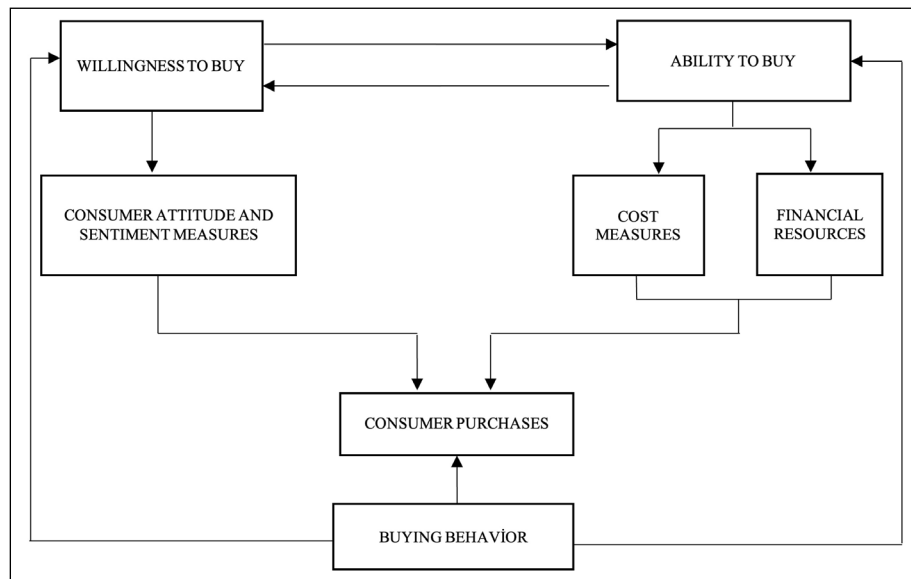
Economists were the first group to propose a specific theory of consumer behavior. This theory is based on the premise that purchasing behaviors are primarily the result of rational and conscious economic evaluations. Consumers seek to spend their income on goods that will provide the most utility, consistent with their tastes and relative prices. This perspective has its origins in the views of Adam Smith and Jeremy Bentham. Smith introduced the concept of economic growth with the principle that humans act according to their interests in all their actions, while Bentham expanded on this idea, arguing that people carefully calculate and weigh the pleasures and pains they anticipate from every planned action. However, Bentham's philosophical analysis of consumer behavior was not applied until the late 19th century. Later, the marginal utility theory was independently and almost simultaneously formulated by Jevons and Marshall in England, Menger in Austria, and Walras in Switzerland (Kotler, 1965).

Alfred Marshall is regarded as the greatest unifier of the classical and neoclassical traditions in economics, and his synthesis of supply and demand analysis is the main foundation of modern microeconomic thought worldwide. Although Marshall aimed for realism in his theory, he begins his method by simplifying assumptions, and analyzing the effect of a change in a single variable while holding all other variables constant. His model

proposes behavioral hypotheses such as: (i) the lower the price of the product, the higher the sales, (ii) the lower the prices of substitute products, the lower the sales of the relevant product, (iii) the higher the real income, the higher the sales of the relevant product (unless it is an inferior good), and (iv) the higher the promotional expenses, the higher the sales of the relevant product (Kotler, 1965). In summary, according to Marshall's economic model explaining consumer behavior, consumers tend to purchase the product that provides them with the greatest benefit, based solely on economic calculations. This suggests that the economic analyses conducted by the consumer have a significant impact on their behavior (Papatya, 2005). In contrast, Freud's psychoanalytic model posits that psychological effects are the basis of consumer buying behavior and that the factors leading consumers to make different choices stem from psychological dissatisfaction (Kaynas, 2012). Freudian psychology has provided the tools for an in-depth study of consumer behavior, enabling researchers to uncover the reasons and symbols behind the buying process (Zaichkowsky, 1991). Other dimensions adapted from human behavior to consumer behavior are attributed to Pavlov and Veblen. Pavlov's theory of "conditioned learning," which includes the stages of stimulus, demand, response, and reinforcement, is used in advertising to understand consumer perceptions. Veblen's socio-psychological model argues that individuals shape their desires and behaviors according to the social groups to which they belong or aspire to belong.

In addition to these pioneering studies that infer consumer behavior from basic human behavior, different theories have been proposed to explain consumer behavior directly. One such theory was developed in 1966 by Francesco Nicosia, who specialized in consumer behavior. In his model, consumer behavior is explained through the relationship between the firm and the potential consumer. The model suggests that messages from the firm primarily influence the consumer's inclination toward the product or service, leading the consumer to adopt an attitude toward the product. If this process, which prompts the consumer to search for or evaluate the product, satisfies the consumer, the product is purchased. This process consists of four areas: company and consumer characteristics, evaluating the product and considering alternative options, purchasing action, and feedback (Jisana, 2014).

Based on the 1968 study by Engel, Kollat, and Blackwell, the consumer decision-making model suggests that the consumer decision-making process consists of



**Figure 1.** Operationalization of Katona's framework (Kumar et al., 1995)

environmental influences (culture, social class, personal influences), individual differences (consumer resources, motivation, and involvement, knowledge, personal values), and psychological processes (information processing, learning, attitude, and behavior) (Rodrigues, 2006). The Howard-Sheth (1969) theory of buyer behavior proposed that various social, psychological, and marketing elements influencing consumer choices integrate into a coherent information-processing process. The model aims to explain consumer behavior in terms of cognitive functioning, while also providing an empirically testable description of these behaviors and their consequences. The theory includes four groups of variables: inputs, perceptual structures, learning structures, and outputs (Foxall, 1990). Unlike the Howard-Sheth and Engel-Blackwell models, Bettman's (1970) information processing approach does not involve constructing a comprehensive model of consumer behavior but rather focuses on how consumers acquire and use information. This approach is based on three basic elements: a memory consisting of a group of signs, some simple processes that work with these signs, and a network representing the rules that link the signs together. Accordingly, the decision process involves the sequential use of this group of signs, which are categorized into three basic groups: selection-oriented features, environmental features, and cognitive variables (Albayrak & Aksoy, 2008).

The importance of consumer behavior has led to the development of many theoretical approaches aiming to explain it. However, another important aspect is measuring consumer satisfaction with the overall state of the economy.

According to the psychological economics theory put forward by George Katona, the founder and one of the most important advocates of behavioral economics, "ability to buy," an objective factor, and "willingness to buy," a subjective factor should be considered for understanding consumer behavior. According to Katona, the decisions that determine the purchasing behavior of consumers depend on the "ability to buy," which is determined according to cost criteria and financial resources, and the "willingness to buy," which is determined according to the psychological state of the consumer during the decision-making period. Emotions and thoughts shape consumers' psychological state, which is critical for understanding consumer behavior (Kumar et al., 1995).

To better understand consumer behavior, it is essential to recognize that the willingness to buy is a subjective element influenced by factors such as feelings and thoughts, whereas the ability to buy is determined by more objective factors like cost criteria and financial resources. As illustrated in Figure 1, these subjective and objective factors play crucial roles in the purchase decision-making process. To effectively analyze consumer behavior, confidence indices can be utilized to provide valuable information on the consumer's propensity to buy, which is a crucial but often unobservable aspect of the purchasing process.

### **Consumer Confidence Index**

The chief problem in the domain of behavioral economics is the elucidation of the "willingness to buy" element, a subjective and hard-to-observe factor. To quantify this element, in 1952, under Katona's

guidance, the University of Michigan Survey Research Center conducted research on consumer behavior and expectations. By using findings obtained from consumers via questionnaires, the groundwork for the discipline known as behavioral or psychological economics was established. These investigations demonstrate that modifications in household saving and spending practices are influenced by the assumption that changes in economic factors, such as incomes, taxes, and prices, as well as future incomes and employment security, may also depend on the household's perception of the economy, that is, consumer behavior (Zagórski & McDonnell, 1995).

Katona (1968) rejected the notion that consumer behavior is solely based on rational decision-making, with the theory of consumer behavior that he proposed. According to Katona, while realistic decisions made after carefully calculated alternatives are the exception rather than the rule, this does not imply that consumer behavior is irrational. Katona's theory posits that changes in tastes should not be viewed as external factors and that a dynamic theory aimed at explaining changes in behavior should include changes in tastes, preferences, and attitudes. Additionally, the theory argues that rather than assuming that consumers will maximize their future satisfaction or constantly do what they believe is best for them in the present, the key consideration should be what has changed from the past to the present when determining the best options. Finally, Katona's proposition that permanent income is the primary determinant of households' consumer spending rejects the determinant role of current income. This proposition is particularly applicable in societies where people's status is determined by birth and class, and where people believe they have the power to create change in their environment. However, in a dynamic society where significant changes can occur frequently and individuals have more control over their lives, Katona's approach may not be entirely suitable (Katona, 1968).

The question of whether spending reflects positive emotions in consumers or whether increased spending generates positive emotions in consumers is critical to understanding and predicting consumer decision-making dynamics (Kumar et al., 1995). Measuring consumer confidence can help to understand this, as well as give important information about the current state and future direction of the economy. Hence, policymakers and economists closely monitor consumer confidence, which they see as a useful economic forecasting tool, and both economic analysts and the news media prominently

report the increases and decreases in confidence (Merkle et al., 2004). On the one hand, developments related to economic confidence take place in the media, on the other hand, economic developments that people follow from the media and daily life also affect economic confidence.

Natural and reassuring economic evaluations are based on economic realities, and there are many arguments to support this claim. Generally, people are more optimistic about the current period and the future when the present situation looks good, and vice versa. For example, if inflation is climbing or unemployment is reaching double digits, views on the economy will become more pessimistic. However, when the leading economic indicators give positive signals for the future, households' expectations for the economic future will improve. Again, an increase in interest rates will raise concerns about the current situation of the economy and doubts about the future. Many variations like this can be mentioned, but the result will remain the same: economic conditions are the basis for economic realities (De Boef & Kellstedt, 2004).

The main question of our study is based on this idea. Namely, which economic indicators cause the consumer confidence index, which is an important measurement that shows the situation of the economy and reflects the consumer's perception of confidence?

## DATA AND METHOD

### Data

In the study, we used the Consumer Confidence Indicator (CCI) as a confidence index variable. CCI shows the results of the surveys conducted with the cooperation of the European Statistical Office (Eurostat) and the statistical institutions of the relevant countries. CCI data was generated with the difference between positive (+) and negative (-) answers given to the questions in this survey as a balanced index. If the index result is positive (+), it is possible to say that the consumer's perspective on the economy in the relevant country is positive. If the result is negative, the opposite can be argued.

In this study, we have analyzed seven different indicators that could be the cause of consumer confidence. In selecting these variables, we have given priority to the most basic macroeconomic indicators of national economies. These basic macroeconomic indicators are undoubtedly the variables whose impact is most readily felt by consumers in their daily lives and whose changes are most easily tracked through the media. Therefore, we

believe that there is a significant relationship between changes in these variables and changes in consumer perceptions of confidence.

The first of these basic indicators is inflation, which is also used by Ramalho et al. (2011), Neisingh and Stokman (2013), Sartell (2014), and Kim (2016). Unemployment, our second preferred macroeconomic indicator, is also used to explain the consumer confidence index in Sartell (2014), Kim (2016), Vanlaer et al. (2020). We believe that economic growth is an important variable in driving consumer confidence. Therefore, we used the industrial production index variable to represent growth in this study as in Çelik et al. (2010), Ramalho et al. (2011), and Paradiso et al. (2014). The last macroeconomic indicator that we think may cause consumer confidence is the exchange rate variable used in Ramalho et al. (2011) and Oduh et al. (2012).

Again, many studies in the literature have used the stock market (Beltran and Duree, 2003; Çelik et al., 2010; Sartell, 2014; Kim, 2016) to examine the relationship between the financial market and the consumer confidence index. For these reasons, we have included the stock market index variable in the study. We believe that developments in the financial market are an important reason for consumers' perceptions of confidence, as many consumers are actually involved in it or are directly affected by it. One of the non-economic indicators we use in the study is the election period variable, which is also preferred in the literature (Vuchelen, 1995; Ramalho et al., 2011). We therefore believe that consumer-oriented government policies, which are likely to be implemented in the periods leading up to the elections, may be the reason for the changes in consumer confidence. The last non-economic variable we include in the study is the terrorist attacks variable. We believe that the security concerns experienced by households during periods of intense terrorist attacks in EU countries also cause changes in consumer confidence. To use this variable, we are inspired by the work of Graeff (2002) and Garner (2004), who examine the impact of the 11 September attacks in the United States on consumer confidence, and Brodeur (2017), who looks at a more recent period.

We used the rate of the Harmonized Index of Consumer Price (HICP) whose base period is 2015=100, for the inflation indicator. For the unemployment indicator, we used the unemployment rate according to the ILO definition, which is formed by dividing the number of unemployed in a certain period by the total labor force in the same period. For the exchange rate variable, we used the dollar value of the currencies used in the countries.

Since 19 of the 27 countries examined in the study use the Euro currency, the USD/EUR rate was used as the exchange rate variable for these countries.

Maybe the most popular macroeconomic indicator calculated for countries is the Gross Domestic Product (GDP), which also shows economic growth. But this variable is calculated for quarterly data. In the literature, usually Industrial Production Index (IPI) variable is usually used as a proxy variable instead of GDP, for monthly data. Therefore, we used the Volume Index of Production in Industry value (2015=100) as a variable. Another variable that we included in the study is the Stock Exchange Index. These indices are calculated with the prices of stocks and the number of stocks in circulation and reflect the changes in the stock market of the relevant country. In the study, we used the leading index of each country's stock market. The base periods of the indices in each country differ from each other and have been determined by the stock exchange institutions of the relevant countries.

**Table 2.** Data and sources

Data	Code	UNIT	Sources
Consumer Confidence Indicator	<i>CONF</i>	Balance (-100, +100, seasonally adjusted)	Statistical office of the European Union (EUROSTAT) <a href="https://ec.europa.eu/eurostat">https://ec.europa.eu/eurostat</a>
Harmonized Index of Consumer Price	<i>CPI</i>	Index (2015=100)	Statistical office of the European Union (EUROSTAT) <a href="https://ec.europa.eu/eurostat">https://ec.europa.eu/eurostat</a>
Unemployment Rate	<i>UN-EMP</i>	% of Labor Force (seasonally adjusted)	Statistical office of the European Union (EUROSTAT) <a href="https://ec.europa.eu/eurostat">https://ec.europa.eu/eurostat</a>
Exchange Rate	<i>EXC</i>	Per USD (monthly average)	OECD.Stat (Eurozone, CZE, DNK, HUN, POL, SWE) <a href="https://stats.oecd.org/X-RATES™">https://stats.oecd.org/X-RATES™</a> (BGR, ROU and HRV), <a href="https://www.x-rates.com/">https://www.x-rates.com/</a> Exchange Rates UK (LVA, LTU) <a href="https://www.exchangerates.org.uk/">https://www.exchangerates.org.uk/</a>
Industrial Production Index	<i>IPI</i>	Index (2015=100, seasonally and calendar adjusted)	Statistical office of the European Union (EUROSTAT) <a href="https://ec.europa.eu/eurostat">https://ec.europa.eu/eurostat</a>
Stock Exchange Index	<i>STOCK</i>	Index (determined by relevant countries stock market)	Nasdaq Baltic (EST, LVA, LTU), <a href="https://nasdaqbaltic.com/">https://nasdaqbaltic.com/</a> Koyfin (LUX), <a href="https://app.koyfin.com/">https://app.koyfin.com/</a> Investing.com (for others) <a href="https://www.investing.com/">https://www.investing.com/</a>
Election Period	<i>ELECT</i>	Dummy variable (0 to 10)	Generated by authors according the election dates.
Death as a Result of Terrorist Attacks	<i>TERR</i>	Number (total)	National Consortium for the Study of Terrorism and Responses to Terrorism (START), the Global Terrorism Database™ <a href="https://www.start.umd.edu/gtd/">https://www.start.umd.edu/gtd/</a>



The study at hand delves into the subject of political election periods and their impact on the consumer confidence index. In choosing the independent variable, we opted for a method suggested by De Boef and Kellsstedt (2004), in which the value increases from 1 to 10 month by month during the election periods and then decreases to 1 during the post-election period due to the honeymoon effect. This approach is deemed suitable for the asymmetric causality method employed in the study, which takes into account cumulative increases and decreases. Moreover, if an early election is called, we assign the value to the election variable from the date of the early election announcement. The specific election periods examined for each country are detailed in Appendix A.

Another important indicator that is thought to influence consumers is terrorist attacks. In this context, we used a common observation for all countries. This fixed variable shows the sum of the civilians who died as a result of terrorist attacks in all EU countries in the month.

We summarize all datasets and sources in Table 2<sup>1</sup>.

In summary, we have eight variables. One of them, *CONF*, is our fixed dependent variable. Also, the other seven variables are our independent variables and we analyzed all of them with *CONF* variables as a binary, separately.

### Method

First, we investigated which variables influence consumer behavior in which countries. For this, we used the asymmetric causality analysis, which was developed by Hatemi-J (2012). Second, we classified the analyzed countries according to their similarities, using with the findings obtained in the first stage. We used hierarchical clustering methods for classification.

### Asymmetric Causality

It is important to test whether one variable is the leading determinant of another variable. This situation is causality in the meaning of Granger (1969). There are many studies about Granger causality, theoretical and empirical. Frequently, the VAR models are applied to find a relationship of causality. Most of the causality studies in the literature assumed that they have the same effect,

both positive and negative shocks. However, this is a very limiting assumption because, in various circumstances, a potentially asymmetrical nature of causal effects may exist. The presence of an asymmetric information concept may be another cause of a potential causality relationship. According to the pioneering studies by Akerlof (1970) and following works by Spence (1973) and Stiglitz (1974), some markets have asymmetric information. Based on this, it can be asserted that it is crucial to use an asymmetrical structure for causality tests (Hatemi-J, 2012).

It is a dominant view in the literature that consumers have asymmetric information. In this study, in which we want to identify the determinants of consumer behavior, we preferred this method because it allows us to include asymmetric information in the analysis.

The idea of transforming data into cumulative positive and negative components is based on Granger & Yoon (2002). However, Granger & Yoon (2002) used this approach for the cointegration test, which they call hidden cointegration. Asymmetric causality extends this idea toward causality analysis. The asymmetric causality approach is based on the following stages:

$$y_{1t} = y_{1t-1} + \varepsilon_{1t} = y_{10} + \sum_{i=1}^t \varepsilon_{1i} \quad (1)$$

$$y_{2t} = y_{2t-1} + \varepsilon_{2t} = y_{20} + \sum_{i=1}^t \varepsilon_{2i} \quad (2)$$

where  $t=1, 2, \dots, T$  and constant  $y_{10}, y_{20}$  are the initial values.  $\varepsilon_{1i}$  and  $\varepsilon_{2i}$  series are white noise process. Positive and negative shocks are defined as follows, respectively:  $\max(\varepsilon_{1i}, 0)$ ,  $\varepsilon_{2i}^+ = \max(\varepsilon_{2i}, 0)$ ,  $\varepsilon_{1i}^- = \min(\varepsilon_{1i}, 0)$  and  $\varepsilon_{2i}^- = \min(\varepsilon_{2i}, 0)$ . So, it can be represented as  $\varepsilon_{1i} = \varepsilon_{1i}^+ + \varepsilon_{1i}^-$  and  $\varepsilon_{2i} = \varepsilon_{2i}^+ + \varepsilon_{2i}^-$ . Thus:

$$y_{1t} = y_{1t-1} + \varepsilon_{1t} = y_{1,0} + \sum_{i=1}^t \varepsilon_{1i}^+ + \sum_{i=1}^t \varepsilon_{1i}^- \quad (3)$$

$$y_{2t} = y_{2t-1} + \varepsilon_{2t} = y_{2,0} + \sum_{i=1}^t \varepsilon_{2i}^+ + \sum_{i=1}^t \varepsilon_{2i}^- \quad (4)$$

representations can be reached. Finally, the positive and negative shocks for each variable can be shown cumulatively as follows:  $y_{1t}^+ = \sum_{i=1}^t \varepsilon_{1i}^+$ ,  $y_{1t}^- = \sum_{i=1}^t \varepsilon_{1i}^-$ ,  $y_{2t}^+ = \sum_{i=1}^t \varepsilon_{2i}^+$  and  $y_{2t}^- = \sum_{i=1}^t \varepsilon_{2i}^-$ . In the next step, the causal relationship between these components is tested. Considering the causal relationship on positive shocks, causality test can be applied using the VAR (p) model with assuming  $y_t^+ = y_{1t}^+ + y_{2t}^+$  (and assuming  $y_t^- = y_{1t}^- + y_{2t}^-$  for negative shocks):

$$y_t^+ = v + A_1 y_{t-1}^+ + \dots + A_p y_{t-p}^+ + u_t^+ \quad (5)$$

where  $y_t^+$  is a  $2 \times 1$  a vector of variables,  $v$  is a  $2 \times 1$  vector of constant term, and  $u_t^+$  is a  $2 \times 1$  vector of error term.  $A$  is a  $2 \times 2$  parameter vector with  $r$  ( $r = 1, \dots, p$ ) (Hatemi-J, 2012).

<sup>1</sup> The business and consumer survey data consists of opinions that may be influenced by events that occur at the same time each year (e.g. certain public holidays such as Christmas or the receipt of extraordinary wage bills at a certain time of the year) and the responses often show seasonal patterns. For this purpose, seasonal adjustment is used in the data (Eurostat, Business and consumer surveys, [https://ec.europa.eu/eurostat/cache/metadata/en/ei\\_bcs\\_esms.htm](https://ec.europa.eu/eurostat/cache/metadata/en/ei_bcs_esms.htm), Access on 14.09.2023)

Wald statistics are used to test the null hypothesis that there is no Granger causality between the series. For this, the previous VAR model is defined as follows:

$$Y = DZ + \delta \quad (6)$$

where:

$$y := (y_1^+, \dots, y_T^+) [n \times T] \quad (7)$$

$$D := (v, A_1, \dots, A_p)[n \times (1 + np)] \quad (8)$$

$$D := (v, A_1, \dots, A_p)[n \times (1 + np)] \quad (9)$$

$$Z_t := \begin{bmatrix} 1 \\ y_t^+ \\ y_{t-1}^+ \\ \vdots \\ y_{t-p+1}^+ \end{bmatrix} [(1 + np) \times 1] t = 1, \dots, T \quad (10)$$

$$\delta := (u_1^+, \dots, u_T^+) [n \times T] \quad (11)$$

and  $H_0 : C\beta = 0$  hypothesis, which shows that there is no Granger causality, can be tested with Wald statistics:

$$W = (C\beta)' [C((Z'Z)^{-1} \otimes S_u)C']^{-1} (C\beta) \quad (12)$$

in here  $\otimes$  is the Kronecker product, and  $C$  shows the indicator function, which includes restrictions.  $\beta = vec(D)$  and  $vec$  defines the column stacking operator.  $S_u$  shows the variance-covariance matrix calculated for the unrestricted VAR model on  $(\delta_v' \delta_v) / (T - q)$  form, and  $q$  is the number of lags in each VAR equation. In the Granger causality test, if the series are not stationary, the cointegration relationship between them is tested first, and if there is a long-term relationship between the series, a causality analysis based on the error correction model is performed. If there is no long-term relationship, the causality test based on the VAR model is applied by taking the difference of the series up to the integration level. However, taking the difference in the series may cause a loss of information. Toda and Yamamoto (1995) suggested adding lag to the VAR model as much as the maximum degree of integration of the relevant series to solve these problems (Yilanci & Bozoklu, 2014). Hatemi-J (2012)'s asymmetric causality test is based on the Toda & Yamamoto procedure (Çevik et al., 2017).

### Cluster Analysis

Cluster analysis represents a set of methods aimed at classifying the investigated objects into clusters (Dostál & Pokorný, 2009). Cluster analysis provides summarized information with its classification and categorization feature.

There are two types of clustering methods used: hierarchical and non-hierarchical methods. We obtained the data used in cluster analysis through asymmetric causality analysis. Since the obtained data types are "there is causality" or "there is no causality", the dataset is in the form of a binary consisting of "1" and "0". Therefore, we preferred Ward's method for clustering, which has one of the best clustering performances for binary data (Tamasauskas et al., 2012).

Similarity and distance measures in binary data are critical in cluster analysis. The Jaccard distance allows the measurement of asymmetric information on binary variables and the comparison of vector components (Salleh et al., 2012). If the binary variable has the "male" and "female" states, both of which are equally weighted, such as gender, and there is no preference as to which outcome should be coded as 0 and which as 1, such variables are said to be symmetrical. However, if there are situations where the results are not equally important, namely if the presence of one of the binary variables indicates a more important situation, then these variables are asymmetrical. If asymmetrical variables exist, the Jaccard Distance should be used (Kaufman & Rousseeuw, 1990). We used the Jaccard Distance to analyze Ward's linkage techniques because our data type has an asymmetrical structure. The Jaccard Similarity and Jaccard Distance presented in equation 13 and 14, respectively.

$$J(A, B) = \frac{|A \cap B|}{|A \cup B|} = \frac{|A \cap B|}{|A| + |B| - |A \cap B|} \quad (13)$$

$$d_J(A, B) = 1 - J(A, B) = \frac{|A \cup B| - |A \cap B|}{|A \cup B|} \quad (14)$$

In this section, we summarized the datasets and methods which we used and applied on Empirical Results section.

## EMPIRICAL RESULTS

### Results of Asymmetrical Causality Tests

Hatemi-J (2012)'s asymmetric causality test applied is as follows: First, we generated two different same-length series, which represent cumulative positive and cumulative negative shocks using the original series, as Granger and Yoon (2002) suggested. After that, we applied the Hacker and Hatemi-J (2010) symmetrical causality test to variable pairs using these generated variables. This test is applied four each time for each variable pairs. As a result, we obtained four following different asymmetric causality results: The positive component of the X variable and the positive component of the Y variable, the negative component of the X variable

**Table 3.** Asymmetric causality tests results for CPI, UNEMP, EXC → CONF

	CPI				UNEMP				EXC			
	+/+	-/-	+/-	-/+	+/+	-/-	+/-	-/+	+/+	-/-	+/-	-/+
Belgium	1.010	1.777	0.116	0.341	1.324	0.921	0.788	0.148	0.207	0.442	0.085	0.446
Bulgaria	4.986**	0.302	5.906**	0.149	0.967	1.695	5.832*	0.001	2.051	0.278	0.377	0.052
Czechia	2.837*	1.756	3.115*	1.088	16.224***	0.765	3.927**	2.046	0.584	2.022	0.202	5.381**
Denmark	0.461	0.474	0.012	0.525	0.073	1.881	0.157	0.006	0.123	3.942*	2.156	2.658
Germany	0.573	3.503*	0.267	0.517	0.981	0.162	0.014	1.023	0.175	1.085	0.778	0.000
Estonia	0.346	1.302	6.133**	0.731	4.685**	0.608	0.003	0.038	0.920	0.160	2.319	0.075
Ireland	2.157	0.075	0.000	1.803	0.295	0.511	0.605	9.984**	0.405	0.049	0.015	1.523
Greece	1.797	0.623	1.618	0.028	0.331	2.873*	0.064	3.061	11.608**	0.070	0.173	0.891
Spain	0.000	0.043	0.291	0.180	3.962	3.420	2.042	6.656	2.563	0.082	0.028	0.112
France	0.124	0.028	0.010	0.307	2.523	1.828	1.215	0.360	0.007	0.985	1.960	0.251
Croatia	0.138	0.548	2.074	3.263*	4.676**	2.143	1.785	2.131	0.541	0.009	0.360	0.004
Italy	1.363	6.570***	0.618	1.925	1.354	0.002	0.017	5.321**	1.529	0.054	0.581	1.992
Cyprus	0.001	0.584	1.868	0.743	4.642**	0.662	6.698**	4.203*	0.928	0.384	0.393	5.961**
Latvia	4.632**	0.000	0.972	0.002	8.410*	3.764	12.612***	1.629	0.599	1.607	0.003	0.006
Lithuania	0.922	0.594	0.311	0.917	0.188	0.609	0.217	0.509	1.440	0.412	0.053	1.318
Luxembourg	0.012	0.063	2.003	0.693	0.589	0.313	0.100	0.001	3.515	3.671*	0.040	1.449
Hungary	0.624	0.095	0.001	0.600	0.428	1.460	2.586	0.119	0.125	0.015	0.006	0.000
Malta	5.255	0.537	0.778	2.354	1.848	0.009	3.044*	2.080	1.226	3.208*	2.514	0.001
Netherlands	0.000	0.048	0.121	1.220	2.675	0.204	0.004	0.511	0.837	0.067	0.044	0.650
Austria	2.324	0.134	0.695	0.062	0.430	0.041	0.123	0.004	0.131	0.929	0.833	0.219
Poland	0.266	0.011	0.205	1.673	0.153	2.178	0.256	0.313	1.019	0.667	1.492	0.936
Portugal	0.306	5.779**	1.517	2.940*	0.005	0.163	0.046	6.858**	0.030	0.299	0.132	0.058
Romania	1.399	0.028	0.372	0.635	2.451	0.484	5.805*	0.098	0.118	1.337	0.176	1.329
Slovenia	6.115*	0.020	1.309	1.256	1.089	1.298	0.703	8.283*	4.136	0.096	0.058	2.253
Slovakia	2.16	5.091*	1.091	0.037	14.156***	2.395	0.093	0.869	2.489	0.011	0.001	0.345
Finland	0.161	0.512	0.188	1.695	1.799	5.439**	1.579	0.133	0.39	0.787	1.021	1.986
Sweden	5.426*	0.379	0.103	0.141	0.041	2.472	3.636	3.148	0.012	0.001	0.138	0.241

Numbers show Wald stats and \*, \*\*, and \*\*\* indicate significance at the 10%, 5%, and 1% level respectively. In + and - signs, the first sign represents CONF and the second sign represents the other variables.

and the negative component of the Y variable, the positive component of the X variable and the negative component of the Y variable, the negative component of the X variable and the positive component of the Y variable.

We applied the asymmetric causality tests unidirectionally. In other words, we only examined whether there was causality from the Y variable to the X variable, where X represents the CONF variable and Y represents the CPI, UNEMP, EXC, IPI, STOCK, ELECT, and TERR variables. The null hypotheses of causality tests are as follows:

$$H_0 : Y^+ \not\Rightarrow X^+ \text{ There is no causality from the } Y^+ \text{ variable to } X^+ \text{ variable.} \tag{15}$$

$$H_0 : Y^- \not\Rightarrow X^- \text{ There is no causality from the } Y^- \text{ variable to } X^- \text{ variable.} \tag{16}$$

$$H_0 : Y^- \not\Rightarrow X^+ \text{ There is no causality from the } Y^- \text{ variable to } X^+ \text{ variable.} \tag{17}$$

$$H_0 : Y^+ \not\Rightarrow X^- \text{ There is no causality from the } Y^+ \text{ variable to } X^- \text{ variable.} \tag{18}$$

If the Wald statistic obtained through the tests exceeds the critical value of 10%, the null hypotheses are rejected, and it can be argued that there is a causal relationship between the series.

We presented the asymmetrical causality test results in the tables. In the table, the row section shows the 27 EU Countries while the column section shows the test types (+/+, -/-, +/- and -/+). For the test types, the first sign represented the component of the CONF variable, and the second sign represented the component of the other seven variables. Namely column of +/- is shown, from  $Y^-$  to  $X^+$  causality results (Eq. 17). In Table 3, we presented the asymmetrical causality test results of from *CPI*, *UNEMP*, and *EXC* to *CONF*.

According to Table 3, there is an asymmetric causality relationship for at least one situation, from inflation indicator to consumer confidence index (*CPI* → *CONF*) for eleven countries. These countries are Bulgaria, Czechia, Germany,



Estonia, Croatia, Italy, Latvia, Portugal, Slovenia, Slovakia and Sweden.  $CPI+ \rightarrow CONF+$  is the most observed relationship type. It does not point out that if the consumer price index increases, the consumer confidence index will increase too. Causality tests answer only the question of whether there is any relationship between X and Y variables or not. If there is a relationship, we cannot learn the direction of the relationship. The direction of the relationship can be positive or negative. Hence  $CPI+ \rightarrow CONF+$  situation only shows there is a relationship between positive shocks of CPI and the positive shocks of CONF. Based on our basic economic knowledge, we expect higher inflation rates to worsen consumer confidence. Therefore, our only comment on this situation is that we expect positive shocks in inflation to reduce positive shocks in the consumer confidence index. The other observed relationship types are  $CPI- \rightarrow CONF-$  for four countries,  $CPI- \rightarrow CONF+$  for three countries, and  $CPI+ \rightarrow CONF-$  for one country. Bulgaria, Czechia, and Portugal consumers are influenced by inflation in two different causality types (Bulgaria and Czechia:  $CPI+ \rightarrow CONF+$ ,  $CPI- \rightarrow CONF-$  Portugal:  $CPI- \rightarrow CONF-$ ,  $CPI+ \rightarrow CONF-$ ).

Table 3 shows consumers in 15 out of 27 countries are influenced by unemployment rates, at least for one situation. Both  $UNEMP+ \rightarrow CONF+$  and  $UNEMP- \rightarrow CONF+$  are the most observed situations. Generally, positive shocks in unemployment affected positive shocks in the consumer confidence index, and negative shocks in unemployment affected positive shocks in the consumer confidence index. Also,  $UNEMP+ \rightarrow CONF+$  and  $UNEMP+ \rightarrow CONF-$  situations observed for 5 and 2 countries, respectively. Cyprus consumers are influenced by three types of causality for unemployment, except  $UNEMP- \rightarrow CONF-$ .

In light of the variables considered, we found that the indicator by which EU consumers are least influenced is exchange rates. Only Czechia, Denmark, Greece, Cyprus, Luxembourg, and Malta consumers are influenced by exchange rates.  $EXC- \rightarrow CONF-$  type was observed for three countries and  $EXC+ \rightarrow CONF-$  was observed for two countries. We presented the asymmetrical causality test results from IPI and STOCK to CONF in Table 4.

**Table 4.** Asymmetric causality tests results for IPI, STOCK  $\rightarrow$  CONF

	IPI				STOCK			
	+/+	-/-	+/-	-/+	+/+	-/-	+/-	-/+
Belgium	0.036	0.087	1.636	1.948	65.694***	66.116***	0.020	27.751***
Bulgaria	0.798	0.675	0.045	0.882	2.018	0.074	5.871**	1.287
Czechia	2.554	0.264	0.242	0.089	0.476	0.356	0.249	53.024***
Denmark	0.802	0.052	0.484	2.161	0.294	0.298	14.637***	43.731***
Germany	0.720	1.328	0.280	0.152	15.173***	14.007**	0.152	107.995***
Estonia	0.065	0.173	0.100	1.807	28.181***	185.746***	0.211	60.272***
Ireland	0.246	0.101	0.396	0.005	11.078**	11.058**	0.758	8.351*
Greece	0.169	0.000	1.398	0.220	22.437***	17.910***	0.066	15.309***
Spain	0.064	3.493*	2.000	2.817*	32.534***	31.967***	0.006	15.217***
France	3.334*	0.134	0.182	0.339	57.167***	56.560***	0.644	31.497***
Croatia	0.448	0.098	0.541	5.808**	31.507***	32.375***	0.493	15.520**
Italy	0.134	1.500	0.037	2.159	54.344***	54.029***	0.300	171.308***
Cyprus	2.946*	0.002	4.895**	0.825	0.060	0.146	1.517	1.314
Latvia	11.358**	0.053	0.199	0.682	0.353	0.113	1.986	98.429***
Lithuania	0.400	0.187	0.531	2.336	0.869	0.093	1.140	2.825*
Luxembourg	0.800	0.093	0.317	2.182	106.524***	107.100***	7.173**	3.238
Hungary	0.885	6.222***	0.881	0.034	23.897***	23.288***	1.173	66.924***
Malta	1.184	0.001	1.108	0.850	57.199***	28.637***	0.898	29.408***
Netherlands	0.042	0.200	0.079	0.155	2.761*	4.068**	0.086	0.473
Austria	0.445	0.163	3.275*	2.676	87.186***	85.884***	0.057	142.779***
Poland	8.866**	0.278	3.766	0.378	12.174***	12.611***	2.108	3.961
Portugal	0.081	0.678	0.215	0.427	27.602***	26.575***	0.302	24.067***
Romania	0.501	0.224	0.062	0.001	12.456**	10.948**	0.936	14.844***
Slovenia	0.338	0.046	0.002	0.797	5.140**	1.853	2.989*	1325.918***
Slovakia	0.299	0.179	0.723	0.070	0.181	0.688	1.893	0.009
Finland	6.244*	0.966	0.765	5.424*	11.062**	11.049**	1.167	6.566**
Sweden	0.242	1.968	1.358	0.024	66.719**	13.725**	1.068	34.106***

Numbers show Wald stats and \*, \*\*, and \*\*\* indicate significance at the 10%, 5%, and 1% level respectively.

In + and - signs, the first sign represents CONF and the second sign represents the other variables.

**Table 5.** Asymmetric causality tests results for ELECT, TERR → CONF

	ELECT				TERR			
	+/+	-/-	+/-	-/+	+/+	-/-	+/-	-/+
Belgium	0.976	0.077	0.553	1.379	3.082*	0.508	1.290	1.174
Bulgaria	5.451**	8.551**	4.878	0.799	1.311	0.382	0.575	0.000
Czechia	2.166	2.097	1.832	0.620	0.608	1.065	2.191	0.283
Denmark	2.400	0.059	5.592*	1.681	0.080	1.259	0.381	2.328
Germany	5.181	0.019	1.234	2.493	6.472**	0.696	0.201	1.391
Estonia	1.190	15.138***	2.223	2.925	0.884	0.871	3.262*	1.245
Ireland	0.775	0.367	1.635	0.135	0.001	0.194	0.626	0.709
Greece	17.454***	6.017*	6.193*	1.662	1.264	0.205	0.056	2.863*
Spain	3.575*	4.204	3.756	0.642	4.812**	6.624**	1.422	0.218
France	3.800	5.331*	3.608	6.744*	0.367	0.611	1.224	0.032
Croatia	1.175	2.572	1.977	1.764	1.079	0.021	1.359	0.458
Italy	1.567	1.018	2.823	1.653	0.773	1.667	0.640	1.737
Cyprus	0.499	0.681	2.306	0.229	1.007	0.043	0.317	0.001
Latvia	0.455	0.191	1.686	1.651	0.499	0.040	0.183	0.338
Lithuania	2.105	0.288	2.729	2.491	0.113	0.171	0.701	0.407
Luxembourg	6.765**	0.506	5.323*	0.225	0.473	0.078	0.027	0.096
Hungary	2.345	2.368	3.914	4.823	0.755	0.140	0.138	0.448
Malta	18.465***	0.955	0.469	0.314	0.248	0.005	0.335	0.139
Netherlands	0.889	23.442***	0.716	1.172	0.697	0.189	0.458	0.325
Austria	0.214	2.384	14.928***	3.106*	0.026	1.300	0.234	0.832
Poland	0.682	0.686	4.322	1.432	0.588	0.230	0.393	0.435
Portugal	1.373	1.882	0.254	0.471	0.010	0.161	0.114	0.024
Romania	1.160	3.146	2.107	0.998	0.035	0.085	0.104	0.242
Slovenia	0.645	1.536	1.506	0.637	0.236	7.698**	1.025	0.007
Slovakia	0.051	2.138	0.219	2.239	0.075	0.670	0.812	0.007
Finland	3.157	3.759	0.795	0.013	3.922**	1.231	2.342	0.117
Sweden	4.062	2.329	0.339	1.334	2.119	0.171	2.502*	0.706

Numbers show Wald stats and \*, \*\*, and \*\*\* indicate significance at the 10%, 5%, and 1% level respectively.

In + and – signs, the first sign represents CONF and the second sign represents the other variables.

We used the industrial production index indicator as a proxy variable for economic growth. Our results show that nine countries' consumers are influenced by the IPI indicator. The most frequently observed asymmetric causality type is IPI+ → CONF+. IPI+ → CONF- observed for three countries, while the other two types were observed for two countries. Cyprus, Poland, and Finland consumers are influenced by two types of causality, according to Table 4.

We found that the stock exchange indicator is the most influencing indicator for consumers. Except for Cyprus and Slovakia, the other twenty-five countries consumer influenced by stock exchange shocks. We found an asymmetrical causality relationship from positive shocks of STOCK to negative shocks of CONF for almost a whole of twenty-one countries. Belgium, Germany, Estonia, Ireland, Greece, Spain, France, Croatia, Italy, Luxembourg, Hungary, Malta, Austria, Portugal, Romania, Slovenia, Finland, and Sweden consumers are more sensitive to the shock of the stock exchange index. The results are valid for three types of causality in these countries.

Table 5 displays the asymmetrical causality test results from *ELECT* and *TERR* to *CONF*.

As can be seen from Table 5, we found that ten countries' consumers are influenced by election periods. The most observed situations are ELECT+ → CONF+ and ELECT- → CONF-. Positive shocks of the election period represent upcoming election periods and negative shocks of the election period represent exit from the election period. We can argue that, generally, approaching the election period is more effective for positive shocks of consumers, and exit from the election period is more effective for negative shocks of consumers. Greek consumers, who experienced five different election periods between 2012 and 2015, are the most affected consumers by the election periods according to the test results.

Finally, we tested terrorist attacks effects on consumer confidence index. We used fixed variables for all countries as terrorist attack indicators. We found that eight countries' consumers were influenced by terrorist attacks at least on one causality type, while Spain, one

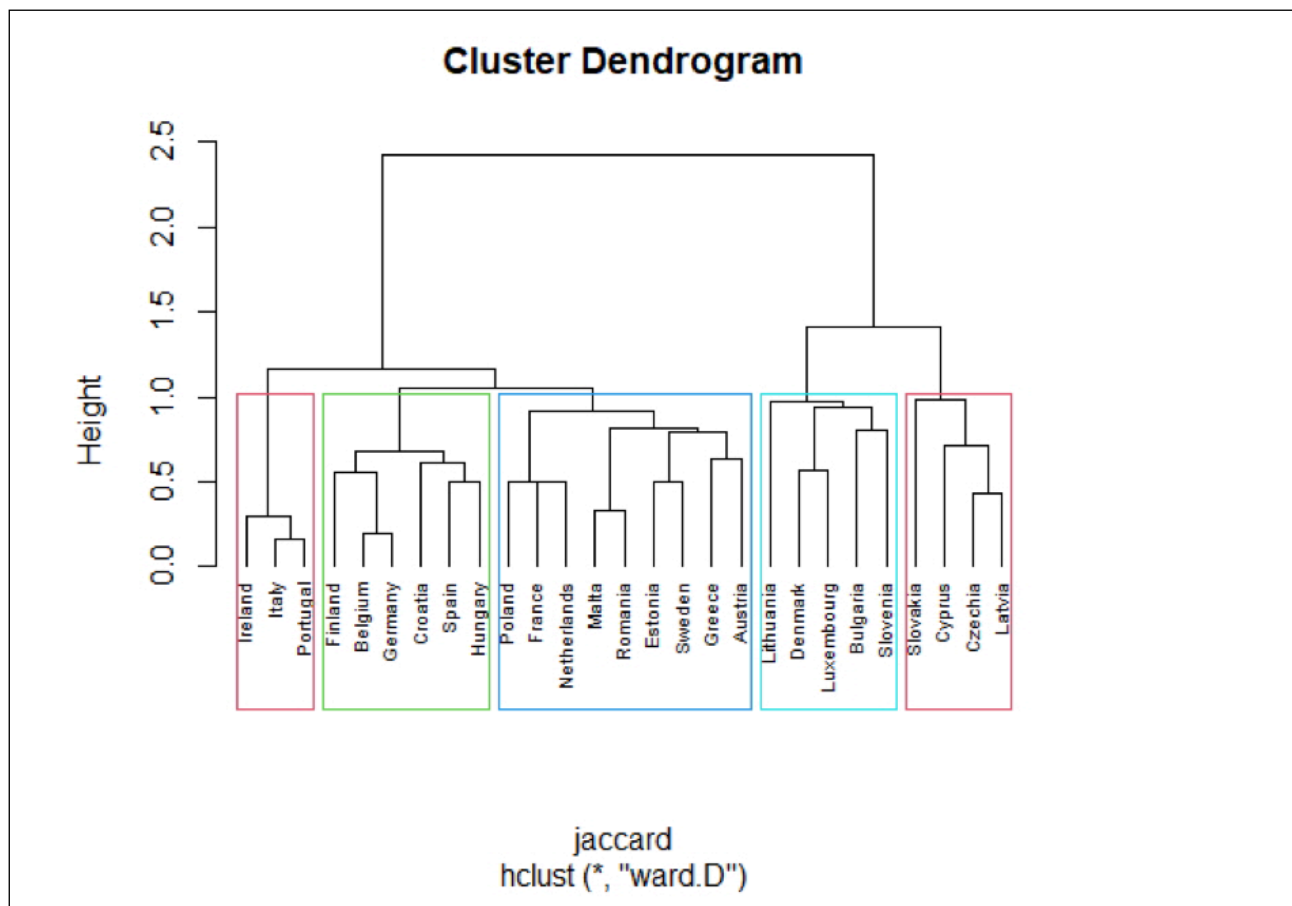
of them, consumers were affected by terrorist attacks on two different causality types.

In summary, it has been observed that the most influential indicator on the consumer confidence index is stock market indices, and the least affecting indicator is exchange rates. The ranking according to the number of countries affected by at least one causality situation for each indicator is as follows: STOCK (25), UNEMP (15), CPI (11), ELECT (10), IPI (9), TERR (8) and EXC (6). The STOCK variable is found to be the cause of consumer confidence in almost all EU countries.

These results are consistent with the findings of Beltran and Duree (2003), Çelik et al. (2010), Sartell (2014), and Kim (2016). Kim (2016), who analyzed different countries as in this study, found a relationship between the stock market and consumer confidence in all ten countries studied. We found the UNEMP indicator to be the cause of consumer confidence in many countries. In addition to Sartell (2014), who found that the unemployment rate is the most important variable explaining consumer confidence, Vanlaer et al. (2020) also confirm this finding. Again, the CPI was the variable that we found to be the source of consumer confidence in most countries. This is in line with Ramalho (2011), Neisingh and Stokman

(2013), and Sartell (2014), who found similar results. However, these results on ENEMP and CPI differ from those of Kim (2016), who finds unemployment and inflation as causes of consumer confidence in only two out of ten countries.

In the study, we found the ELECT variable in ten countries and the IPI variable in nine countries as having caused consumer confidence. The ELECT results for these countries are similar to Vuchelen (1995) and Ramalho et al. (2011), and the IPI results are similar to Çelik et al. (2010), Ramalho et al. (2011) and Paradiso et al. (2014). The results show that the TERR and EXC variables are not a source of consumer confidence in too many countries. Garner (2004) concludes that consumers in the United States are resilient to terrorist attacks and their confidence in the economy is not affected. However, Brodeur (2017) argues that successful terrorist attacks have an impact on consumer confidence. The results of our study are in support of Garner (2004) for nineteen countries and Brodeur (2017) for eight countries. Finally, in only six countries was the exchange rate the cause of consumer confidence, similar to Ramalho et al. (2011) and Oduh et al. (2012). In most countries, the results are different from these studies.



**Figure 2:** Dendrogram of Ward's linkage cluster analysis according to Jaccard distance

**Table 6.** Classification of countries

Clusters	Countries
Cluster 1	Ireland, Italy, Portugal,
Cluster 2	Finland, Belgium, Germany, Croatia, Spain, Hungary
Cluster 3	Poland, France, Netherlands, Malta, Romania, Estonia, Sweden, Greece, Austria
Cluster 4	Lithuania, Denmark, Luxembourg, Bulgaria, Slovenia
Cluster 5	Slovakia, Cyprus, Czechia, Latvia

If we look at the results in terms of countries, we found that the countries most affected by the indicators are Estonia and Greece (with five different indicators). In addition, consumers in eight countries are affected by four indicators (Bulgaria, Czechia, Spain, Croatia, Malta, Slovenia, Finland). Among the countries included in the study, just consumers of Lithuania were affected only by one indicator. Also, consumers in Belgium, Ireland, Hungary, Netherlands, Poland, Romania, and Slovakia are affected by only two indicators.

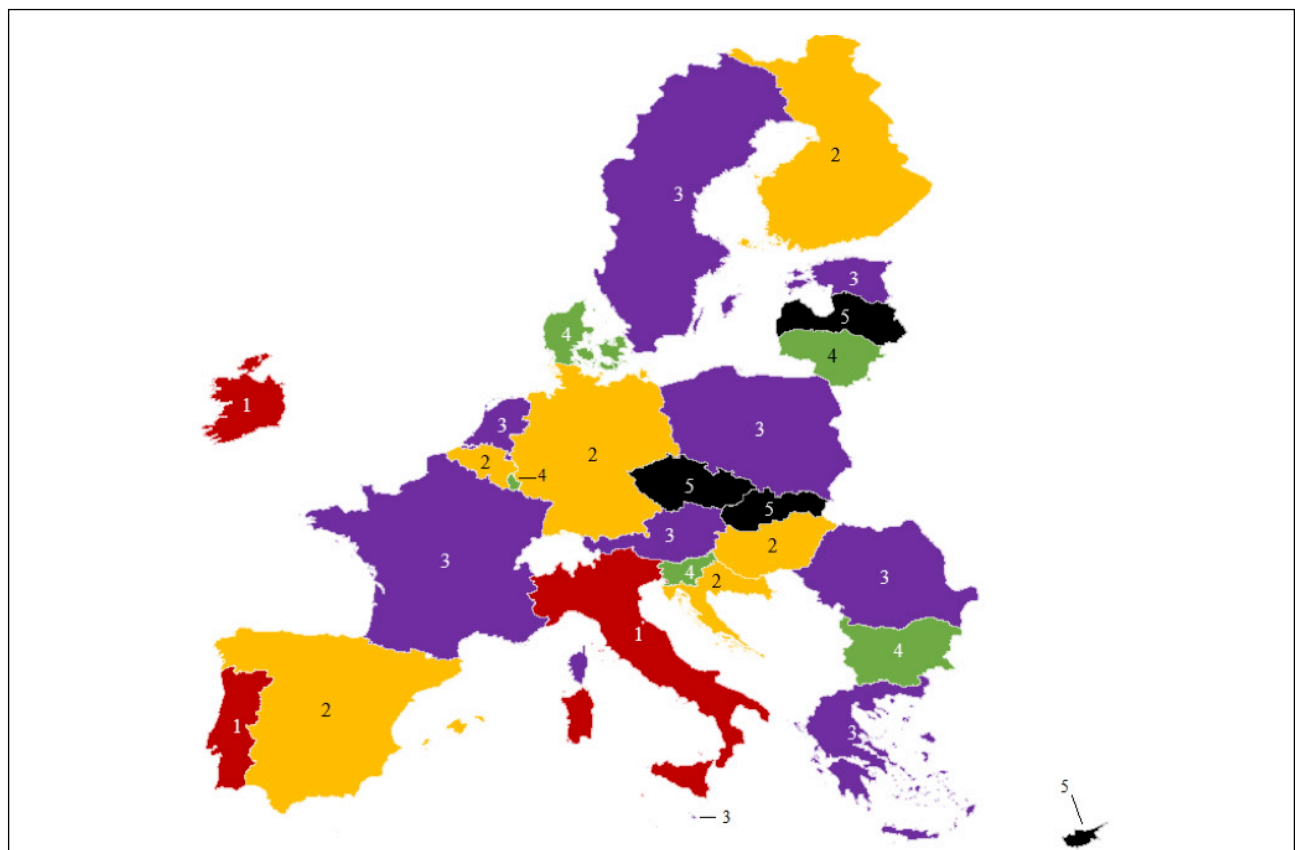
**Results of Cluster Analysis**

In this section, we used asymmetric test outputs for cluster analysis. Outputs have binary data structure with or without asymmetric causality (1,0). We used seven different variables for testing of asymmetric causality relationship with the consumer confidence index. For all variables, we tested four different situations (+/+, -/-,

+/-, and -/+). Therefore, we have 28 observations and 27 countries for cluster analysis.

We preferred a hierarchical cluster analysis method Ward’s linkage technique, which is fit for work with binary datasets. Also, we used the Jaccard Similarity measure to distance. In Figure 2 we presented a Dendrogram of clustering and in Appendix B, we presented a distance matrix for Jaccard distance.

As seen in Figure 2, all countries belong to the different clusters at the first stage while they belong to the same cluster at the last stage. For classification, we considered a scale between the first stage and the last stage. Each colored area in Figure 2 shows a different cluster. Peak points of area are the same height degree and below the peak point shows the same cluster countries. We found five clusters for twenty-seven



**Figure 3:** EU countries by clusters in consumer confidence index

countries. A listing of clustering countries can be seen in Table 6.

Cluster 3 has nine countries, Cluster 2 has six countries, Cluster 4 has five countries, Cluster 5 has four countries, and Cluster 1 has three countries. Cluster member countries are shown in the map in Figure 3 according to their clusters.

As it can be observed from the map, it is possible to assert certain regions where the countries in the same clusters gather geographically, albeit partially. For example, Cluster 1 countries are in South Europe mostly, all Cluster 5 countries are in East Europe, and all Balkan countries are clustered in Cluster 2, 3, and 4. In addition, Cluster 2 countries Belgium with Germany and Croatia with Hungary have a land border. Also, In Cluster 5, Czechia and Slovakia have a land border (they were founded after the dissolution of Czechoslovakia in 1993). Though Cluster 1, 3, and 4 countries are within the same clusters, but cluster countries haven't any land border. Previous section, we mentioned that the countries most affected by the indicators are Estonia and Greece. Also, these countries are in the same cluster. Last, most of the countries, that have the least influencing indicator on the consumer confidence index, clustered in the first three clusters.

## CONCLUSION

In the study, we investigated the factors that determine the consumer confidence index in EU countries through 7 variables that are thought to influence consumer confidence. For this, we first applied asymmetric causality tests to the data between 2012M01-2019M12. Then, we performed a clustering analysis using the outputs obtained from there. Thus, in the first stage, we determined which variables are effective on consumer behavior in which countries. In the second stage, we classified countries according to similarities and differences in consumer behavior.

According to the asymmetric causality results, the variables that most influence consumer confidence in the country are stock market indices, unemployment, and inflation. The stock market is a primary avenue for consumer investments, while employment status is a key determinant of consumer income. Additionally, inflation significantly impacts the proportion of consumers' income that is spent. Consequently, changes in consumer confidence are expected to be driven primarily by these variables, which directly affect income, investments, and spending. We believe that consumers' initial reactions to

the state of the economy are shaped by these indicators, which they frequently encounter in their daily lives.

According to our findings, the other variables analyzed in the study (election periods, industrial production index, terrorist attacks, and exchange rate) are not as important as the other three variables for consumer confidence in EU countries. The common feature of these four variables is that they are indicators of a more general situation, rather than the situations that consumers immediately encounter in their daily lives. We find it interesting that terrorist attacks and exchange rate variables in particular cause consumer confidence in very few countries. This is because while we calculated the terrorist attacks variable jointly for all EU countries, we calculated the exchange rate variable jointly for nineteen Euro area countries. In other words, consumers are more likely to react to developments that directly affect their own country than to situations that affect several countries at the same time. We also found it remarkable that consumers react less to variables that do not directly affect their financial situation, such as the election period and the industrial production index, than to variables that affect their daily economic life. As a result, it can be said that EU consumers' perceptions of confidence more react to individual rather than collective developments. This is consistent with the finding by Vanlaer et al. (2020) that consumers' confidence in their financial situation has a much greater impact on their savings than their confidence in the general economic situation. We believe that these findings make an important contribution to the literature and will shed light for other researchers to research the cause of the individuality/collectivity difference.

Hatemi-J (2012) Asymmetric Causality Test considers the importance of asymmetric information. Also, it detects causality between different components of the series, which symmetric is a test that can't detect. Thus, it was possible to examine the factors determining consumer confidence in more detail. Also, in this way, the data used in cluster analysis included information between different components. We believe this situation adds the unique characteristics of the consumers to the analysis at the classification stage.

As a result of the cluster analysis, we detected the existence of five different country groups. Some of these groups include countries with similar geography and culture. This is illustrated by the fact that all the countries in Cluster 5 are in Eastern Europe. We also found that two of the three countries in Cluster 1 are



in Southern Europe. Especially for the countries in these two clusters, it can be said that consumption patterns are similar within the cluster. However, it is not yet possible to say that there is a sharp distinction between all countries. This is because we have found that some countries that are culturally and geographically distant from each other are in the same clusters. Accordingly, we believe that the most important factor determining the classification results is the current economic structures of the countries. In other words, some countries are geographically and culturally different, but similar in terms of consumer behavior. Therefore, we believe that successful policies to boost consumer confidence in one of the countries in the same cluster, which at first sight appear to be in different circumstances, can be implemented in other countries. Unlike other studies, we believe that this study will contribute to the consumer confidence index literature by grouping countries according to consumer behavior.

The most important limitation of the study is that it does not address the COVID-19 period. We believe that the epidemic situation, which developed suddenly and affected the entire world, has radically affected the emotions and thoughts of consumers. Therefore, we limited the dataset period in this study to analyze the pure effect of economic, social, and political indicators. In future studies, we suggest researchers analyze how the pandemic period affects consumer behavior. In addition, it can be studied what changes have occurred in the effects of analyzed indicators on consumer confidence after the pandemic period. Moreover, researchers who want to examine the factors affecting the behavior of consumers living in different countries according to changes in periodic periods instead of an asymmetric approach can conduct a similar analysis with the frequency-domain causality test method proposed by Breitung & Candelon (2006).



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## Appendix A

Table A. Election Periods

Countries	Election Type	Election Dates	Explanation
Belgium	Federal Elections	25.05.2014 26.05.2019	
Bulgaria	Parliamentary Elections	12.05.2013* 05.10.2014** 26.03.2017***	* Early Election (Election Announce: 28.03.2013). Normal election time was 2013/ July. Hence, we added dummy variables since 2012/October (from 1 to 10). But with the early election announcement dummy variable increased from 5 to 8. Since, election month dummy variables must be 10. ** Early Election (Election Announce: 10.06.2014). *** Early Election (Election Announce: 14.11.2016)
Czechia	Legislative Elections	26.10.2013* 21.10.2017	* Early Election (Election Announce: 26.08.2013). Normal election time was 2014/ May. Hence, we added dummy variables since 2013/August. But with the early election announcement at the end of August, dummy variable increased from 1 to 9 with the 2013/September. Since, election month dummy variables must be 10.
Denmark	General Elections	15.09.2011 18.06.2015* 06.06.2019	* Early Election (Election Announce: 18.06.2015). Normal election time was 2015/ September. Hence, we added dummy variables since 2014/December. But with the early election announcement at the end of May, dummy variable increased from 6 to 10 with the 2015/June.
Germany	Federal Elections	22.09.2013 24.09.2017	
Estonia	Parliamentary Elections	01.03.2015 03.03.2019	
Ireland	General Elections	26.02.2016	
Greece	Legislative Election	06.05.2012* 17.06.2012** 25.01.2015*** 20.09.2015**** 07.07.2019*****	* Early Election (Election Announce: 04.11.2011). ** After the 2012/May election, a government could not be formed. A month later, the election was held again. *** Early Election (Election Announce: 31.12.2014). **** Early Election (Election Announce: 20.08.2015). ***** Early Election (Election Announce: 26.05.2019). Normal election time was 2019/September. Hence, we added dummy variables since 2018/December. But with the early election announcement at the end of May, dummy variable increased from 6 to 9 with the 2015/June.
Spain	General Elections	20.11.2011 20.12.2015 26.06.2016* 28.04.2019** 10.11.2019***	* Early Election (Election Announce: 06.04.2016). ** Early Election (Election Announce: 13.02.2019). ** Early Election (Election Announce: 17.09.2019).
France	Presidential Elections	06.05.2012 07.05.2017	
Croatia	Parliamentary Elections	04.12.2011 08.11.2015 11.09.2016*	* Early Election (Election Announce: 15.07.2016).
Italy	General Elections	25.02.2013 04.03.2018	
Cyprus	Legislative Elections	22.05.2011 22.05.2016	

Latvia	General Elections	17.09.2011 04.10.2014 06.10.2018	
Lithuania	Parliamentary Elections	28.10.2012 23.10.2016	
Luxembourg	General Elections	20.10.2013* 14.10.2018	* Early Election (Election Announce: 10.07.2013).
Hungary	Parliamentary Elections	06.04.2014 08.04.2018	
Malta	General Elections	09.03.2013 03.06.2017*	* Early Election (Election Announce: 01.05.2017).
Netherlands	General Elections	12.09.2012* 15.03.2017	* Early Election (Election Announce: 23.04.2012).
Austria	Legislative Elections	29.09.2013 15.10.2017* 29.09.2019**	* Early Election (Election Announce: 10.05.2017). ** Early Election (Election Announce: 18.05.2019).
Poland	Parliamentary Elections	09.10.2011 25.10.2015 13.10.2019	
Portugal	Legislative Elections	05.06.2011 04.10.2015 06.10.2019	
Romania	Legislative Elections	09.12.2012 11.12.2016	
Slovenia	Parliamentary Elections	04.12.2011 13.07.2014* 03.06.2018	* Early Election (Election Announce: 05.05.2014).
Slovakia	Parliamentary Elections	10.03.2012 05.03.2016 29.02.2020	
Finland	Parliamentary Elections	17.04.2011 19.04.2015 14.04.2019	
Sweden	General Elections	14.09.2014 09.09.2018	

## Appendix B

Table B. Distance Matrix for Jaccard Distance

	BEL	BGR	CZE	DNK	DEU	EST	IRL	GRC	ESP	FRA	HRV	ITA	CYP	LVA	LTU	LUX	HUN	MLT	NLD	AUT	POL	PRT	ROU	SVN	SVK	FIN	SWE	
BEL	1.000																											
BGR	1.000	1.000																										
CZE	0.833	0.625	1.000																									
DNK	0.800	0.889	0.875	1.000																								
DEU	0.333	1.000	0.857	0.833	1.000																							
EST	0.800	0.889	0.714	0.857	0.833	1.000																						
IRL	0.667	1.000	0.833	0.800	0.750	0.800	1.000																					
GRC	0.857	0.800	0.900	0.750	0.875	0.889	0.857	1.000																				
ESP	0.667	0.909	0.900	0.889	0.714	0.889	0.667	0.800	1.000																			
FRA	0.833	0.900	0.889	0.875	0.857	0.875	0.833	0.778	0.900	1.000																		
HRV	0.800	1.000	0.875	0.857	0.833	0.667	0.800	0.889	0.889	0.875	1.000																	
ITA	0.800	1.000	0.875	0.667	0.600	0.857	0.500	0.750	0.750	0.875	0.857	1.000																
CYP	1.000	0.909	0.778	1.000	1.000	0.889	0.857	1.000	0.909	0.900	0.889	0.889	1.000															
LVA	0.800	0.750	0.500	0.857	0.833	0.667	0.800	0.889	0.889	0.875	0.667	0.857	0.750	1.000														
LTU	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000													
LUX	0.857	0.800	0.900	0.333	0.875	0.889	0.857	0.667	0.800	0.900	0.889	0.750	1.000	0.889	1.000	1.000												
HUN	0.750	1.000	0.857	0.833	0.800	0.833	0.750	0.875	0.714	0.667	0.833	0.833	1.000	0.833	1.000	0.875	1.000											
MLT	0.857	0.800	0.778	0.750	0.875	0.889	0.857	0.800	0.778	0.889	0.889	0.909	0.750	1.000	0.500	0.875	1.000											
NLD	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.667	1.000											
AUT	0.800	1.000	0.875	0.667	0.833	0.857	0.800	0.750	0.889	0.714	0.857	0.667	0.889	0.857	1.000	0.750	0.833	0.750	0.800	1.000								
POL	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.833	1.000	1.000	0.667	1.000	1.000	1.000	1.000	1.000	1.000	0.800	1.000							
PRT	0.800	1.000	0.875	0.857	0.600	0.857	0.500	0.889	0.750	0.875	0.667	0.400	0.889	0.857	1.000	0.889	0.833	0.889	1.000	0.857	1.000	1.000						
ROU	0.667	0.857	0.600	0.800	0.750	0.800	0.667	0.857	0.857	0.833	0.800	0.800	0.857	0.500	1.000	0.857	1.000	0.667	1.000	0.800	1.000	1.000						
SVN	0.857	0.800	0.778	0.750	0.875	0.889	0.667	0.909	0.667	0.778	0.889	0.750	0.909	0.750	1.000	0.800	0.875	0.800	0.857	0.750	1.000	0.857	1.000					
SVK	1.000	1.000	1.000	1.000	0.667	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000					
FIN	0.600	1.000	0.889	0.875	0.667	0.875	0.833	0.778	0.778	0.750	0.714	0.875	0.900	0.875	1.000	0.900	0.857	0.900	1.000	0.875	0.833	0.875	0.833	0.900	1.000	1.000		
SWE	0.800	0.750	0.500	0.857	0.833	0.857	0.500	0.889	0.750	0.875	0.857	0.667	0.750	0.400	1.000	0.889	0.833	0.750	1.000	0.857	1.000	0.667	0.500	0.571	1.000	0.875	1.000	

## Appendix B

Table B. Distance Matrix for Jaccard Distance

- i ILO: International Labor Organization (United Nations)
- ii The rates used for the other 8 countries are as follows: USD/DKK for Denmark, USD/SEK for Sweden, USD/BGN for Bulgaria, USD/HRK for Croatia, USD/CZK for Czechia, USD/HUF for Hungary, USD/PLN for Poland, USD/RON for Romania. Since Latvia started to use the Euro currency in 2014, USD/LVL rates were used in this country until 2014, and USD/EUR rates after 2014. Lithuania started to use the Euro currency as of 2015. Therefore USD/LTL rate was used for Lithuania until 2015, and USD/EUR since 2015.
- iii These indices are as follows; Belgium: BEL20, Bulgaria: BSE SOFIX, Czechia: PX, Denmark: OMXC20, Germany: DAX, Estonia: OMXTGI, Ireland: ISEQ, Greece: ATG, Spain: IBEX35, France: CAC40, Croatia: CROBEX, Italy: IT40, Cyprus: CSE, Latvia: OMXRGI, Lithuania: OMXVGI, Luxembourg: LUXXX, Hungary: BUX, Malta: MSE, Netherlands: AEX, Austria: ATX, Poland: WIG20, Portugal: PSI20, Romania: BET, Slovenia: SBITOP, Slovakia: SAX, Finland: OMXH25, Sweden: OMXS30.



# The Impact of Balance Sheet Cleaning on the Relationship Between Non-Performing Loans and Cost Efficiency: Bad Luck or Bad Management? A Case Study of Türkiye

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## ABSTRACT

This study investigates the impact of balance sheet cleaning on the cost-effectiveness of banks, focusing on the “bad luck” and “bad management” hypotheses developed by Berger and DeYoung (1997). These hypotheses posit a negative relationship between increasing non-performing loans (NPLs) and cost efficiency. Analyzing quarterly data from 10 deposit banks in Türkiye from 2012 to 2021, the study utilizes Stochastic Frontier Analysis (Battese & Coelli, 1995) to evaluate cost efficiency and the Dumitrescu-Hurlin Panel Causality Test (Dumitrescu & Hurlin, 2012) to explore causality. The findings reveal that prior to balance sheet cleaning, the “bad management” hypothesis holds, and the “bad luck” hypothesis is more applicable post-cleaning. This shift suggests that balance sheet cleaning can mitigate the detrimental effects of poor management on bank performance. The findings suggest that banks should prioritize balance sheet cleaning to improve cost-effectiveness. As a pioneering effort, this research is the first to explore the effect of balance sheet cleaning on bank cost efficiency under the “bad luck” and “bad management” hypotheses, and it uniquely contributes to the literature by employing the Dumitrescu-Hurlin Panel Causality Test in this analysis.

**Keywords:** Balance Sheet Cleaning, NPL, Cost-Efficiency, Bad Luck Hypothesis, Bad Management Hypothesis.

**JEL Classification Codes:** G21, G28, G29, G32

**Referencing Style:** APA 7

## INTRODUCTION

Banks primarily encounter credit risk, market risk, and operational risk in their operations. When the Basel Regulations were first introduced, the calculation of capital adequacy centered mainly on credit risk. However, as it became evident that market and operational risks could have substantial negative effects on both individual banks and the wider financial system, these risks were later incorporated into the regulatory framework (Bodellini, 2019). This study specifically examines the relationship between credit risk and cost.

Loans inherently carry the risk of non-repayment from the moment they are issued. To mitigate this risk, banks develop and implement credit risk management systems. These systems, governed by regulations established by supervisory authorities and internal bank management, are rigorously monitored and audited to ensure adherence to both legal requirements and internal policies.

Credit losses are an integral part of the lending process, affecting every business unit within banks (Aiyar et al.,

2015). In countries with advanced risk management practices, a range of statistical tools is employed to minimize these losses (Babuşcu et al., 2018). Banks carefully assess risk levels, potential losses, required capital reserves, and necessary loan provisions, ensuring compliance with regulations at every stage of the loan process—prior to issuance, throughout the loan’s duration, and after any risks have materialized.

This study examines the effect of removing non-performing loans from the balance sheet on a bank’s cost-effectiveness. The results are expected to be crucial in evaluating the benefits of balance sheet cleaning for the banking sector.

The existing literature does not contain any studies that examine the relationship between bank cost efficiency and non-performing loans (post-balance sheet cleaning) under the “bad management” and “bad luck” hypotheses. This study is the first to investigate this relationship in this specific context. Furthermore, it is also the first to test the “bad luck” and “bad management” hypotheses using the Dumitrescu-Hurlin Panel Causality Test (2012).

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The study starts by detailing the core processes of credit risk management. It then introduces the concepts of balance sheet cleaning and the “bad luck” and “bad management” hypotheses. This is followed by a review of relevant literature and a presentation of the analysis results. The study concludes with a discussion of the findings.

### Processes Related to Credit Risk

Credit risk management processes for banks in Türkiye are guided by both international standards and national regulations. Furthermore, detailed directives from the Central Bank of the Republic of Türkiye and the Banking Regulation and Supervision Agency (BDDK) provide banks with specific guidance in this area.

This study seeks to offer a fresh perspective on the relationship between non-performing loans and costs. In Türkiye, bank loans are categorized into three main groups—standard quality, closely monitored, and non-performing—in accordance with legal regulations. These classifications are based on the risk levels and the delays in principal and interest payments.

The study’s data covers 40 quarters over a 10-year period. In the last 8 quarters, measures were implemented to mitigate the effects of the global COVID-19 pandemic, including the extension of loan repayment periods in Türkiye. These measures distorted the distribution of loan categories, as non-performing credit risk, which should have been classified as non-performing loans, was instead categorized under standard and closely monitored loans. As a result, when interpreting the study’s findings, it is important to consider that the reported volume of non-performing loans may not accurately reflect the true situation.

### Balance Sheet Cleaning

The asset quality of banks is critical, impacting everything from the efficient use of equity to the costs associated with various borrowings, particularly in maintaining a well-diversified asset portfolio. The NPL ratio (Non-performing loan / Total loan) is a key financial indicator that directly influences borrowing costs, especially from international institutions and through securities issuance. Banks typically manage non-performing loans using two primary methods: the first involves keeping the loans on the balance sheet and attempting to liquidate them through administrative or legal means; the second method entails removing the loans from the balance sheet, either by selling them or writing them off entirely (Bunda, 2021).

In Türkiye, the common practice for handling non-performing loans involves either selling them to Asset Management Companies or removing them from the balance sheet. In the Turkish banking sector, private banks primarily conducted sales to Portfolio Management Companies until 2017. That year, a regulation by the Banking Regulation and Supervision Agency (BRSA) permitted public banks to engage in such sales. However, audit reports indicate that public banks did not make any sales until the end of 2021. Notably, Ziraat Bank, one of the three major public banks analyzed, did not perform any loan deletions during this period. The other two public banks, Halkbank and Vakıfbank, only began deleting non-performing loans in 2021.

### Conceptual Framework

This study investigates whether balance sheet cleaning in banks enhances cost-effectiveness. The analysis is grounded in the “bad luck” and “bad management” hypotheses. Drawing on the framework developed by Berger and DeYoung (1997), the study explores the causal relationship between non-performing loans and banks’ operational cost-effectiveness. The hypotheses, which posit a negative relationship between the increase in non-performing loans and operational cost-effectiveness, are formulated as follows:

**The Bad Luck Hypothesis** suggests that an increase in non-performing loans leads to higher operating costs for banks as they address these challenges, ultimately resulting in decreased efficiency. According to this hypothesis, negative external factors initially manifest as an increase in non-performing loans, which in turn erodes the banks’ efficiency. Under the Bad Luck Hypothesis, a causal relationship is expected from non-performing loans to reduced bank cost-effectiveness (Berger & DeYoung, 1997).

**The Bad Management Hypothesis** posits that ineffective management practices lead to an increase in non-performing loans. When bank managers fail to properly oversee loan allocation and monitoring, and do not support personnel and operational resources with sound loan management policies, the bank’s cost efficiency declines. This inefficiency is then followed by a rise in non-performing loans as a result of poor loan policies. Under the Bad Management Hypothesis, a causal relationship is expected, with declining bank cost efficiency leading to an increase in non-performing loans (Berger & DeYoung, 1997).

## REVIEW OF LITERATURE

Our study falls under two main categories in the literature. The first category includes articles that investigate the relationship between non-performing loans and bank costs, specifically discussing the “bad luck” and “bad management” hypotheses. The second category comprises studies that address the issue of balance sheet cleaning in banks.

### **The Relationship Between Non-Performing Loans and Bank Costs Under the “Bad Luck” and “Bad Management” Hypotheses**

The first study to explore the relationship between non-performing loans and bank costs while testing the “bad luck” and “bad management” hypotheses was conducted by Berger and DeYoung (1997). In their research, they developed four hypotheses to analyze the dynamic relationships between cost-effectiveness, capital, and risk: the “bad luck,” “bad management,” “stinginess,” and “moral hazard” hypotheses. The “bad luck” hypothesis suggests that external events lead to increased loan defaults, thereby raising operating costs for banks. The “bad management” hypothesis asserts that poor management performance results in higher levels of non-performing loans. The “stinginess” hypothesis posits that banks may initially boost efficiency by under-investing in loan allocation and monitoring; however, this strategy eventually leads to an increase in non-performing loans. The “moral hazard” hypothesis links the rise in non-performing loans to a weak capital structure. In our study, we did not employ the “stinginess” and “moral hazard” hypotheses as they were not relevant to our research question.

Williams (2004) extended the causality framework developed by Berger and DeYoung (1997) for American banks to European deposit banks. His analysis provided evidence supporting the “bad management” hypothesis for European banks. In the case of German banks, the results supported both the “bad management” and “bad luck” hypotheses. However, this study did not address the topic of balance sheet cleaning.

Podpiera and Weill (2008) studied banks in the Czech Republic, a region that saw numerous bankruptcies in the 1990s and early 2000s. Their research investigated the causality between non-performing loans and cost-effectiveness, aiming to pinpoint the key factors behind these bank failures. By extending the Granger-causality model from Berger and DeYoung (1997), they analyzed data from Czech banks between 1994 and

2005, uncovering evidence that supports the “bad management” hypothesis. However, their study is limited to the bankruptcy period and does not consider the issue of balance sheet cleaning.

Setiawan et al. (2017) examined banks within the Organization of Islamic Cooperation, investigating the causality between non-performing loans and bank efficiency. Their findings supported the “bad luck” hypothesis for banks in Asia and the “bad management” hypothesis for banks in Türkiye and the Middle East. However, the study did not address the topic of balance sheet cleaning.

Ghosh (2018) conducted a study involving a sample of approximately 100 banks, including a quarter that are Islamic, operating in 12 MENA countries during the 2001-2012 period. The findings supported the “bad luck” hypothesis for both conventional and Islamic banks. However, the study did not consider the issue of balance sheet cleaning.

### **Balance sheet cleaning literature**

Garrido et al. (2016) analyzed non-performing loans in the Italian banking system, arguing that this issue can be effectively addressed through a comprehensive approach that includes economic, supervisory, and legal measures. The study highlights the importance of strengthening corporate governance within banks, expediting bankruptcy and enforcement proceedings, and supporting reforms to facilitate balance sheet cleaning as key strategies for reducing NPLs. However, the study does not investigate the “bad luck” and “bad management” hypotheses.

Jonbst and Weber (2016) analyzed the profitability of the 15 largest Italian banks, finding that while the banking system was generally profitable, it displayed significant heterogeneity. The study underscored the critical role of resolving non-performing loans in enhancing bank profitability, suggesting that increased profitability would allow banks to strengthen capital buffers and expedite balance sheet cleaning. However, it was also observed that some smaller banks still face profitability pressures, highlighting the need for decisive action in clearing their balance sheets. The study ultimately emphasized the importance of encouraging all banks, regardless of their profitability, to pursue balance sheet cleaning. It is important to note that the analysis focused exclusively on profitability, without incorporating a cost-effectiveness assessment or examining the “bad luck” and “bad management” hypotheses.

Manz et al. (2019) explored the effects of disposing of non-performing loans (balance sheet cleaning) on financing costs in the European banking sector. The study analyzed data from 180 NPL sales, providing evidence that selling non-performing loans can reduce financing costs for European banks. However, the study primarily focuses on financing costs and does not examine bank cost-effectiveness or the “bad luck” and “bad management” hypotheses.

Bunda et al. (2021) explored the issue of NPLs in banks operating in African countries and discussed strategies for reducing the financial damage caused by NPLs. The study focused on assessing the impact of removing NPLs from the balance sheet (balance sheet cleaning) on capital adjustment and loan capacity. However, it did not investigate the effect of balance sheet cleaning on the bank's cost-effectiveness.

## DATA AND METHODOLOGY

### Data

The analysis focused on a single country due to challenges in obtaining comparable data from different countries. The data for this study were sourced from independent audit reports of banks available on the BDDK (Banking Regulatory and Supervisory Agency) website, with information on the number of bank employees drawn from the statistical data section of the TBB (Turkish Banks Association) website. The dataset comprises 8 variables—non-performing credit risk, total credit risk, non-performing credit risk sold to VYS (Asset Management Company), non-performing credit risk removed from the balance sheet, personnel expenses, number of personnel, tangible fixed assets, and property, plant, and equipment depreciation expenses—across 40 periods (2011/Q4 – 2021/Q4) for 10 deposit banks operating during this timeframe. In total, 3,200 data points were analyzed. The sample of 10 banks, which represents 83% of the total asset size of banks operating in Türkiye (as shown in Appendix 1), indicates that the sample set has a strong capacity to represent the Turkish Banking Sector.

In the study, the actual non-performing loan rate (actual follow-up), cost efficiency score, and clean non-performing loan rate (clean follow-up) were calculated for each bank for the relevant period, following balance sheet cleaning.

**Real NPL ratio** = (NPL in financial statement + NPL written off balance sheet in the same year)/ Total loans (1)

**Clean NPL ratio** = Non-performing loans in financial statement/Total loans (2)

The NPL ratios calculated using formulas (1) and (2) before and after balance sheet cleaning for the banks included in the analysis are presented in Appendix 2 and 3. Additionally, Appendix 4 provides information on the differences between NPL ratios before and after cleaning. The analysis shows that the three banks with the largest differences in balance sheet cleaning and NPL ratios are medium-sized banks.

### Methodology

In this study, Stochastic Frontier Analysis (Battese & Coelli, 1995) was used to evaluate cost-effectiveness, and the Dumitrescu-Hurlin Panel Causality Test (Dumitrescu & Hurlin, 2012) was applied for causality analysis. We opted for the Dumitrescu-Hurlin Panel Causality Test, a more recent method, because it is particularly suited to our dataset, which is stationary and exhibits cross-sectional dependency between variables.

Several methodologies can be used to estimate banks' cost-effectiveness. In our study, we adopted the production approach, which emphasizes operational costs. According to this approach, operational costs are defined solely as non-interest expenses. The inputs for estimating these costs include labor and physical capital, with loans incorporated into the output vector (Berger & DeYoung, 1997).

In the production approach, banks utilize inputs such as labor and capital to produce outputs like deposits and loans. From an input perspective, only operating costs are considered, excluding interest-related costs. Since our study focuses on the credit aspect of banks, only non-interest costs are taken into account. Therefore, the production approach has been deemed more appropriate for this study.

According to the production approach adopted in this study, banks use labor and capital to produce loans and deposits. The input variables are defined as follows.

**Cost of labor:** 3-month average of personnel expenses / number of personnel at the end of the quarter

**Cost of physical capital:** 3-month average of property, plant and equipment depreciation expenses / quarter-end property, plant and equipment (Podpiera & Weill, 2008).

Stochastic Frontier Analysis, one of the most widely used approaches, was employed in our cost-effectiveness



analysis. The primary goal of Stochastic Frontier Analysis is to maximize output while minimizing input across all production areas, thereby achieving the highest possible efficiency. In this study, we utilized the Cobb-Douglas production function, developed by Battese and Coelli (1995), as the basis for our Stochastic Frontier Analysis.

$$\ln(Q_{i,t}) = \beta_0 + \sum_{j=1}^N \beta_j \ln(x_{j,i,t}) + v_{i,t} - u_{i,t}$$

$Q_{i,t}$  : Output of bank  $i$  in period  $t$

$x_{j,i,t}$  : an input vector

$\beta$  : vector of unknown parameters to predict

$\ln(Q_{i,t})$  : Logarithmic state of production for bank  $i$  and period  $t$

$x_{j,i,t}$  : Input vector for bank  $i$  and period  $t$

$\beta_i$  :Parameters ( $i=1\dots n$ )

$v_{i,t}$  : random error term for bank  $i$  and period  $t$

$u_{i,t}$  : Technical inefficiency error term for bank  $i$  and period  $t$

$N$  : Number of inputs

The model used in the analysis, developed in alignment with our data structure and within the framework of the specified theoretical approach, is presented below (Coelli, 1996):

$$\ln(Q_i) = \beta_0 + \beta_1 \ln(K_i) + \beta_2 \ln(L_i) + (V_i - U_i)$$

$Q$ : output variable (credit)

$K$ : input variable (physical capital)

$L$ : input variable (personnel expense)

$i$ : 1.....40

$\beta$ : unknown parameters to predict

$V_i - U_i$ : random error terms

For the causality analysis, the Dumitrescu-Hurlin Panel Causality Test (Dumitrescu & Hurlin, 2012), based on Granger causality analysis, was employed. The study utilizes the following linear model within this framework.

$$Y_{i,t} = \alpha_i + \sum_{k=1}^K \gamma_i^k Y_{i,t-k} + \sum_{k=1}^K \beta_i^{(k)} X_{i,t-k} + \epsilon_{i,t}$$

$K \in N$  ve  $\beta_i = (\beta_i(1), \dots, \beta_i(K))$ , (Dumitrescu & Hurlin, 2012)

In the model,  $x_1$ ,  $x_2$  and  $y$  represent the variables that were previously determined to be stationary: the actual

NPL rate, clean NPL rate, and cost score, respectively. The dependent variable is cost ( $y$ ), while the independent variables are actual NPL ( $x_1$ ) and clean NPL ( $x_2$ ).

$N$ : number of banks,  $i=1\dots 10$

$T$ : 2012/Q1-2021/Q4 periods in the range,  $t=1\dots 40$

The null hypothesis, which investigates whether the variables and Granger-cause the dependent variable, is formulated as follows.

$$H_0: \beta_i = 0 \quad \forall i = 1, \dots, N,$$

$$\beta_i = (\beta_i(1), \dots, \beta_i(K))'$$

The alternative hypothesis is as follows.

$$H_1: \beta_i \neq 0 \quad \forall i = 1, \dots, N_1$$

$$\beta_i \neq 0 \quad \forall i = N_1+1, N_2+2, \dots, N$$

## ANALYSIS and RESULTS

Cost-effectiveness scores for 10 banks operating in Türkiye were calculated across 40 quarters. In estimating cost-effectiveness, labor and physical capital were used as input variables, with the loan amount as the output variable. The resulting cost-effectiveness scores are detailed in Appendix 5. The causality between Real NPL, Clean NPL, and cost-effectiveness was analyzed in three stages.

In the first stage of the analysis, the Breusch and Pagan (1980), Pesaran (2004), and Baltagi, Feng, and Kao (2012) tests were applied to the cross-sectional panel data of the banks. These tests examined whether there is cross-sectional dependency among the variables (cost, real NPL, clean NPL) and whether changes in one bank's variables influence those of other banks. The following hypotheses were tested for each variable (Breusch & Pagan, 1980; Pesaran, 2004; Baltagi, Feng, & Kao, 2012).

$H_0$ : The variables are independent/no cross-sectional dependence between them.

$H_1$ : The variables are not independent/ there is cross-sectional dependence between them.

The test results are presented in Table 1.

The test results revealed cross-sectional dependence between the variables (Table 1), resulting in the rejection of the null hypothesis that the variables were independent or showed no cross-sectional dependence across all tests. This indicates that a shock affecting

**Table 1.** Cross-sectional dependence table

	Cost/Efficiency	Real NPL	Clean NPL
Breusch-Pagan LM	1374.624 [0.0000]	820.9465* [0.0000]	704.7358 [0.0000]
Pesaran scaled LM	140.1547 [0.0000]	81.79194* [0.0000]	69.54226 [0.0000]
Bias-corrected scaled LM	140.0265 [0.0000]	81.66374* [0.0000]	69.41406 [0.0000]
Pesaran CD	36.74261 [0.0000]	25.58162* [0.0000]	24.39387 [0.0000]

\* Significant at 1% confidence level. The square brackets are the probability values.

one bank in the analysis also influences the others. Subsequently, the stationarity of the variables (real NPL rate, cost score, clean NPL rate) was assessed using the Pesaran-CIPS (2007) panel unit root test, which accounts for cross-sectional dependence (Table 2) (Pesaran, 2007).

The test findings indicate that the cost series is stationary at the logarithmic level with a 1% confidence level, the real NPL series is stationary at a 10% confidence level, and the clean NPL series is stationary at a 1% confidence level (Table 2).

In the analyses conducted thus far, it has been determined that there is cross-sectional dependence between the variables and that they are stationary. In the final stage of the study, the causality between the cost/efficiency, real NPL, and clean NPL variables was explored. To this end, the Dumitrescu and Hurlin causality test, which accounts for cross-sectional dependence in stationary series, was applied (Dumitrescu & Hurlin, 2012). The causality test was conducted on pairs of real NPL and clean NPL variables.

All the results obtained are summarized in Table 3.

**Table 2.** Stationarity Test

	Test Statistic	p-value
<b>Cost/Efficiency</b>		
CIPS	-3.6071	<0.01
<b>Real NPL</b>		
CIPS	-2.28094	<0.10
<b>Clean NPL</b>		
CIPS	-2.71728	<0.01
<b>Critical Values</b>		
%1	-2.56	
%5	-2.33	
%10	-2.21	

**Table 3.** Dumitrescu-Hurlin Panel Causality Test

Variables	<i>Wbar</i> -statistics	<i>Zbar</i> -statistics	p-value	Result
<i>Real NPL is not homogeneously the cause of Cost/Efficiency</i>	6.1157	-1.0312	0.3025	<b>Cost/Efficiency</b> → <b>Real NPL</b>
<i>Cost/Efficiency is not homogeneously the cause of Real NPL</i>	11.2231	1.9624*	0.0497	
<i>Clean NPL is not homogeneously the cause of Cost/Efficiency</i>	2.2004	-1.9541*	0.0507	<b>Clean NPL</b> → <b>Cost /Efficiency</b>
<i>Cost/Efficiency is not homogeneously the cause of Clean NPL</i>	4.99615	0.62336	0.5330	

Probability values belong to *Zbar*-statistics.



As summarized in Table 3, there is a one-way causality from Real NPL to cost/efficiency at the 5% confidence level, as well as from Clean NPL to cost/efficiency. The results suggest that before balance sheet cleaning, cost/efficiency influenced Real NPL, with no evidence of a reverse relationship, thus supporting the “bad management” hypothesis. However, after balance sheet cleaning, the direction of the relationship between NPL and cost/efficiency reversed, providing evidence in favor of the “bad luck” hypothesis.

## CONCLUSION and RECOMMENDATIONS

### Conclusion and Summary of Findings

This study aimed to determine whether balance sheet cleaning improves the cost-effectiveness of banks. The analysis utilized quarterly data from 10 deposit banks operating in Türkiye between 2012 and 2021. Cost-effectiveness was evaluated using Stochastic Frontier Analysis (Battese & Coelli, 1995), while the Dumitrescu-Hurlin Panel Causality Test (Dumitrescu & Hurlin, 2012) was applied to explore causality.

The analysis supports the “bad management” hypothesis, highlighting managerial weaknesses in banks operating in Türkiye. This finding is consistent with the study by Berger and DeYoung (1997), which examined American banks. Similarly, studies by Williams (2004) and Podpiera and Weill (2008) also provided evidence supporting the bad management hypothesis. Setiawan et al. (2017) found results that support the “bad luck” hypothesis for banks in Asia and the “bad management” hypothesis for banks in Türkiye and the Middle East. Conversely, Rossi et al. (2005) found evidence supporting the “bad luck” hypothesis. Ghosh (2018) also reported findings that support the “bad luck” hypothesis for Islamic banks.

The findings after balance sheet cleaning support the “bad luck” hypothesis. This is because, post-cleaning, the dependency of NPL figures on managerial weaknesses diminishes, with external factors, likely driven by market dynamics, playing a more significant role. Additionally, balance sheet cleaning contributes to an increase in cost efficiency.

In summary, balance sheet cleaning reduces the costs associated with non-performing loans and enables banks to operate more cost-effectively. Therefore, banks should be encouraged to pursue balance sheet cleaning. This conclusion is consistent with the findings of Garrido et al. (2016) and the studies by Jonbst and Weber (2016). Similarly, Manz et al. (2019) supported the hypothesis

that the sale of non-performing loans by European banks reduces financing costs.

### Recommendations

The results indicate that banks in Türkiye achieve cost efficiency through balance sheet cleaning, assuming healthy loan processes. To enhance the performance of the Turkish banking sector, we recommend prioritizing and encouraging balance sheet cleaning.

During the data collection process, it was observed that balance sheet cleaning was conducted exclusively by private deposit banks in Türkiye. Public banks, apart from a small amount of balance sheet deletion by Vakıfbank and Halkbank in 2021, did not engage in this practice. It is estimated that if public banks also undertook balance sheet cleaning, the impact of managerial weaknesses on the rise of non-performing loans would be further mitigated. Therefore, we recommend that public banks implement balance sheet cleaning as well. Additionally, for future research, we suggest focusing on the effects of balance sheet cleaning using data solely from private deposit banks.

Another point to consider is the influence of the 4-quarter period in 2020 and 2021, during which flexibility in the classification of non-performing loans was introduced to mitigate the economic impact of the pandemic. While necessary, this adjustment undoubtedly affected the dataset and should be acknowledged as a limitation of the study.

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**Appendix 1. Banks Included in the Sample (31.12.2021)**

	<b>Bank</b>	<b>Total Assets (Billion TL)</b>	<b>Sector Share %</b>
Bank1	Akbank	709	7.7
Bank2	Denizbank	309	3.35
Bank3	Garanti BBVA	758	8.23
Bank4	Halkbank	901	9.78
Bank5	İş Bankası	927	10.06
Bank6	QNB Finansbank	371	4.03
Bank7	Türk Ekonomi Bankası	194	2.76
Bank8	Vakıfbank	1.007	10.93
Bank9	Yapı Kredi	737	8
Bank10	Ziraat Bankası	1.371	14.88
	<b>TOTAL</b>	<b>7.284</b>	<b>82.72</b>

**Appendix 2. NPL before balance sheet cleaning/Total Loans (%) (Real NPL Ratio)**

Period	Bank1	Bank2	Bank3	Bank4	Bank5	Bank6	Bank7	Bank8	Bank9	Bank10
2012/1	1.72	3.31	1.88	2.77	2.17	5.97	2.79	3.44	3.03	1.26
2012/2	1.64	3.32	1.89	2.74	1.97	5.98	2.28	3.43	3.14	1.37
2012/3	1.62	4.24	1.93	2.83	2.16	6.14	2.52	3.68	3.38	2.55
2012/4	1.24	4.06	2.18	2.78	1.9	6.43	2.14	3.8	3.01	2.77
2013/1	1.39	3.98	2.23	2.71	2	6.75	2.19	4.1	3.22	2.68
2013/2	1.21	3.92	1.88	2.62	1.66	5.96	1.96	3.95	3.35	2.38
2013/3	1.3	3.91	1.9	2.48	1.66	6.13	2.09	3.87	3.62	2.25
2013/4	1.47	3.39	2.02	2.46	1.55	6.53	2.19	3.86	3.44	2.1
2014/1	1.56	3.57	2.09	2.55	1.67	6.25	2.3	3.88	3.43	2.0
2014/2	1.63	3.81	2.1	2.53	1.52	5.22	2.46	3.89	3.4	1.94
2014/3	1.81	3.97	2.18	3.64	1.53	5.29	2.19	3.95	3.25	1.92
2014/4	1.78	3.68	2.34	3.46	1.45	5.06	2.38	3.61	3.3	1.85
2015/1	1.78	3.96	2.23	3.29	1.45	5.32	2.03	3.51	3.47	1.73
2015/2	1.97	4.26	2.33	3.04	1.53	5.55	2.14	3.44	3.5	1.68
2015/3	2.12	4.48	2.65	2.9	1.63	5.72	2.34	3.61	3.69	1.6
2015/4	2.26	4.84	2.6	2.96	1.9	6.04	2.24	3.73	3.99	1.62
2016/1	2.12	4.94	2.56	3.07	2.09	6.36	2.49	3.87	4.05	1.65
2016/2	2.24	4.64	2.7	2.93	2.3	5.91	2.42	3.99	4.37	1.65
2016/3	2.37	4.93	2.9	2.99	2.45	6.21	2.89	3.99	4.8	1.78
2016/4	2.49	4.81	2.65	3.03	2.26	6.19	2.99	4.13	4.88	1.75
2017/1	2.48	4.42	2.56	3.06	2.24	5.32	3.06	4.15	4.44	1.69
2017/2	2.17	4.25	2.47	2.98	2.3	5.27	3.07	3.98	4.2	1.58
2017/3	2.19	4.34	2.54	2.87	2.3	5.18	3.12	3.92	4.18	1.57
2017/4	2.24	4.26	2.42	2.82	2.09	4.79	2.93	3.96	4.29	1.55
2018/1	1.99	4.73	2.43	2.79	2.26	4.93	2.92	3.86	4.12	1.73
2018/2	2.73	5.02	3.22	2.64	2.71	4.82	2.9	3.85	3.84	1.85
2018/3	3.43	5.88	4.4	2.29	3.36	4.71	3.22	3.86	3.78	2.02
2018/4	4.21	6.38	4.96	3.29	4.12	6.04	4.15	4.63	5.45	2.4
2019/1	4.75	6.58	5.18	3.27	5.02	6.11	4.81	4.78	5.49	1.94
2019/2	5.36	7.67	5.58	4.02	5.76	6.38	5.24	4.73	5.84	2.02
2019/3	7.17	8.66	6.72	4.57	6.69	6.25	5.58	5.22	6.82	2.28
2019/4	7.86	10.45	6.89	5.15	6.49	6.86	5.99	5.92	7.54	2.8
2020/1	7.44	10.34	6.51	4.75	5.98	6.32	5.07	5.3	7.03	2.66
2020/2	6.79	9.44	5.97	3.9	5.63	6.46	5.14	4.29	6.62	2.3

2020/3	6.37	9.32	5.96	3.57	5.21	5.53	4.77	3.72	6.05	2.1
2020/4	6.83	8.86	4.56	3.76	5.54	5.98	4.22	3.96	6.38	2.29
2021/1	6.41	8.44	4.47	3.49	5.26	5.65	3.93	3.64	5.4	2.14
2021/2	6.25	8.29	4.1	3.41	4.89	5.29	3.61	3.66	5.22	2.17
2021/3	5.75	8.22	3.96	3.4	4.79	4.42	3.27	3.46	4.94	2.18
2021/4	5.29	8.04	3.78	3.02	4.12	4.15	3.08	3.09	4.62	1.93

Source: bddk.gov.tr./ Calculated by the authors considering the data in the Independent Audit Reports

### Appendix 3. NPL after balance sheet cleaning/Total Loans (%) (Clean NPL Ratio)

	Bank1	Bank2	Bank3	Bank4	Bank5	Bank6	Bank7	Bank8	Bank9	Bank10
2012/1	1.63	3.14	1.88	2.77	2.17	5.97	2.79	3.44	3.03	1.26
2012/2	1.54	2.85	1.69	2.74	1.72	5.98	1.84	3.43	3.14	1.37
2012/3	1.49	3.52	1.75	2.83	1.91	6.14	2.09	3.68	3.38	2.55
2012/4	0.53	3.39	2.01	2.78	1.17	6.43	1.09	3.8	2.31	2.77
2013/1	1.38	3.98	2.23	2.71	2.0	6.75	2.19	4.1	3.22	2.68
2013/2	0.93	3.92	1.6	2.62	1.58	4.67	1.63	3.95	3.35	2.38
2013/3	1.03	3.91	1.63	2.48	1.59	4.89	1.78	3.87	3.62	2.25
2013/4	1.18	2.94	1.77	2.46	1.27	5.32	1.89	3.86	3.24	2.1
2014/1	1.56	3.57	2.09	2.55	1.67	6.25	2.3	3.88	3.43	2
2014/2	1.41	3.81	1.99	2.53	1.18	3.55	2.46	3.89	3.27	1.94
2014/3	1.57	3.95	1.97	3.64	1.21	3.74	1.8	3.95	2.87	1.92
2014/4	1.33	2.88	2.14	3.46	0.91	2.9	2	3.61	2.89	1.85
2015/1	1.59	3.96	2.18	3.29	1.24	5.32	1.52	3.51	3.47	1.73
2015/2	1.76	4.26	2.28	3.04	1.34	5.55	1.64	3.44	3.49	1.68
2015/3	1.9	4.48	2.51	2.9	1.44	5.72	1.86	3.61	3.67	1.6
2015/4	2.03	4.83	2.49	2.96	1.71	6.04	1.29	3.73	3.97	1.62
2016/1	1.82	4.94	2.37	3.07	2.09	6.36	2.49	3.87	4.05	1.65
2016/2	1.94	4.15	2.37	2.93	2.3	5.18	2.07	3.99	4.37	1.65
2016/3	2.08	4.1	2.54	2.99	2.44	5.5	2.55	3.99	4.8	1.78
2016/4	2.21	4.0	2.11	3.03	1.89	4.47	2.12	4.13	4.88	1.75
2017/1	2.48	4.07	2.51	3.06	2.24	5.32	2.89	4.15	4.17	1.69
2017/2	1.78	3.6	2.31	2.98	2.3	5.26	2.78	3.98	3.48	1.58
2017/3	1.81	3.7	2.38	2.87	2.3	5.18	2.65	3.92	3.36	1.57
2017/4	1.88	3.47	2.01	2.82	1.81	3.95	2.1	3.96	3.51	1.55
2018/1	1.61	4.73	2.43	2.79	2.26	4.93	2.72	3.86	3.81	1.73
2018/2	2.35	4.7	3.22	2.64	2.7	4.82	2.59	3.85	3.1	1.85
2018/3	3.06	5.56	4.4	2.29	3.36	4.71	2.68	3.86	2.97	2.02
2018/4	1.79	5.03	3.94	3.29	3.77	5.93	3.4	4.63	4.34	2.4
2019/1	4.75	6.39	5.18	3.27	5.02	6.11	4.67	4.78	5.32	1.94
2019/2	5.36	7.48	5.58	4.02	5.6	6.38	4.89	4.73	4.95	2.02
2019/3	7.17	8.48	6.72	4.57	6.11	6.25	4.91	5.22	5.7	2.28
2019/4	6.93	8.66	6.22	5.15	5.95	6.07	5.07	5.92	6.12	2.8
2020/1	7.44	10.34	6.51	4.75	5.98	6.32	4.91	5.3	6.7	2.66
2020/2	6.78	8.73	5.97	3.9	5.63	6.46	4.79	4.29	6.3	2.3
2020/3	6.37	8.66	5.96	3.57	5.21	5.53	4.3	3.72	5.73	2.1
2020/4	6.55	7.49	3.29	3.76	5.53	5.97	3.59	3.96	6.06	2.29
2021/1	6.4	8.44	4.46	3.49	5.06	5.65	3.77	3.64	5.08	2.14
2021/2	6.23	8.28	3.77	3.41	4.48	5.29	3.37	3.66	4.9	2.17
2021/3	5.72	7.71	3.63	3.4	4.31	3.84	2.92	3.3	4.63	2.18
2021/4	4.84	7.6	2.87	3.02	3.72	3.67	2.72	2.95	4.37	1.93

Source: bddk.gov.tr./ Calculated by the authors considering the data in the Independent Audit Reports

**Appendix 4.** Difference Between NPL Ratios Before and After Balance Sheet Cleaning

Period	Bank1	Bank2	Bank3	Bank4	Bank5	Bank6	Bank7	Bank8	Bank9	Bank10
2012/1	0.09	0.17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2012/2	0.10	0.47	0.20	0.00	0.25	0.00	0.44	0.00	0.00	0.00
2012/3	0.13	0.72	0.18	0.00	0.25	0.00	0.43	0.00	0.00	0.00
2012/4	0.71	0.67	0.17	0.00	0.73	0.00	1.05	0.00	0.70	0.00
2013/1	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2013/2	0.28	0.00	0.28	0.00	0.08	1.29	0.33	0.00	0.00	0.00
2013/3	0.27	0.00	0.27	0.00	0.07	1.24	0.31	0.00	0.00	0.00
2013/4	0.29	0.45	0.25	0.00	0.28	1.21	0.30	0.00	0.20	0.00
2014/1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2014/2	0.22	0.00	0.11	0.00	0.34	1.67	0.00	0.00	0.13	0.00
2014/3	0.24	0.02	0.21	0.00	0.32	1.55	0.39	0.00	0.38	0.00
2014/4	0.45	0.80	0.20	0.00	0.54	2.16	0.38	0.00	0.41	0.00
2015/1	0.19	0.00	0.05	0.00	0.21	0.00	0.51	0.00	0.00	0.00
2015/2	0.21	0.00	0.05	0.00	0.19	0.00	0.50	0.00	0.01	0.00
2015/3	0.22	0.00	0.14	0.00	0.19	0.00	0.48	0.00	0.02	0.00
2015/4	0.23	0.01	0.11	0.00	0.19	0.00	0.95	0.00	0.02	0.00
2016/1	0.30	0.00	0.19	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2016/2	0.30	0.49	0.33	0.00	0.00	0.73	0.35	0.00	0.00	0.00
2016/3	0.29	0.83	0.36	0.00	0.01	0.71	0.34	0.00	0.00	0.00
2016/4	0.28	0.81	0.54	0.00	0.37	1.72	0.87	0.00	0.00	0.00
2017/1	0.00	0.35	0.05	0.00	0.00	0.00	0.17	0.00	0.27	0.00
2017/2	0.39	0.65	0.16	0.00	0.00	0.01	0.29	0.00	0.72	0.00
2017/3	0.38	0.64	0.16	0.00	0.00	0.00	0.47	0.00	0.82	0.00
2017/4	0.36	0.79	0.41	0.00	0.28	0.84	0.83	0.00	0.78	0.00
2018/1	0.38	0.00	0.00	0.00	0.00	0.00	0.20	0.00	0.31	0.00
2018/2	0.38	0.32	0.00	0.00	0.01	0.00	0.31	0.00	0.74	0.00
2018/3	0.37	0.32	0.00	0.00	0.00	0.00	0.54	0.00	0.81	0.00
2018/4	2.42	1.35	1.02	0.00	0.35	0.11	0.75	0.00	1.11	0.00
2019/1	0.00	0.19	0.00	0.00	0.00	0.00	0.14	0.00	0.17	0.00
2019/2	0.00	0.19	0.00	0.00	0.16	0.00	0.35	0.00	0.89	0.00
2019/3	0.00	0.18	0.00	0.00	0.58	0.00	0.67	0.00	1.12	0.00
2019/4	0.93	1.79	0.67	0.00	0.54	0.79	0.92	0.00	1.42	0.00
2020/1	0.00	0.00	0.00	0.00	0.00	0.00	0.16	0.00	0.33	0.00
2020/2	0.01	0.71	0.00	0.00	0.00	0.00	0.35	0.00	0.32	0.00
2020/3	0.00	0.66	0.00	0.00	0.00	0.00	0.47	0.00	0.32	0.00
2020/4	0.28	1.37	1.27	0.00	0.01	0.01	0.63	0.00	0.32	0.00
2021/1	0.01	0.00	0.01	0.00	0.20	0.00	0.16	0.00	0.32	0.00
2021/2	0.02	0.01	0.33	0.00	0.41	0.00	0.24	0.00	0.32	0.00
2021/3	0.03	0.51	0.33	0.00	0.48	0.58	0.35	0.16	0.31	0.00
2021/4	0.45	0.44	0.91	0.00	0.40	0.48	0.36	0.14	0.25	0.00
Mean	0.28	0.40	0.22	0.00	0.19	0.38	0.40	0.01	0.34	0.00
Order	5	2	6	9	7	3	1	8	4	10

**Appendix 5. Cost Efficiency Scores of Banks**

Period	Bank1	Bank2	Bank3	Bank4	Bank5	Bank6	Bank7	Bank8	Bank9	Bank10
2012/1	0.90	0.89	0.91	0.89	0.88	0.91	0.89	0.89	0.90	0.92
2012/2	0.90	0.90	0.89	0.91	0.89	0.91	0.89	0.89	0.90	0.92
2012/3	0.89	0.90	0.89	0.90	0.89	0.91	0.89	0.89	0.90	0.91
2012/4	0.89	0.89	0.89	0.91	0.89	0.91	0.89	0.89	0.90	0.91
2013/1	0.85	0.81	0.67	0.78	0.70	0.87	0.76	0.55	0.81	0.89
2013/2	0.79	0.79	0.74	0.82	0.65	0.83	0.76	0.76	0.81	0.88
2013/3	0.71	0.66	0.68	0.83	0.53	0.80	0.72	0.74	0.74	0.85
2013/4	0.67	0.71	0.70	0.84	0.51	0.81	0.68	0.83	0.71	0.82
2014/1	0.46	0.50	0.39	0.64	0.18	0.84	0.58	0.34	0.51	0.52
2014/2	0.35	0.55	0.36	0.81	0.19	0.99	0.68	0.74	0.52	0.43
2014/3	0.25	0.58	0.76	0.86	0.15	0.93	0.46	0.80	0.49	0.42
2014/4	0.21	0.64	0.56	0.99	0.14	0.97	0.18	0.63	0.38	0.46
2015/1	0.84	0.37	0.54	0.59	0.33	0.77	0.56	0.61	0.57	0.66
2015/2	0.75	0.66	0.68	0.66	0.33	0.76	0.58	0.69	0.50	0.61
2015/3	0.71	0.63	0.64	0.70	0.26	0.85	0.56	0.66	0.59	0.66
2015/4	0.61	0.68	0.68	0.74	0.21	0.83	0.59	0.67	0.60	0.69
2016/1	0.92	0.26	0.28	0.65	0.36	0.85	0.64	0.31	0.26	0.44
2016/2	0.86	0.49	0.28	0.63	0.82	0.82	0.57	0.71	0.24	0.43
2016/3	0.73	0.65	0.71	0.74	0.72	0.78	0.51	0.64	0.21	0.40
2016/4	0.60	0.61	0.69	0.61	0.29	0.64	0.41	0.50	0.18	0.80
2017/1	0.70	0.12	0.18	0.26	0.20	0.81	0.14	0.18	0.16	0.28
2017/2	0.66	0.11	0.43	0.59	0.39	0.53	0.12	0.44	0.50	0.28
2017/3	0.59	0.11	0.42	0.60	0.14	0.80	0.10	0.41	0.12	0.60
2017/4	0.49	0.28	0.39	0.64	0.12	0.78	0.91	0.36	0.11	0.55
2018/1	0.82	0.78	0.78	0.78	0.77	0.81	0.78	0.80	0.79	0.79
2018/2	0.82	0.78	0.78	0.81	0.77	0.82	0.78	0.81	0.79	0.81
2018/3	0.81	0.78	0.78	0.81	0.77	0.82	0.77	0.81	0.79	0.81
2018/4	0.82	0.79	0.79	0.81	0.77	0.83	0.79	0.80	0.77	0.82
2019/1	0.73	0.68	0.67	0.71	0.68	0.73	0.70	0.71	0.72	0.71
2019/2	0.75	0.69	0.67	0.71	0.69	0.73	0.66	0.73	0.71	0.73
2019/3	0.75	0.69	0.68	0.71	0.69	0.73	0.66	0.73	0.72	0.73
2019/4	0.76	0.70	0.69	0.71	0.70	0.73	0.70	0.73	0.72	0.74
2020/1	0.73	0.65	0.66	0.68	0.64	0.68	0.68	0.75	0.68	0.69
2020/2	0.72	0.66	0.66	0.69	0.68	0.68	0.68	0.72	0.69	0.69
2020/3	0.72	0.65	0.66	0.69	0.67	0.68	0.67	0.71	0.69	0.69
2020/4	0.72	0.66	0.66	0.68	0.65	0.72	0.66	0.70	0.68	0.71
2021/1	0.69	0.62	0.63	0.66	0.62	0.67	0.65	0.69	0.67	0.68
2021/2	0.70	0.63	0.64	0.67	0.63	0.68	0.64	0.69	0.66	0.69
2021/3	0.70	0.63	0.64	0.67	0.63	0.69	0.65	0.69	0.66	0.69
2021/4	0.70	0.64	0.66	0.68	0.64	0.71	0.65	0.71	0.67	0.72



# Empowering Equity: The Impact of Tax Policies on Inclusive Growth in Turkey

Sevda AKAR<sup>1</sup> 

## ABSTRACT

This study uses the ARDL model to analyze whether the general tax structure affects inclusive growth in Turkey by investigating the 2006:1–2021:4 periods offering growth-friendly and inclusive tax policy reform proposals for Turkey. The Turkish economy is a notably fragile economy that is significantly affected by global shocks. Especially in recent years, the Turkish Lira has experienced a period of stable depreciation against other currencies, adversely affecting macroeconomic indicators such as inflation and economic confidence. Tax revenues are a basic building block in financing public expenditures. Turkey receives significantly lower tax revenues than most OECD countries; its tax structure is mainly based on consumption taxes and personal income tax and corporate tax are largely inadequate. Although this situation increases Turkey's economic growth, it also greatly deteriorates inequality in income distribution. The results of this study suggest that, in Turkey, property tax is more effective in promoting inclusive growth. However, Turkey's tax system is insufficient in terms of access to opportunities to allow Turkish society to benefit from economic growth. To foster inclusive growth in Turkey, it is strongly recommended that a thorough redesign of the tax structure be undertaken, aimed at ensuring equitable opportunities for the entire society.

**Keywords:** Tax Policy, Taxation, Progressivity, Inclusive Growth, Turkey.

**JEL Classification Codes:** E62, H20, O47

**Referencing Style:** APA 7

## INTRODUCTION

Governments attach great importance to economic growth for turning the wheels and transmission mechanism of the economy. The production of goods and services increases through economic growth, thereby decreasing unemployment. Increased employment positively affects total expenditures and incomes in the economy by increasing investments and savings, consequently triggering further economic growth (Mankiw, 2007; Ünsal, 2007).

Although countries target economic growth, it is worth noting whether this growth is inclusive. Inclusive growth was first introduced by Ali and Zhuang (2007); it is a concept related to the extent to which positive developments in the economy reflect on individuals within the affected society. Currently, there is general apprehension in many countries that economic growth is not distributed equitably in society. In basic terms, inclusive growth refers to the social sharing of growth. High poverty rates and increased income inequality are currently the most important constraints on inclusive growth. Despite its importance, economic growth alone cannot solve all market problems.

Recently, a consensus has emerged maintaining that it is more important to focus on inclusive growth rather than growth alone (OECD, 2014; IMF, 2015). The reason for this is that, when inclusive growth is achieved, both economic stability and fair income distribution are achieved, thereby decreasing poverty and facilitating the attainment of economic development goals.

Fiscal policy is just as effective as monetary policy in sharing returns from growth across society and can be used to achieve both economic growth and macroeconomic stability. As stated by Musgrave (1959), both tax and expenditure components are significantly important for inclusive growth, considering the roles of fiscal policy in resource allocation, income distribution, and economic stability. The IMF (2015) also supports this argument, suggesting that fiscal policy is an effective tool to support growth, increasing medium- and long-term growth by 0.75 percent in developed economies and even more in developing economies. This result is also compatible with the findings of Tanzi and Zee (1997), who suggest that fiscal policy is a fundamental factor affecting long-term growth performance.

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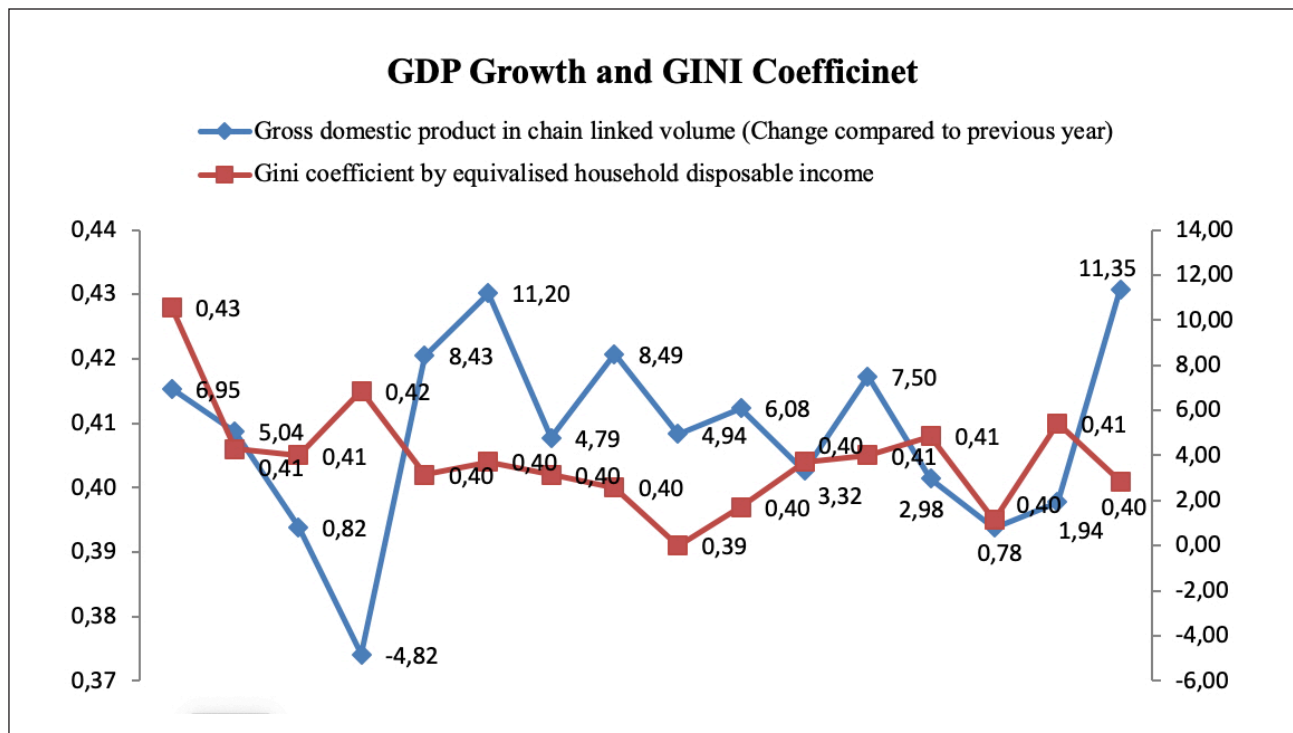
Arnold et al. (2011) were the first to analyze the growth effect of tax policy components. These authors investigated the design of a tax policy that not only facilitates economic recovery from a crisis but also contributes to long-term growth. The impact of tax policy on inclusive growth was also subsequently determined by Estrada et al. (2014), Pasha (2014), Brys et al. (2016), O'Reilly (2016), Hagemann (2018), O'Reilly (2018), Abdel-Kader and Mooij (2020), Mooij et al. (2020), and Acosta-Ormaechea et al. (2022); these studies evaluate the optimal utilization of tax policy components to attain inclusive growth.

Tax policy may not always achieve efficiency (growth) and fairness (distribution) in the economy simultaneously, as there is often a tradeoff between economic growth and fair distribution. Tax structure and tax components are two of the most important determinants of this tradeoff. It is normal for tax structures to be different between developed and developing countries. Direct taxes, such as personal income tax, are emphasized within the tax structure of developed countries, while indirect taxes such as VAT are more effective within the tax structure of developing countries (Estrada et al., 2014).

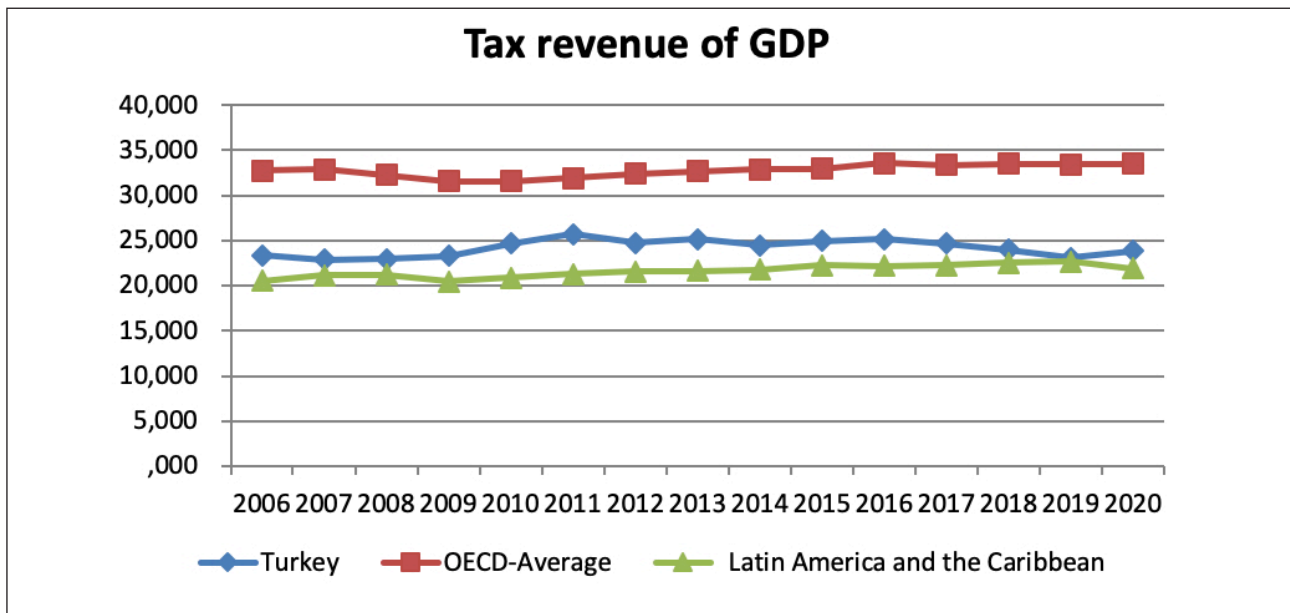
Turkey is an important developing country and has an annual average growth target of 5%, according to the Medium-Term Program (SBB, 2022). Due to the Covid-19 pandemic, several curfews were imposed in the second quarter of 2020 and the Turkish economy shrank by

10.4%. However, 21.9% growth was experienced with a rapid recovery process in the second quarter of 2021, and 9.1% growth was recorded in the last quarter of the same year. In line with these goals and realizations, it can be argued that the government has emphasized economic growth. Although a significant growth rate has been achieved in Turkey, the degree to which this growth is inclusive is debatable. Considering income inequality according to the Gini coefficient (Figure 1), this recent growth in the Turkish economy has not been shared with everyone in society, leading to persistent income distribution inequality.

Turkey has a fragile economy that is significantly affected by global shocks. Particularly in recent years, the Turkish Lira has consistently depreciated against other currencies, negatively influencing crucial macroeconomic indicators such as inflation, domestic demand, economic confidence, investment climate, and escalating debt burden, leading to economic stress. Failure to take proper steps to prevent financial problems may cause these problems to persist in the long run. In particular, the failure to reach inflation targets in monetary policy, the interest rate cut pressures on the Central Bank, and the additional financial costs due to increased contingent liabilities deepen this process. In addition, tax expenditures related to the Covid-19 pandemic and inflation continue. However, taxes are not sufficiently progressive in Turkey considering tax policy and income distribution.



**Figure 1.** GDP Growth (%) and Gini Coefficient 2006–2021  
**Source:** TUIK, (2022).



**Figure 2.** Tax Revenue of GDP: Turkey, OECD, Latin America, and the Caribbean 2006-2020

**Source:** OECD, (2022).

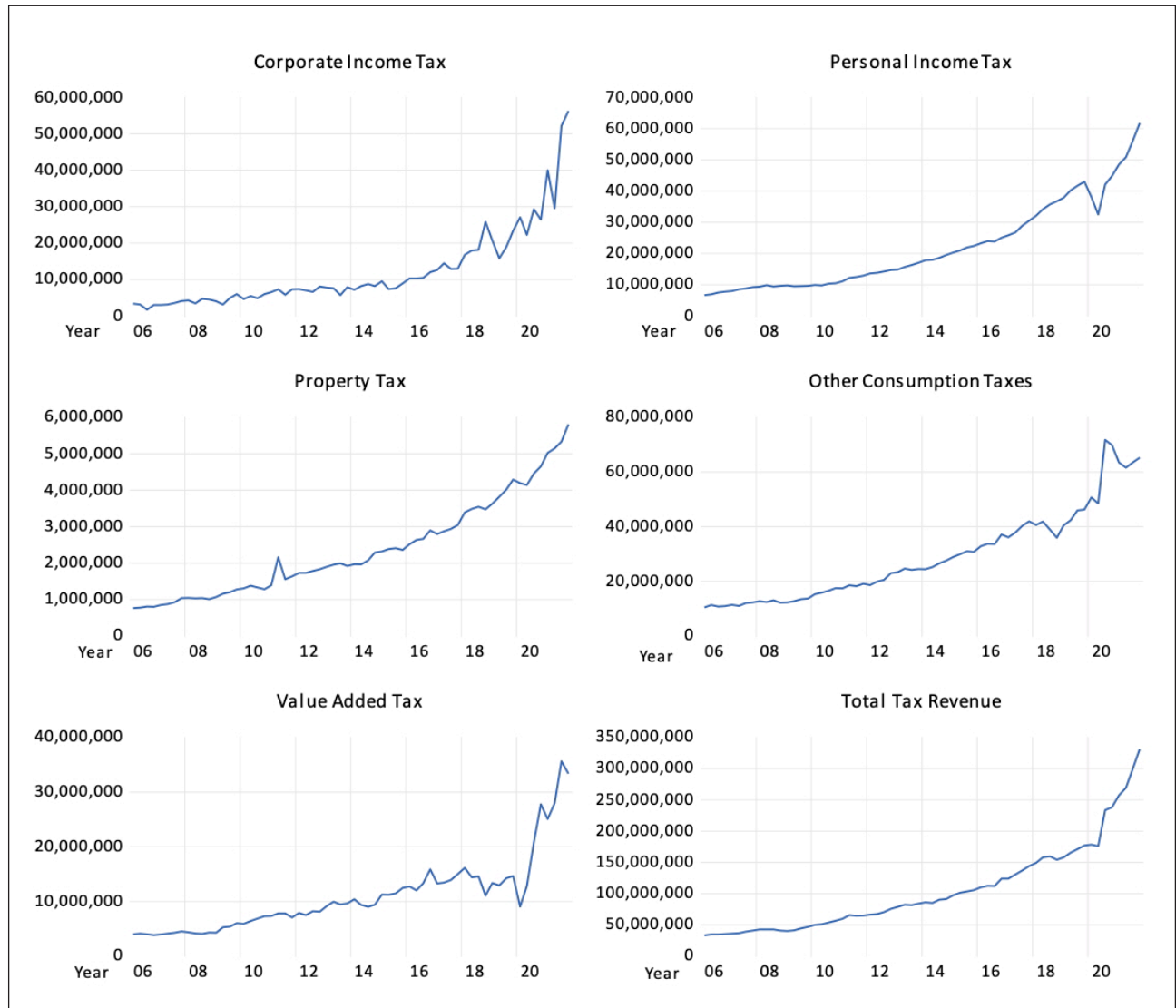
Turkey has lower tax revenues than the average tax revenue of OECD countries and collects slightly more moderate taxes than the average Latin American country (Figure 2). In Turkey, the portion of direct taxes in total tax incomes is relatively low, while the portion of indirect taxes is large, revealing gaps in the collection of PIT (Personal Income Tax) and CIT (Corporate Income Tax) revenues. In addition, Turkey has high-income distribution inequality and emphasizes efficiency in the tax system over unfair income distribution.

Tax deductions, exemptions, and privileges are the leading problems in Turkey's tax system, causing narrow-based taxes. Ultimately, these factors make taxation more complicated and decrease the effectiveness of taxation. Tanzi and Zee (1997) argue that this situation may lead to rent-seeking and hinder growth in the long term. Brys et al. (2016) state that the redistributive role of taxation in Turkey has a very limited function.

Graph 1 shows Turkey's CIT, PIT, real estate tax, VAT, other consumption taxes, and total tax revenues. Considering the tax structure of Turkey, the corporate tax rate decreased from 33% to 30% in 2005, to 20% in 2006, and remained at 20% until 2018. It was then increased to 22% from 2018 to 2020, and to 25% in 2021. The current corporate tax rate, effective from 2023, is 25%. Consumption taxes mainly consist of VAT and special consumption tax (SCT). In Turkey, VAT is applied at three different rates: 1%, 8%, and 18%. On July 7, 2023, the general VAT rate was increased from 18% to 20%, and the 8% reduced VAT rate was increased to 10%. SCT revenues mainly come from petroleum products,

vehicles, alcoholic and non-alcoholic beverages, cigarettes and tobacco products, and other goods, with a different tax rate applied for each category. Due to the increase in exchange rates and oil prices, the SCT taken from petroleum products began to be covered by the government in certain periods (especially during periods of increased public pressure). This method was called the "sliding scale system", in which the SCT on fuel was reset after fuel price increases, and the tax loss was financed by the government. The sliding scale system was intensively implemented between 2018 and 2020.

In the first two quarters of 2021, consumption tax revenues decreased due to curfews and travel bans and the Covid-19 pandemic led to tax deferrals. As of 2021, due to the increased inflation rate, VAT was reduced for basic consumer goods. In the first two quarters of 2020, the effects of the Covid-19 pandemic were not only experienced in consumption tax revenues but also in PIT revenues. In particular, taxes from tradesmen and the self-employed (17% and 20%) were deferred. Since 2021, taxpayers subject to simple taxation have been exempted from income taxes. PIT paid by wage earners is applied progressively at 15%, 20%, 27%, 35%, and 40%. Property tax is only paid in March and November. In addition to existing property tax, valuable house tax came into effect in 2021. In the same year, construction costs rose due to the impacts of the Covid-19 epidemic and the increasing exchange rate. In response to these developments, the government declared a support package to revive the housing sector and reduce the effects of the pandemic. According to this package, the amount of loanable



**Graph 1.** Tax Composition in Turkey (Thousand Turkish Lira)

**Source:** TCMB (2022).

funds for residences was increased and the minimum down payment amount was reduced. Total tax revenues decreased during the pandemic period. Following the reduction in the severity of the pandemic, strict measures were removed and the normalization process began, resulting in economic recovery in the last two quarters of 2021.

For those reasons discussed above, Turkey is a country worth examining for inclusive growth. Considering tax policy as a fundamental part of inclusive growth, the link between tax policy and inclusive growth needs to be better understood if Turkey is to achieve its sustainability goals. The study aims to state whether tax policy in effect in Turkey is effective in achieving inclusive growth in Turkey, and generally seeks answers to the following questions:

1. Has inclusive growth been realized through tax policies in Turkey?
2. What are the distributional effects of taxes applied in Turkey?
3. What kind of tax policy should be applied for inclusive growth in the Turkish economy?

To the best of our knowledge, there is no study in the literature that analyzes the relationship between tax structure and inclusive growth in Turkey. Hence, the study will fill this gap in the literature and contribute to the discussion of tax policy and inclusive growth.

The study is organized as follows: the first part introduces the theoretical background and literature, the second part explains data and methodology, the third part contains empirical data, and the third and final part presents the conclusion and discussion.

## THEORETICAL BACKGROUND AND LITERATURE

Inclusive growth was first defined by Ali and Zhuang (2007), who defined it as growth with equal opportunities. Inclusive growth centers on creating and nurturing opportunities that are accessible to all individuals. To achieve effective inclusive growth, it is necessary to have high and sustainable growth for creating decent employment opportunities and social inclusion to ensure equal access to opportunities for all individuals.

The Commission on Growth and Development (2008) emphasized the concept of inclusivity while defining inclusive growth. Policy fundamentals of sustainable and high growth provide a basis for high levels of investment, job creation, competitiveness, resource mobility, social protection, equity, and inclusion. According to McKinley (2010), inclusive growth refers to the creation of economic opportunities and ensuring sustainable growth by making this growth useable by the entire society. Social security benefits are also addressed to protect the most fragile and disadvantaged individuals.

According to OECD (2014) and Brys et al. (2016), economic growth is crucial but not adequate for inclusive growth unless the benefits of this growth are distributed equitably among citizens and social groups; inclusive growth focuses on achieving continuous improvements in well-being. In addition to income and wealth, non-income dimensions such as health and education also significantly affect people's well-being. Like the OECD (2014), Cerra (2022) also defines inclusive growth as a multidimensional concept and sets out the components of this multidimensional concept when defining inclusive growth. Accordingly, there are three key components of inclusive growth: (1) strong economic growth, (2) inclusivity, and (3) sustainability.

Considering the above-mentioned definitions, inclusive growth is directly related to both macro- and micro-economic dimensions of economic growth. The macroeconomic dimension of growth is based on the Solow–Swan balanced model, emphasizing technological development as the main source of economic growth and underlying the importance of education in labor productivity (Solow, 1956; Swan, 1956). The microeconomic dimension of growth considers systematic change for economic diversity and competitiveness, including the inventive destruction of jobs, necessitating a new distribution policy. Kuznet (1957) and Chenery (1960) often suggest “structural changes” in this new distribution process. According to Kuznets

(1957), income inequality rises with economic growth in the preliminary steps of economic development but decreases in the later stages of economic development. Chenery (1960) states that the transition from agriculture to industry through industrialization is an important factor in economic growth. A recently introduced institutional model by Kongsamut et al. (2001) combines the dynamics of growth and sectoral labor distribution. Ianchovichina and Gable (2012) suggest relocating employment to the agriculture, manufacturing, and service sectors (Ianchovichina and Lundstrom, 2009).

Growth models in the literature focus on the distribution of growth between sectors, the redistribution of income, sustainability, and productivity. The rapid economic growth achieved with these models in recent years has also introduced the problem of income inequality to the agenda. Fiscal policy is one of those policy tools that can be used to provide equal opportunities to everyone in society and claims are made that it can provide a fairer income distribution. The two main components of fiscal policy are expenditure and income. Increasing equity-promoting spending such as education, health, and social protection without increasing incomes can threaten fiscal sustainability. Here, the primary challenge lies in effectively utilizing fiscal policy to foster inclusive growth without compromising fiscal sustainability (Estrada et al., 2014).

Fiscal policy can reduce inequality in terms of both expenditure and income; studies suggest that public spending has a significant impact on inequality (Bastagli et al., 2012; Claus et al., 2014). However, increasing tax revenues and a fair distribution of these revenues are needed to finance public expenditures without impairing financial sustainability. According to Bloch et al. (2016), there is a consensus in the literature that the shift of expenditures to productive expenditures, such as education and health, will increase long-term growth. In addition, the authors argue that shifting taxation from income tax to consumption and property taxes will accelerate growth and that the decrease in the share of “productive expenditures” and the decrease in dependence on distorted taxes are mutually exclusive in terms of their effects on growth. Contrary to these views, Brys et al. (2016) state that the variation between increased tax expenditures of the rich and the use of reimbursable tax credits by the poor is sometimes unclear. Such applications make it difficult to determine whether the transfer-expenditure side of the fiscal policy belongs to the tax side. According to Pasha (2014), the main purpose of progressive fiscal policy is to achieve



inclusive growth, which does not increase inequality and benefits all segments of the population. The success or failure of fiscal policy can be evaluated by identifying current gaps in inclusive growth, which also enables us to identify the difficulties for progressive fiscal policy. In general terms, fiscal policy's focus on the deficits of inclusive growth may be limited to "political economy".

Comparatively, Zouhar et al. (2021) argue that the effect of income policy on inclusive growth may be large enough to balance or increase the effect of expenditure policy. For instance, on the expenditure dimension cash transfers may appear pro-poor, but if deprived individuals pay more taxes the effects of these taxes may be zero or negative on transfers. Therefore, the design of taxes is an important issue for inclusive growth.

A large part of the public revenues policy, which is the main component of fiscal policy, consists of tax revenues. In the literature, the relationship between tax policy and inclusive growth was first discussed by Arnold et al. (2011). Arnold et al. (2011) focus on tax policy design that positively affects both short- and long-term growth. Short-run recovery requires an increase in demand, while long-run growth necessitates an increase in supply. This distinction is significant, as short-run tax concessions can be challenging to reverse, implying that policies aimed at alleviating the crisis may jeopardize long-run growth.

According to Mooij et al. (2020), a tax policy can be evaluated in terms of how inclusive it is and how friendly it is toward growth. Inclusivity reflects the progressiveness of the tax system; as taxpayers' income or wealth increases, their tax burden also increases. Taxes affect much broader aspects of social welfare and are ultimately a means to finance public expenditure. These expenditures can positively trigger inclusive growth. There is a broad agreement that the state needs a minimum level of tax revenue to attain inclusive economic growth (Abdel-Kader and Mooij, 2020).

Tax reforms aimed at fostering growth may incur specific costs in meeting equity targets. Therefore, the design of tax policies for inclusive growth necessitates a thorough examination of their distributional effects (Brys, et al., 2016 Mooij et al., 2020). According to O'Reilly (2018), economic growth and equality can be achieved with win-win policies. For example, higher tax progressivity and a wider tax base will mean that the redistribution of income in a country will be more equitable; conversely, inequality will be greater if the converse is true. In addition, if access to education and health services becomes easier in society, growth and equality will both increase in the

country. Similarly, if social security benefits are provided to a wide range of citizens, the informal economy will decrease within the cost-benefit framework, meaning that growth will increase and unregistered workers will enter the system and be advantaged by social benefits, thereby reducing inequality.

Heshmati et al. (2019) claimed that countries can choose a range of fiscal policy practices to achieve inclusive growth, including tax and social assistance systems, both of which focus on economic growth while reducing inequality and negative effects on growth. In their study, these authors argue that a fair and sustainable tax policy and redistribution system promotes inclusive economic growth. Thus, improved social protection can be achieved and the number of citizens living in poverty should be reduced through more inclusive growth.

Stiglitz (2016) states that increased expenditures and taxes can increase GDP. If countries can choose spending and taxes with efficacy in their fiscal policy, the budget multiplier can be quite high. Tax revenues to GDP ratios are frequently low in developing countries, and therefore higher tax rates are needed in these countries to accelerate growth and support inclusivity through public spending. Thus, tax composition significantly affects growth and inclusivity. Estrada et al. (2014) emphasize that in developing economies, indirect taxes are more critical for revenue generation compared to income taxes, while the opposite is true in developed economies. According to Mooij et al. (2020), tax policy options in developed market economies include more progressive PIT and neutral taxation of CIT, a wider VAT base, and greater taxation of property taxes and inheritance taxes. However, these features may be preferable for inclusive growth if non-progressive tax increases finance welfare expenditures that provide better living standards.

High marginal tax rates in personal income tax create a substitution effect, distort individuals' choices concerning work and leisure time, and encourage tax avoidance and tax evasion. Therefore, optimal progressivity in personal income tax should strike a balance between efficiency and equity (Mooij et al., 2020; Abdel-Kader and Mooij, 2020; Besley and Persson, 2014).

CIT, another pillar of direct taxes, is an integral part of income tax and an important source of income for governments. According to Mooij et al. (2020), the extent to which corporate tax contributes to progressivity remains unclear. The rate of this tax can be passed, not only to firms or shareholders but also to employees by lowering their wages. According to Stiglitz (2016),



lowering the corporate tax rate cannot have an important impact on productive investment. Reducing taxes on companies that invest and create new jobs, and increasing taxes on those that do not invest and create new jobs can only provide strong incentives to make further investments.

Wealth taxes, such as property taxes, are levied on capital stocks or transfers, reduce wealth inequality between generations, and help to realize equal opportunity, which is an important dimension of inclusivity. Wealth taxes are an effective means of redistribution. Abdon et al. (2014) argue that increasing property taxes is more beneficial for growth but reduces income tax in the tax composition. Since property taxes are mostly borne by wealthy households, increasing these taxes can be an effective option to promote both efficiency and equity.

Per the literature, consumption taxes tend to be more growth-friendly than income taxes; in comparison, income taxes generally reduce inequality more than consumption taxes. This choice of tax structure illustrates the tradeoff between growth and inclusivity. Consumption taxes are preferred partly because of implementation and collection convenience and partly because they are an important source of governmental income (Mendoza et al., 1997; Abdon et al., 2014; Abdel-Kader and Mooij, 2020; Mooij et al., 2020). However, all these assumptions apply to VAT, which has a uniform tax rate and a broad tax base. Otherwise, a complex VAT regulation resulting from different rate applications and exemptions may have negative effects on the economy (Acosta-Ormaechea et al., 2022). In fact, Acosta Ormaechea and Morozumi (2021) argue that this may harm economic growth. However, Mooij et al. (2020) argue that widening the tax base for VAT is less detrimental to growth than increasing tax rates. Similarly, according to Hagemann (2018), taxes can be listed from the least harmful to the most detrimental to economic growth as follows: real estate taxes, consumption taxes (including environmental taxes), PIT, and CIT.

Although this does not imply that tax increases inherently stimulate GDP, it suggests that consumption taxes are less detrimental to growth relative to other taxes. From a macroeconomic theory perspective, consumption taxes cause fewer distortions in economic behavior by not directly affecting savings and investments, which are crucial for long-term growth. These taxes typically have a broad base, allowing for lower rates and reducing the economic burden on specific groups, thereby enhancing efficiency. In contrast, income taxes can disincentivize work and investment through high marginal rates,

negatively impacting economic growth. Keynesian theory underscores the role of fiscal policy and the structure of taxation in managing economic activity, suggesting that consumption taxes, due to their less distortionary nature, support sustained growth. Efficient public spending further mitigates the potential negative impacts of higher taxes. Therefore, while income taxes are effective in reducing inequality, consumption taxes are considered more growth-friendly, fostering long-term economic expansion with minimal adverse effects.

The literature is quite limited in terms of empirical studies on inclusive growth and tax policy. Arnold et al. (2011) analyzed the effect of tax components on GDP per capita by panel regression from 21 OECD countries between 1971 and 2004. The authors discovered that a 1% transition in tax revenues from income taxes to consumption and property taxes increased long-term GDP per capita by 0.25–1%.

Mobolaji et al. (2015) investigated the role of fiscal policy in inclusive growth in Nigeria during the 1980–2013 period. The findings of their study indicated a positive and substantial impact of fiscal policy on inclusive growth. The Granger causality test results demonstrated a one-way causation from fiscal policy to inclusive growth in Nigeria. Finally, the authors suggested that government expenditures, tax revenues, and budget deficits from fiscal policy variables could be used to increase inclusive growth in Nigeria. Oyinlola et al. (2020) found that total taxes and disaggregated taxes did not have a major effect on inclusive growth in 27 sub-Saharan African countries during the 1995–2015 period. Their study suggests to policymakers in the region that credible tax reforms should be developed along with quality governance to transform growth into inclusivity.

Acosta-Ormaechea et al. (2022) compared the tax structures of Latin America and OECD countries and presented inclusive growth-friendly tax policy recommendations. According to the study results, Latin American countries gather much lower tax revenues than OECD countries and their tax systems are largely based on corporate tax and personal income tax, which are insufficient compared with those of OECD countries. Therefore, the authors suggested that Latin American countries should strengthen their personal income tax structure to increase their tax revenues and progressivity. Overall, the study proposes tax reform to reorganize direct taxes, focusing on balancing growth and equity goals.

## DATA and METHODOLOGY

The purpose of this study is to analyze the effectiveness of tax policy tools in achieving inclusive growth in Turkey. Quarterly data covering the 2006:1–2021:4 period were used in this research. All data included in the analysis were obtained from TCMB. Table 1 presents the variables used in this study. These variables were seasonally adjusted using the Tramo–Seats method.

Graph 2 shows the graphs and Table 2 demonstrates descriptive statistics of the study variables. The variables are seasonally adjusted and shown as percentages, as expressed in Table 1.

In the literature, inclusive growth is modeled by the increase in per capita income (McKinley, 2010; Acosta-Ormaechea and Morzumi, 2021; Acosta-Ormaechea et al., 2022). The ARDL model in equation (1) was used to examine the effect of taxes on inclusive growth.

In case of the variables being integrated in different orders and there being a cointegration relationship between them, the error correction model based on equation (1) can be created as equation (2).

In equations (1) and (2),  $Y_t$  refers to GDP per capita,  $X$  to variables regarding tax structure (CIT, PIT, VAT, and other consumption taxes; property tax; and total tax revenues), and  $Z$  to control variables (investment rate, employment growth, social security contribution, and government consumption).

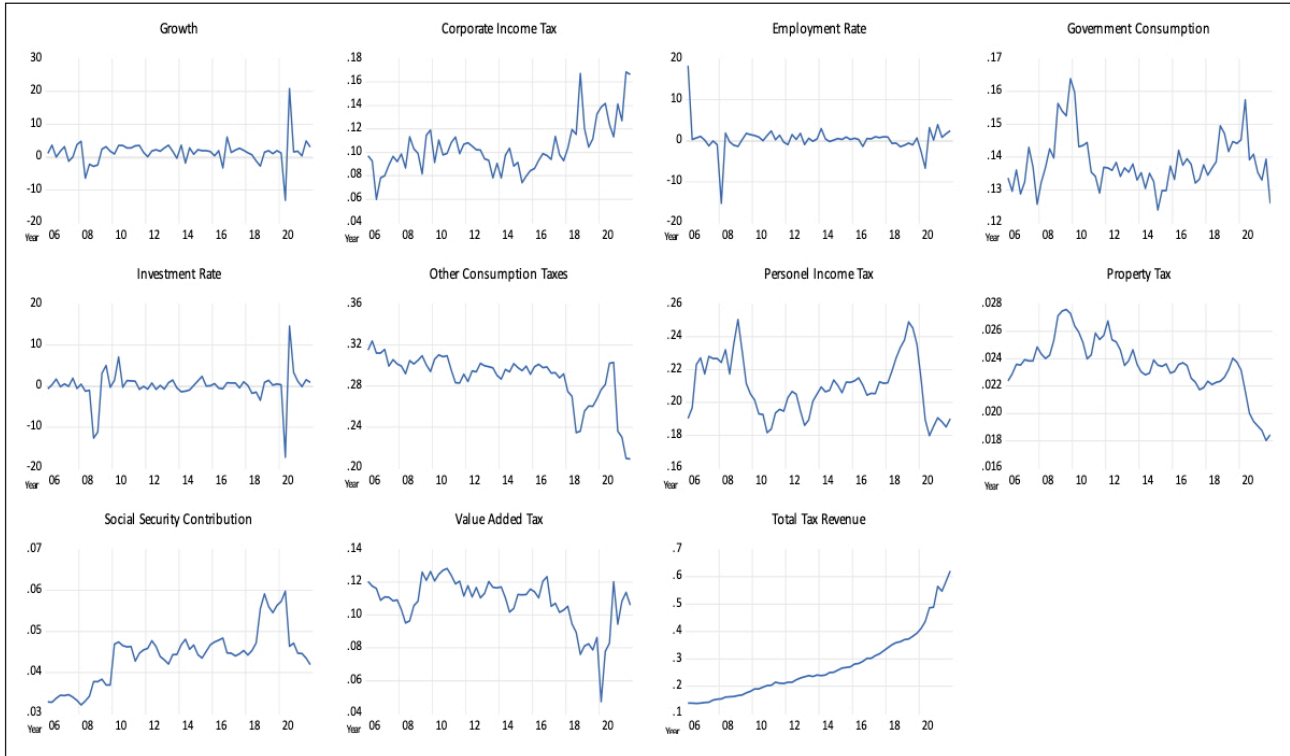
## EMPIRICAL FINDINGS

In the study, empirical analysis was performed in three stages. First, the stationarity levels of the variables were examined by unit root tests. Second, cointegration analysis was performed by the bounds test. Third, the short- and long-term relationships between the variables were evaluated by the ARDL method. Sajid and Ali (2018) and Munir and Ullah (2018) conducted studies to analyze inclusive growth using the ARDL method.

The study conducted a time series analysis to assess the stationarity of the model variables through unit root tests (Table 3). According to the unit root test results, and series were stationary, that is,  $I(0)$ . The other variables in the study had a unit root; they were stationary at their first difference. Therefore, *growth cit*, *cont*, *govc*, *pit*, *prot*, *ssc*, *ttax* and *vat* variables were  $I(1)$ . The integration of the

**Table 1.** Definition of Variables

Variable	Symbol	Definition
Corporate Income Tax	<i>cit</i>	Refers to the tax collected from corporations. (Corporate income tax/Total tax revenue (%)).
Consumption Tax	<i>cont</i>	Refers to the taxes levied on consumption. The consumption tax is expressed as a percentage proportioning to the total tax revenues. Consumption taxes; consist of domestically collected goods and services taxes. (Consumption tax/Total tax revenue (%)).
Employment Growth	<i>emp</i>	Refers to the rise in the labor force participation of the population aged 15 years or over. (Employment Growth (%)).
Government Consumption	<i>govc</i>	Refers to the government's current spending for purchases of goods and services. (Government consumption/GDP (%)).
Growth Rate	<i>growth</i>	Derived from GDP in chain-linked volume by expenditure approach per capita growth. (GDP per capita growth (%)).
Investment Rate	<i>inver</i>	Refers to the capacity utilization rate of the manufacturing industry. (Investment rate/GDP (%)).
Personal Income Tax	<i>pit</i>	Refers to the tax collected from individuals. (Personal income tax/Total tax revenue (%)).
Property Tax	<i>prot</i>	Refers to the taxes levied on the property. Property taxes consist of inheritance and gift tax, motor vehicle tax, and valuable housing tax. (Property tax/Total tax revenue (%)).
Social Security Contribution	<i>ssc</i>	State contributions to social security institutions consist of civil servants, workers, contracted personnel, temporary and other personnel, and the purchase of goods and services. (Social security contribution/Total tax revenue (%)).
Total Tax Revenue	<i>ttax</i>	Shows the amount of all taxes collected in the country. (Total tax revenue/GDP (%)).
Value Added Tax	<i>vat</i>	In the delivery of goods and services, value-added tax is an expenditure tax that is paid by the person who delivers the goods and services but is burdened by the receiver of those goods and services. (Value added tax/Total tax revenue (%)).



Graph 2. Graph of the Variables

Table 2. Descriptive Statistics

Variables	Mean	Median	Min	Max	Std Deviation	Observations
<i>cit</i>	0.104	0.099	0.059	0.168	0.021	64
<i>cont</i>	0.288	0.295	0.209	0.323	0.024	64
<i>emp</i>	0.347	0.387	-15.224	18.268	3.338	64
<i>govc</i>	0.138	0.136	0.123	0.163	0.008	64
<i>growth</i>	1.540	1.767	-13.146	20.837	3.734	64
<i>inver</i>	0.005	0.215	-17.344	14.577	3.899	64
<i>pit</i>	0.209	0.208	0.179	0.250	0.017	64
<i>prot</i>	0.023	0.023	0.018	0.027	0.002	64
<i>ssc</i>	0.044	0.044	0.032	0.059	0.006	64
<i>ttax</i>	0.272	0.239	0.136	0.621	0.118	64
<i>vat</i>	0.107	0.110	0.047	0.128	0.015	64

$$g_t = \alpha_0 + \sum_{i=1}^p \varphi_{0i} g_{t-i} + \sum_{j=1}^k \sum_{l_j=0}^{q_j} \beta_{0j,l_j} X_{j,t-l_j} + \sum_{m=1}^s \sum_{l_s=0}^{q_s} \omega_{0m,l_s} Z_{m,t-l_s} + \varepsilon_t \quad (1)$$

$$\Delta g_t = \alpha_1 + \sum_{i=1}^{p-1} \varphi_{1i} \Delta g_{t-1} + \sum_{j=1}^k \sum_{l_j=0}^{q_j-1} \beta_{1j,l_j} \Delta X_{j,t-l_j} + \sum_{m=1}^s \sum_{l_s=0}^{q_s-1} \omega_{1m,l_s} \Delta Z_{m,t-l_s} + \emptyset ECT_{t-1} + \varepsilon_t \quad (2)$$

variables in different orders prevents using the Johansen cointegration tests because all series must be integrated of the same order in the Johansen cointegration test. Another important point here is that the series that are to be included in the analysis are not integrated at second order I(2). Otherwise, the F-statistics designed by Pesaran et al. (2001) will be considered invalid in a bounds test analysis when determining whether the quadratic integrated variables are cointegrated, and the resulting estimates might lead to misleading results.

The second stage of the empirical model includes the boundary test. This is performed by comparing the F value calculated in this test and those critical values comprising the lower and upper limit values of the table suggested by Pesaran et al. (2001). This approach gives more reliable results than those of Johansen and Engle-Granger's (1987) cointegration analysis in case of a low number of observations (Narayan and Smith, 2006). Mah (2000) also states that this approach provides better results if the size of the sample is small.

The optimal lag length in the models was determined according to the Akaike (AIC), Schwarz (SIC), and Hannan Quin (HQ) information criteria. According to the boundary test results presented in Tables 4, 5, 6, 7, 8, and 9, the null hypothesis suggesting that there is no cointegration between the variables was rejected. In Tables 4, 5, 6,

7, 8, and 9, “k” represents the number of independent variables in the equation, and the critical thresholds are extracted Pesaran et al., Table C1(iii) in (2001: 300).

The ARDL model and the tax distribution and growth relationship were examined in the third stage of the empirical analysis. Table 10 presents the estimation

**Table 3.** Unit Root Tests

Variables	ADF			P-P			KPSS		Decision
	N	I	T and I	N	I	T and I	I	T and I	
<i>cit</i>	1.926 (0.986)	0.495 (0.985)	-0.269 (0.989)	0.964 (0.905)	-2.639 (0.090)	-3.819 (0.021)**	0.648*	0.208*	I(1)
$\Delta cit$	-5.412 (0.000)*	-5.835 (0.000)*	-5.939 (0.000)*	-13.271 (0.000)*	-14.405 (0.000)*	-18.881 (0.000)*	0.338	0.144	
<i>cont</i>	-1.776 (0.072)	1.256 (0.998)	-0.725 (0.965)	-1.132 (0.231)	-0.964 (0.760)	-2.549 (0.304)	0.880*	0.137*	I(1)
$\Delta cont$	-2.725 (0.007)**	-3.324 (0.018)**	-5.914 (0.000)*	-7.559 (0.000)*	-7.662 (0.000)*	-7.670 (0.000)*	0.123	0.051	
<i>emp</i>	-10.576 (0.000)*	-10.464 (0.000)*	-10.325 (0.000)*	-10.353 (0.000)*	-10.242 (0.000)*	-10.291 (0.000)*	0.076	0.055	I(0)
<i>govc</i>	-0.172 (0.620)	-2.641 (0.090)	-2.602 (0.280)	-0.326 (0.564)	-3.442 (0.013)**	-3.377 (0.063)	0.083*	0.083*	I(1)
$\Delta govc$	-10.417 (0.000)*	-10.329 (0.000)*	-10.310 (0.000)*	-10.474 (0.000)*	-10.385 (0.000)*	-10.369 (0.000)*	0.053	0.032	
<i>growth</i>	-1.151 (0.224)	-3.132 (0.030)	-3.138 (0.108)	-9.960 (0.000)*	-15.047 (0.000)*	-14.992 (0.000)*	0.190*	0.99*	I(I)
$\Delta growth$	-5.181 (0.000)*	-5.135 (0.000)*	-5.091 (0.000)*	-39.080 (0.000)*	-38.531 (0.000)*	-39.231 (0.000)*	0.336	0.264	
<i>inver</i>	-8.297 (0.000)*	-8.230 (0.000)*	-8.191 (0.000)*	-8.367 (0.000)*	-8.293 (0.000)*	-8.257 (0.000)*	0.069	0.041	I(0)
<i>pit</i>	-0.494 (0.497)	-2.978 (0.043)**	-2.966 (0.151)	-0.197 (0.611)	-2.549 (0.108)	-2.636 (0.266)	0.100*	0.090*	I(1)
$\Delta pit$	-2.353 (0.019)**	-2.345 (0.161)	-2.289 (0.432)	-5.662 (0.000)*	-5.611 (0.000)*	-5.591 (0.000)*	0.099	0.061	
<i>prot</i>	-0.920 (0.313)	-0.078 (0.946)	-2.778 (0.210)	-0.645 (0.433)	-0.768 (0.820)	-2.406 (0.372)	0.677*	0.160*	I(1)
$\Delta prot$	-4.818 (0.000)*	-4.897 (0.000)*	-5.299 (0.000)*	-5.879 (0.000)*	-5.827 (0.000)*	-6.008 (0.000)*	0.275	0.046	
<i>ssc</i>	0.088 (0.707)	-2.131 (0.233)	-2.047 (0.564)	0.127 (0.719)	-2.133 (0.232)	-2.155 (0.505)	0.702*	0.108*	I(1)
$\Delta ssc$	-7.757 (0.000)*	-7.713 (0.000)*	-7.798 (0.000)*	-7.764 (0.000)*	-7.720 (0.000)*	-7.837 (0.000)*	0.163	0.058	
<i>ttax</i>	0.679 (0.859)	1.925 (0.999)	4.387 (1.000)	6.443 (1.000)	6.343 (1.000)	4.421 (1.000)	0.945*	0.217*	I(1)
$\Delta ttax$	2.812 (0.998)	2.890 (1.000)	1.759 (1.000)	-7.100 (0.000)*	-8.749 (0.000)*	-10.232 (0.000)*	0.692	0.189	
<i>vat</i>	-0.261 (0.587)	-1.372 (0.589)	-3.909 (0.018)*	-0.571 (0.465)	-2.854 (0.056)	-3.138 (0.106)	0.461*	0.124*	I(1)
$\Delta vat$	-3.456 (0.000)*	-3.346 (0.017)**	-3.348 (0.069)	-11.951 (0.000)*	-11.863 (0.000)*	-11.774 (0.000)*	0.205	0.181	

**Note:** In the ADF test, the lag length criteria are chosen according to the Akaike info criterion. The Bartlett–Kernell estimation method was used as spectral estimation method in KPSS and Phillips–Peron tests and bandwidth was determined as Newey–West. ( ): marginal significance level \*: 1% significance level \*\*: 5% significance level. I: intercept, T and I: trend and intercept, N: none.

**Table 4.** F-Bounds Test (Dependent Variable: *growth* : VAT and Other Consumption)

k	F-statistic	Critical thresholds at the 1% significance level	
		I(0)	I(1)
1	8.627	2.79	4.1

**Table 5.** ARDL Error Correction Regression t-Bound Test (Dependent Variable: *growth* : VAT ve Other Consumption)

t-statistic	Critical thresholds at the 1% significance level	
	I(0)	I(1)
-7.457	-3.43	-5.37

**Table 6.** F-Bounds Test (Dependent Variable: *growth* : CIT)

k	F-statistic	Critical thresholds at the 1% significance level	
		I(0)	I(1)
1	7.379	2.96	4.26

**Table 7.** ARDL Error Correction Regression t-Bound Test (Dependent Variable: *growth* : CIT)

t-statistic	Critical thresholds at the 1% significance level	
	I(0)	I(1)
-7.065	-3.43	-5.19

**Table 8.** F-Bounds Test (Dependent Variable: *growth* : PIT)

k	F-statistic	Critical thresholds at the 1% significance level	
		I(0)	I(1)
1	12.684	2.96	4.26

**Table 9.** ARDL Error Correction Regression t-Bound Test (Dependent Variable: *growth* : PIT)

t-statistic	Critical thresholds at the 1% significance level	
	I(0)	I(1)
-9.352	-3.43	-5.19

results and also shows the diagnostics tests of the model. The Breusch-Godfrey LM test was used to state whether the model included autocorrelation. As the p-value was greater than 0.05, there was no autocorrelation in the model. The Breusch-Pagan-Godfrey test was used to examine the validity of the constant variance assumption, suggesting that the assumption of constant variance was provided as the probability value was greater than 0.05. The Jargue-Bera test was used to examine the validity of the normality assumption, suggesting that the residuals were normally distributed as the Jargue-Bera test probability value was greater than 0.05. The Ramsey Reset test was used to determine whether there was any

identification error in the model. According to the results of this test, there was no specification error in any of the models. in Equation (2) represents the error correction term, referring to a lagged value of the error term obtained from the ARDL model established to determine long-term relationships. The coefficient of error term is expected to be significantly negative; it shows how long it will take for a deviation in the long-term relationship between the variables to recover due to any shock.

The study separately evaluated the effect of taxes on GDP growth per capita in three different models. The first long-term model, which included consumption taxes,

**Table 10.** Tax Reallocations and Long-Term Growth

Dependent Variable: <i>growth</i>							
Tax Reallocations and Long-Term Form							
Variable	Consumption Taxes		Income Taxes (CIT)		Income Taxes (PIT)		
	Coefficient	t-Statistic	Coefficient	t-Statistic	Coefficient	t-Statistic	
<i>ttax</i>	18.556**	2.743 (0.010)	2.975	0.733 (0.469)	4.553***	1.818 (0.079)	
<i>prot</i>	835.535*	3.625 (0.001)	244.113	1.374 (0.180)	352.983**	2.440 (0.020)	
<i>ssc</i>	-63.201	-1.553 (0.131)	-22.236	-0.884 (0.384)	-15.198	-0.774 (0.444)	
<i>cont</i>	34.391***	1.964 (0.059)					
<i>vat</i>	-42.372***	-1.893 (0.068)					
<i>cit</i>			-25.909**	-2.431 (0.022)			
<i>pit</i>					-31.114*	-4.090 (0.000)	
<i>inver</i>	1.140*	6.624 (0.000)	1.080*	7.564 (0.000)	1.098*	9.259 (0.000)	
<i>emp</i>	0.139	1.418 (0.167)	0.160**	2.533 (0.017)	0.096***	1.753 (0.089)	
<i>govc</i>	-50.275**	-2.120 (0.042)	-17.933	-0.794 (0.433)	3.856	0.178 (0.859)	
CointEq(-1)*	-0.141*	-5.137 (0.000)	-0.189*	-6.434 (0.000)	-0.254*	-2.675 (0.001)	
Residual and Stability Diagnostics							
$R^2=0.935$	$X_{BG}^2=1.457$ (0.251)		$R^2=0.929$	$X_{BG}^2=0.025$ (0.975)		$R^2=0.956$	$X_{BG}^2=0.571$ (0.571)
$\bar{R}^2=0.864$	$X_{J-B}^2=4.761$ (0.546)		$\bar{R}^2=0.851$	$X_{J-B}^2=5.395$ (0.067)		$\bar{R}^2=0.911$	$X_{J-B}^2=11.909$ (0.002)
	$X_{B-P-G}^2=0.505$ (0.092)			$X_{B-P-G}^2=0.410$ (0.991)			$X_{B-P-G}^2=0.896$ (0.616)
	$X_{Ramsey}^2=0.714$ (0.480)			$X_{Ramsey}^2=0.508$ (0.615)			$X_{Ramsey}^2=0.522$ (0.605)

Note: \*,\*\* indicate 1% and 5% significance, respectively.  $X_{BG}^2$ ,  $X_{J-B}^2$ ,  $X_{B-P-G}^2$ ,  $X_{Ramsey}^2$  show that the Breusch-Godfrey serial correlation LM test, normality Jarque-Bera test, heteroskedasticity test, Breusch-Pagan-Godfrey, and stability diagnostics tests respectively. ( ): shows probability values.

property tax, and investment rates positively affected inclusive growth at the 1% significance level. Total tax revenues were found to be positive at the 5% significance level and government consumption was negative at the 5% significance level. Concerning the effects of consumption taxes such as VAT and SCT, VAT was negative at the 10% significance level and other consumption taxes were positive at the same significance level. In this model, the error correction coefficient was significant in the short run. A negative EC coefficient indicates that the system returns to its long-run equilibrium. According to the error correction term coefficient, a deviation in the short-term comes to the long-term equilibrium after approximately seven quarters ( $1/0.141=7.092$ ).

In the second model, which included corporate tax, the corporate tax positively affected the investment rates at the 1% significance level and the employment rate at the 5% significance level. This means that an increase in corporate tax is associated with an increase in investment rates, likely due to the reinvestment of profits by corporations to benefit from tax deductions or incentives provided for investments. Similarly, higher corporate taxes are correlated with higher employment rates, possibly because corporations increase

hiring to manage higher operational demands or to qualify for tax deductions associated with employment. However, CIT had negative effects overall at the 5% significance level. In the short run, the error correction coefficient was significant as -0.189. According to the error correction term coefficient, a deviation in the short-term comes to the long-term equilibrium after approximately five quarters ( $1/0.189=5.291$ ).

In the third and last model, which included income tax, income tax was negative at the 1% significance level and investment rates were positive at the same level of significance. Property tax had a positive effect at the 5% significance level, while the total tax revenues and employment growth had a positive effect at the 10% significance level. According to the error correction term coefficient, a deviation in the short-term comes to the long-term equilibrium after approximately four quarters ( $1/0.254=3.937$ ).

All three models revealed investment rates to be an important factor in the increase in GDP per capita. This result is also compatible with the assumption of Abdel-Kader and Mooij (2020) in suggesting that taxes can affect economic growth through investment rates.



## CONCLUSION and DISCUSSION

This study aimed to examine whether tax policy triggers inclusive growth in Turkey. Turkey achieved a very rapid growth rate despite the Covid-19 pandemic. For instance, in 2021 Turkey's economic expansion registered a 7.5% growth in the initial, 22.2% in the second, 7.9% in the third, and 9.6% in the fourth quarter, as compared to the corresponding periods in 2020 (SBB, 2022b). Despite the current and ongoing economic instabilities such as inflation and exchange rate shocks, the government emphasizes economic growth rates. Despite its high growth rates, it is debatable how much of Turkey's growth is inclusive.

Inclusive growth, in its most basic definition, benefits all segments of society from economic growth. Inclusive growth provides both economic growth and equal income distribution. Therefore, tax policy has a significant impact on inclusive growth and helps to increase social welfare. Furthermore, there is a linear relationship between the progressiveness of a country's tax system and the inclusivity of its growth; as stated by Mooij et al. (2020), inclusivity reflects the progressiveness of the tax system.

Considering the definition of inclusive growth, the present study analyzed the increase in national income per capita and tax components in the 2006–2021 period using the ARDL method. The effects of different tax components on long-term growth were examined using three models. The first model included VAT and other consumption taxes such as SCT, the second model included CIT, and the third model included PIT.

The results obtained in the study are listed as follows:

Real estate taxes are annually levied on immovable properties of households, meaning that there is a limited behavioral response to tax in households. Since this tax is based on gross values and has a fixed tax base, it causes the least damage to economic growth among tax types (Brys et al., 2016; Abdel-Kader and Mooij, 2020). Our study has determined that property tax has a positive impact on growth in the long run by providing tax neutrality. This finding aligns with Arnold et al. (2011)'s results. In other words, the property tax structure in Turkey is considered progressive does not harm growth, and contributes to income justice as it is collected from rich people.

CIT is among the most destructive taxes for growth. However, this destructiveness for growth may vary depending on the design of CIT. CIT can be regulated as a rent tax to minimize cross-country distortions and

promote inclusiveness. Such a system maintains the existing CIT while deducting the return on corporate capital to equalize interest. Similarly, allowance for corporate capital deducts interest and replaces it with a notional interest rate that is applied to all capital to ensure tax neutrality. These systems have strong effects on the corporate debt level and create positive effects on investment (Abdel-Kader and Mooij, 2020). Consistent with findings in the literature, the present study found that CIT has negative effects on growth. Therefore, the negative effect of CIT on economic growth in Turkey should be reduced by applying the allowance for the corporate capital system as proposed by Abdel-Kader and Mooij (2020) over a long-term period. This system can positively affect investments and increase growth. In addition to the allowance for the corporate capital system, tax reforms should also be implemented, including an expansion of the corporate tax base.

As is the case for CIT, PIT can have negative effects on growth. The present study shows that PIT has negative effects on growth in Turkey. However, this negative effect can be mitigated by redesigning the PIT accordingly; the most promising tax change that can be made to increase growth and achieve economic revival is to reduce income tax on low-income earners, thereby reviving aggregate demand, increasing incentives to work, and decreasing income inequality. The main channel of transferring tax policy to improve inclusive growth in Turkey is through investment and, to a lesser degree, employment growth. The results of the present study are in line with those of Mendoza et al. (1997), Abdon et al. (2014), Besley and Persson (2014), Abdel-Kader and Mooij (2020), and Mooij et al. (2020).

Unlike those found in the literature, the present study has determined that VAT in Turkey is negative and statistically significant regarding inclusive growth. A positive VAT coefficient indicates higher long-term growth. Conversely, a negative VAT coefficient has a negative effect on inclusive growth. The cause of these findings may be due to the trade-off between labor and leisure. Tanzi and Zee (1997), Acosta-Ormaechea et al. (2022), and Acosta-Ormaechea and Morozumi (2021) assumed that complex regulations arising from rate differences and exemptions in consumption taxes negatively affect and may even harm economic growth; these assumptions are potentially valid regarding VAT in Turkey. VAT reductions and exemptions, especially those applied during the 2008 crisis and the Covid-19 pandemic, and the applications of different tax rates are considered as triggers of this situation. According

to the OECD and KIPF (2014), although these reduced VAT rates are designed to support poor individuals, they are still considered a weak tool for achieving inclusive growth. At best, wealthy individuals and poor individuals experience an equal total benefit from the lower VAT rate; at worst, rich individuals benefit more overall. These assumptions show that the lowered VAT rate has a regressive impact on inclusive growth, distorting income distribution equality. Therefore, a single standard rate with a broad tax base should be designed to effectively drive inclusive growth and revenue from VAT. In addition, the results of the present study reveal that SCT and other consumption taxes positively affect growth and furthermore, the expected tax performance from VAT is provided by SCT and other consumption taxes. However, this study suggests that SCT is more growth-friendly than VAT and PIT.

This study argues that inclusive growth can be promoted through tax reform. From this perspective, this study offers certain policy recommendations and proposes a tax reform that mostly strengthens the design of direct taxes and balances growth and equality goals. Although policy recommendations differ by government, there are major reform choices for efficiency and equity. For instance, Turkey has a progressive PIT system, neutral taxation of capital and corporate tax revenues, adoption of a single rate of VAT, minimization of VAT exemptions, and greater use of property taxes. However, the capacity of Turkey's tax administration should also be improved. Turkey should adopt carbon and environmental taxes to reduce the harmful effects of climate change. These implications are consistent with the basic tax policy principles proposed by Brys et al. (2016), such as broadening the tax base for inclusive growth and enhancing the comprehensive progressivity of taxation.

The most important limitation of this study is Law No 5018. The Law came into force in Turkey in 2003 but was only put into practice in the public sector in 2006. As a result, the analytical budget classification method was initiated and the calculation method of tax revenues was changed, leading to the inability to make a comparison between the periods before and after 2006. Therefore, all series included in the study commenced in or after 2006.

The observed positive effect of increased tax revenues on inclusive growth necessitates further theoretical elucidation. While traditional Keynesian theory posits that tax increases generally suppress GDP, the findings of this study suggest that the effectiveness and outcomes of tax policies greatly depend on the specific economic and administrative context in which they are implemented.

In Turkey, the structure and administration of the tax system, alongside policies aimed at broadening the tax base and minimizing distortions, have contributed to positive economic outcomes. This is supported by findings from Acosta-Ormaechea et al. (2022) and Abdel-Kader and Mooij (2020), which underscore the role of progressive tax systems in fostering inclusive growth and economic development. Furthermore, future studies may explore perceived tax fairness among taxpayers for inclusive growth. Governments and taxpayers have different perceptions of the tax system. Accordingly, inclusive growth can be examined for the development of a more effective tax system in consideration of the behavioral fiscal framework of the country concerned. In addition, the effect of public expenditures (which constitute another side of the fiscal policy) on inclusive growth can also be examined in future studies.

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# Foreign Trade Hysteresis: An Empirical Essay Turkish Case

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## ABSTRACT

The permanent effects of temporary shocks in exchange rates on foreign trade flows through firms' sunk costs are defined as hysteresis. This study analyzes the foreign trade hysteresis in the Turkish economy for the period 2003Q1:2021Q2 on the basis of exchange rate, imports, and firm sunk costs with the asymmetry hypothesis. Empirical findings prove that there are hysteresis effects in foreign trade flows of the Turkish economy. According to the asymmetry hypothesis, an increase in import volume in exchange rate appreciation does not lead to a decrease in import volume in exchange rate depreciation. Here, the sunk costs incurred by importing firms when entering the market during exchange rate appreciation is the main dynamic that prevents them from exiting the market during exchange rate depreciation. This process defines the hysteresis in foreign trade flows of the Turkish economy. Firms' staying in the market at inefficient points due to sunk costs after exchange rate depreciation causes problems of resource allocation efficiency and persistence in the foreign trade deficit. As a matter of fact, foreign trade hysteresis caused by sunk costs is an important determinant in the sustainability of the current account deficit.

**Keywords:** Hysteresis; Foreign Trade, Sunk Cost, Imports, Asymmetry Hypothesis.

**JEL Classification Codes:** D22, F14, F31

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## INTRODUCTION

Interdisciplinary relations in social sciences go back to ancient times. In this sense, it can be said that the interdisciplinary relationship between economics and physics dates back to Adam Smith. Adam Smith explained the movements of market makers with Newtonian mechanics while explaining market price formation (Buğra, 2016). The other physics-based form of hysteresis in economic activity was realized in foreign trade flows. Specifically, Cross (1993) argues that hysteresis in foreign trade flows arises from the sunk costs incurred by firms when entering the market as a result of the appreciation of the national currency of the country of investment. In case of a revaluation of the national currency (back to its previous level), firms stay in the market due to sunk costs. This asymmetric process between exchange rate fluctuations and foreign trade flows is hysteresis. On the other hand, Baldwin (1988), who modeled the hysteresis in trade flows, based the asymmetric process in hysteresis on the lagged behavior in market entry. High sunk costs in market entry delay market entry. This

is because the higher the sunk costs incurred in market entry, the longer it will take to recover them. For the firm, this means continuing production at inefficient points due to possible exchange rate fluctuations in the long run. Axarloglou (2007) defines this area of inactivity in the market entry and exit process of firms as the hysteresis band. Setterfield (1993) argues that hysteresis is the best explanation for the current business cycle as mainstream economics moves away from the equilibrium phenomenon and equilibrium control becomes difficult.

Neoclassical theory holds the view that economic agents act rationally and the market will spontaneously come to equilibrium. Towards the end of the 20th century, structural changes in the global economy intensified criticism of the belief in the perfect functioning of the market mechanism. In this context, as a result of the abandonment of the Bretton Woods system and the floating of exchange rates, Dornbusch (1976) showed that the speed of adjustment of financial and real markets is different. With the financial liberalization process that started in the 1980s, capital movements became the

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determining factor in the structure of business cycle waves. Arnon (2022) argued that the argument that macro patterns are not detached from micro fundamentals has started to gain more ground in the literature. This strengthens the theoretical foundations of hysteresis.

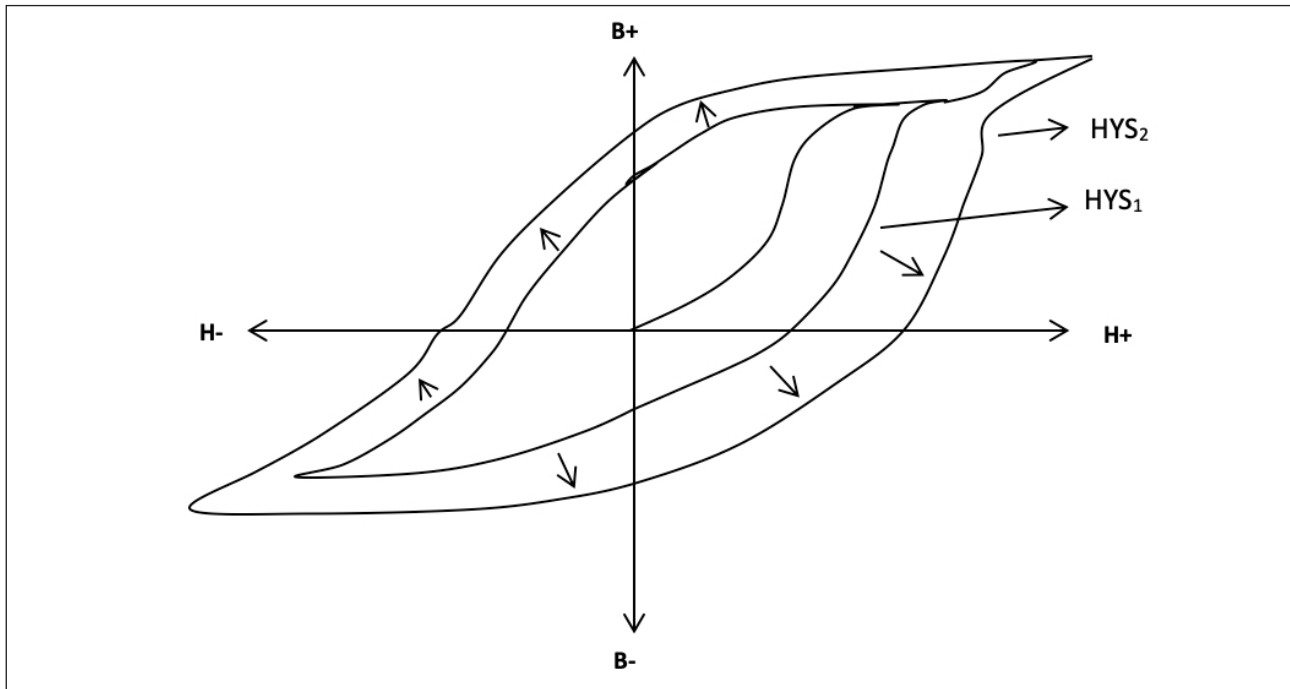
When the behavior of investment decisions in foreign trade flows is examined, it is seen that traditional investment models are insufficient to explain firm behavior. Uncertainty is an important criterion in firms' market entry decisions. Firms consider exchange rate volatility as a measure of uncertainty in market entry and exit. When exchange rates are modeled according to the option theory in financial economics, uncertainty is an increasing function of the volatility range. Under dynamic optimization conditions, firms can better observe the return on their investments over time. Therefore, in cases of increased uncertainty, firms tend to wait for an overvalued exchange rate and act inertially to enter the market (Dixit, 1992; Dixit et al., 1994; Campa, 2004). However, the role of expectations in market exits differs. If firms are not pessimistic about the expectation of exchange rate uncertainty, they widen the band of inactivity and exhibit a stay in market behavior. Indeed, firms will exit the market sooner if they take positions according to the persistence of exchange rate volatility. This process shows that favorable expectations cause hysteresis by delaying exit decisions (Chavas, 1994). Another factor that exacerbates hysteresis effects in firms' decision-making processes is the cost and size of investments. Once firms decide to enter the market and start operations, they tend to make larger investments to compensate for sunk costs in order to maximize future profitability. Large investments, which increase uncertainty and costs, increase sunk costs and deepen hysteresis by widening the inertia band (Bragger et al., 1998).

Traditional exchange rate theories (Mundell, 1960; Fleming, 1962) have emphasized the changes in trade volume caused by real changes in exchange rates. However, it has been ignored that shocks in real exchange rates may cause structural breaks in foreign trade flows and lead to deviations. These structural breaks are based on sunk costs. Sunk costs include fixed costs such as advertising, establishment of a communication network, feasibility costs, and legal costs that firms incur when entering the market. When real exchange rates are overvalued, the importing structure in the economy will be strengthened due to the increase in the marginal incomes of importing firms. When real exchange rates tend to depreciate, firms exhibit a loss-minimizing

behavior of staying in the market in order to cover their sunk costs. If this behavior of firms is expressed with numerical data, there are market entries when revenues exceed marginal costs by 48%, while firms remain in the market until the point where revenues cover marginal costs by 31% (Baldwin, 1988a, Dixit, 1989, McCausland, 2000; Baldwin and Lyons, 1994). Based on this information, the two main behavioral patterns of hysteresis are firms' delayed entry into the market until a certain profit expectation target due to sunk costs and firms' attempt to compensate for the sunk costs they incur at the point of exit from the market by exhibiting the behavior of staying in the market.

In developing countries, real exchange rate appreciation is the main driver of import increases. In the 2007-2011 period of the Turkish economy, the real exchange rate was overvalued according to purchasing power parity (The Economist, 2019). Therefore, it is necessary to analyze the existence of hysteresis effects in the import structure after the 2007-2011 period. In this study, structural break unit root test and asymmetry hypothesis were used to test the hysteresis effect in foreign trade flows. In the literature, studies on the hysteresis effect have generally focused on structural breaks in import volume after a shock in real exchange rates. At this point, the fact that the volume of imports has not been empirically tested during the period of depreciation of the domestic currency constitutes a gap in the literature for the Turkish economy. Moreover, Amable et al. (1994) argue that unit root tests, unit root tests with structural breaks, asymmetry hypothesis, and mathematical foundations should be used more in the analysis of hysteresis effects in addition to unit root tests. In this context, the period after 2016, when the Turkish economy experienced a continuous depreciation of the domestic currency, constitutes an opportunity for the detection of hysteresis effects in foreign trade flows. For this reason, the study aims to determine the existence of hysteresis in foreign trade flows by using the asymmetry hypothesis as well as the structural break test, and moreover, to provide effective policy recommendations based on the behaviour of imports against the exchange rate. This empirical strategy is an important contribution of the study to the literature. Because beyond the permanent structural change in foreign trade flows, we also detect hysteresis from the resilient structure in the interaction of exchange rate and foreign trade.

Parsley and Wei (1994), using the asymmetry hypothesis developed to analyze the asymmetric structure between the real exchange rate and the volume of imports, found



**Figure 1.** Hysteresis loop (potential gdp)

Source: Potential output hysteresis visualised by the researchers by taking physics hysteresis as an example.

evidence of hysteresis. Since volatility in real exchange rates is a general condition in the Turkish economy, the duration of appreciation beyond real exchange rate shocks is also important in terms of hysteresis. As a matter of fact, the fact that the structural break in the import volume of the Turkish economy took place in a certain period (2009Q2) after the period when the domestic currency started to be overvalued (2007) strengthens the validity of the wait-and-see hypothesis for firms. This situation, which is defined as the wait-and-see hypothesis, is among the psychological foundations of the hysteresis effects observed in firms' market entry. As a result, it is determined that the overvaluation of exchange rates in the 2007-2011 period caused a structural break in the import volume. The fact that there is no decline in the volume of imports in continuous exchange rate depreciations in the following periods constitutes evidence for the existence of asymmetric structure and hysteresis in foreign trade.

The structure of the rest of the paper is as follows: the theoretical foundations of the hysteresis effect in the second section, the literature review in the third section, the data set, methodology, and empirical findings in the fourth section, and the paper will be completed with the conclusion section.

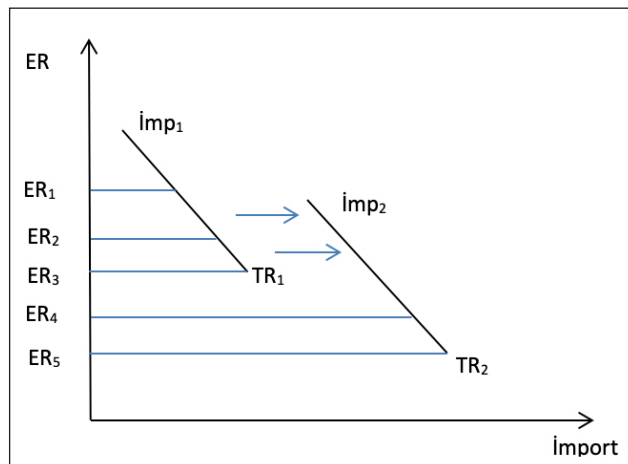
### Theoretical background

Although hysteresis is widely used in economics, it is theoretically a physics-based structure. In order to define

the structure of the hysteresis effect, William Thomson first laid the theoretical foundations of this structure in 1850 by defining the magnetization process. The basis of the hysteresis structure is based on ferromagnetism. Ferromagnetism is defined as electrically charged substances (exposed to a magnet) that maintain their magnet properties even though they are physically disconnected from the magnet. Towards the end of the 19th century, the ferromagnetic properties of many substances were tested, and their ability to hold magnetism was determined. In all ferromagnetic materials, there is a delayed disappearance of the magnetizing effect after magnetization. This phenomenon is called hysteresis in physics (Dörries, 1991). Timbeau et al. (2012), who modelled the economy moving away from its potential (negative economic growth) based on hysteresis, examined the recovery path. However, the potential size of the economy affects the width of the hysteresis band. Taking into account all phases of the business cycle fluctuation, the economic hysteresis cycle on a physical basis is visualized in Figure 1.

The hysteresis loop may vary according to the structure of the ferromagnetic material. When the magnetization process of steel and pure iron is compared, since steel can carry more electrical charge, the hysteresis path ( $HYS_2$ ) follows a wider and delayed course compared to the hysteresis path ( $HYS_1$ ) of iron. When this situation is compared with the hysteresis effect in foreign trade, similar structures are observed. The output gap in the

economy is the determining factor for the width of the hysteresis loop. A high output gap in the economy indicates that the production potential is high. In case of market entry, labour and capital can be increased without any productivity problem in the production process. At this point, if the appreciation in exchange rates continues, the market reaching the saturation point is a more delayed process. Schmitt-Grohe et al. (2008) argue that more resources should be allocated to factors of production for the growth of the economy. In this process, GDP is a constraint in terms of output growth. Because output growth cannot exceed GDP growth. When this situation is evaluated in terms of exchange rates, although real exchange rates continue to appreciate, there is no entry into the market at the point where the production capacity of the market is insufficient and the economy has reached the saturation point. Until the economy reaches the saturation point (full employment), there are market entries in the form of structural breaks. The hysteresis process in import volume is shown in Figure 2.

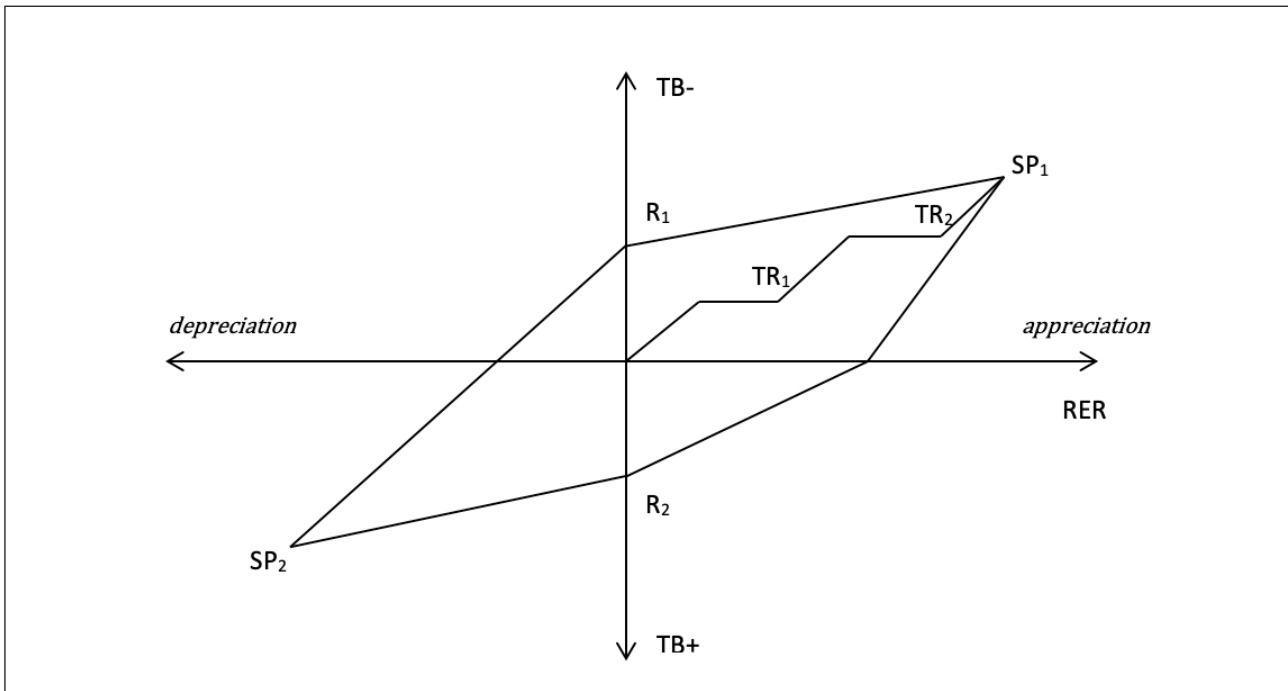


**Figure 2.** Hysteresis effect (import volume)  
Source: Zengin and Vergil (2011).

The asymmetry hypothesis used to measure the hysteresis effect is based on the acquisition of an importing structure (structural break) as a permanent effect of shocks in real exchange rates. When the period before and after the structural break in the economy is compared, the response of imports to real exchange rates exhibits an asymmetric structure. Until the overvalued levels of the real exchange rate ( $ER_1$ - $ER_2$ ), the quantity relationship with imports is symmetric. If the real exchange rate continues to be overvalued after ( $ER_3$ ), which is accepted as the threshold value for causing the hysteresis effect in foreign trade, it causes a structural break in imports and results in hysteresis. The acquisition

of an importing structure in the economy is due to the fact that the domestic currency, which has become more valuable, increases the profitability of firms. As the market becomes more profitable, it triggers market entries ( $TR_1$ ) and increases the volume of imports. In this case, the import line shifts to the right and represents a higher import volume at ( $ER_4$ - $ER_5$ ) levels. Firms incur many sunk costs from fixed costs when entering the market. Therefore, even if the real exchange rate enters a depreciation trend, there is a range of real exchange rates in which firms remain immobile due to sunk costs. This is referred to as the hysteresis effect. For firms to decide to exit the market, it is possible with the persistence of undervalued levels (Parsley and Wei, 1994; Dixit, 1989a). The effects of the hysteresis effect in import volume shown in Figure 2 on foreign trade and the external adjustment mechanism are presented in Figure 3.

Figure 3 coordinate system (vertical axis: trade balance, horizontal axis: real effective exchange rate) is constructed to characterize the hysteresis effect in trade. The origin (center) of the coordinate system represents the situation where there is no external imbalance at the equilibrium exchange rate. As a result of the real exchange rate appreciation, the  $TR_1$  and  $TR_2$  points for firms represent the trigger point, which is the market entry threshold for firms. As the real exchange rate appreciation continues, the market reaches the saturation point  $SP_1$ , where it can provide production factors. After this point, even though the real exchange rate appreciation continues, price increases in factor markets reduce profitability and limit market entry at the saturation point. When the real exchange rate returns to its initial equilibrium level, firms remain in the market due to the sunk costs they incurred in entering the market and continue their activities with profit minimization. As a result of the return of the real exchange rate to the initial level, firms that continue their activities due to sunk costs cause a foreign trade deficit  $R_1$  at the retention point. This level of production, where rationality conditions are not taken into account, causes welfare losses by disrupting the efficiency in resource allocation. As a result of the continuation of the undervaluation of the real exchange rate, the foreign trade deficit becomes permanent with the continuation of the importing structure at undervalued points. When the real exchange rate continues to depreciate,  $SP_2$  becomes minimum at the saturation point, which is the level at which import volume can decrease due to autonomous imports. Due to the hysteresis structure, the lagged adjustment process of the external adjustment mechanism in the economy shows the same effect in real exchange rate appreciations. At the retention



**Figure 3.** Linearized foreign trade hysteresis loop

Source: On the basis of the balance of trade, hysteresis is visualised by the researchers.

point, which represents the equilibrium level of the real exchange rate, there is a foreign trade surplus  $R_2$ . The late acquisition of the importing structure in this appreciation process stems from the fact that in markets with high exchange rate volatility, firms perceive exchange rate changes as temporary and adopt a wait-and-see policy for market entry. Firms that wait for a certain profit rate to enter the market based on the real exchange rate cause a foreign trade surplus at the equilibrium level of the real exchange rate at point  $R_2$  due to the retention effect in the hysteresis structure. This process ends again at  $SP_1$  with the completion of the hysteresis loop. Even if the completion of the hysteresis loop leads to a return to the starting point, welfare losses will be incurred due to delays in the external adjustment mechanism and irrational conditions.

### LITERATURE REVIEW

Hysteresis effects in foreign trade flows manifest themselves in the form of permanent effects of exchange rate shocks on the importing structure. In this process, it is known that there are many transmission mechanisms from exchange rates to the real economy. Among the prominent transmission mechanisms, the import structure is an important dynamic that determines the degree of hysteresis. Therefore, grouping empirical studies on foreign trade hysteresis according to these transmission mechanisms will provide a comprehensive perspective.

Regarding exchange rate volatility, exchange rates have been allowed to float since the early 1980s in order for Turkey to adapt to the financial liberalization process implemented on a global scale. Saatçioğlu and Karaca (2011) argue that the increase in uncertainty during the 1981-2001 period, when exchange rate volatility increased, had a negative impact on exports. On the other hand, De Grauwe (1988) drew attention to the effect of income and substitution effect on exports. Firms' attitudes towards risk and uncertainty may affect exports positively or negatively by differentiating according to income and substitution effects. Since the expected benefit of export revenues will decrease in a risk environment, firms may act according to the income effect by increasing their resources in the export sector in order to compensate for this loss. When firms' attitude towards risk is to act cautiously, they tend to turn to domestic markets due to the substitution effect. This process, in which firms move away from acting according to the equilibrium exchange rate in foreign trade due to uncertainty, is a hysteresis behavior pattern. Backus (1994) argues that with the introduction of a floating exchange rate regime, movements in exchange rates have made price fluctuations more pronounced. At this point, fixed costs become an important factor in price movements as they delay firms' quantity adjustment. Aslan and Kula (2010) argue that the black market has a significant trading volume in foreign exchange markets. While an increase in the volatility of the real exchange



rate leads to a depreciation of the Turkish Lira, it also leads to an appreciation of the Turkish Lira in the black market. With the increase in volatility, firms act more cautiously and widen the inactivity band, which is a form of hysteresis.

Studies on purchasing power parity; McCausland (2002) Short-term adjustments after a shock in real exchange rates are common firm behaviour. In this context, overshooting in exchange rates and short-run behaviour of firms not conforming to the long-run exchange rate path deepen the hysteresis effect in foreign trade. Rapach (2001) argues that in the long run, the view of the neutrality of money states that nominal distortions have no effect on real exchange rates. However, empirical studies show that changes in wealth and competitiveness arising from short-term real exchange rate movements weaken the money neutrality theorem in the short run. Therefore, the formation of hysteresis in real exchange rates requires strong shocks. Rogers and Jenkins (1995) explained the hysteresis effect in real exchange rates through purchasing power parity conditions. Purchasing power parity real exchange rate changes are explained by international relative price movements. Disaggregating the prices of 11 OECD countries, the findings show that in the long run, price stickiness is weak for non-tradable goods, while there is stronger evidence for sticky prices for tradable goods. In this context, the hysteresis effect in real exchange rates is also determined by the degree of tradability of goods.

Studies on the employment structure by Belke and Göcke (1999) show that real exchange rate shocks cause hysteresis effects in trade flows and are also linked to hysteresis effects in the labour market. In case of an increase in volatility, the relationship between employment and its determinants weakens and the band of inactivity in employment operations widens. Thus, the hysteresis structure in trade flows increases its effect. Moreover, Baily (2003) shows that the hysteresis effects of exchange rate shocks on trade flows are also related to R&D expenditures and wages. With the appreciation in the US dollar, firms reduced their R&D shares. When the value of the US dollar returns to its previous level, the competitive structure lost due to R&D expenditures becomes a dynamic that prevents the volume of foreign trade from returning to its previous level. On the other hand, the impact of exchange rate shocks on labour force differs according to the quality of the labour force. While an increase in the value of the US dollar

increases the income of those with higher education levels, it decreases the income of those with lower education levels. The asymmetric structure between exchange rate fluctuations and income distribution is one of the consequences of hysteresis. Analyzing the impact of capital movements, Baldwin and Krugman (1989) argue that large shocks in real exchange rates create permanent effects on trade flows. Continued capital flows following exchange rate shocks prevent the exchange rate from returning to previous levels. In this case, the effects of exchange rate shocks cause exchange rate shocks again. This cyclical process in exchange rate shocks deepens the hysteresis by causing permanent effects on the industrial structure.

Market structure is also an important criterion in the entry and exit of firms. Market price and profitability are the determining criteria for market entry. Bain (1949), who analyzed the pricing behaviour of firms, observed that contrary to the studies that traditionally model the profit maximization behaviour of firms, entry to the market is prevented by applying limit prices. The reason why firms exhibit this behaviour is that they are aware that the competitive structure will change after the entry into the market. Heflebower (1957) argues that the uncertainty in the market price and factor market cost conditions after possible entry into the market causes firms to be more willing to bar entry. Adamonis (2018) argues that beyond competition, firms' market entry leads to a permanent reduction in costs through a learning-by-doing process. As a result of this process, firm profitability, which increases with the decrease in costs, delays exits from the market. Institutionalization is also a component of hysteresis. Elsner (2021) argues that the asymmetric structure of institutional collapses is due to sunk costs and regulations during the emergence of institutions.

Studies analyzing the immobilization processes of firms for market entry and exit in real exchange rate changes by Ansic and Pugh (1999) found that firms remain immobile between certain threshold values in real exchange rates, Baldwin (1988b) modeled the changes in real exchange rates and firms' profitability and found that there is an asymmetry between market entries and exits. It is observed that the behaviour that proves the asymmetric form is the behaviour of staying in the market when the profit margin decreases. Ljungqvist (1994) shows that positive demand shocks temporarily increase profitability. Under inter-period optimization conditions, the fact



that the profitability of the current period is higher than the future period shows that the expected income is also taken into account in the continuation of the importing structure. Christophe (1997), who analyzed the US corporate behaviour in the 1980s when the US dollar was strong, observed that companies were reluctant to reduce their presence in foreign markets even if their profitability in international operations decreased. It is observed that companies consider the future reasonable levels of exchange rates more than the current period profitability in their market entry and exit decisions.

Moreover, it also manifests itself in the behaviour of firms to reduce their presence in foreign markets. Observing that hysteresis is a cause of price rigidities beyond trade flows, Delgado (1991) analyzed menu costs. He observed that firms do not reflect the price changes arising from exchange rate fluctuations to their international customers, and when they do, the volume of trade lags behind the change in the exchange rate. This behaviour of firms is a reason for price rigidities. Dixit (1991), who analyzed menu costs by developing an analytical model, observed that the area of inertia in price adjustments is very large. In this context, price rigidity in the market contributes to the behaviour of staying in the market since it does not bring additional costs. Moreover, Fedoseeva and Werner (2016), who analyze pricing behaviour according to the structure of the target market, observe that firms do not react in the same way to different price and exchange rate shocks of different directions. Firms behave more cautiously in markets with large trade volumes in order not to lose market share. Kulatilaka and Kogut (1996) argue that real exchange rate shocks may change the speed of adjustment of markets as well as the limits of investment in the economy. In the period before the hysteresis structure, when the real exchange rate appreciated, firms waited for a certain limit to exit the market, while this process was observed to be prolonged after exchange rate shocks. This situation points to the existence of a causal relationship between hysteresis effects and the persistence of the current external imbalance.

Indeed, Belke and Kronen (2016) observed in the Greek economy that immobilization is a better option for firms in terms of market entry and exit. Göcke (2002) argues that the hysteresis effect differs in terms of micro and macro fundamentals. While the hysteresis structure in micro fundamentals is based

on the input-output relationship, the change at the macro level is possible only if the aggregated changes in micro fundamentals are sufficiently realized. At this point, whether the instability in the behaviour of firms or a movement in the context of market entry and exit turns into a general trend is a determining factor in hysteresis effects. On the other hand, Gocke (2001) argued that the hysteresis effect in foreign trade flows may be related to political variables as well as economic variables. When activist policies implemented by the government serve political objectives rather than economic objectives, the delay in implementation leads to policy inefficiency. In this context, micro, macro, and political patterns seem to be related in the hysteresis effect. However, Bagnai and Ospina (2015) show that the lack of an inertia band in the Italian economy in the face of real exchange rate shocks may also occur in exceptional cases where the lack of an inertia band is due to the fact that it is reflected in retail prices without being reflected in crude oil prices.

Generally, shocks in economic variables are followed by deterioration of expectations. Economic agents also consider inter-period optimization in this process. Studies within the scope of inter-period optimization by Alfaro et al. (2018), who evaluated in terms of the composition of total costs, found that when R&D sunk costs are higher than fixed costs, firms consider the net present value of their innovative structures more than the impact of negative shocks. While depreciation contributes positively to firms' R&D profitability, appreciation affects it negatively. Therefore, depreciation is more a determinant of total factor productivity. Ljungqvist (1994) observes that temporary positive demand shocks leading to appreciation in real exchange rates are followed by permanent depreciation. Depreciation is a necessary condition for households to balance consumption under budget constraint conditions in order to ensure the balance of foreign trade between countries. Firms experience an increase in the value of equity due to demand shocks. With the withdrawal of the demand shock, temporary profits will tend to decrease. As a result of these developments, firms will remain in the market, but their future profitability will decrease. As a result, in addition to real exchange rates, import prices, and trade flows, firms' equity values also come to the fore as a determining factor in the hysteresis effect.

**Table 1:** Summary of Selected Empirical Studies on Hysteresis in Foreign Trade

Study	Methodology	Country	Finding
Bošnjak, (2021, June)	Structural Break Tests (ADF, PP, DF-GLS, ERS, KPSS)	Croatia, Slovenia, Serbia	Hysteresis was not detected. However, it is observed that negative endogenous shocks are more persistent than positive endogenous shocks. There are limited asymmetries.
Bošnjak vd. (2020)	Structural Break Tests (ADF, PP, DF-GLS, ERS, KPSS, Zivot-Andrews, Arfima), Setar Model	Czech Republic, Latvia, Hungary, Slovakia, Slovenia	Hysteresis applies to the Czech Republic and Latvia, but not to Hungary, Slovakia, Slovenia.
Campbell (2020)	Panel Regression	United States, Canada	In both countries, the validity of trade hysteresis and its underlying causes are found to be temporary exchange rate shocks and sunk costs.
Werner (2020)	Preisach Model	Germany, United Kingdom	Hysteresis is detected in the foreign trade flows of both countries. While hysteresis is based on sunk costs, it is driven by the financial crisis and the Brexit process. As a result, significant welfare losses were experienced.
Rauscher ve Willert (2020)	Nash Bargaining Model	African and European Countries	Institutional deterioration (corruption, bribery) has been found to affect economic activity. Economies with slow economic activity cannot recover due to institutional deterioration. There are also hysteresis effects in foreign trade.
Bhat ve Bhat (2021)	Nonlinear Asymmetric Cointegration	United States	The increase in demand due to the appreciation of the national currency (temporary exchange rate shock) distorted the trade balance more than the decrease in demand. Hysteresis is in asymmetric form.
Bilgin (2020)	NARDL Model	Turkey	Asymmetric structure and hysteresis were found in foreign trade sectors except basic metal sector. In exchange rate fluctuations, appreciation of the national currency distorts the current account deficit more than depreciation.
Dinçer vd. (2020)	Extended Gravity Model	Turkey	In exchange rate fluctuations, depreciations have more positive effects than appreciations of the national currency. This situation observed in the service sector points to hysteresis with an asymmetric form.

Selected studies for the current empirical literature on hysteresis are presented in Table 1.

Studies on the Turkish economy by Zengin and Vergil (2011) concluded that there is no hysteresis effect in foreign trade flows of the Turkish economy in the 1994-2001 period. The decline in import volume during the period of depreciation of the domestic currency in the analyzed period proves that sunk costs are not effective and market exits prevent the hysteresis effect. The absence of a shock that would cause permanent effects for the tested period prevented the formation of an importer structure. On the other hand, Baydur and Atasever (2016) found the existence of hysteresis effects in foreign trade flows of the Turkish economy on a sectoral basis. They attributed the hysteresis effects to the price rigidities caused by long-term contracts in the energy sector together with the shocks in exchange rates. Hysteresis effects became stronger as long-term contracts prevented the use of relatively cheaper alternative energy sources and turned into sunk costs. This process is effective in the chronicisation of the current account deficit.

In conclusion, when empirical studies are analyzed, hysteresis as the permanent effects of exchange rate shocks and structural changes caused by these shocks on foreign trade flows is a common result in the empirical literature. However, the results for some countries are complex, and the empirical literature for Turkey is quite limited. As a matter of fact, this study will contribute to this literature gap by providing information in terms of current account deficit sustainability beyond the determination of hysteresis in foreign trade flows.

### Data and methodology

In the real effective exchange rate calculations for the Turkish economy, 2003 is used as the base year (2003=100). In order to increase the efficiency of the model by minimising nominal effects in the relationship between foreign trade flows and real effective exchange rate, 2003 is set as the base year. In order to analyse the hysteresis effect in foreign trade flows, time series are constructed quarterly for 2003Q1:2021Q2 (t=74). Import quantity index (IMP) is obtained from OECD (Monthly International Merchandise Trade) database, CPI-based real effective exchange rate (REER) and GDP data are obtained from CBRT-EVDS system.

Real effective exchange rate volatility is calculated as the moving average of the standard deviation of the change in the real effective exchange rate, which is widely used in the literature.  $C_t$  is the measure of exchange rate volatility,  $m$  is the order of the moving average. This order is the measure commonly used in the literature<sup>1</sup> to capture exchange rate volatility.

$$C_t = \left[ \left( \frac{1}{m} \right) \sum_{i=1}^m (\ln Q_{t+i-1} - \ln Q_{t+i-2})^2 \right]^{1/2} \quad (1)$$

The natural logarithm of the series is calculated by taking the moving average of the series and 0.028 is the volatility. The Zivot-Andrews unit root test with structural breaks and the asymmetry hypothesis developed by Parsley and Wei (1994) will be used to detect the hysteresis effect.

### Asymmetry hypothesis

In empirical studies analysing the hysteresis effect in the literature, hysteresis is analysed through overvaluation in exchange rates and structural breaks in import volume. In this context, hysteresis in foreign trade flows is a function of overvaluation and structural break:

$$\text{Foreign Trade Hysteresis} = f(\text{overvalued}, \text{structuralbreak})(2)$$

The model is constructed as follows by defining  $V_t$  to be equal to the cumulative change in real exchange rates over the period.

$$V_t = \sum_{i=0}^m \Delta S_{t-i} = S_t - S_{t-m-1} \quad (3)$$

Then, the dummy variable  $D_t$  is defined as follows to determine whether the last change in the real exchange rate is in the same or different direction as the change in the real exchange rate during the period  $m$ :

$$D_t = \begin{cases} 1 & \text{if } \Delta S_t \text{ and } V_t > 0 \\ -1 & \text{if } \Delta S_t \text{ ve } V_t < 0 \\ 0 & \text{otherwise} \end{cases} \quad (4)$$

Finally, the equation expressing the cumulative change in real exchange rates is constructed;

$$E_t = D_t \Delta S_t V_t \quad (5)$$

To test the asymmetry hypothesis, the appreciation or depreciation of the domestic currency should be continuous. If the depreciation of the domestic currency triggers each other throughout the periods,  $V_t$  takes positive value and therefore  $E_t$  takes also be positive value. In this case,  $V_t$  imports are negatively affected.

The continuous depreciation of the domestic currency causes domestic goods to become expensive relative to foreign goods in foreign trade. In this process, the decrease in the demand for domestic goods and the decrease in the revenue of firms will cause exits from the market. On the other hand,  $\Delta S_t V_t$  takes a positive value in the case of currency appreciation (upward movement in the CPI-based real effective exchange rate) and the continuation of appreciation. In case of appreciation of the domestic currency, the domestic market becomes more profitable due to the increase in the purchasing power of the domestic currency and market entry occurs. In this case, sunk costs incurred by firms in market entry are the dynamics of hysteresis. These developments are possible when  $V_t$  takes a negative value. Otherwise, when the signs of the last exchange rate change and the cumulative change are opposite,  $E_t = 0$ . In this study, the period  $m$  is determined by taking into account the data for the period 2016Q2:2018Q2 ( $t=9$ ) when the TL was undervalued. In order to analyse the hysteresis effect in foreign trade, regression analyses were conducted using GDP, import volume, real effective exchange rate and cumulative exchange rate change  $E_t$  series by using the OLS method. The model is defined by equation (6):

$$\text{LNIMP} = \beta_0 + \beta_1 E_t + \beta_2 \text{LNGDP} + \beta_3 \text{LNRER} + \mu \quad (6)$$

Variables; LNIMP = Natural logarithm import volume index,  $E_t$  = Cumulative exchange rate change, LNGDP = Natural logarithm real national income, LNRER = Natural logarithm CPI-based real effective exchange rate.

### Stationarity Analysis

Before estimating the regression analysis, the stationarity of the series should be tested. At this stage, the degree of integration of the series should be determined. Since the series are not stationary  $I(0)$ , the series are integrated at the same degree  $I(1)$  by taking the first difference. Structural break (unit root) means that the shocks occurring in the time series cause permanent effects (Christopoulos and Ledesma, 2010). The variables are at  $I(1)$  level.

### Zivot-Andrews structural-break test

Zivot and Andrews (1992), who criticized the Perron (1989) test technique, which considers structural breaks as exogenous in unit root tests, made structural breaks endogenous by modeling them in an autoregressive structure. The following equations are used for the Zivot-Andrews test:

<sup>1</sup> For the methodology, see Chowdhury (1993) and Doğanlar (2002).

Model A  $\Delta y_t = c + \alpha y_t - 1 + \beta t + \gamma DU_t + \sum_{i=1}^k dt \Delta y_t - i + \varepsilon$  (7)

Model B  $\Delta y_t = c + \alpha y_t - 1 + \beta t + \theta DU_t + \sum_{i=1}^k dt \Delta y_t - i + \varepsilon$  (8)

Model C  $\Delta y_t = c + \alpha y_t - 1 + \beta t + \theta DU_t + \gamma DT_t + \sum_{i=1}^k dt \Delta y_t - i + \varepsilon$  (9)

For Turkey, the structural break in the import volume in 2009Q2 period with the overvaluation of the exchange rate in 2007-2011 proves the validity of the hysteresis effect in foreign trade flows.

The dummy variable DU, which is defined for each

**Table 2: Zivot-Andrews Findings**

Model	Breaking Points	t stats	%1	Critical Values %5	%10
Model A	2008Q4	-7.20	-5.34	-4.93	-4.58
Model B	2009Q1	-7.12	-4.80	-4.42	-4.11
Model C	2009Q2	-7.57	-5.57	-5.08	-4.82

Note: Critical values were obtained by Zivot and Andrews (1992)

**Table 3: Model 1 Regression Analysis Estimation Results**

Dependent Variable: IMP				
Method: Least Squares				
Sample (adjusted): 2003Q2 2021Q2				
Included observations: 73 after adjustments				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
GDP	1.995474	0.241523	8.262027	0.0000
REER	0.305344	0.118907	2.567913	0.0124
C	-0.004677	0.008477	-0.551767	0.5829
R-squared	0.501675	Mean dependent var		0.019761
Adjusted R-squared	0.487437	S.D. dependent var		0.093873
S.E. of regression	0.067207	Akaike info criterion		-2.521861
Sum squared resid	0.316171	Schwarz criterion		-2.427733
Log likelihood	95.04793	Hannan-Quinn criter.		-2.484349
F-statistic	35.23528	Durbin-Watson stat		1.540853
Prob(F-statistic)	0.000000			

Note: \* denotes significance at 1% level, \*\* denotes significance at 5% level.

possible break date (TB), is defined as DT taking into account the slope changes. In this context, T denotes the period to be estimated, TB denotes the break period and  $ve\ 1 = TB / T$  denotes the break point obtained from the edit field (1  $\hat{I}$  (0.15,0.85)). The values of the dummy variables are; DU will be 1 if  $t > TB$  and 0 otherwise. DT will be  $t - TB$  when  $t > TB$  in the identical case and 0 otherwise. The regression process with (T - 2) number of dummy variables created for possible break dates at the point of estimation is followed (Zivot and Andrews 1992). After the application of the empirical technique, the decision process is finalised by comparing the t statistic value (in absolute value) calculated for  $\alpha$  with the critical values.

**Regression analysis estimation results**

In order to effectively test hysteresis in foreign trade, firstly, whether the basic macroeconomic variables are consistent with the theory in the 2003Q1:2021Q2 period will be tested in Model 1. In the next stage, the existence of hysteresis effects in foreign trade flows will be tested with Model 2, in which the asymmetry hypothesis is modelled. Model 1 consists of real national income, import volume and real effective exchange rate variables for the period 2003Q1:2021Q2. The variables were tested with the seasonality test and seasonality was detected in the real national income series. The real national income series was seasonally adjusted and estimated. Autocorrelation, changing variance and multicollinearity problems were not found in the model. Model 1 results are presented in Table 3.

**Table 4:** Model 2 (Asymmetry Hypothesis) Regression Analysis Estimation Results

Dependent Variable: IMP				
Method: Least Squares				
Sample (adjusted): 2003Q2 2021Q2				
Included observations: 73 after adjustments				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
GDP	1.995151	0.243293	8.200603	0.0000
REER	0.305382	0.119762	2.549912	0.0130
DUMMY	0.001747	0.022723	0.076876	0.9389
C	-0.004744	0.008582	-0.552820	0.5822
R-squared	0.501718	Mean dependent var		0.019761
Adjusted R-squared	0.480053	S.D. dependent var		0.093873
S.E. of regression	0.067689	Akaike info criterion		-2.494549
Sum squared resid	0.316144	Schwarz criterion		-2.369045
Log likelihood	95.05106	Hannan-Quinn criter.		-2.444534
F-statistic	23.15856	Durbin-Watson stat		1.544021
Prob(F-statistic)	0.000000			

Note: \* denotes significance at 1% level, \*\* denotes significance at 5% level.

The model structure and variable coefficients are statistically significant. If the coefficients of the variables are interpreted, the effect of real exchange rate and real national income on imports is consistent with empirical studies and theoretical foundations. A 1% increase in real national income leads to a 1.99% increase in import volume. A 1% appreciation in the real effective exchange rate causes a 0.30% increase in the volume of imports. As a result, appreciation of domestic currency increases imports. On the other hand, a decrease in import volume is expected in the period when the domestic currency depreciates. At this point, in order to detect the hysteresis effect, the course of import volume should not change in consecutive periods of depreciation of the domestic currency. This structure is analysed with the asymmetry hypothesis. Considering the cumulative exchange rate, the estimation results of the period (2016Q2-2018Q2) (t=9) when the real exchange rate depreciation is continuous (t=9) with a dummy variable are contrary to what is theoretically expected. The positive coefficient of the dummy variable (0.001) reveals that the import volume and the real effective exchange rate move in different directions in the periods when real exchange rate depreciations follow each other, in other words, there is no decrease in the import volume during the period when the domestic currency depreciates. This indicates the existence of hysteresis effect in foreign trade. The regression estimation results showing the relationship between the coefficients are presented in Table 4.

As can be seen in Figure 5, the real effective exchange rate and import volume generally follow a parallel course. In order to analyse the hysteresis effect, the period in which exchange rate depreciations follow each other should be taken into account. In this sense, exchange rate depreciations in the (2016Q2-2018Q2) period are continuous. During this period, import volume did not decline and followed a horizontal course. Moreover, while exchange rate depreciations became continuous between 2012-2021, import volume followed a horizontal course, which proves the hysteresis.

The period of overvalued exchange rates in Turkey is between 2007 and 2011. Based on these developments, the fact that the structural break in the import volume in the 2009Q2 period after the 2007-2011 period when the domestic currency was overvalued strengthens the proposition that importing firms apply a wait-and-see policy in entering the market. As a matter of fact, the high growth performance and the increase in imports in the period when the Turkish Lira was overvalued after the 2008 World Crisis are in parallel. When these developments are evaluated in the long run, it is theoretically expected that imports will decrease in the period when the national currency depreciates (2016Q2-2018Q2). However, imports that increase when the national currency appreciates do not decrease when the national currency depreciates, in other words, this asymmetric structure is hysteresis behaviour.



## CONCLUSION and POLICY IMPLICATIONS

With the abandonment of the Bretton Woods system and the financial liberalization process, exchange rates have widened their fluctuation margin globally, and sudden shocks in exchange rates have become frequent with capital flows. At this point, Dornbusch (1976) observed that the speed of adjustment of financial and real markets is different with the model of overshooting in exchange rates and observed that real markets adapt with a lag. However, another structure that should be emphasized at this point is the hysteresis phenomenon. Because hysteresis effects are not included in macrodynamism, macroeconomic variables exhibit a structure inconsistent with the theoretical foundations in the stabilization process of economic activity after structural break.

In the study, hysteresis effects are analyzed by testing whether the increase in imports after exchange rate shocks (overvaluation) returns to its previous level in exchange rate depreciations. As a result of the unit root test with structural break, the structural break in imports in 2009Q2 points to hysteresis effects. At the same time, hysteresis effects are tested with the asymmetry hypothesis in terms of the behaviour of staying in the market in case of depreciation of the domestic currency. The strength of the asymmetry hypothesis approach is that it identifies the resilient structure between foreign trade and exchange rate, which is the most basic hysteresis behaviour pattern. The combination of these two approaches provided a more robust basis for the findings. Recurring exchange rate depreciations, which are necessary to test hysteresis at the estimation stage, were experienced in the 2016Q2-2018Q2 period. In this period, the decline in import volume is theoretically expected in recurring exchange rate depreciations. However, no decline in import volume was observed in this period, and it was observed that firms maintained their importing structure by exhibiting a stay-in-the-market behaviour. These findings provide strong evidence for the existence of hysteresis effects in foreign trade flows.

Due to the hysteresis effect, importer firms exhibited a stay in the market behaviour during the period of depreciation of the domestic currency in the Turkish economy. The structural break in the 2009 Q2 period triggered the importer structure in the Turkish economy due to the high growth performance after the 2008 World Crisis. After the 2008 World Crisis, the Turkish economy exhibited strong growth performance, and imports increased. The period of overvalued exchange rates in Turkey is the 2007-2011

period. Based on these developments, the fact that the structural break in the import volume in the 2009Q2 period after the 2007-2011 period when the domestic currency was overvalued reinforces that importing firms applied a wait-and-see policy in entering the market. As a matter of fact, during the period when the Turkish lira was overvalued, an importer structure was acquired by causing market entries. Looking at the import volume developments in the 2016Q2-2018Q2 period, when the domestic currency depreciated strongly, it is observed that firms exhibited a stay-in-the-market behaviour. Akdoğan and Werner (2021), who analyzed hysteresis effects in the manufacturing industry of the Turkish economy, reached similar findings and found that firms exhibit wait-and-see behaviour by considering certain exchange rate threshold levels in their market entry and exit decisions. It is concluded that the main dynamic of hysteresis effects is sunk costs.

As a result, structural breaks in exchange rates in foreign trade flows of the Turkish economy and the long-run effects of these breaks on the importing structure, in other words, the existence of hysteresis effects have been determined. It is observed that the hysteresis effects in the Turkish economy started with the behaviour of firms with delayed entry into the market due to the overvaluation of the domestic currency. In the following period, the theoretically expected decline in imports did not materialize during the period of strong depreciation of the domestic currency. This process points to a structure suitable for the hysteresis process in foreign trade flows. However, although the macro-based process implies that firms prefer to stay in the market due to sunk costs, a micro-based sectoral and firm-based analysis is important for clear inferences. This approach will ensure that the hysteresis in trade flows has a more robust microbasis in future studies. Finally, firms' stay-in-market behaviour has widened the immobility band for market entry and exit. The ongoing importing structure due to hysteresis effects causes the current account deficit problem in the Turkish economy to deepen, making the sustainability of the current account deficit difficult. Based on the macroeconomic variables and empirical findings in the Turkish economy, there are some issues that policymakers should pay attention to for the solution of hysteresis effects. In this context, stabilizing exchange rates in a way that does not cause structural breaks in import volume, reducing sunk costs by increasing efficiency in market entry, and reducing the effect of sunk costs on market entry and exit decisions in the long run by increasing total factor productivity come to the fore as important policy recommendations.



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# An Assessment of Türkiye's Public Diplomacy Activities after the Johnson Letter: Are Cultural Relations an Investment?

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## ABSTRACT

For Türkiye, the year 1964 witnessed a significant break in its long-standing foreign policy approach. During this period, Turkish foreign policy, which was shaped around the Cyprus Issue, sought alternatives after the Johnson Letter. This study aims to examine various cultural activities carried out by Türkiye in 1964 and evaluate them in the context of public diplomacy. In this direction, firstly, the international political atmosphere of the 1960s was evaluated from the perspective of Türkiye. Later, sections of Türkiye's important public diplomacy activities in different fields in the period from 1920s to the Johnson Letter were revealed. Finally, the report on cultural relations published by the Ministry of Foreign Affairs in 1964 was examined by documentary scanning method, and in this context, various public diplomacy initiatives were put forward in which the Cyprus Issue was at the center. As a result of the study, it has been understood that Türkiye invests in cultural and artistic activities in accordance with its political objectives within the scope of the maximum benefit strategy with minimum cost and makes positive contributions to the image of the country.

**Keywords:** Public Diplomacy, Türkiye, Cyprus Issue, Johnson Letter, Cultural Relations.

**JEL Classification Codes:** F50, F59

**Referencing Style:** APA 7

## INTRODUCTION

Although the conceptualization of public diplomacy was developed in the 1960s, it is quite possible to find out similar activities in terms of public diplomacy earlier (Cull, 2020). The whole of the actions, which were mainly handled and shaped within the framework of the idea of publicity/propaganda in the previous periods, were named as public diplomacy in the most heated years of the Cold War period, of course, with a slightly changed framework. Public diplomacy is classically defined as a government's means of interacting with foreign publics to foster awareness for its national goals and present policies, institutions and culture, as well as concepts and values of its country (Tuch, 1993, p. 3). In other words, public diplomacy is the effort of international entities to influence the global landscape according to their preferences by cultivating relationships with the relevant publics (Cull, 2009, p. 12). Later on, especially in the 21st century, a new understanding of public diplomacy has emerged, which was characterised by a diversification of stakeholders and an increased focus on two-way communication (Melissen, 2005). Thus, states

have introduced a novel dimension to the methods of achieving international legitimacy by prioritising soft power components over hard power (Sancar, 2012, p. 1).

Considering the definitions aiming towards the framework of public diplomacy, since its establishment, the Republic of Türkiye has paid attention to public diplomacy activities to articulate its position to global public opinion. Even while the National Struggle was going on, one of the most important things done was to try to attract the attention of the world public opinion by establishing the Anadolu Agency (Topuz, 2016, p. 139).

Türkiye's self-expression efforts started to form as of 1920 have always been an important agenda item in the foreign policy understanding of the Republic; accordingly, many large and small public diplomacy activities have been carried out. Some of these were initiatives that attracted international attention. Which tools the new state will prefer and which country's public opinion it will target has been directly related to foreign policy. For example, in the first years of the Republic, a traveling exhibition was organized under the name of the Black Sea Ferry to show that young Türkiye was a country that adopted Western

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values. The preference of important ports of Europe as the route of the ferry is a reflection of this policy (Başarır & Zorlu, 2022). *La Turquie Kemaliste* magazine, which began to be published in 1934 for similar purposes, also wanted to reach primarily Western and urban people with its French-based content (Özdemir, 2024). As the 1930s came to an end, the most important issue in terms of Turkish foreign policy was the Hatay Issue, and the first foreign radio broadcast started on this axis (Kocabaşoğlu, 2010, p. 226). During World War II, the London People's House was opened to introduce Türkiye to the British public, which is of critical importance for Türkiye, and to explain its values. Türkiye, which made a serious change in its foreign policy in the post-war period, established news bureaus as a public diplomacy tool and launched the first of them in New York City to develop close relations with the United States (USA) (Duman, 2020).

In the 1950s, when Türkiye became a member of North Atlantic Treaty Organization (NATO), the strategic importance of the United States in foreign policy continued to increase. The developing relations between Türkiye and the United States led to the opening of a second news bureau in the United States in a short time. However, in the 1960s, the agenda of the Turkish foreign ministry was shaped around the Cyprus issue, and the United States did not adopt an attitude in the direction that Türkiye expected. The relations between the two countries, which started to deteriorate in this process, weakened with the famous "Johnson Letter" sent to İsmet İnönü by US President Lyndon B. Johnson in 1964 (Aydın & Taşkın, 2018, pp. 123–128). While Johnson's letter necessitated alternative moves within traditional diplomacy in the foreign policy of Türkiye, which had considered itself as a part of the Western Bloc for many years, it also required a similar search for a way in terms of public diplomacy, which started to be used as a new tool in international relations.

In the study, firstly, the important developments of the period, which necessitated a change in Türkiye's foreign policy understanding for many years, were evaluated within the framework of the international political atmosphere of the 1960s. Afterwards, Türkiye's main public diplomacy activities at the international level until the 1960s were revealed. Finally, the report titled "Memorandum on the Examination of Cultural Relations as a Subject of Investment" published by the Ministry of Foreign Affairs in 1964, which includes cultural relations, was examined by documentary scanning method and various public diplomacy initiatives shaped around the Cyprus Issue were revealed.

## THE POLITICAL ATMOSPHERE OF THE 1960's

Türkiye's non-participation in World War II was the greatest achievement of the neutrality policy pursued since 1923. However, with the complete change in the balance of power after the war, Türkiye had to change its neutrality policy. The negative attitude of the Union of Soviet Socialist Republics (USSR) towards Türkiye in this period necessitated the abandonment of the "fully independent" principle of Turkish foreign policy in the bloc-based transforming world. Turkish foreign policy, which is oriented towards the West in the new order, has been based on a very close cooperation with the United States to balance Türkiye's foreign policy interests and goals with the foreign policy and interests of the West for a long time. The understanding based on opposition to the USSR and a very close cooperation with the USA continued until the mid-1960s as the basic policy of Türkiye (Bağcı, 2007, pp. 129–130).

Türkiye, which harmonized its foreign policy with the Western countries allied to NATO, thought that the biggest threat to its security came from the USSR in the 1950-1960 period and strongly avoided actions that would weaken the solidarity of NATO, which it saw as a guarantee against the USSR (Turan & Barlas, 1994, p. 431). On the other hand, after 1960, Cyprus constituted the basis of Turkish foreign policy. Other issues that Turkish foreign policy, which is shaped by Cyprus, is interested in have also developed under the influence of the Cyprus issue (Armaoğlu, 2004, p. 785). In fact, the issues that caused the most serious crises in Türkiye's foreign policy during this period are related to the Cyprus problem (Zürcher, 2013, p. 396).

The Republic of Cyprus, which was established in 1960, has become a deepening crisis in a short time due to the refusal of the Greek Cypriots, who did not give up the idea of Enosis, to respect the constitutional rights given to the Turkish Cypriots, although it provided a temporary peace. During the debates on the Constitution of Cyprus, President Makarios and other Greek Cypriot leaders demanded some amendments that would prevent the rights of the Turkish Cypriots and their statements in this direction deepened the uncertainties about the future of the current structure in Cyprus (Hale, 2003, p. 154).

After the Greek Cypriots could not get what they wanted in terms of constitutional amendments, with the start of the attacks known as "Bloody Christmas" on December 21, 1963, Türkiye wanted the USA to intervene to stop the attacks, but could not get the necessary support. Türkiye's decision to intervene militarily after the



attacks did not stop was interrupted by a letter sent by US President Lyndon B. Johnson (Erhan, 2002, pp. 685–686).

The Johnson Letter, which caused a “shock” in terms of Turkish foreign policy, made Turkish-American relations questioned and even caused a break with the effect of the détente period (Davutoğlu, 2004, p. 242). Although the letter did not completely destroy Turkish- American relations, it dealt a heavy blow to the alliance of the two countries. With the Johnson Letter, it was discussed how much Türkiye could trust the US alliance, and as a result of this discussion, the USSR began to be considered as a new element against the USA by taking advantage of the opportunities of détente. Although care has been taken not to take a direct stance against the existing alliance with the USA, there has been a dissolution in the alliance ties and a distant structure. The most concrete indicator of the coldness towards the US is the regulation of the free use of bases and facilities in Türkiye by the US in the few years following the Johnson Letter (Armaoğlu, 1999, pp. 426–427).

After the trust in the USA was shaken, action was taken to improve relations with the USSR, and the Minister of Foreign Affairs Feridun Cemal Erkin paid a visit to Moscow within a few months following the Johnson Letter - between October 30, 1964 and November 6, 1964. In the statement issued after the visit, two communities in Cyprus were mentioned. The statements about Cyprus in the declaration were interpreted as the USSR's support for Türkiye's Cyprus policy. During this period, Turkish-American relations lost serious momentum, while Turkish- Soviet relations showed a rapid improvement (Armaoğlu, 2004, p. 794).

The change in Turkish foreign policy after the Johnson Letter was not limited to the USSR and other Eastern Bloc countries. At the same time, Türkiye has included in the new foreign policy process the actors that emerged with the colonial revolutions, which it neglected due to the isolation it experienced in the UN (United Nations) on the Cyprus issue. In this context, a new policy was developed for the Islamic world and Asian-African countries and country groups (Davutoğlu, 2004, p. 72). Foreign policy, which has become a prominent and widespread topic of discussion as of 1964 (Sezer, 1972, p. 17), was discussed in a way that included previously neglected regions and countries. Especially to provide the necessary political support in the international arena, it was necessary to explain the facts about Cyprus in the countries located in these geographies. In this direction, there has been a change in the procedures applied in foreign policy, and while the framework of classical diplomacy has

been expanded to go beyond the Western Bloc, modern diplomacy methods have been put into use as well as classical practices.

## **A SECTION OF TÜRKİYE'S PUBLIC DIPLOMACY ACTIVITIES UNTIL 1964**

It has consistently been a significant concern for Türkiye to articulate its position in the international arena. In fact, a kind of public diplomacy understanding has been developed since the National Struggle period. According to Ünal Erzen (2012, p. 94), after the proclamation of the Republic, the aim that formed the basis of foreign policy was to introduce the newly established Turkish state to the world. This understanding has been maintained for many years after the establishment period with various initiatives.

Founded in 1920, when the Republic had not yet been declared and the National Struggle was continuing, Anadolu Agency is the prime example of the importance Türkiye attaches to public diplomacy. During the War of Independence, the communication opportunities necessary to create public opinion at home and abroad were lacking. For this reason, it was decided to establish a news bureau (Bengi, 2012, p. 301); thus, it was aimed that the people of Anatolia would regularly reach accurate information about the ongoing War of Independence and that the Turks' war of independence would be told to the whole world (Özkaya, 1985, p. 590). In this direction, liaison offices were put into operation in Istanbul, Izmit, Zonguldak, Inebolu and Antalya in Türkiye, and in Vienna, Geneva, Paris, Berlin, London and New York abroad (Özkan, 2021, p. 214). The activities of Anadolu Agency enabled the National Struggle to gain legitimacy and sympathy. Thanks to the work of the agency, there has been a significant increase in the material and moral support of Muslims in different parts of the world to Turks (Poyraz, 2013, p. 81). Therefore, Anadolu Agency's communication activities inside and outside the country have been a milestone for Türkiye's public diplomacy efforts (Özkan, 2021, p. 214). Additionally, the Irshad Council's establishment in 1920 was a significant development in the field of Turkish public diplomacy (Koyuncu, 2022, p. 933).

One of the most important initiatives to introduce the newly established country to the world in the early Republican period was the travel of the Black Sea Ferry. The Black Sea Ferry mobile exhibition, which was prepared by attaching importance to Türkiye in the context of modernization, embarked on a three-month journey to Europe in 1926 to promote Turkish products

and find new markets (Bozkurt, 2019, p. 1100). Thus, both the products and artifacts produced in Türkiye were sold by presenting them to the visitors, and new dialogue channels were opened by organizing events representing the new state (Başarır & Zorlu, 2022, p. 952). The Black Sea Ferry traveled 9,986 miles in about three months; during this time, the ferry anchored in sixteen different ports of twelve countries and was visited by 65,000 people (Ayhan, 2020; Şencan Görtunca, 2020). After the establishment of the Republic, it was aimed to explain the commercial potential of Türkiye, to shape international relations and to show its modern identity to the international public through the ferry, which was the first exhibition/fair organized abroad to promote the country (Özkan, 2021, p. 220).

Türkiye's self-expression efforts towards the world public opinion continued in 1934 with the publication of *La Turquie Kemaliste* magazine. The journal, which was used as a public diplomacy tool in the early years of the Republic of Türkiye, is important both in terms of explaining the different dimensions of the young Turkish revolution and developing a new understanding of Western and modern citizenship (İşler, 2017). Although the publication language of the journal was French, sometimes English and German content was also included. In *La Turquie Kemaliste*, which appeals to Western and urban readers, content that shows modernizing Türkiye, criticizes the orientalist perspective towards the country and encourages tourism has come to the fore (Özdemir, 2024). The journal, which aims at public diplomacy, tried to reach Europe and the USA by emphasizing visuality and texts in its content (Belge, 2014, pp. 34–35). *La Turquie Kemaliste* is one of the important tools used for public diplomacy in the early years of the Republic (Duman, 2020, p. 43).

Türkiye's international radio broadcasts since the end of the 1930s also draw attention among public diplomacy activities. At a time when all countries of the world were making propaganda through radio broadcasting, Türkiye also started radio broadcasts abroad (Demirkıran, 2008, p. 249). Türkiye's first international radio broadcasting, more specifically than public diplomacy/publicity, was carried out due to the Hatay crisis. After the Hatay Issue was resolved, regular publications were tried to be made in English, German, Bulgarian, French and Arabic, with news bulletins predominantly (Kocabaşoğlu, 2010, p. 226). During the years of World War II, Türkiye tried to make its voice heard to Britain and the United States, believing that they had a vital role. In this context, a program called *Mailbox* has been prepared for English-

speaking countries. In this program, which also includes readers' letters, news from modern Türkiye and information about the government were given priority. In addition, it was aimed to convey the theses defended by Türkiye, the foreign policy it pursued, and the democratic and liberal ideas in the country to the West through the Mailbox ('*Radyo Mecmuası*', 1945, p. 20).

Another strategic step taken for public diplomacy during World War II was the opening of the London People's House. The London People's House, which is the first people's house to be opened abroad, was an important initiative in terms of its operation at a time when Türkiye's national security sensitivities were at the forefront. In particular, the people's house, which continued its activities as a center where various activities related to Turkish life, art and literature were held, carried out many public diplomacy activities between 1942 and 1950 (Duman, 2020, p. 65; Sisson, 1944, p. 290). The main objectives of the London People's House were to introduce Türkiye and its culture to British citizens through activities, to contribute to the cultural relations of the two countries, and to be a social center for Turks going to England. In this direction, between 1942 and 1945, when the activities of the people's house were extremely intense, exhibitions were opened; conferences and Turkish lessons were given; film screenings were organized, and events for special days were organized (Yaşar, 2010).

With the end of World War II, the USA was the most powerful actor of the new order that emerged in international politics. In parallel with the change in its foreign policy in this process, Türkiye accepted the United States as an important target in terms of public diplomacy. For this reason, the first of the news bureau, which was the new application area that Türkiye applied to appeal to the international public opinion in the post-war period, was opened in New York, USA. By opening a news bureau in New York, Türkiye aimed to introduce the country to the US public, for which the country was not well known, and to ensure the continuity of the support received from the USA through the Truman Doctrine and Marshall Aid (Duman, 2020, p. 218). The News Bureau first made use of printed publications to promote Türkiye; it engaged in modern broadcasting activities such as radio and television, which were very important within the available possibilities. In this context, *the Turkish Hour* program organized by the New York News Bureau was met with great interest ('*Ayın Tarihi*', 1948, p. 33). In the second half of the 1950s, due to the development in Türkiye-US relations, a news bureau was opened in San Francisco in 1956, thus increasing the

number of news bureaus in the USA to two. Likewise, in parallel with Türkiye's foreign policy approach, news bureaus in Paris, Cairo, Beirut, Athens and Cyprus, cities with strategic importance, started to operate (Duman, 2020, pp. 111–116).

In the 20th century, Türkiye began to give more weight to efforts to influence public opinion to legitimize the actions of states in the international arena. Türkiye, founded in 1923, also tried to adapt quickly to this trend. In this direction, in the period from the establishment of the Republic to the 1960s, significant public diplomacy activities were carried out in different application areas; based on available opportunities, it was observed that these were tried to be maintained in line with strategic targets. Considering at the main framework of all activities, it is seen that Türkiye made an intense effort towards the world public opinion since the period of the War of Independence.

### **TÜRKİYE'S ACTIVITIES and OBJECTIVES IN 1964**

Both domestic political developments and global developments influenced Türkiye's foreign policy in the 1960s. The Cuban Crisis between the USA and the USSR and the dismantling of the Jupiter Missiles in Türkiye in the bargain made in connection with this crisis and the detente in international relations led to a new perspective in Turkish foreign policy, in contrast to the period of 'full alliance' with the USA. In particular, Türkiye, whose opinion was not asked during the dismantling of the Jupiter Missiles, was reduced to the position of an ignored ally in its relations with the US (Erhan, 2002, pp. 684–685; Sever, 2008, p. 664; Uçarol, 2000, p. 708).

The year 1964, which marked an important breaking point for Türkiye, revealed a new phase in Turkish foreign policy, which was determined during the Cold War. Türkiye, which participated the U.S.A./NATO/Western bloc against the USSR after World War II, contradicted its ally the U.S. on the Cyprus issue after the Bloody Christmas attacks in Cyprus in December 1963. The Cyprus issue, which was the first major problem that emerged during the Cold War period in Türkiye-US relations, revealed a new parameter in Turkish foreign policy with the "Johnson Letter" in which US President Johnson prevented Türkiye's intervention in Cyprus. Until 1964, Türkiye, which followed a one-dimensional policy mostly due to its alliance with the United States, started to discuss an alternative foreign policy after the Johnson Letter.

In this period, in which changes were seen in the field of diplomacy, in addition to classical diplomacy tools, activities that were described as public diplomacy today but were called promotion/propaganda/cultural relations<sup>1</sup> were implemented to announce Türkiye's policy on Cyprus to the world and to protect the rights of the Turkish Cypriots on the Island. Especially after the Johnson Letter, public diplomacy became a very important issue due to the situation Türkiye was in. At the end of 1964, Feridun Cemal Erkin made allegations to the Minister of Foreign Affairs by in the Turkish Grand National Assembly that Türkiye's work was "incomplete" in the face of the intense propaganda efforts of the Greek Cypriots, and Greeks were quite remarkable in terms of showing how important public diplomacy became in foreign policy ('Dışişleri Belleteni, October-December', 1964, pp. 31–32). This indicates that public diplomacy has historically been an essential instrument for achieving foreign policy goals (Köksoy, 2023, p. 84).

Although the debate on whether Türkiye's public diplomacy activities were insufficient or not was an important finding, the Ministry of Foreign Affairs had carried out some theoretical and practical studies long before the debate in the Grand National Assembly of Türkiye. After the letter crisis, the Ministry of Foreign Affairs, which first dealt with public diplomacy theoretically, published an evaluation titled "Memorandum on the Study of Cultural Relations as a Subject of Investment" ('Dışişleri Belleteni, October', 1964, p. 93). The assessment was prepared by the Fourth Department of the Ministry, whose field of study was Cultural Affairs. Especially in this period, the establishment of departments within the Ministry of Foreign Affairs that carried out public diplomacy activities such as information and cultural affairs or the assignment of some departments within this scope showed that modern diplomatic practices started to gain weight in foreign policy (Özcoşkun, 2018, pp. 33–36).

Evaluating the conditions under which public diplomacy developed, the Report emphasized that the changes emerging after World War II gave special importance to "cultural relations" and determined that the foreign policy carried out by many countries that followed an active policy in the international arena systematically and to a great extent developed cultural relations as an instrument of influence and prestige. Acknowledging that Türkiye's cultural, namely, public diplomacy activities started with a great delay, the Report stated that cultural relations were of vital importance for Türkiye during the Cold War ('Dışişleri Belleteni, October', 1964, p. 93).

<sup>1</sup> See, Soysal, İ. (1976). Tanıtma ve Türkiye'nin Tanıtılması. UNESCO Türkiye Millî Komisyonu.

Assessing the importance of public diplomacy for Türkiye, the Report first stated that Türkiye, which was not sufficiently recognized by its Western allies, should show the European public that it adopted its ancient civilization and European culture, especially in order to maintain its place in Europe and to base its political reputation on solid foundations. After the crisis with the USA, the understanding of Westernness was not broken, instead Europe was evaluated as a model and ally in the West. The increasing importance of Europe in Turkish foreign policy made the European public opinion an essential element for Türkiye to secure the support it wanted ('Dışışleri Belleteni, October', 1964, p. 93).

The second region considered was the Middle East, which was different from the classical understanding of Westernism. According to the Report, which considered the Middle East as a "vital region" for Türkiye, regardless of its relations with some Middle Eastern countries, Türkiye should have prestige in the region in general. Türkiye, which needed the support of more countries than Greece and the Greek Cypriots to provide the necessary support, especially the United Nations, on the Cyprus issue, wanted to reinforce its "delay" with the religious ties between it and the Middle Eastern countries. Emphasizing the common denominator of Islam between Türkiye and the region, the Report noted that Middle Eastern countries also showed favor to Türkiye ('Dışışleri Belleteni, October', 1964, p. 93).

The third region that was important for Türkiye's public diplomacy was the Asian-African countries that had recently gained and continued to gain their independence. Considering that a link would be established between the liberation of Asian-African countries from imperial domination and Atatürk's anti-colonialist struggle, the officials of the Ministry of Foreign Affairs determined that there was a concern for Türkiye just like in the Middle East, and emphasized that the existing interest should be turned into friendship. According to them, it was not "impossible" to establish a friendly relationship between Asian-African countries and Türkiye, and moreover, Türkiye was "in need" of this friendship ('Dışışleri Belleteni, October', 1964, p. 93).

Touching on the importance of the three regions for Türkiye foreign policy, the Report considered it a necessity to consider public diplomacy provided by cultural relations as a matter of political investment first and foremost. It was also pointed out that Türkiye's public diplomacy activities were in a key position for Türkiye, which was in need of foreign aid in economic terms. Likewise, it was considered as an issue of great

importance that the activities to be carried out within the scope of cultural relations had the potential to develop tourism<sup>2</sup> (Soysal, 1976, pp. 150–151), which was thought to contribute to Türkiye's economy ('Dışışleri Belleteni, October', 1964, p. 93).

The officials of the Ministry of Foreign Affairs came to the conclusion that Türkiye's experience in cultural relations in recent years should be considered as an important investment issue in political and tourism issues. The Report, which expected that Türkiye would provide great benefits with a small expenditure, put forward some examples to strengthen its thesis in this context. France was given as an example of Türkiye's gain from the development of cultural relations with European countries. In 1964, the Report, which announced the number of French scholarship holders in Türkiye as approximately 123 people, determined the amount of aid provided by France only within the scope of this scholarship as 90,000 dollars. Satisfied with the scholarships, the officials of the Ministry emphasized the need to develop cultural relations between the two countries to continue France's general interest and assistance to Türkiye ('Dışışleri Belleteni, October', 1964, p. 93). Likewise, it was considered that the artists sent abroad from Türkiye for cultural and artistic activities such as concerts and events made a significant contribution to increasing the political influence of Türkiye, and in this context, the tour organized by opera singer Ferhan Onat in Poland and the concert of pianist İdil Biret in Italy were considered as important case studies ('Dışışleri Belleteni, October', 1964, p. 95).

In general, what needs to be done is to take "cheap" but very productive steps for the "good recognition" of Türkiye, such as sending art exhibitions to the relevant countries and inviting well-known names of that country to Türkiye ('Dışışleri Belleteni, October', 1964, p. 94). The economy, which the report emphasized, was a very important problem for Türkiye, as the Minister of Foreign Affairs Feridun Cemal Erkin himself stated that public diplomacy is "first and foremost" a matter of money. For this reason, Türkiye aimed to achieve maximum benefit through economic breakthroughs in public diplomacy ('Dışışleri Belleteni, October- December', 1964, p. 32).

Some "cheap" but effective methods applied to promote Türkiye and increase the prestige of the country were also discussed in the Report. The first example given in this context was the Anatolian Archeology Exhibition

<sup>2</sup> From 1963 to 1968, tourism, which was officially handled together with political promotion, was evaluated by separate units only when political promotion was considered as a different issue.



opened at the Petit Palais in Paris. The exhibition, which was opened in 1964 and visited by 79,000 people, was an event that attracted great attention from the French press. The fact that French newspapers, radios and televisions declared Anatolia as the cradle of Western civilization due to the Exhibition led to the evaluation of the Exhibition as a beneficial investment for Türkiye in the long term. According to the findings of the report, while it was necessary to spend thousands of dollars to make "such useful publications" for the promotion of Türkiye, the country's political reputation and prestige were increased with a "ridiculous" figure of only 1500 dollars ('Dışişleri Belleteni, October', 1964, p. 95).

Another example is the International Handicrafts Exhibition held in Florence. Türkiye participated in the event with a small exhibition. Türkiye's exhibition was later exhibited in Rome as well. A total of 620,000 people visited the exhibition, and highly sought-after Turkish handicrafts were shown on television along with the other two pavilions that showed the most success. Likewise, Turkish handicrafts have found a lot of places in fashion magazines published in Rome. The Report, which made a cost-benefit analysis with the example of the Turkish Handicrafts exhibition, stated that Türkiye spent 23,500 liras for the exhibition. However, it was stated that Türkiye would have to pay this money to *Marie Claire*, who devoted two pages only to Turkish products for a similar promotion. The report made an important finding here and reminded that the indirect promotion method was much more effective than direct promotion, and underlined that it should not be forgotten that this method was much better for the promotion of Türkiye ('Dışişleri Belleteni, October', 1964, pp. 95–96).

The third example of Türkiye's public diplomacy was the exhibitions of the "child artist" Bedri Baykam held in Bern and Geneva. Bern Television alone devoted 40 minutes to the exhibition, while the number of articles about the exhibitions in the Swiss press was 12. The articles, which were evaluated in terms of quality as well as quantity, aroused satisfaction because they contained very positive opinions about Türkiye. The amount of money spent on Bedri Baykam's exhibitions was stated as 8,571 Liras ('Dışişleri Belleteni, October', 1964, p. 96).

The three examples that the report discussed were those in which maximum benefit was achieved with only minimum investment. Otherwise, in the same year, many brochures were printed, films were prepared, press conferences were organized and contacts were made with the world press to explain the theses of Türkiye and the Turkish Cypriots. Likewise, an agreement was reached

with a public relations firm to benefit the United States in favor of Turkish theses ('Dışişleri Belleteni, October-December', 1964, p. 32).

Finally, the Report, which dealt with the activities carried out for the promotion of Türkiye within the cost-benefit analysis, stated that the money allocated for cultural relations for a year provided "earnings and income to the extent of much larger amounts" to the treasury by giving it to the treasury in the same year. Türkiye's expanding promotional activities were expected to provide great gains in the long term, just as cultural relations provided "gains" in the short term. This gain, on the other hand, included economic areas such as tourism by contributing to the prestige of the country, which was very important. In the current period, the prestige of international relations in many cases and the fact that the countries with this prestige became much easier to solve their political and economic issues required Türkiye to place the country's prestige in an important place in its foreign policy. The Report, which made a final recommendation through public diplomacy, recommended that the sums to be allocated to cultural relations should be considered as part of the general planning regulating Türkiye's political moves in the political and economic fields ('Dışişleri Belleteni, October', 1964, p. 96).

## CONCLUSION

Although the conceptualization of public diplomacy coincides with the 1960s, it is known that many countries have engaged in similar activities in accordance with the meaning of the word. In this context, since its establishment, the Republic of Türkiye has implemented many public diplomacy activities targeting the world public opinion. In determining these activities, it should be noted that the strategic objectives of the state's foreign policy are compatible with global developments. As a matter of fact, from the establishment of the Republic to the period including the 1960s, the tools used in public diplomacy activities and the targeted public votes were shaped according to the changing foreign policy priorities of the country.

During the Cold War, the year 1964 marked the beginning of a new phase in Türkiye's foreign policy. Türkiye, which had problems with its ally the USA due to the Bloody Christmas attacks carried out by the Greek Cypriots in Cyprus shortly before the aforementioned date, started to question the alliance. In this process, the letter by President Johnson preventing Türkiye's intervention in Cyprus triggered the development of a different understanding in Turkish foreign policy. Türkiye,

which adopted a more one-sided policy in the Cold War conjuncture, needed an alternative foreign policy as a result of the developments.

Especially after the Johnson Letter, public diplomacy became a very important issue due to the situation Türkiye was in. In this direction, interest in Europe, the Middle East and the newly independent Asian and African countries increased. In addition, public diplomacy activities carried out through cultural relations had an extremely strategic importance as a political investment; thus, the idea that it would contribute to obtaining the foreign aid that was often needed began to be accepted. Likewise, it was expected that the positive image that would be formed through cultural relations would also support the development of tourism. In other words, it was accepted that the activities to be carried out within the framework of public diplomacy in this period should be seen as a serious investment in political and economic terms.

The activities aimed at improving the cultural relations carried out by Türkiye in 1964 were important in terms of revealing the understanding of public diplomacy of the foreign ministry. In this context, student mobility with France came to the fore as an extremely beneficial activity for Türkiye. In addition, opera singer Ferhan Onat's tour in Poland, pianist İdil Biret's concert in Italy, and the exhibition of child artist Bedri Baykam's works in Bern and Geneva, two important cities of Switzerland, led to the opinion that Türkiye would increase its political influence through such cultural and artistic activities.

In the same year, Türkiye organized low-cost art exhibitions as a way to be recognized in the best possible way. The Anatolian Archaeology Exhibition was opened at the Petit Palais in Paris and was visited by 79,000 people. The International Handicrafts Exhibition, held in Florence and Rome, Italy, respectively, was met with great interest, and the total number of visitors reached 620,000. Both exhibitions contributed positively to Türkiye's image in the international public opinion. Therefore, the officials of the Ministry of Foreign Affairs wished to explain Türkiye to the world without incurring great costs and tried to use cultural and artistic activities efficiently for this purpose.

Until the Cyprus issue intensified and became the main issue of Turkish foreign policy, the trust in the United States was at a high level. However, in the aftermath of the Johnson Letter, Türkiye sought alternatives and started public diplomacy activities on the axis of cultural activity to explain the Cyprus issue to the international public. Thus, Türkiye aimed to proclaim its righteousness to the

world. Because Türkiye was aware that it was behind the Greek Cypriots on this issue. Indeed, the overwhelming interest and positive response to cultural events suggests the establishment of a favourable perception.

Türkiye aimed to achieve great gains in both the short and long term without allocating huge budgets to its public diplomacy activities carried out through various cultural relations with significant influence. As a result of all these activities, the first important gain expected was Türkiye's ability to explain its arguments to the world in the face of the Cyprus Issue. In addition, it was aimed to contribute to the image of the country and to achieve some economic gains. Therefore, it has been seen that what Türkiye wanted to achieve in all of the activities within the conceptual framework of public diplomacy as of 1964 was in parallel with what is expected from public diplomacy today.



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# Conceptual Evolution of City Branding: A Systematic Review and the Progress of the Terms “Social Media” and “Smart City” in Literature

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## ABSTRACT

The aim of this study is to examine the evolution of the city branding concept and to explore the development of smart city and social media terms in city branding literature, from January 1st, 2003, to August 1st, 2023. Conducting a systematic review of 325 peer-reviewed English articles from the Emerald, Proquest, and Web of Science (WoS) databases that feature “city branding” or “city marketing” in their abstracts, keywords, or titles, the study assesses the transition from simpler branding strategies to complex and integrated approaches over the two-decade period. The research reveals an uptick in concept-related research since 2010, particularly highlighting the growing significance of smart city and social media concepts within the city branding literature. Furthermore, it identifies an increased focus on city branding efforts in Chinese cities over the last decade. By providing a comprehensive review of the developments and changes in city branding, alongside the evolving roles of smart city and social media concepts, this article is expected to contribute valuable insights to the existing body of literature.

**Keywords:** City Branding, City Marketing, Social Media, Social Media Marketing, Smart City, Smart City Branding.

**JEL Classification Codes:** M30, M31, R00

**Referencing Style:** APA 7

## INTRODUCTION

Since the ancient times when human mobility took shape in the world, a lot of effort has been made by mankind to differentiate from its competitors, to stand out and to be preferred. Mankind strives to maintain this state of differentiation and aims to be preferred by the means of branding. Brand creation and management strategies were first created and developed on a product basis; while focus for the branding of places, cities, regions and nations started over time. The same trend is observed when the academic literature is examined; brand literature was first established to be product-oriented, but with changing marketing dynamics and structures, studies on corporate branding gained momentum. The continuing development of corporate branding has an inspiring affect on academic studies to focus on the branding of cities.

Kavaratzis (2004) defines city branding as a way for the city to gain a competitive advantage in order to attract investment and increase tourism, and thus to ensure social development and, accordingly, to strengthen local identities and increase citizens' belongingness to

the city. Middleton (2011) summarised city branding as a way of telling the city's story to the world. When the development of city branding is analyzed through academic studies, it is clear that it has developed in parallel with marketing dynamics. When examined chronologically, it is evident that branding studies focus on marketing strategies through physical elements (symbol item, logo, mega event, architectural element, etc.) in urban space management from the 1980s until almost the millennium. Since the 2000s, there has been a tendency towards the idea that branding should be evaluated and the process should be carried out in a long-term programme through abstract elements (the story of the city, city residents, stakeholders, behavioural patterns of the city, governance culture, etc.) in addition to physical elements. Today, because the city is a structure that is complex and difficult to control, it needs to concentrate on far more than product or institutional branding. The creation of branding activities should be with an integrated and multi-stakeholder participation, with collaborative understanding and sensitivity, while also taking technological developments into account.

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Integration of technological developments into all areas of life, problems and concerns regarding global warming, and the prominence of themes such as sustainability and resilience in urban management have directly enhanced the concept of smart city management, especially in the last 10 years. Considering the integrated structure of branding literature that has developed over time and as a result of the literature reviews, it can be contemplated that more emphasis is placed on the smart city phenomenon within the scope of the branding process; there are articles on smart city branding and the use / importance of smart city strategies in branding (Chan *et al.*, 2019; Molinillo *et al.*, 2019; Parks and Rohracher, 2019; Pevcin, 2019; Valdez *et al.*, 2018). On the other hand, it is seen that the developments in Web 2.0 and Web 3.0 technologies have caused a radical change in branding practices (Song and Yoo, 2016). It can be argued that these developments directly affect every component of the city; these new communication technologies are effective in a wide range of environments from city residents, institutions, visitors, business lines. In this context, as a result of the literature review on branding, it is seen that most of the articles written in the last 10 years have mentioned the social media phenomenon and this technology is actively used in branding strategy and branding effectiveness measurement.

Within the scope of the article, articles on city branding published in the WoS, Proquest and Emerald databases in the 20-year period between January 1<sup>st</sup> 2003 and August 1<sup>st</sup> 2023 were scanned. Data from 2003 onwards was chosen in order to adequately track the rapid evolution and development in marketing and urban management paradigms led by the Web 2.0 technology. The study aims to examine the change and development of city branding literature by systematically scanning the articles published on city branding in the last 20 years, and at the same time, while analyzing this development, to examine the development of the existence of smart city and social media concepts in branding literature and to show to what extent they are used in branding literature.

In line with the objectives, this study will try to answer the following research questions;

- How has the concept of city branding changed and developed in the process?
- How do the concepts of smart city and social media develop in the index of city branding?
- When the published articles are analyzed, are there any points that draw attention and should be underlined?

In this context, within the scope of the article, firstly, a conceptual framework will be created in order to examine the development of the literature and the change in the themes of branding in the 20-year period. Also, contributions of the authors to the definition of the concept and the process of the inclusion of “smart city” and “social media” in this process will be explained. In the second part, the findings extracted from the data generated from the literature review will be mentioned. Finally, the information obtained from the findings will be compiled and the article will be completed by submitting interpretations and presenting suggestions for future studies.

## LITERATURE REVIEW

### Exploring the Conceptual Evolution of City Branding

Under this topic, firstly, the basic historical development of the city branding concept will be summarised. Then, the studies on city branding will be evaluated by presenting a compilation on the changes / similarities in the approach to the concept in the articles examined in the last 20 years within the scope of the research.

### A Brief History of City Branding

It is observed that academic studies on the concept of city branding have developed increasingly especially since the 1980s. It is plausible to associate this development with the dominance of neoliberalism policies in the world during these periods and to say that the conceptual development has been clearly affected as a result of the effects of neoliberalism policies on economic, political and social life.

The first studies on the creation of a city's branding process were based on branding studies in corporate structures. However, as studies progressed, it has been fathomed that the branding process of cities, although basically similar in principle, is a much more complex process than the branding process in corporate structures; it involves many uncontrollable elements and should be carried out with the participation of multiple stakeholders.

Much of the published research into city branding originates in the disciplines of marketing and urban studies, two fields that have tended to follow parallel rather than interdisciplinary paths (Dinnie, 2011). The transformation of city branding into an integrated structure and a multidisciplinary field that should include many elements has enabled each academician to work on city branding according to their own field of interest and expertise.

### **City Branding Literature in 20 years**

In the studies conducted throughout the period and with the criteria specified in the methodology within the scope of the article, it is clear that the perception and process of city branding has changed and developed over the years. Lucarelli and Olof Berg (2011) concluded that studies generally focus on three perspectives. These are;

1. branding as production,
2. branding as appropriation,
3. critical studies of city brands and city branding.

When current studies are analyzed, a similar structure is evident to be preserved in the articles written on the subject. Studies on the subject have increased exponentially after the 2010s; and since, many different points have been underlined rather than a single focal point. The complex, multidisciplinary and integrated structure of city branding has been discovered and studies have directed their focuses accordingly.

In the first years of the scanned articles, articles especially mention the effect of branding on tourism and its economic contribution to the city. In today's intensely competitive tourism marketplace, it is often mentioned that it is important for cities to create a positive image in order to differentiate from others and become attractive (De Carlo et al., 2009). Making the city attractive by using significant architectural icons such as mega events and mega projects in branding is very effective. On the other hand, it is stated that the combination of activities such as competition-oriented city branding in addition to traditional tools in local economic policies creates a successful economic policy (Blume, 2006) and branding is seen as an economic instrument in cities where the service sector has become the main sector. In this context, it can be argued that branding was directly associated with tourism and the economic structure of the city in the first years under study.

It is contemplated that this approach, which is associated only with economy and tourism, is not considered three-dimensional and is more akin to the branding of the corporate structure. Practices progressing in this direction have aroused concern in some authors. There is a distanced and critical approach to the concept; these concerns shed light and will continue to do so on future studies and prepare the ground for developing the concept. Stigel and Frimann (2006) stated that the implementation of the corporate branding process in cities has many handicaps; first of all,

it is very difficult to understand the complex structure of the city, it is difficult to establish an absolute and healthy consensus; these problems will create a contradiction in the creation of a unique identity. In support of this view, Kavaratzis (2009) stated that branding has a nature that is affected by disruptions and difficulties in political and administrative processes; branding requires long-term coordination, but the complex nature of the city creates a contradiction in this regard, and that marketing should be an urban development subject that concerns urban residents beyond urban tourism development.

In the following years, it is clear that the topics addressed in the articles have diversified, especially following the contribution of the narrow scope of city branding practices in the previous years and the criticisms against it. It can be argued that globalisation, the climate crisis, the change in all paradigms with the emergence of Web 2.0 and the reflections of the failures of neoliberalism on social and physical life are also effective in this. Articles written in the last 10 years emphasise participation and multi-stakeholder management in city branding (Chen & Qu, 2020; Herezniak & Anders-Morawska, 2015; Kavaratzis & Kalandides, 2015; Kaya & Marangoz, 2014; Lindstedt, 2015; Merrilees et al., 2012) It is underlined that city branding is not only about attracting tourists and/or investors, but also about the welfare of the inhabitants of the city; that the inhabitants, existing business owners and NGOs representing the city should also take an active role in the branding process, and that the vision and identity created should be adopted by everyone. In addition, Herezniak and Anders-Morawska (2015) state that it is important for stakeholders to play an active role in the creation of the brand and progress towards common goals, as well as in the measurement and evaluation of the effectiveness of the created brand.

The fact that digitalisation is effective in city management and city image as well as in all areas of life has caused this issue to be intensively covered in city branding articles. Studies mainly focus on the effects of innovations in communication technologies on city image, city management and brand; and on the effective use of technological innovations in city management.

The responsibilities imposed on societies and city managers by globalisation and the climate crisis and changes in economic, social and physical structure have caused these themes to rise to prominence in city branding. It is stated that smart city management comes to the forefront by acting in an integrated manner with digitalisation, and smart cities can be evaluated as a branding strategy (De Almeida, 2023; De



Jong, 2019; Gretzel & Collier De Mendonça, 2019; Sirkis et al., 2022) being part of historical, social, economic, cultural, and tourist imaginary constructions. The goal is to understand how the territorial brand, based on regional development theories, is being used in the metaverse city of Seoul, South Korea. The method used was a case study associated with bibliographic and documentary research, using a pro-protocol with four analytical categories. The main results referred to a metaverse territorial-regional brand, bringing discussions about a new geographical-virtual-immersive metaverse scale. It also addressed the use of recognition and competitiveness strategies between interactive-immersive territories. The conclusion confirms that Seoul's metaverse territorial-regional brand is strategically divided into three situations: (1 and it has been observed that there is a focus on this issue in recent studies.

As a result, when we look at the points mentioned in city branding literature and the development and change of the concept in the research conducted in the last 20 years, it is evident that the scope of branding has expanded, contributions have been made to eliminate the problems caused by the complex structure of the city, trends in urban management and changes in the world are followed and that these are evaluated within the framework of the concept.

### **Connecting the Concepts of City Branding, Smart City and Social Media**

Within the scope of the study, it is seen that the use of smart city and social media concepts in the city branding literature has increased over the years and it is thought that in a changing world, the concepts affect each other continually and improve the image of the city in a positive way. For this reason, in the publications made in the last 5 years, it has been stated that social media, which is an ICT tool, is an important item in developing a strategy in smart city development, that innovations in this technology offer an advantage for the concept to spread more easily, that the smart city concept cannot be fully mentioned without social media, and that it must be used for brand communication (Gretzel, U., Mendonça, M. C., 2019; Gryszel, P., Pelka, M., Zawadzki, P., 2023; De Almeida, G.G.F., 2023).

### **Smart City Concept in City Branding Literature**

The European Commission (2015) explains the concept of smart city as using technological solutions for the management and efficiency of the urban

environment. The concept of smart city promises the potential for significant urban change by realising the city's technological potential through a more efficient use and better organization of urban systems (Wiig, 2016). The concept is a process that needs to be considered multidimensionally and managed with a multidisciplinary approach and shows the vision of the city in terms of the sustainability of the cities of the future.

It is recommended that smart city strategies effectively include the use of ICT. In this context; it can be said that social media is an efficient technology that smart cities use to disseminate and realise their strategies; and on the other hand, social media users can both play a participatory role in the management of smart cities and promote them (E-WoM).

In the articles scanned within the scope of the research, when the position of the smart city concept in city branding literature is examined, it is seen that the concept of "smart city" has been included in literature since 2014. In general, it is clear that the connection between branding and smart city gives cities the opportunity to be more competitive, attractive and sustainable. The use of the smart city concept in branding is basically mentioned as a valuable label that should be included in the branding strategy of cities of the future (Carrizo Moreira *et al.*, 2023; Gretzel and Collier De Mendonça, 2019; Ojo, 2020; Pevcin, 2019; Pirnar *et al.*, 2017; Sirkis *et al.*, 2022) Gretzel and Mendonça (2019) state that the "smart city" label allows cities to attain economic prominence and attract enterprises and investors. Concurrently, it is evident that the creation and management of smart cities and the branding process are similar to each other. Both concepts require long-term plans and need to be evaluated in cooperation with experts in different fields from a broad perspective. In both concepts; using technological innovations contributes positively to the process, improving the quality of life of city residents is one of the main goals, and prioritising the theme of "sustainability" is very important for a successful process. Therefore, it can be clearly said that the correct management of smart city will affect the city brand, and the correct management of the brand will affect smart city. In 2020, the Covid-19 crisis that engulfed the globe caused many practices to change in every field. Pasquinelli et al. (2021) stated that this crisis will push cities to transform into smart cities and therefore the smart city theme will be used more frequently in branding activities. When today's

conditions are evaluated, it is seen that the use of smart applications in city management is faster due to Covid-19, and more importance is given to self-sufficient, environmentally sensitive cities. In summary, analyzing literature reveals that, in recent years; the smart city concept is a city management model used under the theme of sustainability and resilience, and that the correct use of this model for city image will generate a positive label. The analysis of literature also shows that in a world where ICT is very effective, smart city integration will make the city very advantageous and these advantages will both increase the quality of life of the city residents and make the city attractive to visitors and entrepreneurs.

### **Social Media in City Branding Literature**

Cities are increasingly interconnected in a global and increasingly digitalised world (Sassen, 2004). Technological innovations in transport and rapid development in web technologies deeply affect economic and social activities. Especially with the development of the Web 2.0 technology, critical changes have occurred in social relations, and the effects of this have been reflected in urban economies. Social media applications are amongst the new media technologies that entered our lives with Web 2.0.

During the period analyzed in this literature review, it was observed that the first use of the concept of social media was encountered in 2011, which coincides with the period when the use of social media applications became more widespread and started to be used in marketing. In the first few years when the concept was first used in branding literature, it is recommended that social media is an important element of contemporary marketing, that these applications can be used as a channel for promotional activities and communication with the user, and in this context, managers are advised to use this innovation in their branding strategies (Jankowska, M., 2012; Sevin, E., 2013; Shirley Beresford, B.J., 2014; Kavaratzis, M., Kalandides, A., 2015; Lindstedt, J., 2015). In support of this opinion; Sevin (2013) states that social media is the more efficient digital mean of communication toward city governments, requires lesser budget, is wider spread, and is much easier to show; Tjiok (2017) states that the role of social media cannot be overlooked as they are a wonderful means by which to encourage communication and education, even promotion, in an approachable way; and Schade v.d. (2018) states that in the contemporary environment, social media communication is getting more important for city brand communication, as it

enables city brand managers to convey the congruent characteristics to specific target groups at reasonable cost. On the other hand, the most important feature of Web 2.0 technology is that the users also become the producers, which brings bidirectional interaction to the forefront. The most valuable communication channel that directly affects the city image is word of mouth (WoM). Through social media, millions of people can have an impact on cities with e-WoM with very little effort, without the need for any physical contact. In other words, the city dweller can easily become a part of the branding process with social media. In this context, it can be argued that user generated content is a treasure for policy makers and marketers. It is also emphasised in the scanned articles that this interaction socially motivates people towards the city and has a unifying power.

When the articles published especially in the last 5-6 years are examined, it is clear that there are evaluations on the active use of social media in processes such as participation and impact assessment/measurement. Considering the complex structure of the city, in order to create a successful image, participation should be supported and feedback and evaluations should be continuously tracked. With social media applications, it is effortless for all stakeholders who are related to the city to participate and to be informed about the participation activities. Social media is also a very efficient channel for measuring and evaluating the impact of current or future/planned activities.

Recent publications and researches state that for sustainability; the future of cities is smart cities. Also, Molinillo *et al.* (2019) states that the use of social media is necessary and should be used in many areas in the process of branding smart cities.

### **METHODOLOGY**

Findings show that city branding literature has changed in parallel with the ever-changing world dynamics. This research aims to examine the change and development in the city branding literature in the last 20 years. On the other hand, it is contemplated that the concepts of social media and smart city are part of the evolution of the city branding concept; they have important contributions to the process of change and development of city branding, while also developing in the process themselves. Therefore, it is seen as a secondary objective to question the existence of these concepts in the city branding literature and to examine their development. The reason for analysing the last 20 years is the rapid

**Table 1:** Distribution of articles in each database, scanned according to the determined criteria (Produced by the author)

Database	Equation Search	Number of Papers	Duplicates	Total
Emerald		82		
Proquest	<u>Search Terms:</u> "City Marketing" OR/AND "City Branding" in Abstract, Keywords, Titles <u>Time Period:</u> 01.01.2003- 01.08.2023 <u>Language:</u> English	163	98	325
Web of Science		178		

developments in web Technologies (Web 2.0), which have led to radical changes in the dynamics of the world throughout this period, and these advancements have induced distinctive interpretations in marketing and urban management. Within the extent of this study, a systematic literature review was conducted. The research method was planned based on the following criteria;

#### 1. Search fields

- Peer-reviewed journal articles
- Articles written in English
- Articles published between January 1<sup>st</sup> 2003 and August 1<sup>st</sup> 2023
- Articles in the Emerald, Proquest and WoS database
- Articles with "city branding" or/and "city marketing" in their abstracts, keywords, titles

#### 1. Exclusion criteria

- Books and book chapters, conference papers, non double refereed papers, reports of institutions and organisations, master's and doctoral theses,
- Studies focussed only on country branding rather than city branding,
- Duplicates

As a result, as can be seen in the distribution in Table 1, 423 articles were found and after removing duplicates, a total of 325 articles were examined.

Within the scope of the study, the terms "social media" and/or "smart city" were searched in the filtered articles (except for the bibliography of the articles) that were generated when examining the city branding literature. With this analysis, the existence and development of concepts mentioned in the branding literature was questioned. As a result, it was found that there were 46

articles with the term "smart city", 90 articles with the term "social media" and 19 articles in which both terms were used at the same time.

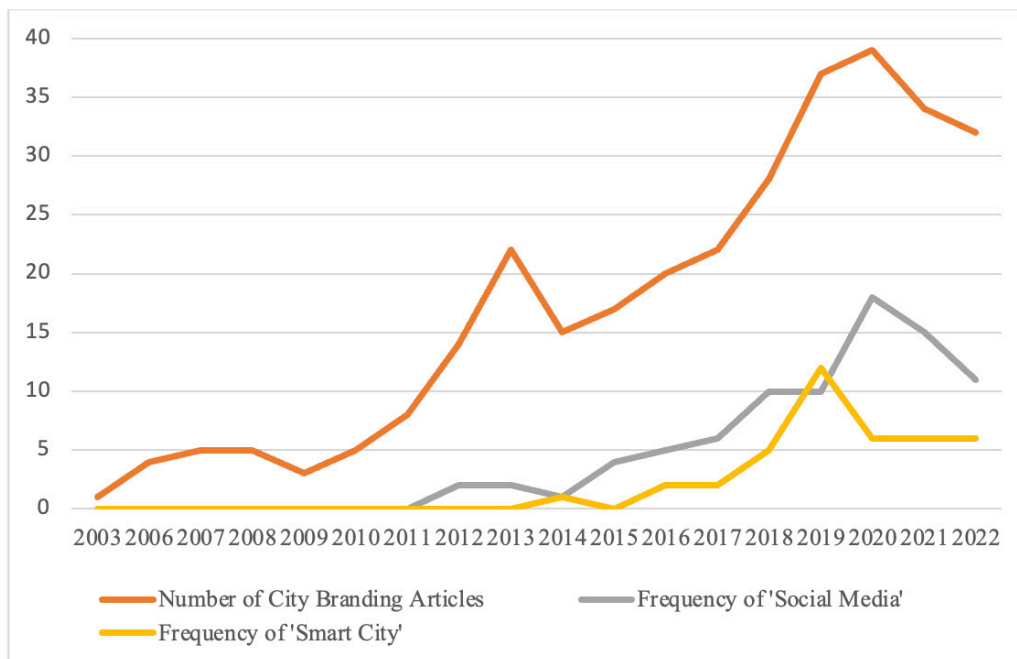
## RESULTS

In this part of the study, the systematic review will be evaluated in detail and different focal points in the development of the literature will be mentioned. Firstly, it will focus on the change in publications over the years; then it will be questioned which journals and authors are at the forefront of the concept, which countries are more focused on in the publications, and which research methods and research types are used.

### Numerical Change in Literature by Years

Under this topic, a graph was prepared from the data between 2003 and 2022 and the trend of the number of articles was analyzed (2023 was omitted in the graph because data for an incomplete year would be misleading). Figure 1 shows the change in the number of city branding publications over the years, scanned according to the determined criteria.

The graph reveals that there has been a dramatic increase in the number of articles written on city branding especially since 2010. This is the period where Marketing 3.0, which is value-oriented marketing, has emerged, and with this change in marketing understanding, the concept of brand is more frequently discussed in every field. In an environment where globalization affects everyday life with developing technology, competition is increasing, and competitive advantage can be gained only by considering complex elements; the development and modernization of classical marketing theories is anticipated. The graph clearly shows that city branding is also affected by this trend and is an emerging subject. In relation, during the same period, the existence of the social media concept started to be discussed in city branding literature and increased in general.



**Figure 1:** Number of City Branding Articles and Frequency of the terms 'Social Media' and 'Smart City' by year (Produced by the author)

The presence of the concept of smart city in city branding is first seen in 2013, but after 2015, it shows an increase similar to other concepts in literature. It is thought that the smart city concept has become popular in the last 10 years with; the integration of expanding digitalisation into the city, sustainability and especially the theme of resilient cities. The concept is a city management model that requires long-term planning in itself and it is slowly being integrated into the concept of branding. For these reasons, the smart city concept is thought to be a few years behind social media and less used in branding literature.

#### **Distribution of Publishers and Subject Areas in Journals**

A total of 184 journals have been published on city branding; 145 of these journals have published only once on the concept during the period under investigation, while the remaining 39 journals account for more than 55% of the scanned articles. Table II shows the names of these journals, their years of establishment, subject areas, quartile levels and the number of publications on the subject. Top 10 journals are listed below (see Appendix-1 for complete list of 39 journals).

Table 2 shows that the number of publications on city branding in the two journals: *Sustainability* and *Journal of Place Management and Development*, is significantly higher than the other journals. 65 of

325, that is 20% of scanned articles were published in these two journals. These two journals have been in publication for less than 15 years, yet they have spent significant effort on city branding in a short period of time. The distribution of journals in which the term "smart city" is mentioned in the articles show that, as expected, almost half of the articles in which the term "smart city" is mentioned are published in the top 3 journals on Table-II. Conversely, in the articles in which the term "social media" is mentioned, there is a more heterogeneous distribution. Considering that "social media" is mentioned in around 30% of all articles and "social media" is a more flexible subject, this heterogeneous distribution is expected.

Figure 2 shows the distribution of journals according to their subject areas. The graph reveals that city branding is a concept that is discussed under the domains of urban planning, architecture, sociology, tourism and business administration. Accordingly, the majority of journals published on the subject are on Social Sciences and Business, Management and Accounting. With the prominence of sustainability and resilience elements in urban management, city branding is being considered through these elements in journals published in the field of Environmental Science.

**Table 2:** Distribution of top 10 journals that has published about the concept (Produced by the author)

Publication title	Year of Establishment	Subject Area	Number of Article (2003-2023)
Sustainability	2009	*Computer Science *Energy *Environmental Science *Social Sciences	34
Journal of Place Management and Development	2008	*Business, Management & Accounting *Social Sciences	31
International Journal of Tourism Cities	2015	*Business, Management & Accounting *Environmental Science *Social Sciences	14
Cities	1983	*Business, Management & Accounting *Social Sciences	9
European Planning Studies	1993	*Social Sciences	6
International Journal of Sports Marketing and Sponsorship	2007	*Business, Management & Accounting *Economics, Econometrics & Finance *Health Professions	6
Journal of Product & Brand Management	1992	*Business, Management & Accounting	6
Procedia - Social and Behavioral Sciences	2009-2019	*Psychology *Social Sciences	5
Urban Studies	1964	*Environmental Science *Social Sciences	5
Place Branding and Public Diplomacy	2008	*Business, Management & Accounting	4

Finally, another point that should be mentioned is that the *Sustainability* journal, which has “Energy” as one of its subject areas, has a large number of publications on city branding. When the subjects of the articles published in the magazine are examined, it is seen that there are publications that generally associate city branding with digitalisation and ecological civilisation, which is one of the main reasons why “Energy” ranks fourth in Figure 2.

#### **Distribution of Authors Contributing to the Literature**

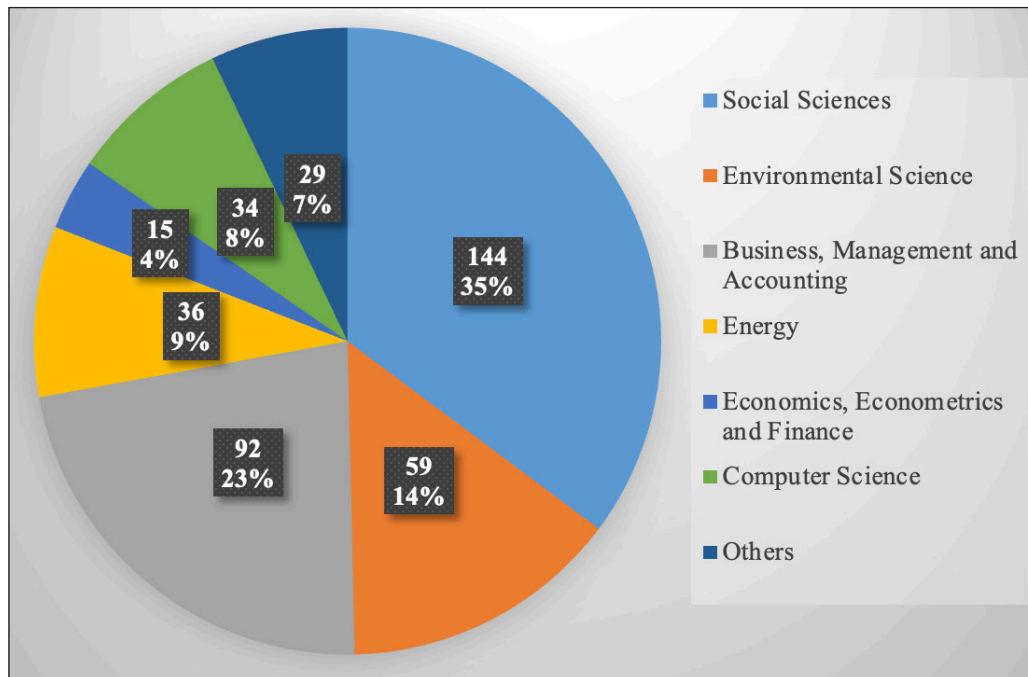
More than 800 authors have contributed to the concept of city branding, some of these authors have contributed more to the index, and some articles have attracted more attention and citations than others. Table III shows the 5 most cited articles, all of which have received more than 200 citations, and the oldest of these articles was published 15 years ago.

The aim of this analysis was to; find out the city branding point of view of the articles that attract attention and are considered valuable and are cited; and find out the authors who contribute more to the index.

The most striking data in Table III is that Kavaratzis’ articles published in 2012 and 2015 are among the top 5 most cited articles. The author has contributed to the concept with a total of 4 articles in the literature review (within the scope of the review, Kavaratzis is one of the authors with the maximum number of articles), and the fact that half of his publications are among the top 5 most cited articles shows that the author is closely associated with the subject and is a pioneer (the author’s other two articles are among the top 80 most cited articles). Another finding is that the most cited articles in Table III are publications aimed at filling theoretical gaps.

Only one of these most cited articles included the term “social media”, the other 4 articles did not include





**Figure 2:** Figure 2: Distribution of Subject Areas in Journals (Produced by the author)

No	Article Title	Number of Citations	Publication Title	Year	Authors
1	City branding: a state-of-the-art review of the research domain	324	Journal of Place Management & Development	2011	Lucarelli, A., Olof Berg, P.
2	Policy Boosterism, Policy Mobilities, and the Extrospective City	257	Urban Geography	2013	McCann, E.
3	The image of the creative city: Some reflections on urban branding in Turin	247	Cities	2008	Vanolo, A.
4	From “necessary evil” to necessity: stakeholders’ involvement in place branding	242	Journal of Place Management & Development	2012	Kavaratzis, M.
5	Rethinking the place brand: The interactive formation of place brands and the role of participatory place branding	220	Environment & Planning	2015	Kavaratzis, M., Kalandides, A.

**Table 3:** Authors contributing to the literature and articles that are cited the most (Produced by the author)

the terms “smart city” and/or “social media”. Considering the publication dates of the most cited articles, it can be argued that these dates are early for the widespread use of the concept of smart city. On the other hand, the term “social media” was published only in the article published in 2015 by Kavaratzis and Kalandides, where social media use was recommended as a part of measuring participation.

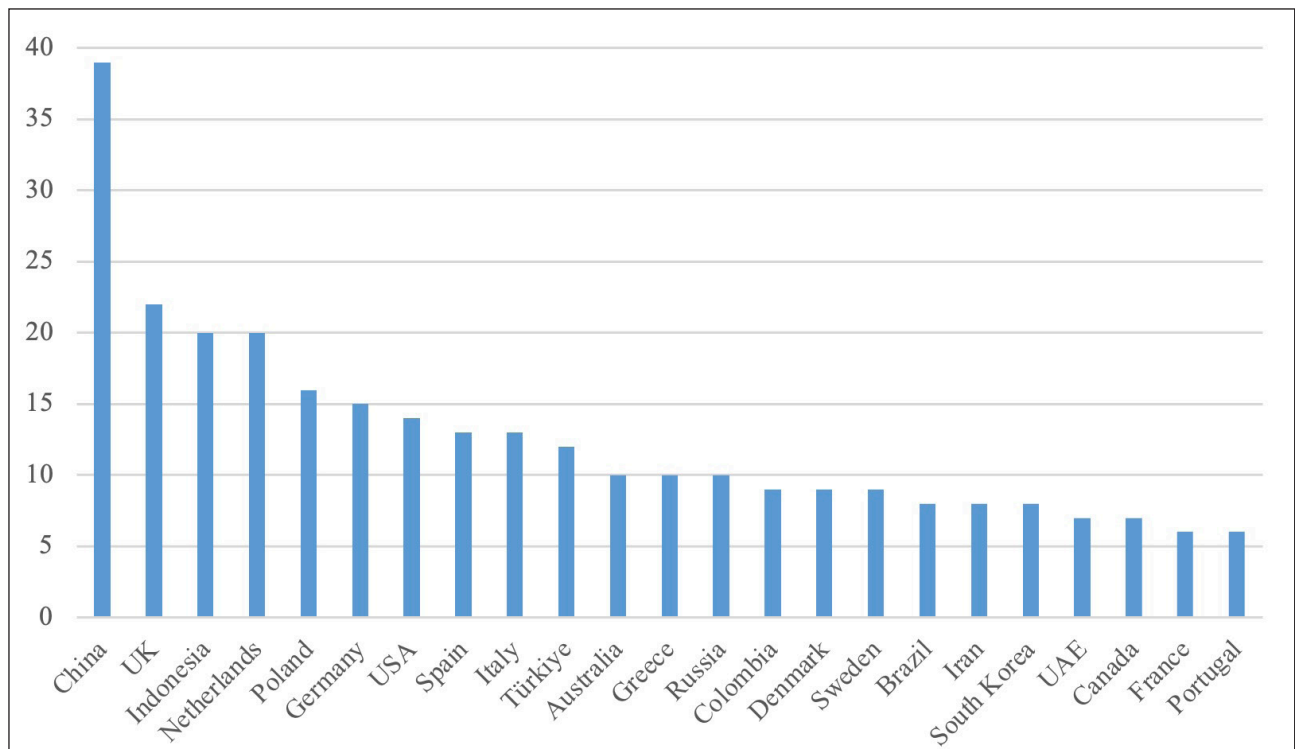
**Distribution of Articles According to the Countries to which the Cities of Study are Affiliated**

Another striking point revealed by the study is that there are some countries that are particularly focused on. In this context, the cities studied in the articles were individually filtered, and then the numerical distribution was made by classifying them according to the countries to which the city is affiliated, aiming to determine which countries have more studies on city branding. The percentage of countries with more than 5 studies in literature is more than 75%, therefore, not all countries are shown in Figure 3, only countries with more than 5 studies are included. In addition, there are a total of 57 articles in the literature that do not include any city in their research.

Figure 3 clearly reveals that the country whose cities have been studied the most within the scope of branding is predominantly China. In the distribution of the number of articles by years (Figure 1), it was revealed that there

has been a significant increase in the literature on city branding, especially in the last 10 years, and following the same trend, the articles that are based on cities in their research are also concentrated in the last 10 years.

90% of the articles researching the cities of China have been published in the last 10 years; there is a heterogeneous distribution and there is no concentration on any city. The second country in the graph is the UK, but it is seen that almost half of the studies on the cities of the UK are on comparison with cities of other countries, while this ratio is almost 10% in the articles on the cities of China. In other words, the articles on the cities of China are domestic, while UK articles include UK cities and cities of other countries and compare them. When other countries’ studies are examined, a similar pattern is generally observed. In articles on developed countries, many cities and countries are included for comparison rather than focusing on a city. In articles on developing countries and/or countries that have recently invested in their cities and are trying to transform their cities into a competitive element in the global arena, the research is domestic based. Finally, it can be argued that in literature on city branding, the significant presence and efforts of especially developing countries are evident in the graph.



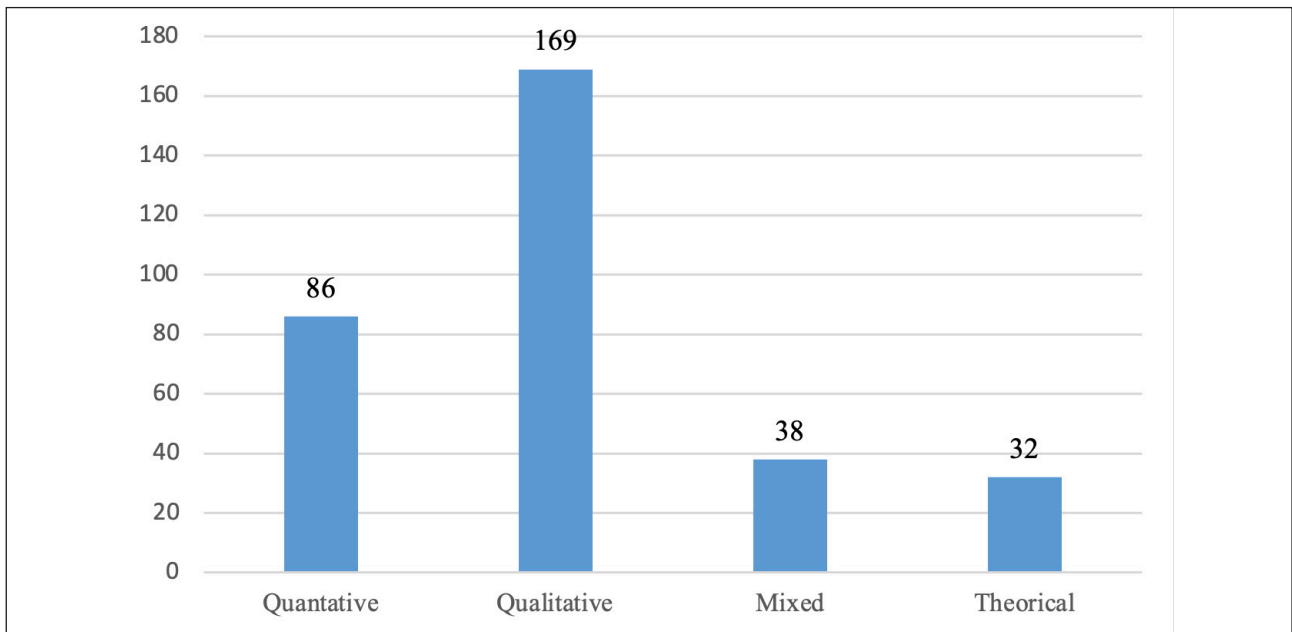
**Figure 3:** Distribution of Countries (Produced by the author)

**Distribution of Research Methods and Article Types Used**

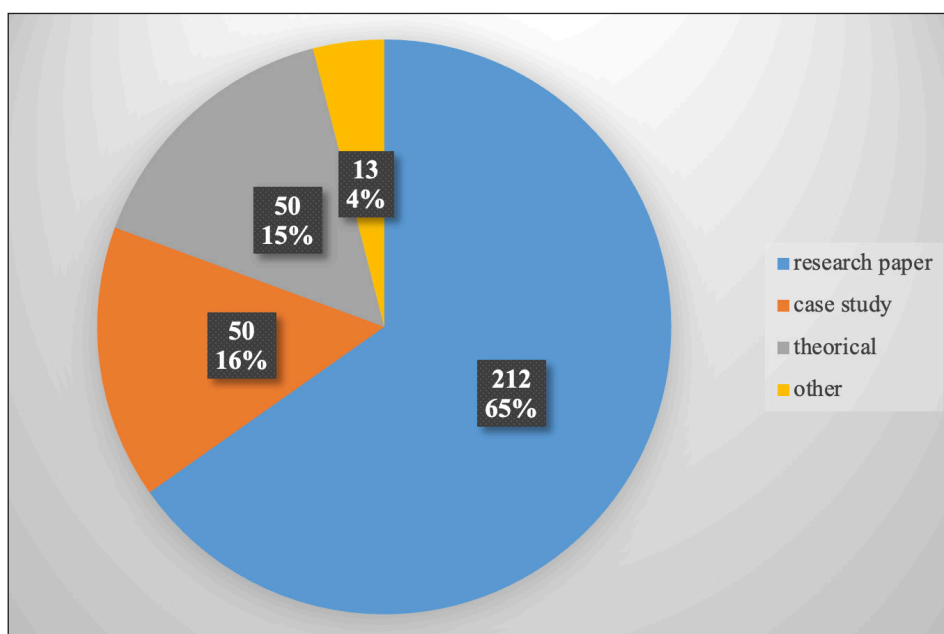
The last finding to be analyzed as a result of the literature review is the distribution of research methods used in the literature and the types of articles written. Figure 4 shows the numerical distribution of the research methods used in the articles. More than half of all studies were published by conducting qualitative research. When we look at the distribution according to the years, it is seen that qualitative research method is always the more preferred method for each year.

Figure 5 shows that 65% of the studies are research papers. Looking at the intensity of theoretical studies over the years, it is clear that the existence of theoretical studies on the concept is more prevalent especially between 2010-2013. These studies can be attributed to the developments in Marketing 3.0 and Web 2.0 and in this context, the increase in literature on city branding during those periods.

In summary, in the studies conducted within the scope of the concept of city branding, it was observed that the majority of studies used qualitative research (Figure



**Figure 4:** The volume of articles in terms of research methods (Produced by the author)



**Figure 5:** The volume of article types (Produced by the author)

4); 169 of total studies conducted qualitative research, while a total of 124 studies used quantitative and mixed research. It can be argued that studies conducted in social sciences contain more qualitative research than studies conducted in physical sciences. The concept of city branding is a subject that can be better evaluated in the field of social sciences, so it is not surprising that qualitative research is dominant in the analysis of research methods.

## DISCUSSION AND CONCLUSION

Within the scope of the study, taking into account the criteria specified in the methodology, the articles published on city branding in the last 20 years have been systematically scanned. The aim of the study is to examine the change in city branding literature and to question the development of the presence of smart city and social media concepts in literature while examining this change.

In academic terms, it can be stated that the concept of city branding has developed with neoliberal policies and globalisation. With the transformation of cities into economic instruments and the shift of the main sector in cities to the service sector, cities are being pushed to the forefront within the framework of certain labels in order to gain competitive advantage in the global arena (Kavaratzis, M., 2004; Middleton, A.C., 2011). When the course of city branding is examined chronologically within the scope of the systematic analysis, as reviewed in detail in the section 'City Branding Literature in 20 years', it is seen that it has changed with the developing marketing paradigms, evolved from a product and marketing-oriented approach to a more integrated and complex system at the same time; it has drawn a framework to create a system that tries to adopt and bring to the forefront; branding strategies that integrate advanced technology, and city management models that are formed with climate crisis in consideration. One of the important findings of the study is that the scanned articles are centered around two elements; articles focusing on the physical structure and urban sociology of the studied cities, that is, articles that examine the unique characteristics of the city, and articles that study city branding by drawing conclusions from a more global framework that examines changing world politics and digitalisation.

Another important finding of the study is that city branding initially focused on concrete elements such as tourism and economic development, but over time, more abstract elements such as the social structure of the city

and technological developments have taken place in city branding strategies. Considering the course of change in the articles scanned during the period under study; creating a city brand should now be a process; that aims to make the city more integrated and more resilient; that develops participatory policies by putting the city dwellers at the center; that is focused on long-term planning stages.

When the existence of the concepts of 'smart city' and 'social media' in the city branding literature is examined, it is revealed that these concepts have been in existence especially in the last 10 years and that they have a two-way interaction with branding. It is generally stated in articles that the smart city model is important for the cities of the future in order to increase efficiency by integrating sustainability and technology into the city and that the correct use of this concept will be a good label for branding. When we look at the use of the concept of social media in branding, it is stated that it is a low-cost but very effective strategy for brand managers. On the other hand, it is a good tool for measuring and evaluating the effects of the strategies created. It is also an advantage for city users to integrate easily into the city and to be the brand ambassador of the city.

In the last part of the article, certain findings from the literature review are explained and it is aimed that the analyses will help in finding answers to the research questions of the article.

The study reveals that the number of articles on city branding has accelerated during the period analysed and that the concepts of social media and smart city have been included in these articles at a remarkable rate, especially in the last 10 years. This remarkable increase shows that the concept of city branding has also been affected by the trends in technological developments and marketing dynamics in the world and has become inclusive of these issues. In addition, the subject areas of the journals that have published articles related to the subject show that city branding is within the radar of those specialised in social sciences and business, which is an expected result. Another important finding encountered while searching for answers to the research questions of the article is China, where significant publications on the concept have been made in the last 10 years. Although Chinese publications were not analysed, the fact that a remarkable number of publications on Chinese cities have been made in English in the last 10 years shows that the country has focused on branding and played an active role in the development of the literature. The last point to be mentioned is that, as the subject areas

may give an idea, qualitative research on the concept is generally carried out and the method has not shown an outstanding change in the last 20 years. The use of the quantitative research method, which is used extensively in engineering, biology and science studies, has not changed in city branding studies in 20 years; articles have progressed through qualitative data rather than numerical data.

In conclusion, the literature review readings based on the 325 articles examined have answered the research questions, have been able to show the development and trend of the existence of the concept and the two concepts examined within the concept in the process, and the analyses based on these articles have been found to be helpful in finding answers to the research questions.

This study is limited to WoS, Proquest and Emerald databases, which have a significant volume in academic publications written in English, and in this context, the progress of the concept and the existence of two different themes within the concept are questioned by drawing a broad framework. It is anticipated that this comprehensive study will form the basis for further studies, and that detailed analyses can easily be made on different elements within a narrower period or theme through this general framework. Language limitation is another important limitation that should be mentioned in the discussion section of the study; the imposition of this barrier has led to the omission of the content of publications written in languages spoken by dense populations such as French, Spanish, German and Chinese. Analysing studies written in different languages in future studies will surely provide more detailed and varying information on national studies, as well as a comparison between the international literature and the national literature. Another suggestion for future studies is to categorise the articles as; developing countries and emerging countries (based on the city that the articles examine). Examining the change in practices and mentality in countries at different levels of development in a deeper way can help clarify the differences in the city branding literature according to region.



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**Appendix-1.** Distribution of complete 39 journals that has published about the concept (Produced by the author)

Publication title	Year of Establishment	Subject Area	Number of Article (2003-2023)
Sustainability	2009	*Computer Science *Energy *Environmental Science *Social Sciences	34
Journal of Place Management and Development	2008	*Business, Management & Accounting *Social Sciences	31
International Journal of Tourism Cities	2015	*Business, Management & Accounting *Environmental Science *Social Sciences	14
Cities	1983	*Business, Management & Accounting *Social Sciences	9
European Planning Studies	1993	*Social Sciences	6
International Journal of Sports Marketing and Sponsorship	2007	*Business, Management & Accounting *Economics, Econometrics & Finance *Health Professions	6
Journal of Product & Brand Management	1992	*Business, Management & Accounting	6
Procedia - Social and Behavioral Sciences	2009-2019	*Psychology *Social Sciences	5
Urban Studies	1964	*Environmental Science *Social Sciences	5
Place Branding and Public Diplomacy	2008	*Business, Management & Accounting	4
GeoJournal of Tourism and Geosites	2013	*Earth and Planetary Sciences *Social Sciences	4
Tijdschrift voor Economische en Sociale Geografie	1967	*Economics, Econometrics & Finance	3
TPR	1977	*Social Sciences	3
Urban Geography	1980	*Social Sciences	3
Antipode	1969	*Earth and Planetary Sciences *Social Sciences	2
Brazilian Journal of Marketing	2015	*Business, Management & Accounting *Economics, Econometrics and Finance	2
Cogent Business & Management	2014	*Business, Management & Accounting *Decision Sciences	2

Economics and Sociology	2008	*Business, Management & Accounting *Economics, Econometrics and Finance *Social Sciences	2
Energies	2008	*Energy *Engineering *Mathematics	2
European Spatial Research and Policy	2009	*Social Sciences	2
IDPR	1997	*Social Sciences	2
Int. J. Tourism Policy	2008	*Business, Management & Accounting	2
International Journal of Architectural Research	2011	*Engineering *Social Sciences	2
International Journal of Cultural Policy	1997	*Social Sciences	2
International Journal of Event and Festival Management	2010	*Business, Management & Accounting	2
International Review for Spatial Planning and Sustainable Development	2013	*Environmental Science Social Sciences	2
Journal of Business Strategy	1980	*Business, Management & Accounting	2
Journal of Cultural Heritage Management and Sustainable Development	2011	*Arts and Humanities *Business, Management & Accounting *Social Sciences	2
Journal of Urban Design	1996	*Arts and Humanities *Social Sciences	2
Landscape Research	1970	*Environmental Science *Social Sciences	2
Management Letters	2001	*Business, Management & Accounting *Economics, Econometrics & Finance	2
Marketing Theory	2001	*Business, Management & Accounting	2
Polish Journal of Management Studies	2010	*Business, Management & Accounting	2
Qualitative Market Research: An International Journal	1998	*Business, Management & Accounting	2
Social Semiotics	1991	*Social Sciences	2

Strategic Direction	2002	*Business, Management & Accounting	2
Transportation Research - Procedia	2014	*Social Sciences	2
Urban Forestry and Urban Greening	2002	*Agricultural and Biological Sciences *Environmental Science	2
Urban Planning	2016	*Social Sciences	2



# The Effects of Burnout Syndrome on Materialist Tendencies and Compulsive Buying Behavior

Deniz YALÇINTAŞ<sup>1</sup> , Sezen BOZYİĞİT<sup>2</sup>

## ABSTRACT

Numerous factors influence the tendency for materialism and compulsive shopping. Burnout, one of these factors, is a frequently seen situation, especially in working individuals. This study aims to reveal the effect of emotional exhaustion, personal accomplishment, and depersonalization which are the three sub-dimensions of burnout, on individuals' materialism tendencies and obsessive-compulsive and impulsive purchasing behaviors. Data was collected from 390 consumers over the age of 18 who live and work in Türkiye voluntarily through a survey form prepared for the research. Structural equation modelling was used in the analysis to measure impact. According to the results of the analysis, while emotional exhaustion positively affects materialist tendencies and impulsive buying, it does not affect obsessive-compulsive buying. While personal accomplishment negatively affects materialistic tendencies and obsessive-compulsive buying, it does not affect impulse buying. Finally, while depersonalization does not affect the materialist tendency, it positively affects obsessive-compulsive buying and impulsive buying.

**Keywords:** Compulsive Buying Behaviour; Materialism; Burnout Syndrome; Impulsive Buying; Structural Equation Modelling.

**JEL Classification Codes:** D11, D12, I12

**Referencing Style:** APA 7

## INTRODUCTION

The concept of burnout, which is one of the most important issues of modern working life, has been one of the organizational issues of interest to researchers in recent years. Burnout occurs in modern workplaces due to problems such as time pressure, workload, role conflict, lack of autonomy, or lack of social support (Bui et al. 2022). Burnout has become an inevitable challenge for people worldwide as a result of the COVID-19 pandemic (Amanullah and Ramesh Shankar 2020; Gualano et al. 2021). Burnout syndrome is one of the most important challenges in today's business world, exerting a negative effect on both employee well-being and organizational performance. Occupations with frequent interpersonal communication and interaction, particularly those centered on customer service, tend to exhibit higher tendencies of burnout (Jaramillo, Mulki and Boles 2011). The concept of burnout is related with a process that follows a development linked to individuals' physical needs, passions, and relationships with friends and family. Employees exhibit certain physical, mental, emotional, and behavioral symptoms of burnout

as a result of interactions in both work and family environments. Burnout can also lead to unnecessary shopping behavior such as materialism and compulsive buying. In certain researches, it has been emphasized that individuals engage in purchasing behavior to reduce stress and even consumers with negative moods shop to improve these feelings (Yılmazoğlu 2021).

"The importance the consumer attaches to worldly goods" is a brief definition of materialism (Belk, 1984). Materialistic people believe that consumption and purchases are closely related to social standing (Harnish and Bridges 2014). According to several research (Yurchisin and Johnson 2004; Dittmar 2005; Claes et al. 2010; Harnish and Bridges 2014; Müller et al. 2014), materialism and compulsive buying are linked, materialists having a higher propensity for obsessive shopping. Compulsive buying is a reaction to overwhelming cravings that cause low psychological well-being and strong emotional affect, including stress and anxiety (Davenport, Houston and Griffiths 2012; Kellett and Bolton 2009). Compulsive buyers use their purchases as a coping mechanism for any unpleasant

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feelings that may surface, such as stress, anxiety etc. (Kellett and Bolton 2009; Thornhill, Kellett and Davies 2012).

Stress is closely related to burnout, materialism, and compulsive buying. The persistent experience of stress combined with disruptive thoughts might lead to burnout (Melguizo-Ibáñez et al. 2022). Roberts et al. (2003) find that the relationship between family conflicts and the happiness component of materialism is mediated by stress. Also, according to certain studies (Müller et al. 2012; Singh and Nayak 2015; Baker et al. 2016), stress and compulsive buying behavior are positively correlated. According to Weaver, Moschis and Davis (2011), one of the main causes of materialism's development over a person's life is stress, and marketing messages that portray things as ways to reduce stress or boost self-esteem may exacerbate this tendency. Rahim et al. (2022) examined materialism, stress, and compulsive buying behavior through the economic well-being of single Malaysian mothers. They contend that controlling the elements of materialism, stress, and compulsive buying is essential to improving the financial security of single moms. According to Roberts and Roberts (2012) rising number of early adolescents turn to compulsive buying as a coping mechanism for elevated levels of academic stress. In several studies (Rodriguez-Villarino et al. 2006; Saraneva and Saaksjarvi 2008; De Zwaan 2011; Mueller et al. 2011; Williams 2012), compulsive buying is that it serves as the main reaction to unpleasant experiences or emotions. It is thought that compulsive buyers react to stressful situations with higher levels of anxiety in response to than non-compulsive buyers (Roberts and Roberts 2012). By the way, it was discovered that materialism (Dittmar 2005; Mueller et al. 2011) predicted and was linked to compulsive shopping. According to Manolis and Roberts' research (2012), compulsive shopping and materialistic attitudes are linked to decreased subjective well-being among consumers.

From the study results presented above, it is understood that stress is associated with burnout, materialism, and compulsive buying, and even that there is a connection between materialism and compulsive buying. Additionally, there are also studies examining the relationship between burnout and materialism (Unanue et al. 2017; Toprak, Arıca and Yavuz 2020; Reyes et al. 2024), burnout and compulsive buying (Arslan, Tanrıku and Aksöz 2022; Tekşan and Öztürk 2023) and burnout-impulse buying (Torun and İpcioğlu 2015; Tekşan and Öztürk 2023) in the literature. However, no study has been found in the literature examining the relationship

between the sub-dimensions of burnout syndrome and materialism, compulsive and impulse buying. Thus, the purpose of this study is to ascertain how burnout's three sub-dimensions—emotional exhaustion, depersonalization, and personal accomplishment—affect individual tendencies toward materialism as well as their compulsive, impulsive, and obsessive-compulsive buying behaviours. This study is important in terms of revealing the effect of burnout on the materialism and compulsive buying of consumers in Türkiye. Thus, it is thought that the results of the study will help guide policymakers and practitioners in Türkiye in this period of rising inflation and severe economic conditions. In addition, it is thought that this study will contribute to the literature since the number of studies examining burnout, materialism, and compulsive buying behavior together is limited in the literature.

## LITERATURE REVIEW

### Burnout Syndrome

The concept of burnout has been conducted in abundance (Acosta-Ramos et al. 2021; Chirico et al. 2021; Melguizo-Ibáñez et al. 2022; Samusevica and Striguna 2023) in recent years as a popular term, was coined in the 1970s by Freudenberger to describe a condition observed among voluntary healthcare workers. This condition involves fatigue, loss of energy, disillusionment, lack of motivation, and the tendency to quit the job (Ince and Sahin 2015). The definition of burnout given by Freudenberger (1974), is characterized as the failure, wearing out, and exhaustion of an individual due to overly requests for energy, power, and resources. According to (Louw, Van Ede and Louw 1998) burnout syndrome manifests as exhaustion, sleeplessness, pains, alcohol or drug addiction, and social problems; also emotional fatigue, and inefficiency, it is a condition that also expresses feelings of vulnerability and loss of control.

Maslach and Jackson (1981) conducted important studies on burnout and they described burnout as a condition of mental, emotional, and physical tiredness. The Maslach Burnout Scale, which is the most widely used in studies on the measurement of burnout, considers burnout in three sub-dimensions emotional exhaustion, depersonalization, and personal accomplishment (Maslach and Jackson 1981). *Emotional exhaustion*, the first stage of burnout, constitutes the core dimension of burnout syndrome and is mostly related to work stress (Lewin and Sager 2008). It is defined as the feeling of being overloaded on the employee due to the work he does and as a result feeling exhausted

(Maslach and Jackson 1981; Tsigilis, Koustelios and Togia 2004). The person in this dimension feels that her/his emotional resources are exhausted and that it is not possible to devote herself psychologically to her work for a long time (Maslach and Jackson 1981). The second dimension of burnout syndrome is *depersonalization*. The interpersonal aspect of burnout is represented by the sarcasm or depersonalization component (Maslach, Schaufeli and Leiter 2001). In this case, the person shows negative attitudes towards customers, colleagues, and managers, and exhibits cold, indifferent, rude, and humiliating behavior (Cordes and Daugherty 1993; Hollet-Haudeberet, Mulki and Fournier 2011). *Personal accomplishment* is the third dimension of burnout syndrome, which is the self-evaluation dimension. This dimension of burnout is also referred to as personal failure in some sources (Cordes and Daugherty 1993). It expresses feelings such as incompetence, lack of performance, and inefficiency at work (Maslach, Schaufeli and Leiter 2001). In this dimension, the person thinks that no one loves her/him, becomes withdrawn, feels like she cannot be successful, and experiences communication breakdowns with her colleagues (Güven and Sezici 2016).

According to the Maslach Model, burnout has a stress-related effect on the staff. It begins with emotional exhaustion as a response to emotional resources. As a coping strategy against emotional exhaustion, the person begins to become desensitized in his/her relationships with others and to keep a psychological distance from them. When depersonalization begins, the individual realizes the incompatibility between the potential expectations of the people s/he serves and the employer and the situation s/he is in. This results in the person feeling inadequate and seeing herself/himself as a failure when evaluating his successes (Ari and Bal 2008). Burnout is characterized by high degrees of depersonalization and emotional tiredness as well as low levels of personal success (Schaufeli et al. 2002).

### **Compulsive Buying Behavior**

Compulsive buying behavior, which has become a common buying model in consumption culture, is a perpetual, insistent, and uncontrolled buying behavior with negative financial and social consequences (O'Guinn and Faber 1989). It is thought that compulsive buying is a psychopathological disease that results in distressing, uncontrollable cravings (Harnish and Bridges 2014). According to Hassay and Smith (1996), obsessive buyers do it because their purchases offer them instant, albeit fleeting, solace from their worry or melancholy. As a result, emotional strain, low self-esteem, and self-

image issues, together with other life obstacles, can lead to compulsive buying (Roberts, Manolis and Pullig 2014). According to Boujbel and d'Astous (2015), when consumers' consumption desires are met, they frequently experience emotional psychological states like happiness, excitement, annoyance, and guilt. However, when consumers over consume and lose control over their purchases, there are more serious repercussions, such as social and financial issues (Müller, Mitchell and De Zwaan 2015). Additionally, because compulsive buying is regarded as a psychopathological disorder that results in uncontrollable impulses that cause distress, the situation extends beyond the person's financial difficulties and can have detrimental effects such as marital issues, family strife, and legal issues (Harnish and Bridges 2014). Numerous academics have discovered evidence in favor of a belief in psychology, according to which compulsive shopping is a coping strategy people employ to deal with uncomfortable ideas or situations. For instance, studies (Rindfleisch, Burroughs and Denton 1997; Roberts et al. 2006) conducted on teenagers have shown a favorable correlation between compulsive buying and stressful family events like divorce. Human motivation, well-being, social interactions, neuroticism, and impulsivity are all impacted by money attitudes (Eroğlu and Bilgen Kocatürk 2020). Additionally, they have a favorable correlation with compulsive buying (Durvasula and Lysnoski 2010). According to Ridgway, Kukar-Kinney and Monroe (2008), obsessive-compulsive disorder and impulse control disorders share similarities with compulsive buying behavior. Also, compulsive buying behavior has two basic dimensions: Obsessive compulsive buying and impulse buying.

### **Obsessive Compulsive Buying**

The main definition of obsessive-compulsive buying behavior is an uncontrollable buying problem and behavior stemming from a consumer's impulse to make excessive purchases of goods. This need is usually brought on by unpleasant emotions because many compulsive buyers also experience mental illnesses like guilt and worry, which impair their judgment and put them and other people in danger (Gohar et al. 2023). As stated by Ridgway, Kukar-Kinney and Monroe (2008), compulsive buying activity is classified as obsessive-compulsive spectrum disorder because, similar to obsessive-compulsive disorder, repetitive purchase behavior is carried out by customers to relieve anxiety. Furthermore, these customers lack control over their buying impulses, just as those with impulse-control disorder do. Furthermore, a lack of control over an impulse to act follows an impulse to perform in

both diseases. According to Harnish and Bridges (2015), obsessive-compulsive purchasing behavior can be caused by a variety of factors, such as anxiety, materialism, low self-esteem, and lack of confidence. As such, obsessive-compulsive buying behavior is an attempt to overcome these emotions. Shopping is a coping mechanism for obsessive-compulsive purchasers who exhibit symptoms of sadness and mood disorders (Frost, Steketee and Williams 2002; Suresh and Biswas 2019). The hedonic aspects of internet channels have produced an increase in shopping that causes obsessive-compulsive buying because people who have compulsive tendencies have a recurring obsession with spending and shopping, and they utilize shopping as a coping method for their problems (McElroy et al. 1994). Research indicates that compulsive buying disorders can develop in a variety of contexts, including internet retail environments (Dittmar, Long and Bond 2007; Bridges and Florsheim 2008; Santini et al. 2019). Obsessive-compulsive buyers are known to seek out arousal and excitement due to the unique and curiosity-driven aspects of the Internet for purchases, which may worsen with regard to Internet platforms (Santini et al. 2019).

### ***Impulsive Buying***

Impulsive buying is the unforeseen decision to purchase a good or service right before making a larger purchase (Khajemahmodabadi, Dadras and Djoury 2017). Impulse is spontaneous, arises from being exposed to stimuli, and is made on the spot. The buyer is unlikely to hold off on making an impulsive purchase until after gathering more information, compare prices, get advice from a friend, or even merely pause the decision for a little (Jones et al. 2003). Both internal and external variables can impact consumers and cause them to act impulsively while making purchases. Anything can be considered a pulse item, including new releases, samples, and well-known brands at surprisingly low costs (Suganya and Joice 2017). Customers who are compelled to make last-minute purchases must first view the item before deciding to buy it. Impulsive buyers tend to be impetuous, emotionally invested in the product, and in search of quick satisfaction (Kacen and Lee 2002). Impulsive buying happens when the desire to buy outweighs willpower; otherwise, it doesn't happen when willpower is strong (Li 2015). Rook and Hoch (1985) asserted that internal psychological affective and cognitive factors have an impact on customers' impulsive purchasing behavior. Due to product satisfaction and satisfying an urge, it was suggested that customers' impulsive purchases had a beneficial impact on their mood (Ahn, Lee and Kwon 2019; Gardner and Rook 1988). Li (2015) also looked at

how impulsive buying affects consumers' pleasure and feelings after making a purchase. While impulsive buying helps customers fulfill their desire to acquire goods, it also prevents them from saving money, which can lead to unpleasant feelings like regret and shame. Guilt and regret are likely to be experienced, especially after making impulsive purchases of luxury products (Kivetz and Zheng 2006). Trocchia and Janda (2002) also discovered that when impulse buying happens, customers experience feelings of shame and resentment for their wastefulness. According to certain studies (Shehzadi et al. 2016; Gogoi 2020), impulsive or uncontrollably high consumer purchasing behavior is a powerful indicator of obsessive buying. According to Özdemir (2022), materialism has a favorable impact on obsessive and impulsive purchasing.

### **Materialism**

An increasingly materialistic mindset and the need for money to buy status and happiness are characteristics of contemporary consumer society (Dittmar 2004; Dittmar, Long and Bond 2007). Most of the time, money is associated with material belongings, and for certain individuals, belongings are essential to who they are and how they live (Richins and Dawson 1992). The level of importance a customer places on material items is known as materialism, or the tendency to possess material goods (Belk 1984). Materialism is an important concept that not only affects a person's worldview but also affects how they behave as customers (Goldsmith and Clark 2012). Conceptualized in different ways with various perspectives in different fields, materialism generally represents a tendency towards material possessions and money (Rupert and Smith 2016). The concept of materialism is diverse and cannot be approached from a singular perspective. It has undergone transformation and development throughout its history. In one of its early definitions, philosophy-based materialism put out the idea that nothing is more substantial than substances and objects made of matter, including their motions and changes (Scott, Martin and Schouten 2014). Materialism can be described as the significance that consumers attribute to material possessions and acquisitions when they define their own and others' success, and when they believe that it stands for the ultimate goal and the main cause of happiness (Richins and Dawson 1992). Materialism is defined by Górník-Durose (2020) as the value an individual attaches to riches and possessions to be able to reach a preferred final condition, like pleasure. Since materialistic individuals frequently experience high levels of anxiety, it seems to reason that materialism would positively correlate with and predict compulsive buying



(Gohar et al. 2023). According to Roberts (2000), people who have a strong tendency toward materialism may be more prone to purchase compulsively because they think that success and pleasure can be attained by obtaining material items. Weaver, Moschis, and Davis (2011) indicated that a person's adolescent experiences and circumstances have an impact on their subsequent compulsive shopping in early adulthood as well as their materialism.

### The Current Study

In this part of the research, firstly, by the purpose of the study, the results of the studies that led to the creation of hypotheses were mentioned, and then the hypotheses of the study were included. There are various studies in the literature examining the relationships between burnout syndrome, obsessive-compulsive buying, and impulse buying. For example, as a result of their studies, Deckop et al. (2010) revealed that work-related personal well-being and success, including job satisfaction, intrinsic and extrinsic reward satisfaction, and career satisfaction, were negatively related to materialism. Unanue et al. (2017), in their study in Chile, found that employees with high materialistic values have low levels of job satisfaction and commitment, and in addition, their intention to leave work and the possibility of experiencing burnout are high. Toprak, Arıca and Yavuz (2020) also stated in their study with medical school students that there was a moderately positive significant relationship between materialism and emotional exhaustion and that as emotional exhaustion increased, materialism also increased. Reyes et al. (2024), in a study with Chilean workers, found that materialism predicts subsequent levels of burnout through higher need frustration in both individual-level and within-person longitudinal analyses. As a result of studies finding a relationship between materialism and burnout, the following hypotheses were created:

*H<sub>1</sub>: Emotional exhaustion affects materialist tendencies positively.*

*H<sub>2</sub>: Personal accomplishment affect materialist tendency negatively.*

*H<sub>3</sub>: Depersonalization affects materialist tendencies positively.*

Müller et al. (2005) found that individuals continue compulsive buying despite negative personal, social, or professional consequences and financial debts. Sneath, Lacey and Kennett-Hensel (2014) examined the depression-induced compulsive buying behaviors of victims after Hurricane Katrina. As a result of the study, it was revealed that depression had a positive effect on

compulsive buying behaviour. Arslan, Tanrıku and Aksöz (2022) conducted a study to reveal the effect of social burnout levels of women living in Türkiye on their online compulsive buying behaviour. They concluded that social burnout levels of women are effective in online compulsive buying behaviour. Rahim et al. (2022) examined materialism, stress, and compulsive buying behaviour through the economic well-being of single Malaysian mothers. They contend that controlling the elements of materialism, stress, and compulsive buying is essential to improving the financial security of single moms. Tekşan and Öztürk (2023) state in their study that burnout has a positive effect on compulsive buying. In this context, the following hypotheses were created:

*H<sub>4</sub>: Emotional exhaustion affects obsessive-compulsive buying positively.*

*H<sub>5</sub>: Personal accomplishment affects obsessive-compulsive buying negatively.*

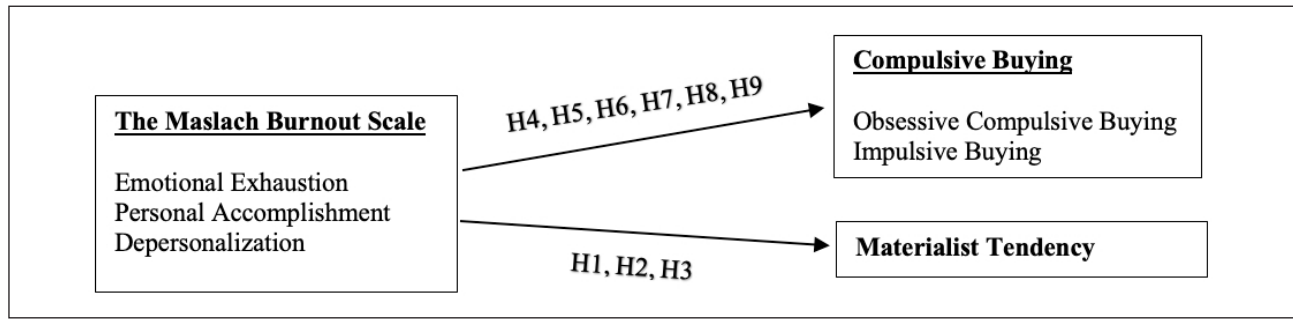
*H<sub>6</sub>: Depersonalization affects obsessive-compulsive buying positively.*

Torun and İpcioğlu (2015) investigate the phenomenon of connections between elements of burnout syndrome and impulsive buying in public sector workers. Depersonalization, one of the components of burnout syndrome, has been revealed to be the only factor that significantly correlates with impulsive buying behaviour. Zhao et al. (2022) also investigated the direct effect of COVID-19 burnout on online impulsive buying as well as its indirect effects via self-control to represent the psychological implications of a prolonged pandemic. Online impulsive buying and COVID-19 burnout were regularly correlated indirectly through self-regulation and self-appraised impulsivity, but not always directly. Online impulsive buying did not correlate with COVID-19 burnout. This research raises the possibility that the relationship between burnout and impulse buying is more complex and environment-sensitive. Tekşan and Öztürk (2023) state in their study that burnout has a positive effect on impulse buying, and as the burnout level of individuals increases, impulse buying behaviour also increases. In this context, the following hypotheses were created:

*H<sub>7</sub>: Emotional exhaustion affects impulsive buying positively.*

*H<sub>8</sub>: Personal accomplishment affects impulsive buying negatively.*

*H<sub>9</sub>: Depersonalization affects impulsive buying positively.*



**Figure 1:** Research Model

## Method

In the method section of the study, the model of the study was presented and explanations were made about the population, sample, data collection, data analysis methods, validity, and reliability. First of all, hypotheses were created based on the information given in the literature, and as a result of the hypotheses, the research model was drawn as shown in Figure 1.

The population of the research consists of consumers aged 18 and over living in Türkiye and working in a job. The sample was chosen because it was impossible to reach the entire universe. The sample of the research consists of 390 consumers with the same qualifications. Coşkun, Altunışık and Yıldırım (2017) stated that a sample size of 384 is sufficient when the population is 100,000 and above. Therefore, it is considered that the number of samples is sufficient. Sampling was achieved using the convenience sampling method. Participants were asked questions through the online survey method. In the first part of the questionnaire, there were scales related to the variables, and in the second part, demographic questions such as age, gender, education, employment status, and year worked. In the study, Richins' (1987) 6-item materialism scale was used to measure materialism tendency. For compulsive buying, the compulsive buying scale consisting of two sub-factors, Obsessive Compulsive Buying (3) and Impulsive Buying (3), developed by Ridgway, Kukar-Kinney and Monroe (2008) was preferred. Finally, The Maslach Burnout Scale, which consists of Emotional Exhaustion (9), Personal Accomplishment (8), and Depersonalization (5) sub-factors, created by Maslach and Jackson (1981) was used for burnout syndrome. Items were measured using a 5-point Likert scale (1: I strongly disagree, ... 5: I strongly agree).

The surveys were applied between 08 February and 15 March 2022. The data of the research were examined before being analyzed. The data collected by the survey method may show deviations from the required value for some

reasons, and this may affect the results (Coşkun, Altunışık and Yıldırım 2017). For this reason, the questionnaires were checked before the analysis was made, and the incorrect and incompletely filled questionnaires were not included in the analysis. 435 questionnaires were collected, 8 of them were filled incorrectly, and 37 of them were excluded from the analysis after the Mahalonabis extreme value analysis. Analyzes were made on 390 questionnaires. Likert scale was used in the research. Şencan and Fidan (2020) stated that Likert data has the feature of being ordinal, therefore it does not generally follow a normal distribution, but when the sample size exceeds 25, it may be sufficient to meet certain criteria such as Skewness and Kurtosis for the assumption of normality. In this regard, İbrahim and Shariff (2014) emphasized that the absolute value of the Skewness value greater than 3 and the kurtosis value greater than 10 will cause problems, therefore the absolute value of Skewness and Kurtosis should not be greater than 3 and 10. Since the Kurtosis and Skewness data of the research data were between 1.5 and -1.5, it was assumed that the data were normally distributed. Frequency analysis and structural Equation Model were applied to the questionnaires.

The main purpose of scientific methods is to give correct answers to questions or problems. For this reason, importance is given to reliability and validity in studies (Coşkun, Altunışık and Yıldırım 2017). To ensure validity in the research, the prepared questionnaire was shown to three academicians who are experts in the field, and a pre-test was conducted with 28 business owners for face validity. The survey was finalized by making necessary adjustments with the feedback of academics and consumers. Confirmatory factor analysis was also used to test the construct validity. The reliability of the study was tested using the alpha coefficient method. In the reliability test performed before the data were subjected to confirmatory factor analysis, the reliability of the study was found to be 0.849. After the confirmatory factor analysis, the reliability of each sub-factor was examined and presented in the tables in the findings section.



**FINDINGS**

53.8% of the participants were male and 46.2% were female. 24.4% have 6501-8500 TL, 19.2% have 4501-6500 TL and 14.4% have 8501-10500 TL income. 51.8% of the participants are undergraduate and 17.4% are associate degree graduates. 42.1% work in the public sector, 39% in the private sector, and 19% are self-employed. Of the participants, 44.9% of whom are 26-35 years old, 25.9% are 41 years and older, 40.8% have a working experience of 1-5 years, and 22.8% have a work experience of 6-10 years.

Table 1 shows the fit values of the materialist tendency scale. After removing 2 items from the materialist tendency scale, which consists of 6 items, it was seen that the values of the scale were good fit values.

In Table 2, factor loading, Cronbach's Alpha (CA), AVE and finally composite reliability (CR) values of the materialist tendency scale items were presented. AVE coefficient is related to convergent validity, it is recommended that this value be greater than 0.5, CA coefficient, CR, and factor loads of 0.70 and above (Hair et al., 2017). The AVE value of the scale was 0.49, the CR value was 0.78, and the CA value was also 0.76. While the AVE value is accepted because it is very close to the limit, other values are already within the desired limits. The factor loads of the items belonging to the materialist tendency scale ranged from 0.474 to 0.923.

No statement was removed from the compulsory consumption scale, but covariance was made between IM1 and IM3. As seen in Table 3, the compliance values of the compulsive consumption scale were good fit values.

As seen in Table 4, the compulsive buying scale is divided into 2 sub-factors Obsessive Compulsive Buying and Impulsive Buying. The factor loads of the expressions of the sub-factors vary between 0.519 and 0.852. CA values are 0.75; 0.68, AVE 0.53; 0.46 and CR 0.77; 0.62 respectively. If the AVE value is below 0.5 and the CR value is higher than 0,6, the AVE value is considered sufficient (Fornell and Larcker 1981). All these values are within the desired limits according to Fornell and Larcker (1981).

The Maslach Burnout Scale compliance values are presented in Table 5. After removing 1 from Emotional Exhaustion, 2 from Personal Accomplishment, and 2 from the Depersonalization sub-factor, it was seen that the fit values in the scale were within acceptable limits, excluding CFI. MacCallum and Hong (1997) and Carlbäck and Wong (2018) stated that it is possible to conduct power analyses for model fit tests based on GFI, CFI, and AGFI, but GFI and CFI values are very sensitive to sample size. They indicated that it was less reliable. Instead, they point out that they recommend using RMSEA for power analysis and model evaluation.

Table 6 presents the items of The Maslach Burnout Scale. The scale consists of 3 sub-factors: Emotional Exhaustion, Personal Accomplishment,

**Table 1:** Fit Values of the Materialist Tendency Scale

Scale	X <sup>2</sup>	DF	X <sup>2</sup> / df	GFI	CFI	RMSEA
Materialist Tendency	2,309	2	1,155	0,997	0,999	0,020
Good Fit Values			≤3	≥0,90	≥0,97	≤0,05
Acceptable Compliance Values			≤4-5	0,89-0,85	≥0,95	0,06-0,08

**Table 2:** Measurement Model Results of the Materialist Tendency Scale

Variables	Code	Factor Loading	CA	AVE	CR
Materialist Tendency (M_T)	MT2	,745			
	MT3	,923			
	MT4	,572	0,76	0,49	0,78
	MT6	,474			

**Table 3:** Fit Values of the Compulsive Consumption Scale

Scale	X <sup>2</sup>	DF	X <sup>2</sup> / df	GFI	CFI	RMSEA
Compulsive Consumption	8,518	7	1,217	0,993	0,998	0,024
Good Fit Values			≤3	≥0,90	≥0,97	≤0,05
Acceptable Compliance Values			≤4-5	0,89-0,85	≥0,95	0,06-0,08

**Table 4:** Measurement Model Results of the Compulsive Buying Scale

Variables	Code	Factor Loadings	CA	AVE	CR
Obsessive Compulsive Buying (O_B)	OB1	0,519	0,75	0,53	0,77
	OB2	0,852			
	OB3	0,775			
Impulsive Buying (I_M)	IM1	0,726	0,68	0,46	0,72
	IM2	0,580			
	IM3	0,723			

**Table 5:** Fit Values of the Maslach Burnout Scale

Scale	X <sup>2</sup>	DF	X <sup>2</sup> / df	GFI	CFI	RMSEA
Maslach Burnout Scale	314,586	116	2,712	0,910	0,927	0,066
Good Fit Values			≤3	≥0,90	≥0,97	≤0,05
Acceptable Compliance Values			≤4-5	0,89-0,85	≥0,95	0,06-0,08

**Table 6:** Measurement Model Results of the Maslach Burnout Scale

Variables	Code	Factor Loadings	CA	AVE	CR
Emotional Exhaustion (E_E)	EE1	0,591	0,88	0,50	0,88
	EE2	0,581			
	EE3	0,742			
	EE4	0,782			
	EE5	0,860			
	EE6	0,808			
	EE8	0,694			
	EE9	0,525			
	Personal Accomplishment (P_A)	PA1			
PA2		0,808			
PA3		0,738			
PA5		0,704			
PA6		0,538			
PA7		0,605			
Depersonalization (D_P)		DP2	0,773	0,74	0,53
	DP3	0,872			
	DP5	0,488			

and Depersonalization. The factor load of the items belonging to the Emotional Exhaustion sub-factor was 0.525-0.860, CA 0.88, AVE 0.50, CR 0.88; Personal Accomplishment factor loads 0.538-0.808, CA 0.83, AVE 0.46, CR 0.83 and factor loads of depersonalization factor items 0.488-0.872, CA 0.74, AVE 0.53, CR 0.76.

To provide the fit values in the structural equation model, the item PA6 was removed from the Personal

Accomplishment sub-factor and covariance was made between EE2 and EE3. As a result of the modifications, it was seen that all values of the structural equation model, except CFI, were within acceptable limits.

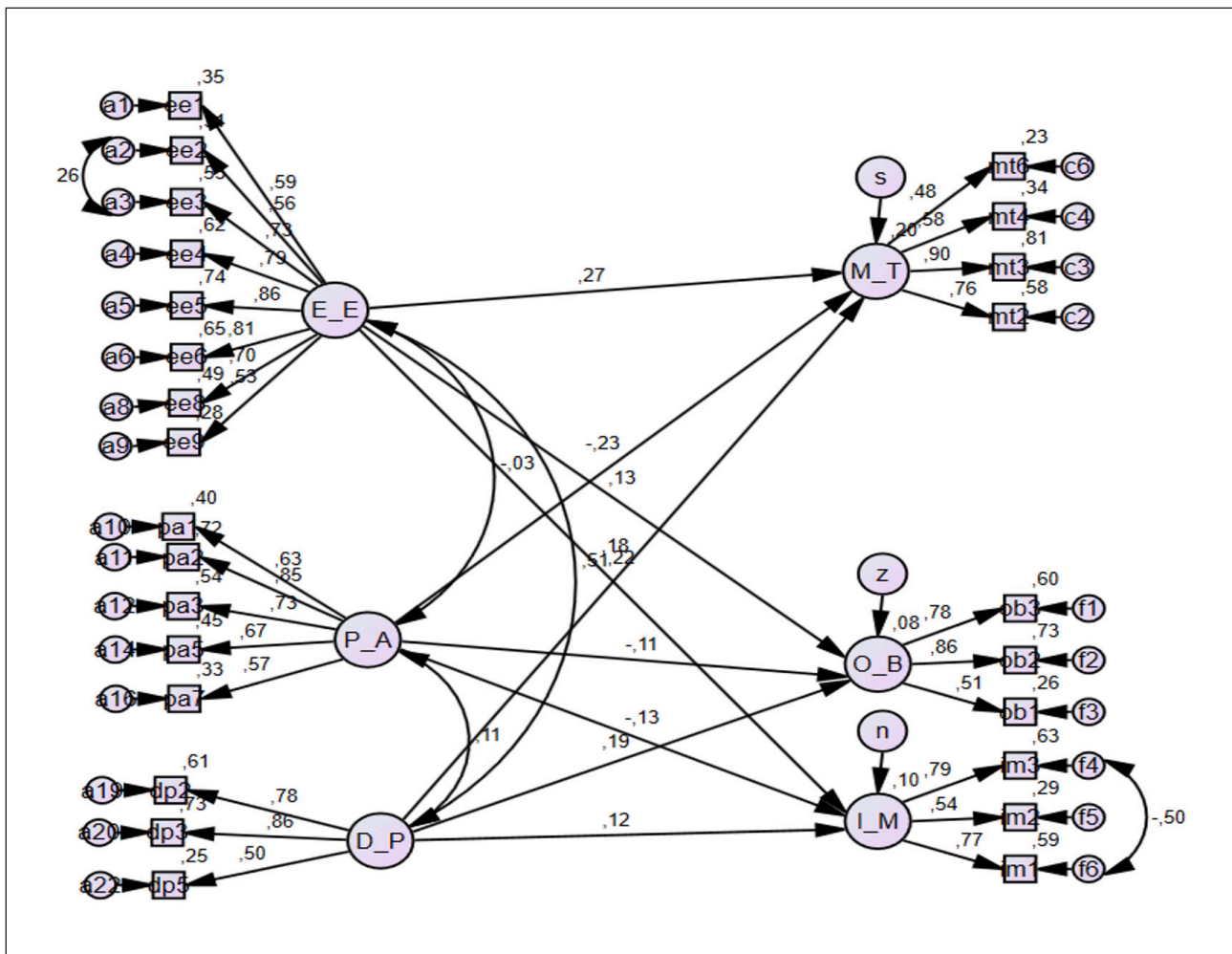
According to Table 8, emotional exhaustion positively affects materialist tendencies and impulsive buying. One unit increase in emotional exhaustion increases materialist tendency by 0,271 and impulsive buying by

**Table 7:** Structural Equation Model Fit Values

	$\chi^2$	df	$\chi^2/df$	GFI	CFI	RMSEA
Compliance Values	641,611	285	2,251	,891	,908	,057
Good Fit Values			$\leq 3$	$\geq 0,90$	$\geq 0,97$	$\leq 0,05$
Acceptable Compliance Values			$\leq 4-5$	<b>0,89-0,85</b>	$\geq 0,95$	<b>0,06-0,08</b>

**Table 8:** Structural Equation Model Coefficients

Scales	Variables	Standardize B	S.E.	p	R <sup>2</sup>
Materialist Tendency	Emotional Exhaustion- Materialist Tendency	0,271	0,080	***	
	Personal Accomplishment- Materialist Tendency	-0,228	0,104	<b>0,010</b>	0,101
	Depersonalization- Materialist Tendency	0,181	0,055	0,072	
Obsessive Compulsive Buying	Emotional Exhaustion- Obsessive Compulsive Buying	0,128	0,078	0,082	
	Personal Accomplishment- Obsessive Compulsive Buying	-0,105	0,105	<b>0,016</b>	0,082
	Depersonalization- Obsessive Compulsive Buying	0,185	0,064	<b>0,002</b>	
Impulsive Buying	Emotional Exhaustion- Impulsive Buying	0,215	0,090	<b>0,024</b>	
	Personal Accomplishment- Impulsive Buying	-0,132	0,118	0,108	0,203
	Depersonalization- Impulsive Buying	0,116	0,080	***	



**Figure 2:** Structural Equation Model

0,215. Emotional exhaustion does not affect obsessive-compulsive buying. Personal accomplishment negatively affects materialistic tendencies and obsessive-compulsive buying. A one-unit increase in personal accomplishment causes a 0,228-unit decrease in materialistic tendency, and in obsessive-compulsive buying 0,105-unit decrease. Personal accomplishment does not affect impulse buying. Finally, while depersonalization does not affect the materialist tendency, it positively affects obsessive-compulsive buying (0,185) and impulsive buying (0,116). 10% of Materialist Tendency, 8% of Obsessive Compulsive Buying, and 20% of impulse buying are explained by the sub-dimensions of burnout syndrome. According to the results of the analysis, hypotheses  $H_1$ ,  $H_2$ ,  $H_3$ ,  $H_6$ ,  $H_7$ , and  $H_9$  were supported. In Figure 2, the structural equation model is presented visually.

### CONCLUSION AND DISCUSSION

It has been observed that there is an increase in the stress level of individuals, especially with the effect of the COVID-19 epidemic and earthquake disaster in Turkey recently. This stress causes individuals to become desensitized and feel emotionally bad both in their work and private lives. Some individuals may engage in irrational purchasing behavior to escape this stressful situation. Durante and Laran (2016) also state that consumers can sometimes exhibit impulsive spending behavior as a result of the stress of daily life. In some studies, it has been emphasized that individuals engage in purchasing behavior to reduce stress and even consumers with negative moods shop to improve these feelings (Yılmazoğlu 2021). Therefore, this study aims to reveal the effect of emotional exhaustion, depersonalization, and personal accomplishment, which are the three sub-dimensions of burnout, on individuals' materialist tendencies and obsessive-compulsive and impulsive purchasing behaviors.

More than half of the research participants are men. The majority of the participants are between the ages of 26-35, have an income of 6501-8500 TL, and work in the public sector. Additionally, more than half of the participants have undergraduate degrees. When the effect of the sub-dimensions of burnout on materialistic tendency was examined within the scope of the research, it was concluded that emotional exhaustion affected materialistic tendency positively and personal accomplishment negatively affected it. When individuals are disappointed or feel mentally exhausted, they try to reduce these disappointments by purchasing more products. In this context, it is thought that the happiness of owning more products reduces emotional exhaustion.

On the contrary, when individuals feel happy, energetic, and successful in their work and think that they are useful to other people, their materialistic tendencies decrease. This result is parallel to the results of some studies in the literature. Yıldız, Kadir and Erdem (2015) stated in their studies that as individuals' desperation and disappointment increase, their materialistic tendencies also increase. Toprak, Arıcak and Yavuz (2020) also stated in their study as emotional exhaustion increased, materialism also increased. The results regarding personal accomplishment and job satisfaction are also compatible with Deckop et al.'s (2010) and Unanue et al.'s (2017) study results.

While depersonalization positively affects obsessive-compulsive buying, personal accomplishment negatively affects this variable. One of the main bases of compulsive buying behaviour is to compensate for an existing stress or sadness by purchasing. In this context, it is an expected result that the stress factor increases compulsive buying. This result of the study is consistent with Sneath, Lacey and Kennett-Hensel (2014), Arslan, Tanrıku and Aksöz (2022) and Tekşan and Öztürk (2023) are similar to the results of their studies. It is seen that as personal success increases, obsessive-compulsive purchasing behaviour also decreases. Günaydın (2021) also emphasizes that as individuals' awareness of responsibility increases or as individuals become more comfortable, cool-headed, energetic, and balanced, the tendency for obsessive-compulsive purchasing decreases.

Finally, both emotional exhaustion and depersonalization positively affect impulse buying behaviour. This result is also compatible with the results of studies in the literature. Because it is stated in the literature that consumers may exhibit impulse buying behaviour as a psychological reaction (Konyalıoğlu and Şeker kaya 2020). In their study, Torun and İpcioğlu (2015) revealed that depersonalization, one of the components of burnout syndrome, is a factor significantly related to unplanned purchasing behaviour. Tekşan and Öztürk (2023) also stated that burnout has a positive effect on impulse buying.

### Theoretical Implications

It is thought that the study contributes to the literature on various subjects. First of all, although burnout syndrome is a much-studied topic in the literature, it has been observed that this concept has been discussed especially in the context of organizations, and its relationship with motivation, organizational commitment, and turnover has been investigated. In

this study, it was revealed that burnout syndrome causes consumption, especially unnecessary consumption.

Secondly, the relationship between materialism, obsessive-compulsive buying, and impulse buying behaviours, which are called unnecessary consumption in the literature, and stress was examined. However, in this study, the effects of three sub-dimensions of burnout syndrome on these variables were examined. It is thought that the negative effect of the personal success dimension on materialistic tendencies and obsessive-compulsive consumption is an important finding. Success is a concept related to materialism and is even a sub-dimension of materialism. However, this study concluded that individuals being successful in their jobs and thinking that they have good relationships with people due to their work reduces their materialistic tendencies. Finally, in this study, unlike other studies, the relationship of all sub-dimensions of burnout with three variables: materialistic tendency, obsessive-compulsive buying, and impulse buying was evaluated.

### **Practical Implications**

Both burnout syndrome and unnecessary consumption are two undesirable phenomena. This study revealed that burnout syndrome, which is an undesirable condition, causes undesirable consumption behaviours. Individuals engage in purchasing behaviour to relax, reduce their stress, or improve their psychology. Qadir (2012) also states: "Consumers sometimes believe that the act of purchasing is a good strategy to repair or enhance their emotions and identity; They engage in compensatory behaviour based on excessive purchasing desires, adopting popular slogans such as "I shop, I find myself." However, this is a very wrong compensation method. Because unnecessary consumption is a phenomenon that harms society as well as individuals. In particular, obsessive-compulsive buying behaviours is a behaviours that is also called a disease by medicine. As individuals who engage in unnecessary purchasing behaviours continue to purchase products, they will cause the people around them to suffer both financially and morally in the future. For this reason, it is important to get to the source of stress and resolve it. Individuals can get psychological support to get rid of burnout syndrome. According to), Faber's escape theory participation in immediate and concrete tasks can help escape or compensate for painful self-awareness (Rocha et al. 2023). Participating in urgent and concrete tasks here should not be a shopping behaviours. Individuals can try to improve their psychology by acquiring new hobbies and engaging in these hobbies. They can reduce their stress by going to sports instead of shopping.

Employers also have responsibilities in eliminating employee burnout. Employers should check the job descriptions of their employees and not assign unnecessary responsibilities to their employees. By applying rotation in the workplace, monotony, and depression caused by individuals constantly doing the same job can be prevented. Since personal success reduces unnecessary consumption behaviour, employers can give their employees tasks in which they can be more successful. In this sense, by providing training such as in-service training, individuals can be more successful in their jobs and gain self-confidence.

### **Limitations and Suggestions for Future Studies**

The study has several limitations. Firstly, in the study, data were collected by survey and the effect between variables was examined. Further studies can use qualitative methods such as in-depth interviews to investigate why individuals shop to relieve burnout syndrome, where they shop, whether their stress decreases as a result of shopping, or how they feel as a result of shopping. Secondly, the burnout status of individuals working in different sectors and how this leads to unnecessary purchasing behaviour can be investigated. Thirdly, this study did not examine the channels through which shopping was made. Future studies can determine whether individuals prefer to shop online or decrease stress by going to the store when they experience burnout syndrome. Finally, other studies can examine the impact of burnout syndrome on compulsive purchasing and materialistic tendencies in the context of demographic effects such as gender, age, and profession.



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# Scientific Developments in Careerism Research in the Field of Business: A Bibliometric Review

Zeynep KAPTAN<sup>1</sup> 

## ABSTRACT

This study presents the first known bibliometric analysis of research on careerism in business and management, and shares the results obtained by examining 33 articles published between 1983 and 2024. Although there are existing studies in the careerism literature, there are some gaps in terms of global trends, collaboration networks, and institutional contributions in this field. The aim of the study is to provide a comprehensive overview of the current status and future trends of careerism research, and with its methodological approach that emphasizes collaboration networks and institutional effects, it brings a different perspective to the existing literature. In order to identify studies on the concept of careerism, a search was conducted in the Web of Science (WoS) database between 1983 and 2024 with the term "careerism" in English, and the publications were analyzed using the Biblioshiny 4.2 interface (Aria & Cuccurullo, 2017) used in the R programming language. In addition, VOSViewer software was used to visualize the collaboration analyses. According to the findings, the most productive period in terms of careerism studies was 2015-2016, and the most productive author was determined as de Vos. In addition, contributions from leading institutions such as the Texas Aandm University and prestigious journals such as the Journal of Business and Psychology reveal the importance of academic studies in the field of careerism. Although significant progress has been made in careerism research, some important gaps continue. As a result of the analysis, it is understood that topics such as "normative commitment", "continuity", "perceptions", "management", and "leadership" need to be examined further. These areas are critical to better understand the changing structure of careerism within organizations, and it is recommended that future research focus on these themes. In addition, the results reveal the dynamic nature of careerism research and offer new opportunities for future research in this field..

**Keywords:** Careerism, Bibliometric Analysis, Scholarly Impact.

**JEL Classification Codes:** M10, M12, M19

**Referencing Style:** APA 7

## INTRODUCTION

Careerism refers to the behavior of individuals who prioritize their career advancement and personal goals over everything else in the workplace (Chiaburu et al., 2013). This approach often involves placing personal success, such as promotions and recognition, ahead of organizational objectives and teamwork (Kozlowski & Ilgen, 2006).

In the business world, careerism manifests as employees' efforts to maximize their development and promotion opportunities (Huo, 2021). These efforts can take various forms, including networking, where individuals build relationships to expand their professional influence (Somal, 2018); strategic positioning, which involves taking on key projects to showcase their skills and value (Hernandez, 2024); self-marketing, where employees highlight their achievements and abilities to others, especially superiors (McCorkle et al., 2003); and political

maneuvering, where individuals leverage workplace power dynamics to gain advantages (Chisanga, 2024).

Careerism shows up in several key areas of business practice: performance management, where individuals aim to achieve high performance ratings (Tardi, 2023); high visibility, where they engage in prominent projects to attract senior management's attention; leadership roles, as they actively pursue leadership positions to ascend the managerial ladder; and mentorship, where they seek guidance and sponsorship to accelerate their career growth (Ibarra & von Bernuth, 2020).

The effects of careerism can be both positive and negative (Gokcen Kapusuz, 2024). On the positive side, career-driven employees often show high motivation, which can lead to better performance (Zhenjing et al., 2022). Their focus on innovation and initiative tends to drive new ideas and projects in the workplace, and they are typically committed to professional development,

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continuously seeking to improve their skills (Fischer et al., 2019; Huang et al., 2022; Karimi et al., 2023).

However, careerism can also have negative consequences. It can foster a competitive work environment, potentially leading to unhealthy competition among colleagues (Keller et al., 2016). This intense focus on individual success may weaken teamwork, as employees prioritize personal goals over collaborative efforts (Ghulam et al., 2017). Ethical concerns can arise when individuals engage in questionable behavior to further their careers (Lynn & Kalay, 2016; Zhang et al., 2020). Additionally, the relentless pursuit of career goals can disrupt work-life balance, leading to stress and burnout (Wedgwood, 2022).

Careerism is a common phenomenon in the business field, and if not managed properly, it can have detrimental effects on organizational culture and work outcomes (Bouzdani & Torun, 2019; Jain & Sullivan, 2019). Nevertheless, with the right strategies, careerism can contribute to both individual and organizational success (Alvesson, 2002).

In the broader context of business administration, careerism refers to prioritizing one's career advancement above ethical considerations, teamwork, or the organization's overall goals (Alford, 1989). This often means prioritizing personal achievements, such as promotions, salary increases, or prestige, over the welfare of colleagues or the company's mission (Potgieter et al., 2019). Careerists may focus on self-promotion at the expense of acknowledging team contributions, and they may avoid risks that could jeopardize their career progression (Bowman, 1994). While ambition is a natural part of professional life, careerism can be harmful when it undermines ethical behavior and the collective goals of the organization (Kutlu & Bedel, 2021; Nalbantoglu, 2018).

Effective business administration should aim to balance individual growth with fostering a collaborative and ethical work environment (Radu, 2023). This balance encourages not only personal success but also the achievement of shared organizational goals (Metz et al., 2020; Pathan, 2023).

Historically, careerism has been assessed by a variety of measures, including empirical indicators such as employee engagement scores (Yildiz & Alpan, 2015), turnover rates (Feldman & Weitz, 1991; de Vos et al., 2009), and motivation (Homles, 1983; Collins, 1985), emphasizing its effects on organizational performance

(Naseer et al., 2020; Bhattarai et al., 2024), employee satisfaction (Jain & Sullivan, 2020), and organizational commitment (Chiaburu et al., 2013; Hamilton & Treuer, 2012).

Recent studies have examined the dual nature of careerism—its potential to enhance morale (Fatima et al., 2023), particularly through its motivational features and its relationship to organizational commitment (Jian & Sullivan, 2020), but also its potential to foster unhealthy competition around issues such as employee alienation (Chiaburu et al., 2013), counterproductive work behaviors (Qazi et al., 2019), and psychological contracts (de Hauw & de Vos, 2010). Careerist attitudes may manifest themselves through a strategic approach in which individuals attempt to maximize their personal interests in the business world (Bouzdani & Torun, 2019; Malik & Malik, 2019; Smale et al., 2018). In this context, some of the basic theories used in careerism studies in the existing literature may be explanatory.

*Social exchange theory* emphasizes the assessment of mutual benefits and costs in relationships (Emerson, 2003). In the context of careerism, employees often evaluate their roles based on what they gain (e.g., salary, recognition, career advancement) versus what they invest (e.g., time, effort, emotional energy) (Jia-jun & Hua-ming, 2022; Potgieter & Ferreira, 2019). Careerist employees might prioritize relationships that provide the most substantial rewards, leading them to engage in behaviors that maximize personal gain, such as networking or taking credit for others' work (Barrington, 2021; McCoy, 2018). This can create an environment of competition rather than collaboration, where individuals focus on self-interest over collective organizational success (de Francesco, 2024; Riedl et al., 2024).

According to *conservation of resources theory*, individuals strive to protect and accumulate resources to cope with stress (Farkash et al., 2022). In a career-driven environment, employees may experience heightened stress levels due to competition and the pressure to advance (Jamil et al., 2023). They may focus on safeguarding their resources—such as status, time, and support networks—especially when facing threats to their career progression (Anderson et al., 2021). When employees invest significant effort into their careers, they may feel stressed if their investments do not yield expected outcomes, such as promotions or recognition (Sorn et al., 2023). This stress can lead to burnout or dissatisfaction, influencing how they navigate their careers and relationships within the organization (Rifin & Danaee, 2022).

*Psychological contract theory* highlights the unwritten expectations between employees and employers (Hansen et al., 2015). Careerism can be influenced by these expectations, as employees may have personal aspirations for advancement and security while employers expect commitment and performance (Zhenjing et al., 2022). When an employee believes that their loyalty should result in promotions or opportunities for growth, a breach of this psychological contract—such as a lack of promotion—can lead to disillusionment (Johnson & O’Leary-Kelly, 2003). Careerist individuals might react by seeking new opportunities elsewhere if they feel their expectations are not met, which can impact organizational stability and morale (Chisanga, 2024).

However, in addition to existing studies, there are gaps in global trends, collaboration networks, and institutional contributions in the field of careerism research. This study presents a bibliometric analysis examining influential authors, publications, and institutions in the field of careerism, while also highlighting collaborative patterns and citation networks. By exploring these dimensions, it aims to synthesize the existing literature and identify future research directions. The significance of the research questions lies in their ability to illuminate the historical development of careerism studies, recognize decisive contributions, and guide future careerism studies. Consequently, this study aims to provide a comprehensive understanding of the current status and future trends of careerism research, and distinguishes itself from the existing literature by using a methodological framework that emphasizes collaborative networks and institutional influences.

## METHODOLOGY

The research aims to understand the knowledge in the field of careerism, track the development of the field, and determine future research directions.

### Research Questions

In this study, bibliometric analysis of 33 publications was conducted. The research design was based on identifying topics relevant to the research aim, and the following research questions were formulated:

RQ<sup>1</sup> During which time period were the most studies on careerism published, and which publications attracted attention during the most productive period of careerism studies?

RQ<sup>2</sup> Which authors, articles, and institutions receive the most citations in careerism studies?

RQ<sup>3</sup> What are the leading countries or institutions in the field of careerism, and which ones show lower levels or engagement?

RQ<sup>4</sup> What are the common collaborative patterns among authors, institutions, or countries in careerism research, and which partnerships are the most frequent?

RQ<sup>5</sup> Which publications play a leading or transformative role in the development of the field of careerism?

RQ<sup>6</sup> In which areas of careerism literature is there a need for more research?

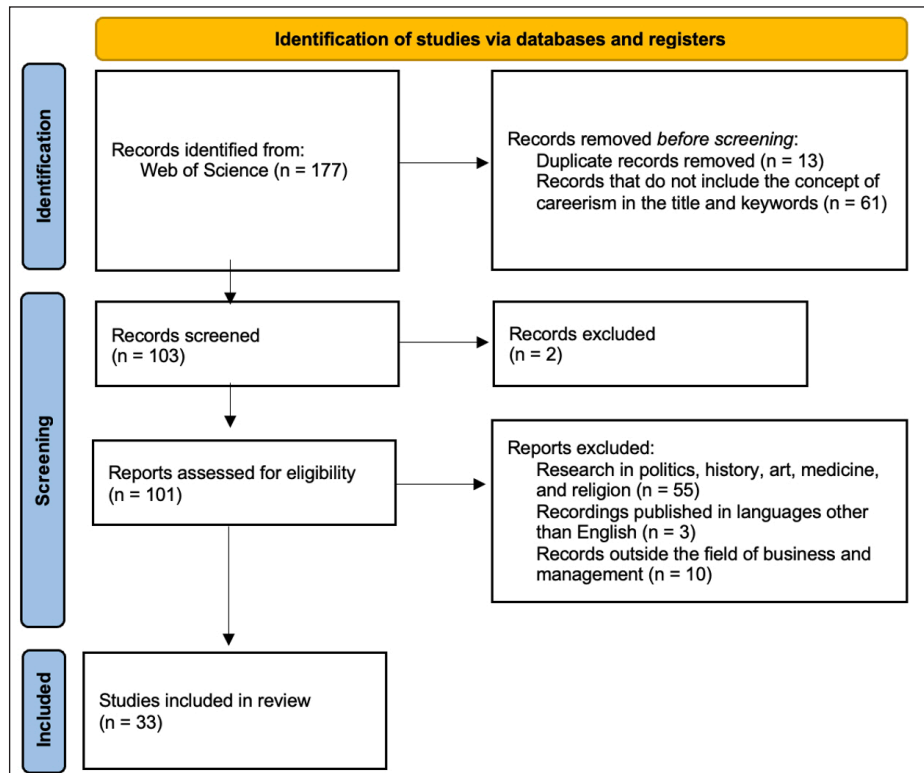
### Desing and Methodology of Research

Using the Web of Science (WoS) database, a data search was conducted on studies addressing the concept of careerism. To identify publications related to careerism, the term “careerism” was searched within English language studies published in the WoS database between 1983 and 2024. In this bibliometric analysis, 33 publications containing the term “careerism” in the WoS database were examined using the Biblioshiny 4.2 interface (Aria & Cuccurullo, 2017), implemented in the R Statistics programming language (R Core Team, 2023). Additionally, VosViewer software (van Eck & Waltman, 2009) was used to visualize some collaboration analyses.

### Inclusion Criteria

The 33 selected studies in the analysis must adhere to specific criteria:

1. The selected publications should focus on the subject of careerism.
2. The publications should consist of scholarly works, including journal articles, conference papers, book chapters, and similar academic sources.
3. The selected studies must have been published between 1983 and 2024.
4. The relevant publications must be included in the Web of Science database and must have been published in English.
5. The studies should consist of national or international publications and should encompass research conducted in the field of business and management.



**Figure 1:** PRISMA flow diagram

### Exclusion Criteria

In determining the studies not to be included in the bibliometric analysis of careerism studies, the following criteria are taken into consideration:

1. Researches that do not relate to careerism or address tangential topics,
2. Researches that do not align with the predefined types of articles for the analysis,
3. Researches that fall outside the specified publication years for the analysis. For example, studies published before 1983 or after 2024,
4. Researches published in languages other than English,
5. Researches found in databases other than Web of Science,
6. Researches lacking sufficient scientific standards or that have not undergone peer review,
7. Researches published outside the field of business and management are not included in the bibliometric analysis.

### Selection and Results of Studies

The studies identified through the database search are as follows: There are 177 studies found in Web of Science. Among the scanned records, 113 out of 177 records were removed from the dataset because they contained

renewed records, 61 records did not include the concept of careerism in their titles and keywords. As a result of the suitability assessment, 55 out of 101 records were removed from the dataset because they were published in the fields of politics, history, art, medicine, and religion, 3 articles were published in languages other than English, and 10 records were removed from the dataset because they were outside the fields of business and management. As a result, the remaining 33 studies were included in the bibliometric analysis (See Figure 1).

### RESULTS

Figure 2 summarizes the basic data of the bibliometric analysis of studies on careerism. A total of 33 studies published between 1983 and 2024 were included in 30 different sources. 18.18% of the studies were conducted through international collaborations, and 11 were single-authored works. The studies examined received an average of 26.45 citations and the average age of these studies was recorded as 14.1 years, indicating that the vast majority of research in the field is old. In addition, the studies contributed by 65 different authors have a collaborative structure with an average of 2.24 authors. The use of keywords is quite diverse; there are 135 Keywords Plus and 102 author keywords. While these data reveal that there are international collaborations in careerism studies, they also show that the field needs new research.



Figure 2: Descriptive analyses: Main information about the data

**Annual Scientific Research in Careerism**

When we examine Figure 3 we observe fluctuations in the research conducted in the field of careerism over the years. However, we can say that the most productive period of careerism studies was the period 2015-2016. There are six studies published during these years.

The notable studies from this period are as follows: The study titled “A proposed conceptual model of destructive deviance: The mediator role of moral disengagement” by Yildiz and other researchers published in 2015; the study titled “A theoretical model on the proposed predictors of destructive deviant workplace behaviors and the mediator role of alienation” by Yildiz and Alpan published in 2015; the study titled “Prevalent concealed ignorance of low-moral careerist managers” by Shapira

published in 2015; the study titled “Careering through academia: Securing identities or engaging ethical subjectivities?” by Clarke and Knights published in 2015; The study titled “Career commitment as a mediator between organization-related variables and motivation for training and turnover intentions” by Kim and other researchers published in 2016; and Tadjewski’s 2016 study titled “Academic labor, journal ranking lists and the politics of knowledge production in marketing.”

**The Most Productive Authors, Journals, Institutions, and Countries in Careerism Studies**

Table 3 lists the top 10 most productive authors in careerism studies. Six countries, including Belgium (1 author), Turkey (3 authors), USA (1 author), Pakistan (3 authors), Israel (1 author), and the England (1 author), are represented by the

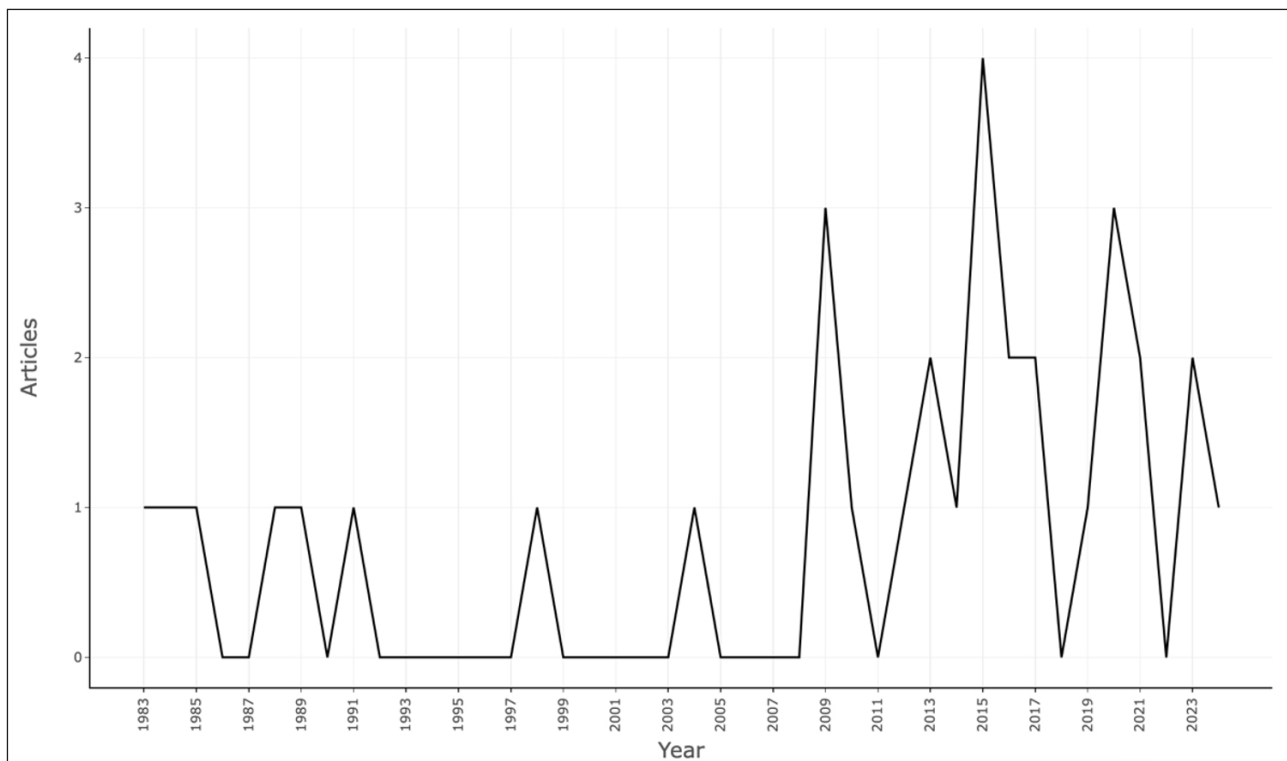


Figure 3: Annual scientific research in careerism



**Table 1:** The most productive authors in the careerism research field

	Author	N	Year of 1 <sup>st</sup> Publication	Total Publication	h-index	Total Citation	Current Affiliation	Country
1	de Vos, A.	3	2003	47	27	2461	University of Antwerp	Belgium
2	Yildiz B.	3	2015	18	8	194	Istanbul University	Turkey
3	Alpkan L.	2	2005	35	13	1593	Istanbul Technical University	Turkey
4	Chiaburu D.	2	2005	57	30	3962	Lehigh University College of Business	USA
5	Naseer S.	2	2016	26	13	727	Brock University	Pakistan
6	Qazi S.	2	2019	3	3	95	International Islamic University	Pakistan
7	Shapira R.	2	1981	16	5	67	Western Galilee Coll	Israel
8	Syed F.	2	2016	29	13	678	International Islamic University	Pakistan
9	Yildiz H.	2	2013	9	7	157	Bandirma Onyedi Eylul University	Turkey
10	Basnawi A.	1	2020	2	2	11	University of Reading	England

**Note:** N, Number of authors' articles in the field of careerism

most productive authors in the field of careerism, as listed in Table 1. These 10 researchers are authors of 21 out of the 33 articles included in the analysis, with their first publications ranging from 1981 to 2020. According to Web of Science, the most productive careerism authors are de Vos A. from Belgium (with 3 articles), Yildiz B. from Turkey (with 3 articles), and Alpkan L. from Turkey (with 2 articles)<sup>1</sup>.

Table 2 lists the top 10 journals that have published the most articles on careerism in the last forty years. Out of the total 36 articles, 14 have been published by these top 10 journals. Based on this data, the most productive journal in the field of careerism is the Journal of Business and Psychology, with 4 articles, constituting 11.11% of the total publications. The Journal of Business and Psychology takes the lead with 300 citations, while the California Management Review and the Journal of Business Ethics have the highest citation counts among the top 10 journals with 72 and 43 citations, respectively. The findings also indicate that the top 10 most productive journals belong to seven different publishers. Among the top 10 journals, 3 are published by Springer and 2 are published by Emerald.

Among a total of 47 universities, the Texas Aandm University has been identified as the university with the highest number of publications in the field of careerism, with 8 publications. Additionally, Qazi S. and Syed F., who are influential authors in the field of careerism, are affiliated with the International Islamic University, ranking second on the list with 3 publications (as shown in Figure 4).

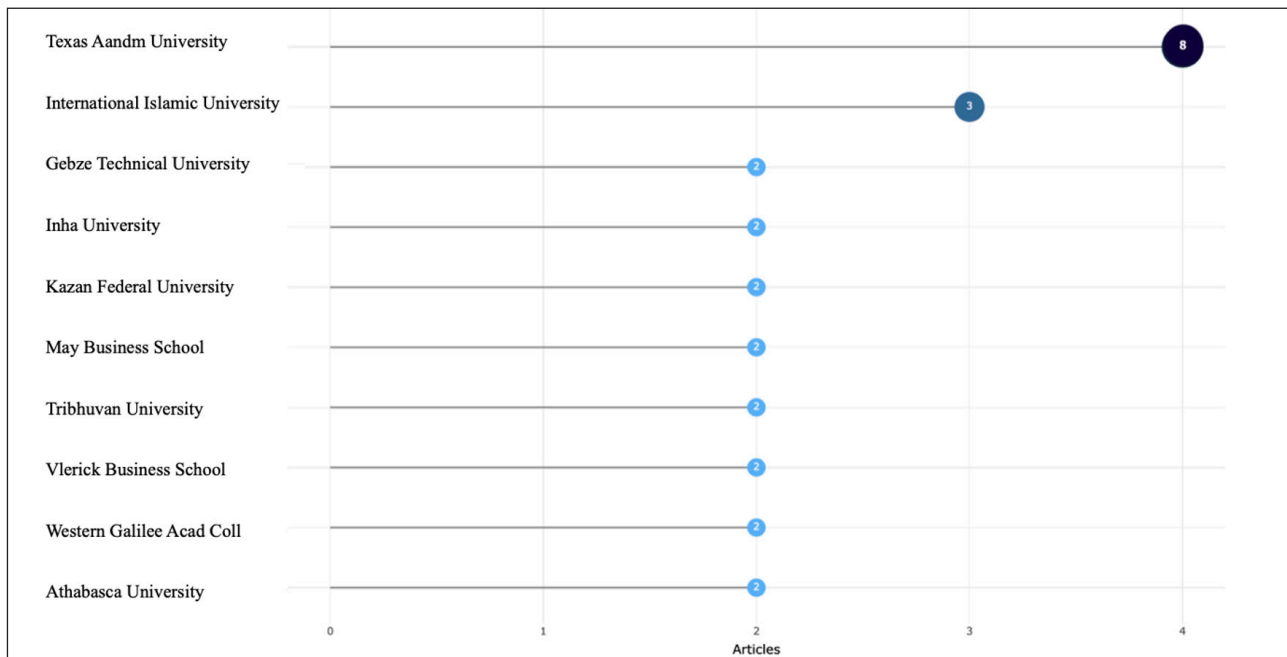
Other universities with the highest number of publications related to careerism include Gebze Technical University, Inha University, Kazan Federal University, Mays Business School, Tribhuvan University, Vlerick Business School, Western Galilee Academic College, and Athabasca University, each with 2 publications (See Figure 4).

In total, 12 countries contributed 33 publications to careerism research. Leading the pack, the USA published 8 articles in the field, making it the most productive country, contributing 24% of the total publications and boasting the highest citation count of 212. Following closely, the United Kingdom produced 6 publications with 213 citations, while Pakistan contributed 3 publications with 78 citations. Furthermore, Belgium stands out with a higher citation count and average article citation compared to Pakistan and the United Kingdom, totaling 231 citations (See Table 3).

### **Collaboration Networks of Authors, Institutions and Countries in Careerism Studies**

Figure 4 presents the collaboration network of 55 authors. According to the figure, the collaboration networks of authors are divided into 17 clusters. The first two clusters with the highest collaboration consist of 8 authors each. In the first cluster, the authors de Vos, Chiaburu, de Hauw, de Stobbeleir, Diaz, Gardner, Meganck, and Muñoz form a collaboration network among themselves. In the second cluster, the authors Naseer, Qazi, Syed, Bouckenoogle, and Khan form a collaboration network among themselves.

<sup>1</sup> Table 2 and Table 3 are created inspired by the study titled "Bibliometric analysis of global research on organizational citizenship behavior from 2000 to 2019" by Guiling et al. (2022).



**Figure 4:** The most productive institutions in careerism

**Table 2:** The most productive journals in the careerism research with their most cited article

	Journal	TP (%)	Number of Citations	The Most Cited Article	Times Cited	Publisher
1	Journal of Business and Psychology	4	300	Millennials' career perspective and psychological contract expectations: Does the recession lead to lowered expectations?	315	Springer
2	Journal of Business Ethics	2	43	How to spot s careerist early on: Psychopathy and exchange ideology as predictors of careerism	43	Springer
3	11 <sup>th</sup> International Strategic Management Conference	1	8	A proposed conceptual model of destructive deviance: The mediator role of moral disengagement	11	Procedia
4	Advances in Management of Technology, PT1	1	-	Survey and analysis of negative behaviors in the workplace in China	-	AAPH
5	British Journal of Management	1	7	Straightjacket of male domination in senior positions: Revisiting acker's 'ideal worker' and the construction of the 'ideal executive'	8	Wiley
6	California Management Review	1	72	The future challenges of business: Rethinking management education	98	SAGE
7	Career Development International	1	7	An examination of psychological contracts, careerism and ITL	12	Emerald
8	Corporate Governance the International Journal of Business in Society	1	3	Governance failure and its impact on financial distress	3	Emerald
9	Destructive Organizational Communication: Processes, Consequences, and Constructive ways of Organizing	1	8	Excessive careerism and destructive life stresses the role of entrepreneurialism in colonizing identities	11	Routledge
10	Eurasian Business Review	1	1	How careerists use LMX as a strategy to achieve power and career success? A moderated mediation model	1	Springer

**Note:** TP, total of publications produced by the journal

**Table 3:** The most productive countries in the careerism

	Country	Article	SCP	MCP	Freq	MCP_Ratio	TC	AAC
1	USA	8	6	2	0.242	0.250	212	38.90
2	United Kingdom	6	5	1	0.182	0.167	213	31.40
3	Pakistan	3	2	1	0.091	0.333	78	21.70
4	Australia	2	2	0	0.061	0.000	19	7.00
5	Belgium	2	2	0	0.061	0.000	231	111.00
6	Canada	2	1	1	0.061	0.500	55	27.00
7	Israel	2	2	0	0.061	0.000	3	1.50
8	Russia	2	2	0	0.061	0.000	0	0.00
9	Turkey	2	2	0	0.061	0.000	33	16.50
10	France	1	1	0	0.030	0.000	9	9.00
11	Korea	1	0	1	0.030	1.000	20	20.00
12	Nepal	1	1	0	0.030	0.000	0	0.00

**Note:** SCP, single country publications; MCP, multiple country publications; TC, total citations AAC, average article citations

Collaboration networks among authors are valuable resources for understanding how scientific studies are interconnected. (Li et al., 2013). These networks can help identify significant themes and trends in a particular research area by showing which researchers collaborate with each other (Fu et al., 2022). For instance, identifying authors or groups that collaborate most on a specific topic can indicate intensive research activity in that area (Ding, 2011). Moreover, collaboration networks involving researchers from different disciplines coming together can lead to comprehensive and multifaceted research by integrating various perspectives (Bhattacharyya, 2024; Green & Johnson, 2015). Therefore, analyzing authors'

collaboration networks can be an important tool for identifying significant relationships and trends in a research field (Pandia & Bihari, 2015).

Figure 5 presents the collaboration network of 34 institutions. According to the figure, the collaboration networks of institutions are divided into 12 clusters. According to the figure, Texas Aandm University, Mays Business School, and University of Antwerp form a collaboration network. Additionally, upon further examination of other collaborations, International Islamic University, Brock University, Quaid I Azam University, and United Arab Emirates University collaborate among



**Figure 5:** Collaboration network of authors







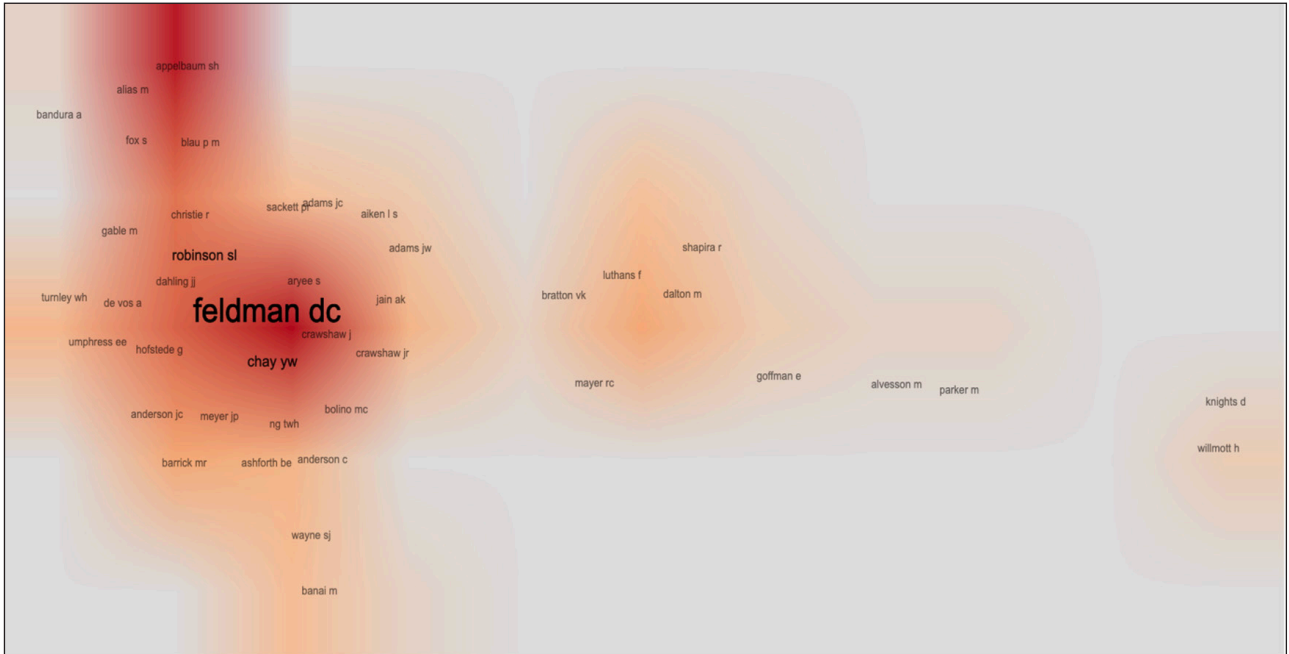


Figure 9: Co-citation network of authors

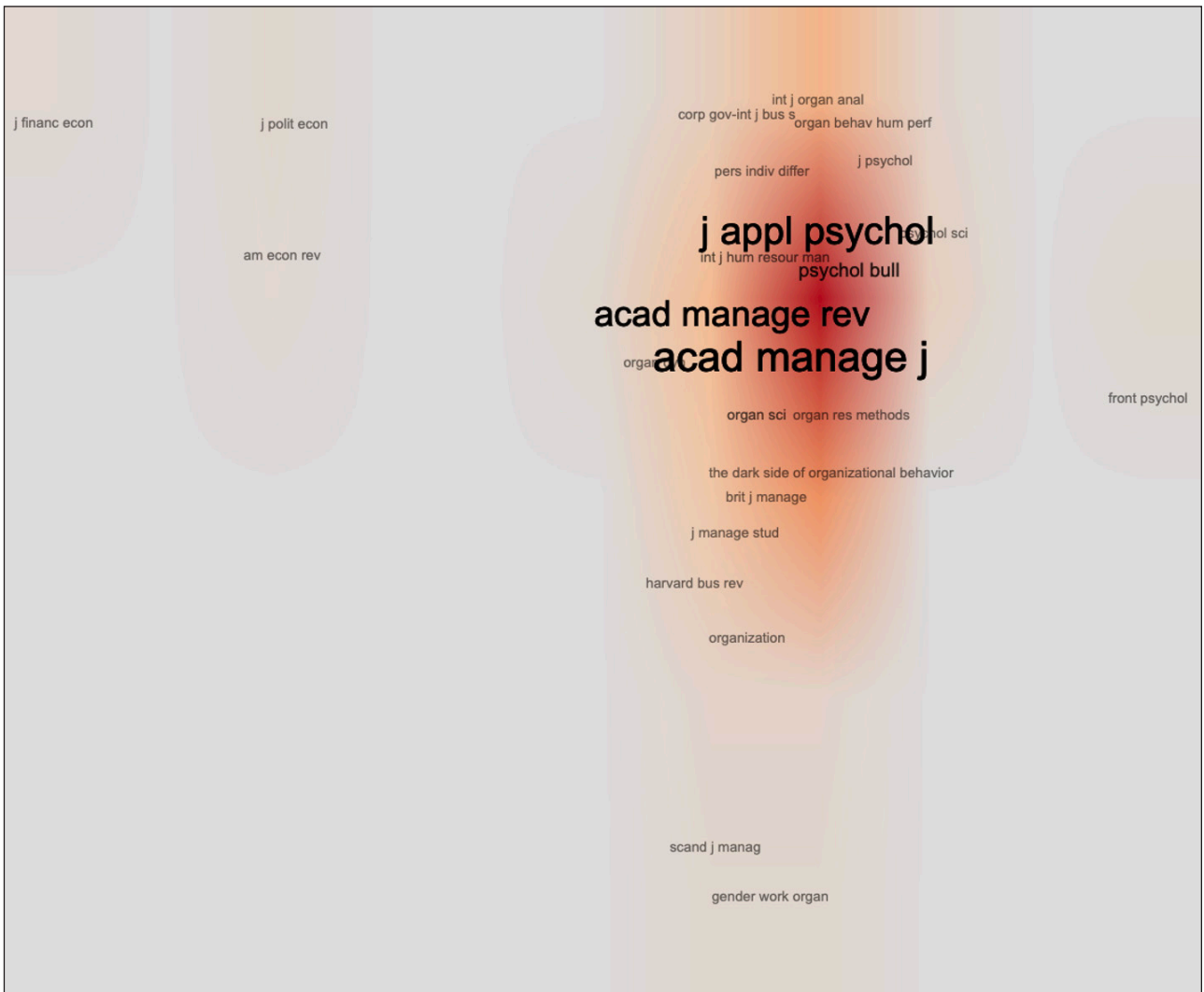


Figure 10: Co-citation network of journals



**Figure 11:** The 20 most used keywords in careerism research

journals in careerism research. These journals may have published significant studies and research related to careerism. The common citation network among these journals can help identify important trends, innovations, and developments in careerism research. Knowing which journals cite each other can be an important indicator for understanding trends in the research field, highlighting which topics and studies are prominent.

**Analysis of Keywords in Careerism Research**

In Figure 10, the frequency of keywords used in research on careerism is presented. In this table, an analysis of the 20 most commonly used keywords in the existing 33 studies has been conducted. As a result of this analysis, among a total of 102 keywords, the words with the highest proportions are observed to be “careerist orientation”, “career satisfaction”, “counter-productive work behaviors”, “machiavellianism”, “organizational commitment”, and “psychological contract”.

The frequency of specific keywords can indicate which topics researchers are focusing more on and which topics are significant within the field. For example,

words like “career focus” and “career satisfaction” can indicate researchers’ focus on individuals’ career goals and satisfactions. Additionally, by assessing which keywords stand out, you can determine which topics are prominent in the field of careerism. For example, words like “counterproductive work behaviors” and “machiavellianism” can indicate research into negative behaviors in the workplace or the examination of unethical conduct.

The relationships between prominent keywords in the analysis can also be evaluated. For example, there might be a connection between words like “psychological contract” and “organizational commitment”. These relationships can indicate researchers’ efforts to understand the interaction and linkage between specific topics.

As a result of the wordcloud analysis, it is seen that the most frequently used keyword among the studies is careerism (See Figure 11). This situation shows that the concept of careerism is considered as a central topic in the relevant literature. Other keywords such as “careerist orientation” and “career satisfaction” are also used



**Figure 12:** The 50 keywords of WordCloud analysis

with relatively high frequencies, indicating that these concepts are also among the important research topics in the context of careerism.

In addition, the use of terms such as “machiavellianism” and “psychological contract” reveals that career-oriented behaviors and psychological contracts are also considered within the scope of careerism.

Other terms that are repeated less frequently include “abuse”, “academia”, “affective commitment”, “counterproductive work behaviors” and “employee alienation”, and the use of these terms shows that various behaviors and attitudes associated with careerism are examined.

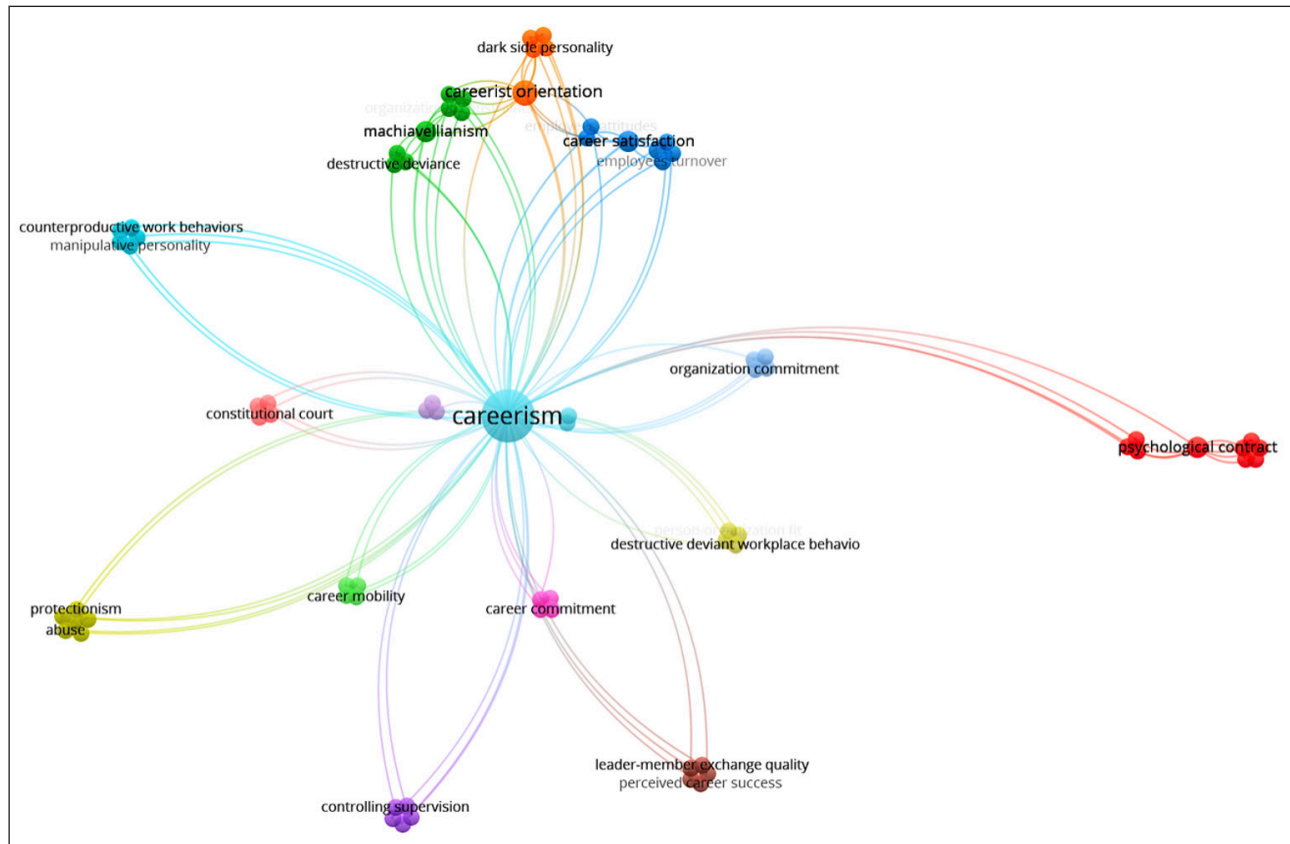
Based on the frequency of use of keywords, this analysis reveals which topics are prominent in the studies and which terms are researched more in the literature.

In studies, the impact of career strategies and management (career strategy, individual career management) and economic conditions (economic recession) on career planning stands out as an important research topic (See Figure 12). In this context, career

satisfaction of individuals and their attitudes within the organization (employees attitudes, turnover intentions) are also among the frequently examined concepts. In particular, issues such as employee alienation at work and intentions to leave the job are directly related to organizational commitment and job satisfaction (Abdallah et al., 2017; Artar et al., 2017; Lagios et al., 2022; Ramamurthi et al., 2016; Zopiatlis et al., 2014).

On the other hand, destructive and unethical behaviors in the workplace (destructive deviance, machiavellianism, moral disengagement) also have an important place in careerism studies. It is investigated how factors such as organizational constraints, social influences and unethical leadership approaches shape the task performance and ethical attitudes of employees (Dust et al., 2018; Halbusi et al., 2019; Hoyt et al., 2013; Malik et al., 2016). At this point, another important theme that is taken into consideration is how authority figures manage power and how they exceed ethical boundaries (abuse, authority, ethics).

There is also an important relationship between creativity and types of supervision (Khan, 2022; Koseoglu



**Figure 13:** The 76 keywords of Co-Word analysis

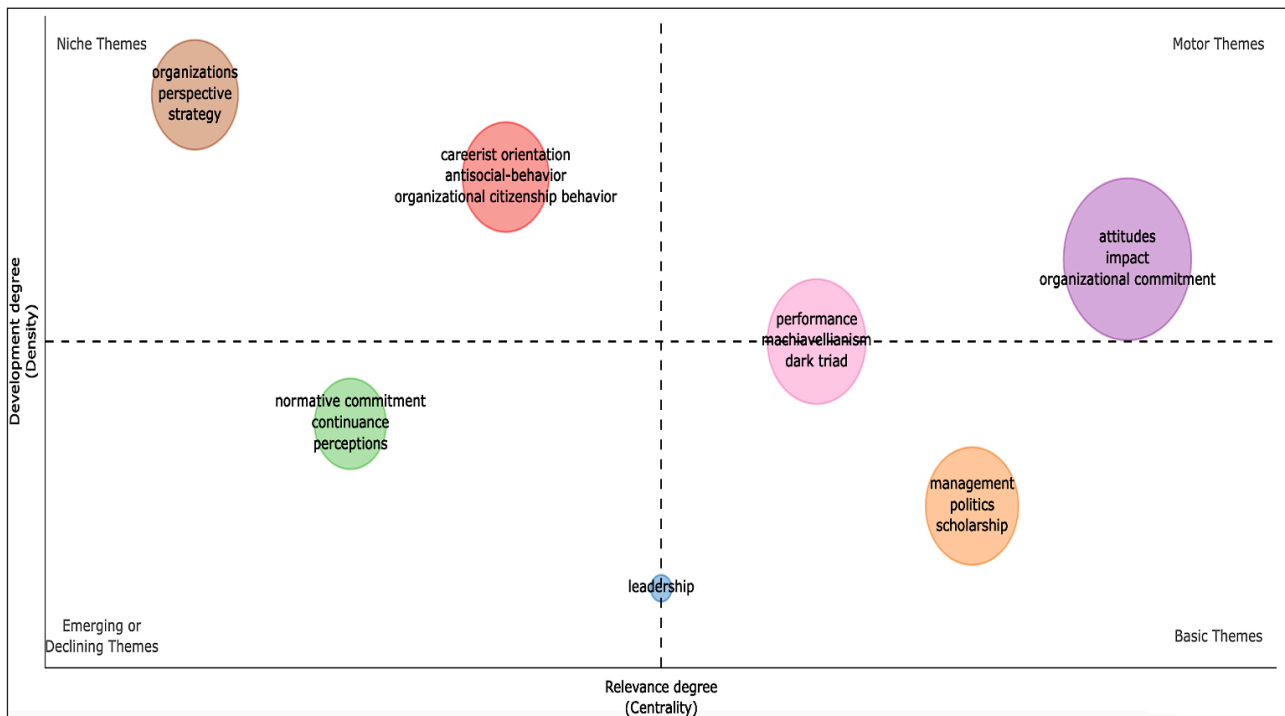
et al., 2017). The terms controlling supervision and non-controlling supervision reveal the effects of managers on employee creativity (Bhattarai et al., 2024; Oldham & Cummings, 1996). The contribution of creativity-supporting supervision styles to human resources development and innovation processes is seen as a part of these studies (Collin et al., 2020; Joo et al., 2013).

In addition, counterproductive work behavior and manipulative personality traits in the workplace are associated with careerist tendencies. The negative effects of employees' unethical behaviors and prioritizing their personal interests on organizations are the focus of researches in this area (Ahmad et al., 2024; de Cremer & Vandekerckhove, 2016; Elshaer et al., 2022; Lin et al., 2023). In particular, careerist orientations and "dark side personality" traits are examined in terms of understanding individuals' unethical career strategies (Farqan, 2024; Gurlek, 2020).

As a result, themes such as individual career management, organizational commitment, unethical behaviors and creativity come to the fore in careerism studies, and how these interact with economic conditions and leadership approaches is addressed in a comprehensive manner.

Thematic map analysis helps determine the importance and development status of topics (themes) (Hurley et al., 2021; Naeem et al., 2023). *Niche themes* are themes with high density but low centrality (Ying et al., 2022). These themes represent very specific and narrow areas of research (Bansal et al., 2024). These themes, despite their high density, have limited direct relevance to the general literature in the field (Carst & Hu, 2023; Janik et al., 2021). For example, concepts such as "organizational citizenship behavior" and "anti-social behavior" refer to specific areas of research and focus on specific aspects of organizations. "Careerist orientation" can be associated with antisocial behavior from a career-based perspective. These themes are usually the focus of studies that appeal to a more niche and limited audience. Themes such as "organizations, perspective, strategy" focus on specific strategic management approaches or perspectives, but have a weaker connection to general management theories (See Figure 13).

*Motor themes* are themes that have both high intensity and high centrality (Herrera-Viedma et al., 2020; Kremer Sott et al., 2020). These themes represent research topics that are both important and well-developed in the field (Durante Mühl & de Oliveire, 2022; Qivind Madsen et al., 2023). These themes are topics that guide the literature and contribute to the development of the field (Durante



**Figure 14:** Thematic map of keywords

Mühl & de Oliveira, 2022; George, 2023). The concepts of “performance” and “dark triad” are an important research topic in the business world where manipulative behaviors that affect performance are studied. “Machiavellianism” establishes strong connections to how such negative behaviors affect performance in organizations. Similarly, concepts such as “attitudes” and “organizational commitment” examine the impact of organizations on employees. These topics play a key role in understanding employee behavior and job performance in particular and are considered to be frequently studied basic topics.

*Emerging/declining themes* are themes with low density and low centrality (Cobo et al., 2018). These themes, which show low density and centrality, represent either declining or emerging concepts (Sadatmoosavi et al., 2021). Concepts such as “normative commitment” and “continuance” may be losing traction in the literature, while more general concepts such as “perceptions” may represent topics that are just entering the literature or are receiving renewed interest. These themes may regain importance in the future or disappear from the field altogether.

Finally, *basic themes* are themes that have high centrality but low density (Eduljee et al., 2022). These themes express basic knowledge or general concepts in the field (Beylik & Palteki, 2022; Ying et al, 2022). They cover topics that are frequently studied but not explored in depth (Snyder, 2019). Basic themes are interconnected with other topics and provide an important reference for

the general literature (Naeem et al., 2023). The concepts of “management” and “politics” are very broad and basic concepts related to the functioning of organizations. These themes are related to many other topics but may not have been studied in depth. “Scholarship” is a concept that represents the general framework in academic literature. It is connected to basic information but may not contain deep research of its own.

“Leadership” is both a fundamental concept and a developing topic. In other words, it has a strong connection with the main structures in the literature and is emerging as a theme that is attracting renewed attention in current research. Leadership studies are always important for understanding the impact of leaders in organizations and are included in a wide literature (Kirchner & Akdere, 2014; Kiyak & Bozkurt, 2020), but some subtopics may be just beginning to develop. Therefore, it may be among both fundamental and rising/declining themes.

## DISCUSSION AND CONCLUSION

This bibliometric analysis revealed that the period in which the most publications on careerism were made was between 2018 and 2023, with a significant increase observed in 2015 and 2016. Notable publications during this period include Yildiz and other researchers (2015), Yildiz and Alpan (2015), Shapira (2015), Clarke and Knights (2015), Kim and other researchers (2016), and Tadjewski (2016). These findings suggest that interest in careerism is increasing and that it is driven



by socioeconomic factors such as machiavellianism (Kuyumcu & Dahling, 2014; Yildiz et al., 2015), high/low-trust cultures (Shapira, 2015), and identity (Clarke & Knights, 2015), as well as organizational changes such as destructive deviant workplace behaviors (Yildiz & Alpan, 2015), participative decision-making (Yildiz & Alpan, 2015), stress (Tadajewski, 2016), and organizational ethical behavior (Kim et al., 2016). This peak in publications highlights the importance of the evolving nature of career-related research.

The analysis shows that Chiaburu, de Vos, and Alpan are frequently cited in the careerism literature. Their publications in 2005, 2003, and 2005, respectively, have significantly influenced the field and developed the concepts that form its foundation. Institutions such as Texas Aandm University, International Islamic University, and Gebze Technical University have also made notable contributions. The implications of these citation patterns suggest that specific scholars and institutions shape the discussion on careerism and may influence future research directions.

The findings show that the USA, the United Kingdom, and Pakistan are leading contributors to careerism research, reflecting the presence of strong academic communities and resources in this field. In contrast, countries such as France, Korea, and Nepal have contributed less, suggesting that their research agendas do not focus sufficiently on career-related issues. These differences in contributions may affect global understanding of careerism and suggest that researchers in less active countries should be more involved by increasing collaboration with leading institutions.

The review of collaborations revealed that authors such as Feldman, Chiaburu, Podsakoff, and Bolino and institutions such as Texas Aandm University, Mays Business School, and University of Antwerp frequently partner in careerism research. In particular, the relationships between authors such as de Vos, Chiaburu, de Hauw, and de Stobbeleir and the USA, Canada, and Israel demonstrate a strong network that fosters knowledge sharing and resource pooling. This collaboration highlights the importance of international approaches to addressing complex career issues and offers a variety of perspectives that increase the depth of the research.

In this study, the analysis of the most influential journals in the field of careerism research plays a critical role in understanding the development and trends of the literature. The journals examined are not only platforms

where research findings are published, but also dynamic environments where academic discussions take shape, ideas are shared, and new research areas are identified. In particular, articles on careerism in high-impact journals reflect the most current trends and debates in the field. For example, the *Journal of Business and Psychology* and the *Journal of Business Ethics* have hosted important studies on careerism, shedding light on both the theoretical and practical dimensions of this topic.

Some key publications have played a transformative role in the field of careerism. For example, de Vos and other researchers (2009), Collins (1985), Yildiz and Alpan (2015), and Bhattarai and other researchers (2024) have provided innovative frameworks and insights, paving the way for subsequent research. These studies have also contributed to theoretical developments. This demonstrates the interplay of theory and practice in the study of careerism.

Despite advances in careerism research, several gaps remain. The current analysis identifies "normative commitment," "continuance," "perceptions," "management," "politics," "scholarship," and "leadership" as areas that need to be investigated. These areas are critical to understanding the evolving nature of careerism in organizations and suggests that future research should prioritize these themes.

To summarize, this study effectively addressed the research questions posed and provided insights into careerism-related publication trends, citation patterns, geographic contributions, collaboration networks, influential publications, and current research gaps. The findings highlight the dynamic nature of careerism research and provide opportunities for future research that will contribute to a better understanding of this important area.

This research has several limitations. Firstly, it only includes studies published in English, potentially overlooking important contributions in other languages and skewing the understanding of careerism literature in non-English-speaking countries. The reliance on the Web of Science database may exclude relevant studies from other sources, and the time frame of 1983 to 2024 might miss significant earlier works or emerging trends. The exclusion of non-scholarly can work narrows the analysis. Additionally, the final dataset of 33 publications may not be representative of the broader careerism field, limiting the generalizability of findings.

Based on the findings of the bibliometric analysis of careerism, several recommendations for future research can be made. First, researchers should explore under-researched areas such as normative commitment, management, and leadership, as these themes require deeper examination. Second, it is important to investigate the influence of socio-economic factors, such as Machiavellianism and cultural trust levels, on career behaviors across different populations. Additionally, understanding the role of institutions is crucial. Future studies should explore the factors that facilitate or hinder research output in careerism, particularly within leading universities. Publishing in high-impact journals is another key recommendation, as it ensures that findings reach a wider audience and contribute to ongoing academic discussions. By pursuing these avenues, future research can significantly enhance the understanding of careerism and its implications within business and management contexts.

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# Bitcoin Crypto-Asset Prediction: With an Application of Linear Autoregressive Integrated Moving Average Method, and Non-Linear Multi-Layered and Feedback Artificial Neural Network Models

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## ABSTRACT

This study aims to examine the forecasting performance of two widely used methods in time series analysis: the ARIMA and the MLP-ANN models, focusing on Bitcoin (BTC) price data. ARIMA represents a linear forecasting approach, while MLP-ANN is a nonlinear forecasting method. Both models were evaluated using R-Studio, and the stationarity of the dataset was validated through unit root tests. The dataset consists of weekly BTC price observations from 2020 to 2022. The analysis results indicate that the ARIMA model outperformed the MLP-ANN model in predicting BTC prices. This finding contradicts the growing consensus that nonlinear models are better suited to capture the complex dynamics of financial data. The study contributes to the cryptocurrency forecasting literature by providing empirical evidence on the strengths and weaknesses of both linear and nonlinear models.

**Keywords:** Crypto-assets, Bitcoin, Time Series Forecasting, ARIMA, Neural Network, Multilayer Perceptron.

**JEL Classification Codes:** C42, E17, G15

**Referencing Style:** APA 7

## INTRODUCTION

Cryptocurrencies represent a revolutionary form of digital assets, facilitating peer-to-peer transactions through the use of blockchain technology (Amiri, Tavana & Arman, 2024). This technology eliminates the need for intermediaries, significantly reducing transaction costs and increasing transaction speed. Bitcoin was introduced in 2008 by an anonymous author known as Satoshi Nakamoto (He, Li & Li, 2024), and since then, interest in cryptocurrencies has continued to grow among both individual and corporate investors (Sun, Liu, & Sima, 2020). Its decentralized nature, as a cryptocurrency not backed by any government authority, has garnered significant attention from speculators and investors due to its high price volatility. As of now, Bitcoin continues to be the most widely recognized cryptocurrency, accounting for more than 40% of the total market value among various cryptocurrencies (Koo & Kim, 2024).

As cryptocurrencies continued to grow in popularity, its impact on global financial markets became more evident, especially as it introduced a

new decentralized model for digital transactions. The cryptocurrency market has experienced significant growth and development over the past decade, during which Bitcoin has emerged as the first and most successful example of a decentralized digital payment system (Park & Yang, 2024). By leveraging blockchain technology to provide secure and transparent transaction processes, Bitcoin has revolutionized the financial system and, on a global scale, become the leading and most successful model within the cryptocurrency ecosystem, attracting millions of users and investors.

The growing success of Bitcoin was further amplified by its unique features, which not only attracted individual investors but also prompted institutional adoption. Features such as anonymity, independence from central authorities, and protection against double-spending attacks have further increased the appeal of cryptocurrencies (Mostafa, Saha, Islam & Nguyen, 2021). As of July 28, 2023, the total market value of cryptocurrencies reached \$1.18 trillion, highlighting the rapid growth and adoption of the market.

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Although cryptocurrencies initially emerged as a medium of exchange, their roles in financial markets have expanded, and they are now regarded as valuable financial instruments (Dierksmeier & Seele, 2018). This evolution has particularly led to increasing attention towards Bitcoin. As a new investment tool in the financial markets, Bitcoin has garnered significant investor interest due to its high volatility and the potential for substantial returns (Kang, Yuan, Zhang, Chen, & Li, 2024). Predicting the price of Bitcoin presents a significant challenge for researchers, investors, and other stakeholders in financial markets. The high volatility of Bitcoin and the investment risk associated with it, being perceived as more significant than that of traditional financial assets (Amiri, Tavana & Arman, 2024). have led to Bitcoin price forecasting becoming an important mathematical model in the FinTech sector (Han et al., 2025; Cheng et al., 2024). A comprehensive understanding, modeling, and forecasting of Bitcoin prices is crucial not only for making informed investment decisions in the digital asset market but also for effective risk management, optimizing portfolio performance, and minimizing potential financial losses. This process aids investors in better assessing market trends and volatility, thereby contributing to the development of long-term financial strategies (Liu, Tsyvinski, & Wu, 2022).

However, the very volatility that makes Bitcoin an attractive investment opportunity also presents a significant challenge when it comes to accurate price forecasting. Bitcoin, in particular, attracts attention for its portfolio diversification potential, offering investors the opportunity to optimize their risk-return profiles. Accurate cryptocurrency price forecasting helps investors make informed, risk-averse decisions, while also contributing to the development of more effective regulatory frameworks for policymakers.

Time series analysis provides powerful tools for modeling the future behavior of a variable based on its past data or interactions with other variables. These models can be useful and provide reasonably accurate predictions when there is insufficient information about the data generation process or when satisfactory explanatory models are not available (Zhang, 2003). Although price prediction models have been extensively studied in the literature, most studies focus on traditional asset classes, and cryptocurrency forecasting has received relatively less attention.

Given these challenges, time series analysis has become an essential tool for understanding and forecasting Bitcoin prices, as it allows for the modeling of future

behavior based on historical data. One of the most widely used linear models in time series analysis is the ARIMA model, introduced by Box and Jenkins in 1976 (Box, Jenkins, Reinsel & Ljung, 2015). ARIMA's flexible structure allows for its use across various fields, including social, economic, and financial domains. In recent years, ANNs have gained increasing popularity due to their ability to model nonlinear relationships (Kumar & Yadav, 2023). However, while ANNs offer advantages in modeling nonlinear functions, they also present challenges such as the difficulty in interpreting their inner workings and the tendency for models to yield different results in each test.

In this study, BTC price predictions were made using the ARIMA model, a linear method, and the MLP-ANN model, a nonlinear approach. The comparison of these two methods' performances contributes to the growing literature on cryptocurrency price forecasting and highlights the strengths and weaknesses of both linear and nonlinear methods.

The primary objective of the study is not to provide a precise forecast of BTC's future value but rather to evaluate the performance of two widely utilized forecasting models. All analyses were conducted using R-Studio.

Using BTC data, time series forecasting was performed with the ARIMA and MLP-ANN models. While neither model achieved high forecasting accuracy, the findings reveal that the ARIMA model demonstrated better predictive performance for BTC. This result contradicts the growing acceptance that nonlinear models are more suitable for capturing the complex dynamics of financial time series. In conclusion, this study compares the performances of two distinct forecasting models, ARIMA and ANN, using BTC price data. Testing these models in the context of cryptocurrencies makes a significant contribution to the literature on financial time series forecasting and provides valuable insights for both researchers and industry professionals.

Following the introduction, the study proceeds with a review of selected literature in the first section, econometric methods in the second section, empirical findings in the third section, and a discussion of the results and recommendations for researchers and industry professionals in the conclusion section.

## **SELECTED LITERATURE**

In this literature review, a bibliometric analysis method was utilized. Studies containing the keywords ARIMA and ANN were searched in the Web of Science

**Table 1:** Keywords, occurrences and total link strength

<b>Id</b>	<b>Keywords</b>	<b>Occurrences</b>	<b>Total Link Strength</b>	<b>Id</b>	<b>Keywords</b>	<b>Occurrences</b>	<b>Total Link Strength</b>
1	Artificial Neural Networks	117	303	21	Particle Swarm Optimization	12	31
2	ARIMA	116	309	22	Support Vector Regression	12	30
3	Forecasting	87	243	23	Artificial Intelligence	11	44
4	Time Series	51	149	24	Forecast	11	27
5	Time Series Forecasting	50	126	25	Support Vector Machines	11	31
6	Neural Networks	43	122	26	Wavelet Transform	11	25
7	Artificial Neural Network (ANN)	38	86	27	Wind Speed	11	38
8	Hybrid Model	36	97	28	Wind Speed Forecasting	11	18
9	Machine Learning	28	84	29	Artificial Neural Network (ANN)	10	19
10	ANN	27	67	30	Empirical Mode Decomposition	10	28
11	Prediction	22	60	31	Genetic Algorithm	10	25
12	Neural Network	21	53	32	Lstm	10	26
13	Time Series Analysis	19	52	33	Autoregressive Integrated Moving Average (ARIMA)	9	22
14	ARIMA Model	17	35	34	SARIMA	9	26
15	Deep Learning	15	50	35	Covid-19	8	21
16	ARIMA Models	14	31	36	Demand Forecasting	8	20
17	Hybrid Models	14	35	37	Wind Speed Prediction	8	24
18	Autoregressive Integrated Moving Average	13	39	38	Exponential Smoothing	7	29
19	ANFIS	12	28	39	Predictive Models	7	44
20	ANNs	12	34	40	Time Series Prediction	7	21

(WoS) database within the title and abstract sections, yielding a total of 718 studies. When filtered to include only journal articles, this number was reduced to 562. In the third stage, considering the SSCI, SCI (SCI-E), and ESCI indexes, 560 studies were identified. Finally, after excluding articles published in languages other than English, 540 studies published in English were included in the analysis. This analysis covers works published between January 1995 and August 2023.

A total of 1488 keywords from the 540 included articles were scanned, and 246 keywords that were used at least twice were examined in detail. This analysis was conducted using the VOSviewer software. VOSviewer is a bibliometric analysis tool with a user-friendly graphical interface that creates networks based on elements such as journals, authors,

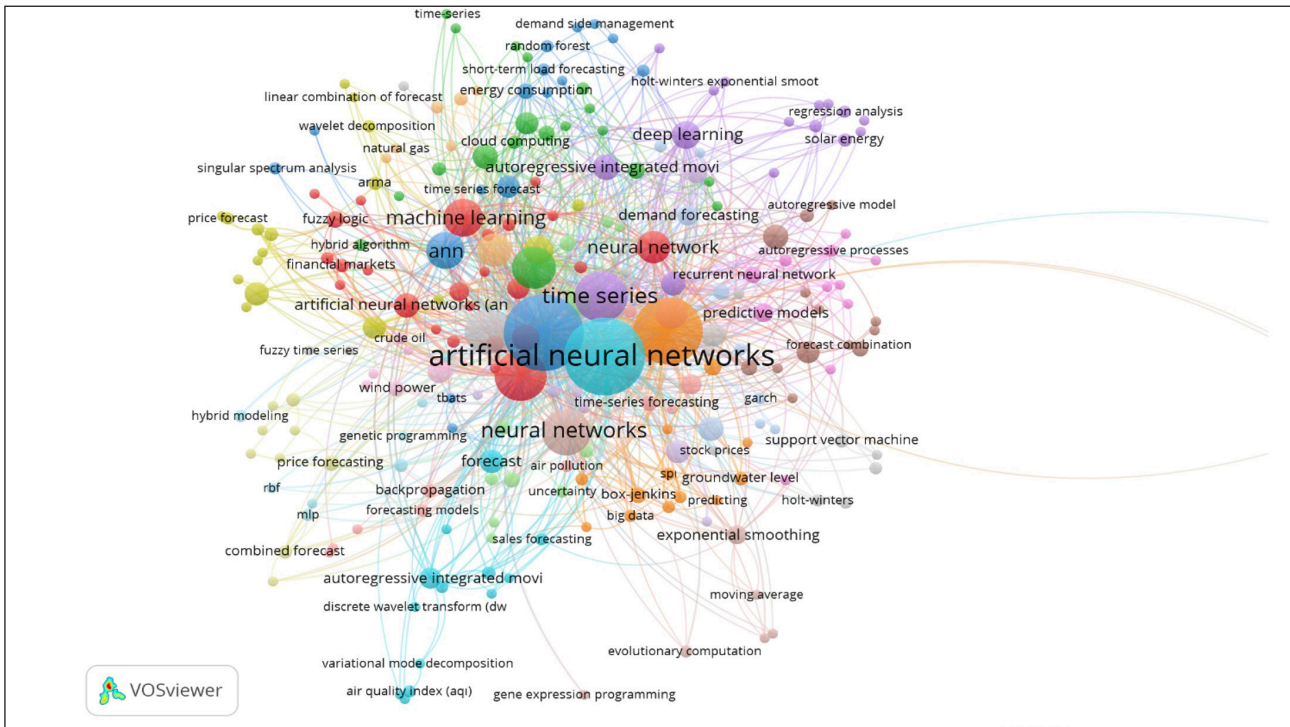
publications, organizations, and countries (Sharifi, Simangan, & Kaneko, 2021).

The bibliometric analysis performed with VOSviewer presents the 80 most frequently used keywords in Tables 1 and 2. Keywords used in scientific studies are considered an important data source to understand which models are more frequently utilized in the relevant literature.

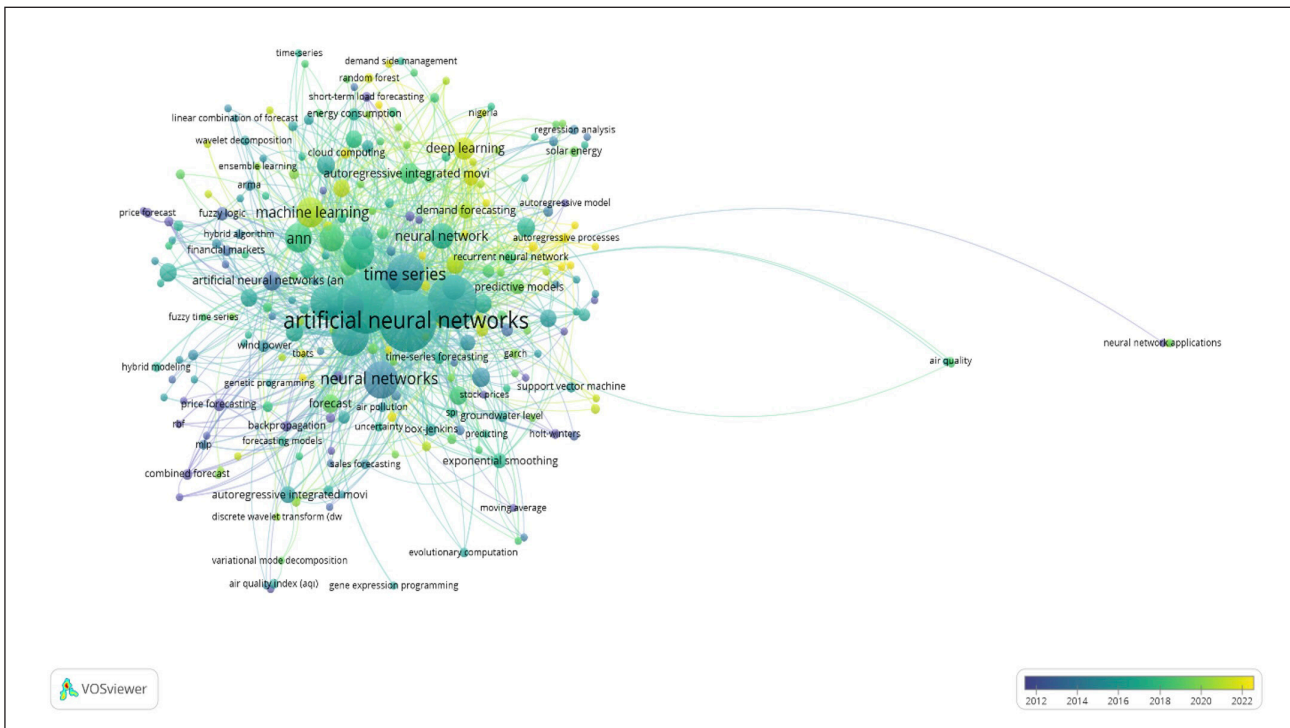
Upon examining Table 1, it is observed that the top five most frequently used keywords are "Artificial Neural Networks" (117), "ARIMA" (116), "Forecasting" (87), and "Time Series" (51). These keywords also exhibit high total link strengths with other terms, indicating that these terms receive greater attention and are frequently associated with other concepts.

**Table 2:** Keywords, occurrences, and total link strength

<b>Id</b>	<b>Keywords</b>	<b>Occurrences</b>	<b>Total Link Strength</b>	<b>Id</b>	<b>Keywords</b>	<b>Occurrences</b>	<b>Total Link Strength</b>
41	Artificial Neural Networks (ANN)	6	14	61	Extreme Learning Machine	4	6
42	Auto-Regressive Integrated Moving Average (ARIMA)	6	20	62	Financial Markets	4	13
43	Fuzzy Logic	6	16	63	Financial Time Series Forecasting	4	9
44	LSTM	6	20	64	Groundwater Level	4	10
45	RNN	6	24	65	Hybrid System	4	16
46	Autoregressive Integrated Moving Average (ARIMA)	5	10	66	Multiple Linear Regression	4	11
47	Box-Jenkins	5	15	67	Nonlinear Time Series	4	8
48	Electricity Price Forecasting	5	5	68	Seasonality	4	8
49	Energy Consumption	5	16	69	Short-Term Forecasting	4	8
50	Feature Selection	5	14	70	Solar Energy	4	11
51	Price Forecasting	5	12	71	Support Vector Machine	4	13
52	Rainfall	5	10	72	Support Vector Machine (SVM)	4	6
53	Regression	5	16	73	Time Series Modeling	4	9
54	Time Series Model	5	14	74	Air Pollution	3	11
55	Time-Series Forecasting	5	13	75	Air Quality Index (AQI)	3	2
56	Wind Power	5	14	76	Auto-Regressive Integrated Moving Average (ARIMA)	3	10
57	ARMA	4	7	77	Autoregressive Processes	3	23
58	Backpropagation	4	13	78	Autoregressive Integrated Moving Average	3	6
59	Cloud Computing	4	8	79	Back Propagation	3	9
60	Combined Forecast	4	14	80	Big Data	3	7



**Figure 1:** Keyword analysis  
Source: Created by the authors.



**Figure 2:** Keyword density analysis  
Source: Created by the authors.

Table 2 presents the results of the co-occurrence analysis, which is used to identify the main themes in the literature and detect topics frequently discussed together. It appears that the most frequently used keywords focus heavily on forecasting and time series.

Figure 1 presents a cluster map derived from the analyzed keywords. It demonstrates that “ANN” and “ARIMA” models are heavily used in forecasting and time series prediction studies. These methods are also preferred in areas such as demand forecasting, wind speed forecasting, energy consumption, and solar energy.

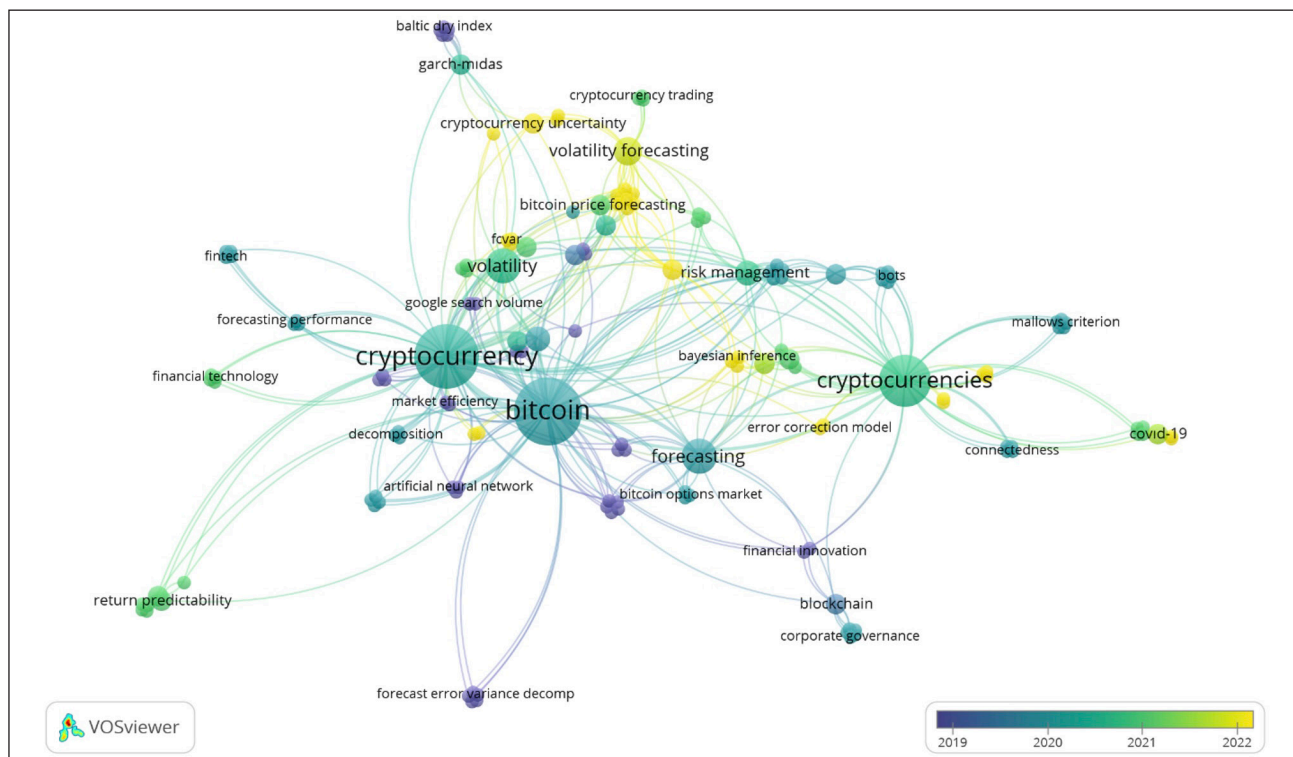
**Table 3:** Business finance studies

Rank	Author	Years	Journal	Data
1	Mallikarjuna & Rao	2019	Financial Innovation	Stock Market Returns
2	Ahmad et al.	2023	International Journal of Finance & Economics	Unemployment Rate
3	Fadlalla & Amani	2014	Intelligent Systems In Accounting Finance & Management	Stock Market Price
4	Kumar	2009	Asian Academy of Management Journal of Accounting And Finance	Hang Seng Index (Hsi) And Standard & Poor's (S&P) 500 Indices Returns
5	Temur & Yıldız	2021	Istanbul Business Research	Monthly Sales Quantity Budget
6	Aras et al.	2017	Istanbul University Journal of The School of Business	The Pairwise Combination of Methods.
7	Smith et al.	2016	South African Actuarial Journal	Financial Markets
8	Stebliuk et al.	2023	Financial And Credit Activity-Problems of Theory And Practice	Economic Trends

In Figure 2, trends regarding which topics have gained more attention over the years can be observed. For instance, in 2012, ARIMA and ANN models were used together in electricity price forecasting studies, while after 2020, new methods such as “Machine Learning,” “Deep Learning,” “LSTM,” and “Demand Forecasting” have come to the forefront.

When the literature review is limited to studies in the field of corporate finance, eight studies were identified in which ARIMA and ANN models were used together, and these studies are presented in Table 3.

A search using the keywords cryptocurrency, BTC, and forecasting yielded 75 studies, and keyword analysis of these studies revealed that GARCH, EGARCH, GARCH-



**Figure 3:** VOSviewer network graph of the reached studies



MIDAS, and Markov models were frequently used. The VOSviewer network graph is presented in Figure 3.

Upon examining Figure 3, the development of studies on cryptocurrency over the years can be observed. In 2019, topics such as “BTC,” “forecast error variance,” and “dynamic model averaging” were prominent, while after 2020, subjects like “volatility,” “Ethereum,” “fintech,” “Ripple,” and “cryptocurrency” became more frequently studied.

## ECONOMETRIC METHOD

Time series data exhibit unique characteristics, and selecting the most appropriate forecasting method depends on the structure of the data and the desired outcomes. Several approaches are used in time series analysis, including linear methods (such as traditional ARIMA), nonlinear methods (e.g., artificial neural networks), and hybrid methods that combine both linear and nonlinear approaches to improve forecast accuracy. This study employs two commonly used methods for time series forecasting: the ARIMA model and the MLP-ANN architecture.

Linear models, particularly methods like ARIMA, require data preprocessing (such as removing trends, adjusting for seasonality, and ensuring stationarity), whereas artificial neural networks can work with raw data. However, the literature suggests that artificial neural networks perform better with preprocessed data. While ARIMA models are generally considered more suitable for smaller datasets, ANN models tend to yield better results on larger datasets. Despite the relatively small dataset of 135 weekly observations used in this study, both methods are compared to highlight their strengths and weaknesses.

The dataset used in this study consists of weekly Bitcoin (BTC) price data from the first week of 2020 to the thirty-first week of 2022, comprising a total of 135 observations. The data were obtained from Investing.

com, with CoinMarketCap used as the final data provider. All analyses were conducted using the R-Studio program.

## Forecasting with the ARIMA method

ARIMA is a well-established linear econometric method that forecasts future values by using the lagged values of a time series. ARIMA models can be particularly effective for small datasets, but financial time series often pose challenges due to their volatile and non-stationary nature, which may limit ARIMA models in capturing the complex dynamics of such data. Therefore, careful assessment of model assumptions and performance is necessary.

Several steps are followed when constructing an ARIMA model, as outlined below:

- ⊖ *Stationarity and seasonal adjustment:* The time series is first examined for stationarity and seasonal effects. If necessary, differencing (d) or seasonal differencing (s) is used to eliminate these effects. Since seasonal effects were addressed in the preprocessing phase, the model does not include a seasonal parameter (s).
- ⊖ *Determination of AR and MA lags:* The lag lengths of the autoregressive (AR) and moving average (MA) components are determined using the Autocorrelation Function and Partial Autocorrelation Function plots. Table 4 provides a guideline on how to interpret ACF and PACF results.
- ⊖ *Model estimation:* An ARIMA model is estimated based on the selected lags. In this study, the ARIMA (0,1,0) model was chosen, representing a random walk model.
- ⊖ *Model diagnostics:* After estimation, the residuals of the model are examined to determine whether they resemble white noise, thereby assessing the model’s ability to capture patterns in the data.

**Table 4:** Provides a theoretical guideline for interpreting ACF and PACF results

$p$	$q$	ACF	PACF
1	0	Exponential decrease	Only the first coefficient is outside the confidence interval
2	0	Exponential decrease	Only the first coefficient is outside the confidence interval
0	1	Only the first coefficient is outside the confidence interval	Exponential decrease
0	1	Only the first coefficient is outside the confidence interval	Exponential decrease
1	1	Exponential decrease	Exponential decrease

**Source:** Eđriođlu and Bađ, (2020)

⊖ *Model validation*: If the model satisfies all diagnostic criteria, valid and reliable forecasts can be made.

⊖ *Forecast evaluation*: The final step is to assess the forecast accuracy of the model. Some commonly used error measurement methods in the literature are listed below:

- *Root Mean Square Error (RMSE)*: Calculated by taking the average of the squared differences between the predicted and actual values. Equation (1) is used for RMSE (Hyndman & Koehler, 2006).

$$RMSE = \sqrt{\frac{1}{ntest} \sum_{t=1}^{ntest} (x_t - \hat{x}_t)^2} \quad (1)$$

- *Mean Absolute Error (MAE)*: Represents the average of the absolute differences between the actual and predicted values. Equation (2) is used for MAE (Armstrong, 2001).

$$MAE = \frac{1}{n} \sum_{t=1}^n |x_t - \hat{x}_t| \quad (2)$$

- *Mean Percentage Error (MPE)*: Indicates the percentage of forecast error relative to the actual value (Kourentzes et al., 2014). Equation (3) is used for MPE.

$$MPE = \frac{1}{n} \sum_{t=1}^n \left( \frac{x_t - \hat{x}_t}{x_t} \right) \times 100 \quad (3)$$

- *Mean Absolute Percentage Error (MAPE)*: Reflects how accurate the model predictions are and allows for comparison across data with different scales (Armstrong, 2001). Equation (4) is used for MAPE.

$$MAPE = \frac{100}{n} \sum_{t=1}^n \left| \frac{x_t - \hat{x}_t}{x_t} \right| \quad (4)$$

A combination of methods like RMSE, MAE, MPE, and MAPE can provide a comprehensive analysis of forecast accuracy, consistency, and model fit. The results of these methods in this study offer valuable insights into the prediction of crypto assets, laying the foundation for future forecasting studies.

### Artificial Neural Networks (ANN) for Forecasting

ANN are nonlinear machine learning techniques inspired by the functioning of biological neurons. They are particularly successful in capturing relationships in complex and nonlinear data structures. In this study, the MLP-ANN architecture was employed. This architecture consists of an input layer, one or more hidden layers, and an output layer.

The forecasting process using ANN involves the following steps.

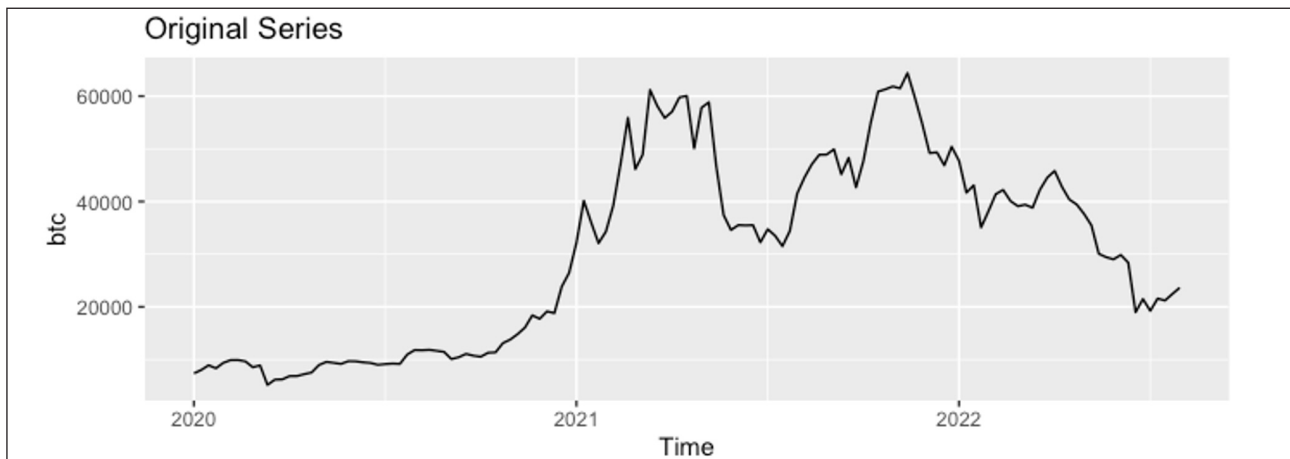
- *Data normalization*: The dataset, consisting of weekly Bitcoin (BTC) prices, was normalized between 0 and 1 to ensure consistent results during model training.
- *Data splitting*: The dataset was divided into training and test subsets to evaluate the model's ability to generalize to unseen data.
- *Model design*: A feed-forward neural network model was developed using supervised learning, and it was trained using the backpropagation algorithm. The number of neurons in the hidden layers and the activation functions (e.g., sigmoid or ReLU) were determined experimentally to enhance model performance.
- *Optimization*: Various parameters (such as the number of neurons and learning rate) were optimized to minimize error and improve overall performance.
- *Performance evaluation*: The performance of the final model was made comparable to that of the ARIMA model and evaluated using the same error metrics.
- *Model selection*: The model with the lowest error rate was chosen as the best ANN model.

The choice of model architecture is critical when using artificial neural networks. Selecting the appropriate number of hidden layers and the quantity of neurons within those layers plays a crucial role. Using too many hidden layers or neurons can lead to overfitting, reducing the model's generalization capacity, while using too few neurons may negatively impact model performance. Therefore, it is important to strike a balance between the number of layers and neurons to determine the optimal architecture.

One approach for estimating the number of layers and neurons is the formula provided by Elmas (2018) in Equation (5).

$$Hmax = \sqrt{(NNHL + NNOL + 10)} \quad (5)$$

Equation (5) can serve as a guideline for determining the optimal number of neurons in hidden and output layers. Benli and Tosunoğlu (2014) state that, while there is no theoretical limit to the number of layers in an ANN, the optimum architecture is achieved by appropriately



**Figure 4:** The original time path graph of BTC data (CoinMarketCap, <https://coinmarketcap.com/>, Access date: 22.08.2023)

adjusting the number of neurons. Many studies have shown that architectures consisting of an input layer, two hidden layers, and an output layer are preferred for solving complex problems (Esenyel, 2016).

Elmas (2018) further suggests that as the complexity of the relationships between the input and output layers increases, it may be necessary to increase the number of neurons in the hidden layers to improve model performance. This is especially true when modeling independent processes. However, these general recommendations do not guarantee the best result in every case, as the optimal architecture is often determined through trial and error based on error metrics (Tosunoğlu & Benli, 2012).

## EMPIRICAL APPLICATION

In this study, the performance of two different methods was compared for forecasting cryptocurrency values. These methods include the linear forecasting model ARIMA and a non-linear forecasting model, Artificial Neural Networks (ANN). Testing both models across sectors provides valuable insights into determining which method is more suitable for a specific sector. In this context, the comparative empirical results between these two methods used for predicting cryptocurrency values contribute to the existing literature.

The aim of this study is not to predict the future value of the variable with absolute accuracy. Similarly, it would not be appropriate to claim that one method is superior to the other based on the results. The primary objective is to examine two commonly used methods in time series forecasting—both of which have been tested and validated with different examples in the literature—in the context of Bitcoin (BTC) and to present empirical

evidence on their performance.

The dataset consists of weekly values of the BTC cryptocurrency in U.S. dollars, spanning from the first week of 2020 to the thirty-first week of 2022, with a total of 135 observations. The analysis was conducted using R-Studio software. The time series data's stationarity was examined using three unit root tests: ADF, PP, and KPSS. For the forecasting process, ARIMA from the linear methods and the MLP-ANN architecture were employed. The original time series graph of BTC prices is shown in Figure 4.

When examining Figure 4, it can be observed that BTC prices remained relatively flat between 2020 and 2021. However, starting from the early months of 2021, the prices entered an aggressive upward trend. By the second quarter of 2021, nearly half of these gains were lost, but the losses were recovered in the final quarter, reaching the highest level recorded. Over the following 15 months, BTC prices exhibited a relatively moderate downward trend, returning to levels observed 24 periods earlier.

### Stationarity test application

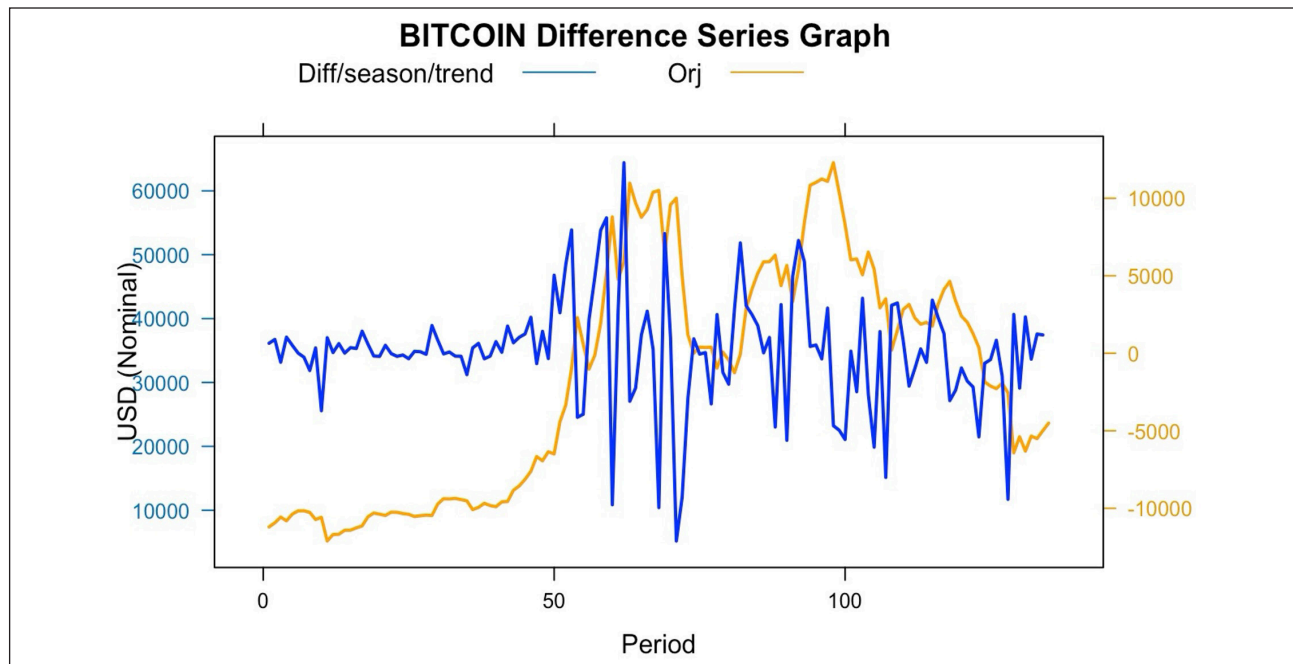
The stationarity properties of the time series data were analyzed using ADF, PP, and KPSS unit root tests. The null hypotheses for these tests are as follows:

- *ADF and PP Tests:*
  - $H_0$ : The series has a unit root. (If the p-value < 0.05,  $H_0$  is rejected.)
- *KPSS Test:*
  - $H_0$ : The series is stationary. (If the p-value > 0.05,  $H_0$  is accepted.)

The results of these tests are presented in Table 5.

**Table 5:** Stationarity results

Test	Stationary Level	Lag Order	Pr(> t )	Result
ADF	I(0)	5	0.8	H0 Reject
	I(1)	5	0.01	H0 Accept
PP	I(0)	4	0.9	H0 Reject
	I(1)	4	0.01	H0 Accept
KPSS	I(0)	4	0.01	H0 Reject
	I(1)	4	0.1	H0 Accept



**Figure 5:** Original series and difference series plot graph

As shown in Table 5, the results of all three unit root tests indicate that the variable is not stationary at the  $I(0)$  level. However, after differencing, the tests reveal that the series becomes stationary at the  $I(1)$  level across all three tests. In the subsequent linear analyses, the differenced and stationary series were used. The graphical representations of both the original series and the differenced series are presented in Figure 5.

In Figure 5, the red graph represents the original series, while the blue graph shows the differenced series at the  $I(1)$  level, which has been rendered stationary. This indicates that the observations in the series fluctuate around a constant mean and exhibit constant variance.

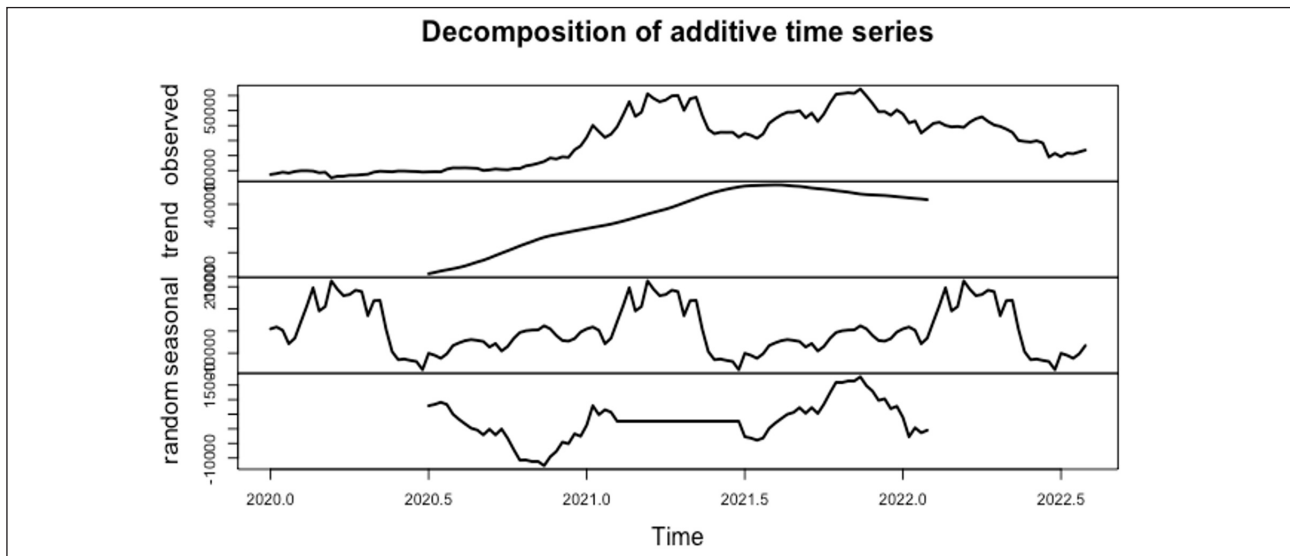
### Seasonality Test Application

Time series data typically consist of components such as trend, seasonality, and random walk. One of the key objectives in time series analysis is to differentiate these

components in order to improve the accuracy of the analysis. The visual examination of the trend, seasonality, and other components of the time series is presented in Figure 6.

Based on the qualitative assessment of Figure 6, it can be suggested that there may be potential seasonality in the time series. However, for a quantitative analysis of seasonality, the "WO" function from the R programming environment can be utilized (Webel & Ollech, 2020). This function partitions the series into specific periods and calculates the averages. A value close to 1 in the test results indicates the presence of seasonality, while a value of 0 suggests that the series is not seasonal. The results of the WO Seasonality Test are presented in Table 6.

When Table 6 is examined, it is seen that there is no seasonality in the series.



**Figure 6:** BTC time series decompose graph

**Table 6:** Seasonality results

Test	Test Result	P-value
WO	0	1 / 1 / 0.2695

**Table 7:** ARIMA model prediction statistics

Series	Pred. Model	$\sigma^2$	Log Likelihood	AIC	AICc	BIC
btc	ARIMA (0,1,0)	13237606	-1173	2349	2349	2352

### ARIMA Model Application for Forecasting

The ACF and PACF plots created for the time series data are presented in Figure 7.

Upon examining Figure 7, it is observed that the autocorrelation in the ACF plot decreases regularly up to approximately the 32nd lag, remaining within the confidence intervals. However, starting from the 45th lag, the autocorrelation exits the confidence interval. This situation suggests that the series may be evaluated as AR(1) or AR(2), as well as MA(0). The stationarity analysis indicated that the series has become stationary at the I(1) level (Table 5).

Based on these assessments, it is anticipated that the ARIMA model could be (1, 1, 0) or (2, 1, 0). The "auto.arima" function in R can be used to quantitatively determine the parameters ( $p$ ), ( $d$ ), and ( $q$ ) of the model (Wang, Smith & Hyndman, 2006). The best model statistics obtained from the "auto.arima" function are presented in Table 7.

As shown in Table 7, it has been determined that the ARIMA (0, 1, 0) model is the most suitable forecasting

model. To validate the model's adequacy, the residuals were assessed using the Ljung-Box Test to determine whether they conform to a White Noise process. The null hypothesis for the test is presented below.

H0: The residuals of the ARIMA (0, 1, 0) model do not conform to a White Noise process, meaning the residuals do not exhibit a normal distribution. (H0 cannot be rejected for  $p < 0.05$ )

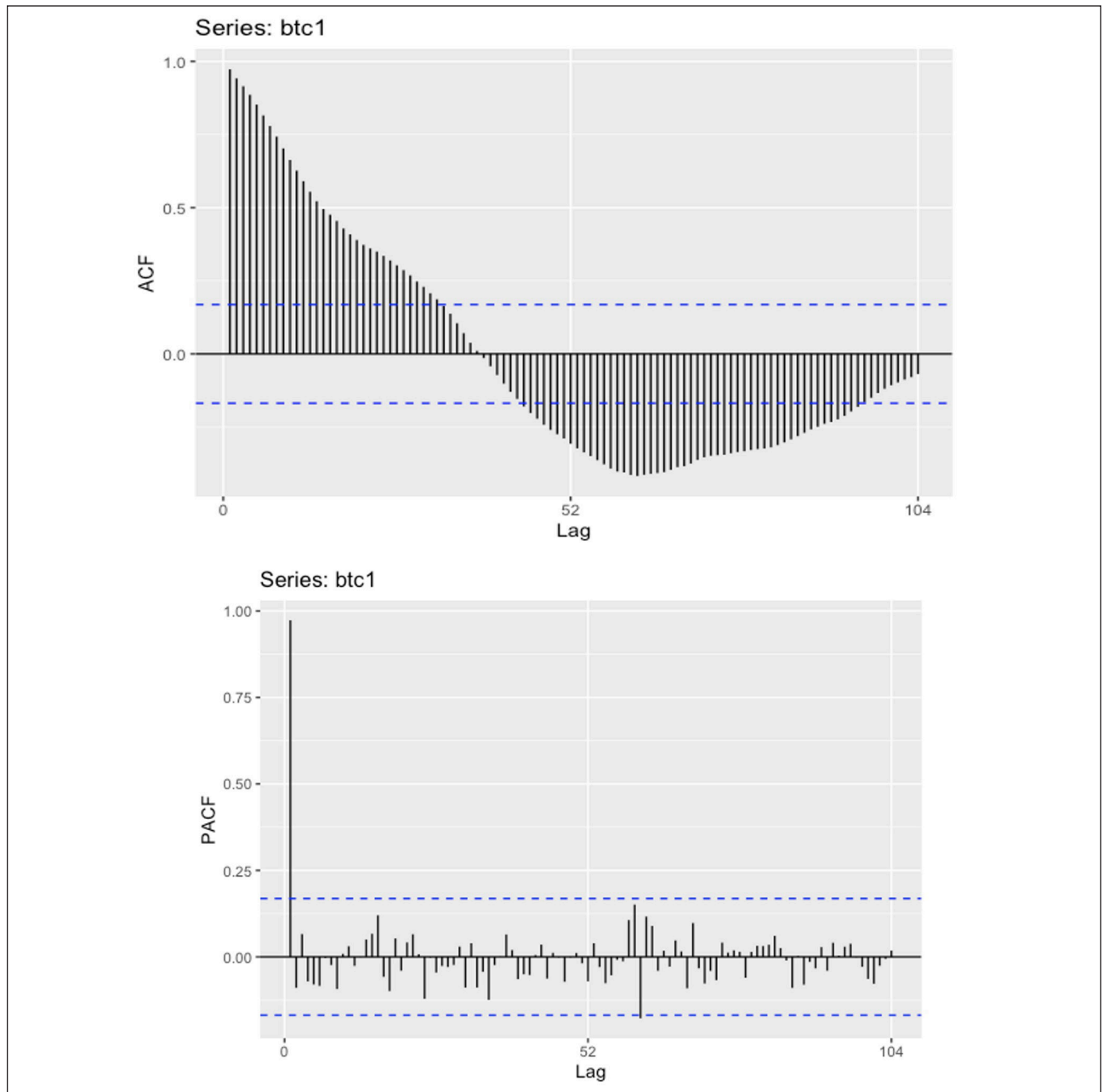
The results of the Ljung-Box Test are presented in Table 8.

According to Table 8, since the p-value of 0.3167 > 0.05, it can be concluded that the residuals conform to a White Noise process. Additionally, the normality of the residuals was examined using the Shapiro-Wilk Test. The null hypothesis for this test is presented below.

H0: The residuals do not exhibit a normal distribution (H0 cannot be rejected for  $p > 0.05$ ).

The test results are presented in Table 9.





**Figure 7:** ACF) and PACF graphs

**Table 8:** Box-Ljung test statistics

$\chi^2$	df	P-value
11.544	10	0.3167

**Table 9:** Normality test results

Data	W	P-value	Result
ARIMA model residuals	0.93	0.000009	H0 Red

**Table 10:** Time series prediction results with ARIMA model

Period	Point	Forecast	Lo 80	Hi 80	Lo 95	Hi 95
1	124	35468	30727	40210	28217	42720
2	125	35468	28745	42192	25186	45751
3	126	35468	27212	43725	22841	48096
4	127	35468	25908	45028	20848	50089
5	128	35468	24751	46186	19077	51859
6	129	35468	23696	47241	17464	53473
7	130	35468	22718	48219	15968	54968
8	131	35468	21800	49136	14564	56372
9	132	35468	20931	50005	13235	57701
10	133	35468	20102	50834	11968	58968
11	134	35468	19308	51628	10753	60183
12	135	35468	18543	52394	9583	61353

From Table 9, it can be concluded that the p-value of  $0.000009 < 0.05$  indicates that the residuals do not exhibit a normal distribution. Thus, the validity and reliability of the estimated ARIMA (0,1,0) model have been confirmed. Time series forecasts for twelve periods were made using this model, and the results are presented in Table 10.

Table 10 shows that in the twelve-period forecasts, the lowest and highest predicted values fall within the 80% and 95% confidence intervals.

In this study, the forecasting performance of the ARIMA model was evaluated using several different error measurement criteria. A detailed discussion of the forecasting performance, along with the MLP-ANN prediction results, is presented in Table 13.

#### Forecasting with the Multilayer Perceptron Artificial Neural Network (MLP-ANN) Model

In this study, a supervised ANN model known as MLP was employed for the nonlinear forecasting of the Bitcoin (BTC) time series. The forecasts were made based on the original observation values of the dataset. The BTC variable consists of a total of 135 observations. The

first, second, fourth, and twelfth lagged values of the observation values were defined as the input variables of the model. In this context, the first variable (x1, also the dependent variable) consists of a total of 123 observations from the 1st observation to the 123rd observation of BTC. The second variable (x2) consists of observations from the 2nd observation to the 124th observation of BTC; the third variable (x3) includes observations from the 5th observation to the 127th observation; while the fourth variable (x4) comprises a total of 123 observations from the 13th observation to the 135th observation of BTC.

The dependent variable (x1) and the independent variables (x2, x3, and x4) of the dataset were normalized, and the observation values were scaled between 0 and 1. The normalized observation values are presented in Table 11.

As seen in Table 11, in the normalized dataset, the smallest observation value has been transformed to 0, while the largest observation value has been converted to 1. The optimal weight values calculated for the best-performing ANN model are presented in Table 12.

**Table 11:** Normalized observation values

Observation / Variables	X1	X2	X3	X4
1	0.04	0.05	0.07	0
2	0.05	0.06	0.08	0.01
3	0.06	0.05	0.08	0.01
...	...	...	...	...
120	0.59	0.58	0.42	0.26
121	0.58	0.55	0.41	0.26
122	0.55	0.51	0.4	0.28
123	0.51	0.42	0.42	0.3

**Table 12:** Optimal weight values calculated for the best ANN model

Input_1	Input_2	Input_3	Hid_1_1	Hid_1_2	Hid_1_3	Hid_1_4	Output_1
0	0	0	0.169	-0.223	0.271	0.142	0.000
0	0	0	-0.180	0.060	0.053	0.159	0.000
0	0	0	0.115	-0.229	0.036	-0.016	0.000
0	0	0	0.000	0.000	0.000	0.000	0.189

**Table 13:** Statistics of estimated errors for ARIMA and MLP-ANN models

Estimated error criteria	ME	RMSE	MAE	MPE	MAPE
ARIMA (0, 1, 0)	228,4	3623,5	2394	0,7	7,5
MLP-ANN	866,8	870,5	866,8	151410	151410

When the model is executed in R with the best-performing ANN architecture, the algorithm conducts the learning process based on iterations, error measurement criteria, and threshold values. Upon completion of the learning phase, a prediction is obtained. However, when the model is rerun, variations in error rates may be observed. This situation is one of the major disadvantages of ANN models, and to ensure prediction stability, it may be necessary to reuse the weights between neurons.

The error rates of the predictions made using the ARIMA and MLP-ANN models are compared in Table 13.

Table 13 presents the error metrics for the ARIMA (0, 1, 0) and MLP-ANN models. Based on these metrics, the following conclusions can be drawn.

- *ME*: Indicates the average difference between the predicted and actual values. A low ME suggests that the model's predictions are closer to the actual values.
- *RMSE*: Measures the magnitude of the errors and gives more weight to larger errors. A low RMSE indicates better performance of the model in the face of significant deviations.
- *MAE*: Reflects the absolute magnitude of the errors. A lower MAE signifies higher overall accuracy.
- *MPE*: Represents the percentage difference between the predicted and actual values. Positive values indicate overestimation, while negative values denote underestimation.

- *MAPE*: Represents the average percentage of the errors and is commonly used to evaluate model performance.

In conclusion, the ARIMA model outperformed the ANN model in both absolute and percentage error metrics. For instance, the ARIMA model's MAPE of 7.5% indicates that the predictions occurred with a 7.5% deviation, while the excessively high MAPE in the ANN model suggests significant deviations in its predictions.

These results serve as a significant finding regarding the difficulty of predicting crypto assets, as frequently discussed in the literature. High forecast errors reflect the complex and volatile nature of these assets. In this context, a detailed analysis of potential errors and limitations in the modeling process is provided in the results and discussion section of this study.

## DISCUSSION AND CONCLUSION

This study compares the performance of linear and nonlinear models in predicting cryptocurrency values. Forecasts for BTC were made over a 12-period horizon using both ARIMA and MLP-ANN models. The forecasting performances of these two models were evaluated using various error metrics, including ME, RMSE, MAE, MPE, and MAPE.

Upon evaluating the forecasting results of the ARIMA model, the following error metrics were obtained: RMSE = 3623.5, MAE = 2394, ME = 228.4, and MAPE = 7.5%. These results indicate that the ARIMA model can make reasonably accurate short-term predictions in volatile

markets like cryptocurrencies. In particular, the MAPE of 7.5% suggests that the ARIMA model provides an acceptable level of forecasting performance based on historical BTC data. The low error rates of the ARIMA model demonstrate its success in capturing cyclical patterns in past price movements. However, considering the high volatility of cryptocurrency assets, it is important to note that the ARIMA model may be inadequate for long-term predictions. This suggests that ARIMA is more suitable for short-term cyclical forecasts, while it may yield risky results in long-term forecasting.

Conversely, the predictions made using the MLP-ANN model yielded unexpectedly high error rates. The MLP-ANN model's forecasts showed excessive values, such as RMSE = 870.5, MAE = 866.8, ME = 866.8, and MAPE = 151410%. These results indicate that artificial neural networks fall short in speculative and volatile markets like BTC. The MLP-ANN model failed to capture the volatile nature of cryptocurrencies, resulting in a significantly low forecasting performance. Factors contributing to the model's failure include the inability to optimize parameter settings for a highly volatile asset like BTC, overfitting, and the model's failure to fully capture its complex nature.

### Model comparison

The comparison of forecasting performances between the ARIMA and MLP-ANN models clearly reveals the fundamental differences between the two approaches. The ARIMA model appears to perform better with cyclical data and can capture volatility to a limited extent.

However, it should be noted that the performance of ARIMA may decline with increasing volatility in long-term forecasts. On the other hand, the ANN model has high error rates due to the sensitivity of parameter settings and difficulties in handling volatile data. Thus, it can be concluded that the ANN model is limited in its application in speculative markets due to its inability to fully capture the complex structure of cryptocurrencies.

### Recommendations for researchers

This study highlights the differences between linear and nonlinear models in predicting cryptocurrencies. Various recommendations can be made for researchers who plan to conduct similar studies in the future.

- *Model selection:* The structure of the data is a crucial factor that directly affects model selection. Linear models like ARIMA can provide successful short-term predictions for cyclical and trend-

influenced data. However, the success of nonlinear models can vary based on the complexity and multidimensional nature of the data. Researchers must choose models suitable for the characteristics of the assets they analyze.

- *Model tuning:* Nonlinear models, particularly artificial neural networks, must be optimized with appropriate parameters. Carelessness in parameter selection can lead to overfitting or insufficient learning. Researchers are advised to optimize the parameter settings of neural networks and use regularization techniques to avoid overfitting.
- *Hybrid models:* Instead of using solely linear or nonlinear models, hybrid models that combine the advantages of both approaches can yield better forecasting results. Utilizing different methods like ARIMA and ANN together can contribute to increased flexibility and accuracy in predictions. Future research should advance the development of such hybrid models.
- *Alternative forecasting models:* In addition to ARIMA and ANN models, alternative methods for time series forecasting in volatile markets exist. Particularly in volatile and unpredictable markets like cryptocurrencies, the following additional models may be considered.
- *GARCH models:* Commonly used to capture volatility, GARCH models are suitable for analyzing the volatile structure of cryptocurrencies. While GARCH models account for increases and decreases in volatility, ARIMA does not capture this volatility.
- *SARIMA models:* In markets where seasonal effects are pronounced, SARIMA models can be employed. If weekly or monthly cycles exist in cryptocurrency markets, these cycles can be integrated into predictions using SARIMA.
- *VAR models:* VAR models, which examine the relationships among multiple time series variables, are suitable for analyzing relationships among cryptocurrencies. Interdependencies between BTC and other cryptocurrencies can be investigated.
- *LSTM (Long short-term memory) models:* LSTM, a type of deep learning method, is effective in learning long-term dependencies. LSTM models may be evaluated for long-term predictions in volatile markets like cryptocurrencies.

### Recommendations for industry professionals

Financial sector professionals should be aware of several important points when forecasting in cryptocurrency markets. This study provides various insights for professionals by considering the limitations of both linear and nonlinear models.

- *Short-term strategies:* The ARIMA model offers relatively low error rates in short-term predictions for cryptocurrencies. For short-term analyses and trades, the ARIMA model can be utilized as an appropriate tool for capturing cyclical patterns in cryptocurrency markets.
- *Caution in long-term forecasts:* Long-term predictions for cryptocurrencies may prove inadequate with both ARIMA and ANN methods. Professionals should not overly rely on these forecasts for long-term investment decisions and should employ a broader analytical framework.
- *Monitoring market dynamics:* Regulatory announcements, political events, and social media impacts are significant in cryptocurrency markets. Therefore, in addition to mathematical models, it is crucial to closely monitor market dynamics.

### Recommendations for investors

The findings of this study can assist individual and institutional investors planning to invest in cryptocurrency markets in making more informed decisions.

*Avoid over-reliance on forecasting models:* Both ARIMA and ANN models have certain limitations in predicting cryptocurrency values. Investors should avoid excessive reliance on the results of these models and consider evaluating alternative analytical methods.

*Awareness of volatility:* Cryptocurrencies exhibit high volatility. Investors should be aware that significant gains and losses may occur in both the short and long term, necessitating the development of appropriate risk management strategies.

### CONCLUSION

This study aims to fill a significant gap in financial markets by comparing the performance of linear and nonlinear models used in predicting cryptocurrencies. The findings indicate that linear models are more effective for short-term predictions, particularly for highly volatile cryptocurrencies like Bitcoin. Conversely, it was concluded that nonlinear models such as artificial

neural networks are inadequate under current market conditions.

Future research can expand upon the findings of this study by conducting more comprehensive analyses regarding the prediction of cryptocurrencies. Actions taken by researchers and industry professionals based on these findings will contribute to more effective forecasting in financial markets and more informed investment decisions.

In conclusion, it is clear that further studies are needed on the dynamic structure and predictability of cryptocurrencies. Research that addresses both theoretical and practical aspects will facilitate a better understanding and management of cryptocurrencies in financial markets.



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# Barriers in Sustainable Lean Supply Chain Management: Implementation in SMEs

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## ABSTRACT

As the world undergoes significant transformations in various domains, including technology, energy supply and communication, the idea of sustainability has become a significant issue. This study investigates the barriers to Sustainable Lean Supply Chain (SLSC) management within Small and Medium-Sized Enterprises (SMEs) and explores the structural interrelationships among these barriers. A comprehensive literature review was carried out to recognize critical elements relevant to the research topic, resulting in the identification of fifteen specific elements that account for 85% of the barriers in SLSC management. The DEMATEL method was used to evaluate the significance and influence levels of these factors. Furthermore, structured in-depth interviews were conducted with ten experts representing sectors that constitute 85% of the SMEs operating in Kayseri Organized Industrial Zone (OIZ), Turkey, including metal products, furniture, plastic packaging, construction materials, textiles and food. The findings reveal that strategies represent the most significant barrier to SLSC management in SMEs. The barriers were analyzed in two dimensions: influencing and influenced factors. The primary influencing factor identified was laws, standards, regulations, and legislation while the most significant influenced factor was found supply and suppliers. The study concludes with findings and actionable recommendations for practitioners and decision-makers.

**Keywords:** Sustainability, Lean, Supply Chain Management, Barriers, SMEs.

**JEL Classification Codes:** M00, M10, M11, M19, M20, Q01

**Referencing Style:** APA 7

## INTRODUCTION

With the Covid-19 pandemic, a significant negative deviation between the predicted and actual Human Development Index since 2020 has necessitated the development of a new economic model. Following the "Covid-19: Great Reset Manifesto" proposed at the WEF, the human and planet-oriented "Stakeholder Capitalism" model has emerged as an alternative to the traditional model of modern capitalism. In this context, sustainable development goals were established at the WEF in 2020, and stakeholder capitalism indicators were discussed under four categories: principle of governance, planet, people and prosperity.

According to Linton et al. (2007), sustainability can be approached through macro elements such as the economy and the environment, or it can be related to businesses and their processes. In Sustainable Supply Chain (SSC) management, the sustainability of companies depends on their capacity to manage both cost and quality. Concepts such as "Lean Production, Lean Management, SLSC management and Lean Operations"

are gaining prominence. SLSC management, which necessitates collaboration and cooperation among supply chain members particularly with suppliers, requires businesses to undertake various initiatives to enhance their sustainability through joint efforts. However, even when aware of their responsibilities to partners and stakeholders, businesses often encounter various difficulties and barriers during implementation. As of 2020, there are 3.2 million registered SMEs constituting 99.8% of the total businesses in the country. SMEs account for 73.8% of total employment, 64.5% of the total turnover and 56.3% of total exports in Turkey (Division of SME Research and Consultancy Center, 2022).

This research employs a literature review and structured interview technique to identify barriers in SLSC management, elucidating how these barriers structurally influence one using the DEMATEL methodology. The DEMATEL method was created to improve the comprehension of particular issues and to assist in devising practical solutions within a structured framework (Kobryn, A. 2017).

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This research employs the DEMATEL method to systematically solve issues by organizing associated factors into categories of problems and outcomes. This approach facilitates a deeper understanding of casual relationships, organizes factors according to the importance of criteria and investigates the interdependent effects of various relationship types.

This research intends to tackle the subsequent questions:

1. What barriers exist for SLSC management in SMEs in Turkey?
2. In what ways do the barriers faced in SLSC management practices in SMEs in Turkey structurally influence each other?

The findings indicate that *strategies* are of paramount importance among the barriers to SLSC management in SMEs. Furthermore, the barriers in SLSC management have been analyzed from two perspectives: as influencing factors and as influenced factors. It has been determined that *Laws/Standards/Regulations/Legislation* constitute the most significant influencing factor, while the most notable influenced factor is *Supply and Suppliers*.

This research elucidates the impact and interrelationship of the barriers encountered in SLSC applications by employing a structured in-depth interview technique within SMEs.

This study is one of the pioneering investigations conducted in a mixed method framework that reveals the barriers encountered in SLSC applications and examines how these barriers structurally affect one another. This is achieved through structured in-depth interviews and model studies on the barriers in SLSC management in SMEs in Turkey.

The primary limitation of the research is the challenge of comparing the results with other studies due to the scarcity of relevant literature on the subject in Turkey. Another limitation is that SMEs operating in Kayseri may possess limited or no knowledge regarding sustainability and lean transformation.

The research findings, along with recommendations for practitioners and decision-makers, are included in this study.

## RELATED LITERATURE REVIEW

Caldera et al. (2019) conducted an evaluation of the facilitators and barriers associated with the successful

implementation of sustainable business practices in SMEs, focusing on the issue of SLSC management. Through in-depth interviews with chief executives of SMEs Queensland, Australia, as well as senior managers engaged in sustainability and lean management studies, the research identified several barriers to the adoption of sustainable business practices.

Gupta et al. (2020) researched the barriers to innovation in SSC and proposed strategies to overcome these barriers. Heidary et al. (2020) investigated interaction barriers within SSC management practices. Kazancoglu et al. (2020) presented a conceptual framework for identifying barriers in textile supply chains. Narimissa et al. (2020) explored the drivers and barriers to the implementation and enhancement of SSC. Nazam et al. (2020) conducted a study modeling the primary barriers in knowledge management related to SSC. Furthermore, Nazam et al. (2020) categorized barriers to adopting SSC initiatives to explore pathways to business excellence. Praharsi et al. (2020) discussed the barriers and facilitators affecting SSC development in traditional shipyards in East Java, Indonesia.

Ratna and Kumar (2020) proposed an ISM approach to assess barriers to SSC applications. Sajjad et al. (2020) provided managerial perspectives on the drivers and barriers to SSC implementation, using New Zealand as a case study.

Ada et al. (2021) conducted a systematic literature review of 136 articles to analyze the barriers to circular food supply chains and propose solutions related to Industry 4.0. To understand the concept of the circular economy, applications in food supply chains from 2010 to 2020 were examined using the WOS and Scopus databases, focusing on these barriers. Caldarelli et al. (2021) pragmatically addressed the barriers to blockchain adoption in SSC management within the fashion industry. Chen et al. (2021) explored socio-political sustainability barriers in the Indian banking sector through causality analysis using ISM and MICMAC. Khan et al. (2021) evaluated the barriers and potential solutions for the adoption of social sustainability in multi-layer supply chains. Kouhizadeh et al. (2021) investigated the theoretical barriers to the adoption of blockchain technology and SSC. Kumar et al. (2021) analyzed barriers in SSC for sustainable operations in the context of Industry 4.0 and the circular economy. Additionally, Nair and Thankamony (2021) researched the barriers and applications of social sustainability within supply chains in the energy and manufacturing sectors in Indian and North America.



Palsson and Sandberg (2022) examined the sustainability barriers to sustainable packaging practices in food supply chains in Africa and Sweden. Alayon et al. (2022) investigated the barriers and facilitators for the adoption of sustainability in manufacturing SMEs across seven categories. Guimaraes et al. (2022) researched the barriers to sustainable supply chains in the Brazilian Coffee Industry. According to their survey, the main barriers identified include a lack of government support, high process complexity and communication issues, gaps between parties and insufficient cooperation. Vishwakarma et al. (2022) analyzed the barriers to SSC in the textile sector using a hybrid ISM-MICMAC and DEMATEL approach. The research identified barriers such as communication gaps between stakeholders, factors affecting the performance of the sector, a lack of education and training on sustainability, capacity constraints and insufficient reverse logistics. Hariyani et al. (2022) conducted a literature review on organizational barriers to sustainable production system, while Bhandari et al. (2022) investigated barriers to sustainable resource use in the garment and luxury fashion industry.

Paul et al. (2023) investigated the barriers to SSC management and the strategies to overcome these barriers within the context of the Indian automobile industry, utilizing a literature review and experts' interview. Singh et al. (2023) identified the barriers associated with blockchain technology that hinder supply chain transparency and sustainability in the construction sector, employing the Pythagorean FAHP method. Lahane et al. (2023) assessed and prioritized solutions to address the challenges related to the adoption of Industry 4.0 in sustainable food supply chains. Verma et al. (2023) examined the modeling of 3D printing implementation for sustainable food supply chains, identifying and validating thirteen barriers with input from food printing experts, among which the cost of consumables emerged as a significant barrier. Adams et al. (2023) explored sustainable supply chain barriers in sixteen large food and beverage companies in Australia, highlighting the lack of a governmental regulatory and environmental framework as a major constraint. Kumar Dadsena et al. (2023) analyzed the barriers to supply chain digitization from the perspective of sustainable development goals. Kumar et al. (2024) investigated the barriers to the adoption of Industry 4.0 within the context of sustainable food supply chains, considering a circular economy perspective. Similarly, Rashid et al. (2024) developed a fuzzy multi-criteria model utilizing pareto analysis to prioritize barriers in SSC within the textile industry. Their findings revealed that the major barriers

include a lack of commitment from the top management of suppliers and insufficient financial incentives. Singh and Maheswaran (2024) analyzed social barriers to sustainable innovation and digitization in supply chains.

## **SUSTAINABLE LEAN SUPPLY CHAIN MANAGEMENT**

Sustainability is a concept that pertains to various disciplines. The United Nations (UN) Commission on Environment and Development characterizes sustainability as maintaining continuous development by fulfilling societal needs without jeopardizing the requirements of future generations (Brundtland Report, WCED, 1987). As scientific research continues, world leaders at the UN General Assembly in 2015 agreed on a consensus on seventeen global sustainable development goals (70th UN General Assembly, September 28, 2015). Humanity is suffering on our planet due to wars and changing geopolitical dynamics. Crises create challenging living conditions by generating chronic, interacting ambiguities on a global scale. There are now three additional variables contributing to the uncertainties that people have faced throughout history (UNDP, Human Development Report, 2021/2022): dangerous changes in the Anthropocene, the search for social transformations, the excesses of societies divided into opposing groups.

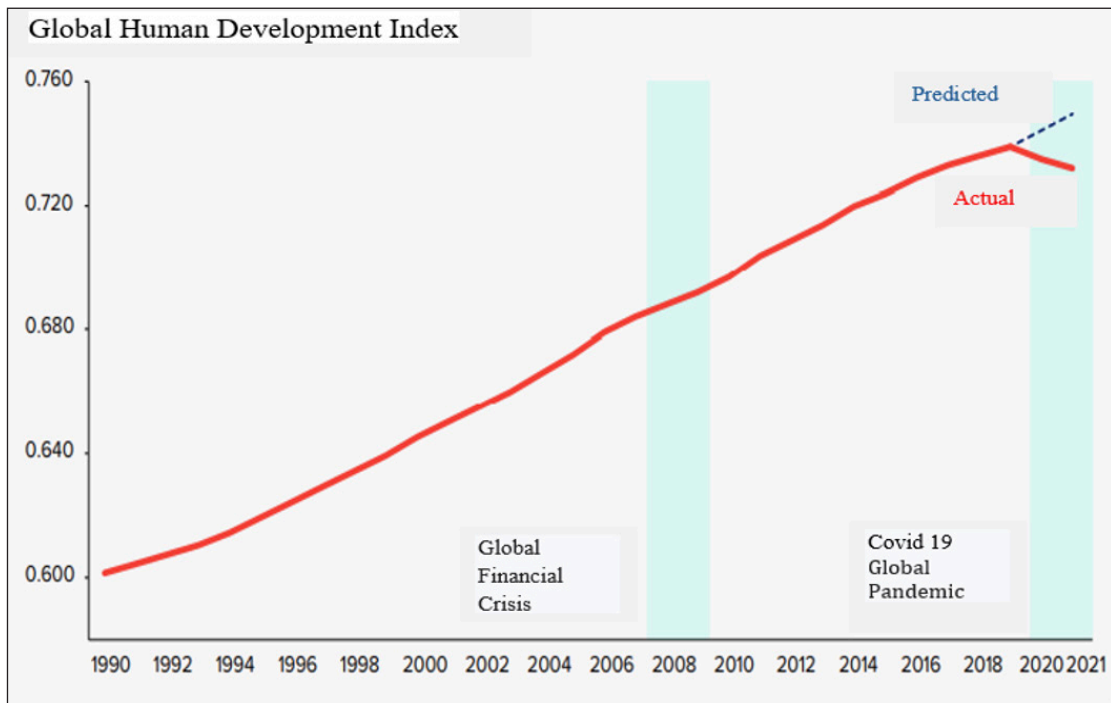
This new uncertainty leads to deficiencies and inequalities in human development. In this regard, according to the UNDP 2021-2022 Human Development Report, the value of the global

Human Development Index is presented in Figure 1. However, research indicates that there has been a negative deviation between the predicted and actual Human Development Index since 2020.

The situation created by the COVID-19 pandemic has necessitated the development of a new economic model. Following the publication of the "COVID-19: The Great Reset" manifesto at the World Economic Forum (WEF) in 2020, a human- and planet-oriented model known as "Stakeholder Capitalism" was proposed as an alternative to the modern capitalism model based on private ownership of manufacturing assets and their use for profit.

Stakeholder Capitalism is a model in which companies, in collaboration with their stakeholders, aim to create long-term value that aligns with societal needs (Schwab, 2021). It is emphasized that companies should benefit not only capitalists but also their stakeholders in order





**Figure 1.** Global Human Development Index

to achieve sustainable development and wealth. In terms of measuring stakeholder capitalism, the WEF (2020) discussed common indicators and consistent reporting frameworks for sustainable development goals and value creation. The WEF categorizes stakeholder capitalism indicators into four main headings: principle of governance, planet, people and prosperity.

In the context of the global economy, characterized by volatile markets, competitive pressures, shortened product lifecycles, stringent quality demands, rapid response requirements, and heightened ecological awareness, the survival of numerous companies increasingly relies on their capacity to consistently enhance quality while lowering costs. Production systems must adapt to constant changes and sustainability requirements. Consequently, there has been considerable interest in the concept of “lean production” and the broader notion of “lean enterprise” in recent years. Womack et al. (1990), in their book, define a “lean system” as one that is free of waste elements. The lean system is an approach that enables manufacturing or service businesses to eliminate waste through employee involvement, organize production resources according to customer demand, and strive for perfection in quality and profitability. Taiichi Ohno (1912-1990), a manager at Toyota Motor Corporation (TMC), identified eight types of waste: defective production, overproduction, waiting, excessive processing, transportation, inventory, unnecessary movement, and unused talent (Begam

et al., 2013). Lean operations with low inventory levels are becoming increasingly significant. Numerous organizations have embraced the lean thinking framework to improve performance and strengthen competitive advantage. Based on lean principles, lean manufacturing boosts resource effectiveness, decreases waste and energy expenditure, maximizes both direct and indirect resources, and supports the production of high-quality products at lower expenses. There are five fundamental principles required for the successful implementation of lean systems in businesses: value, value stream, continuous flow, pull system, and perfection (Womack and Jones, 1998).

The concept of lean thinking must be regarded as “sustainable,” as it effectively minimizes both the energy required to produce specific products and the waste generated by by-products. Numerous examples illustrate the reduction of human effort, space, and scrap associated with each product through the implementation of lean principles within organizations.

As a result, lean manufacturing and sustainable development are frequently regarded as complementary efforts because of their shared focus on minimizing waste. In contrast to mass production, which emphasizes large batches, lean production focuses on smaller batches and swift adjustments, thereby preventing unnecessary production and excess inventory. The environmental effects of moving from mass production to lean production are considerable. Research in academia

examines the effective and sustainable implementation of lean practices in organizations, underscoring that the main incentive for adopting lean methodologies lies in the economic and environmental benefits linked to sustainability.

Sanders (2012) outlined the benefits of the SLSC system:

1. Financial advantages, including reduced operating and administrative costs, optimized capital investment, and enhanced returns and market valuation.
2. Consumer advantages, such as increased customer satisfaction, expanded market share, enhanced company reputation, and the development of new business opportunities.
3. Operational advantages, including process innovation, improved resource efficiency, reduced processing times and minimized waste.

From a business perspective, an effective SLSC can provide a competitive advantage for supply chain members, shorten lead times, facilitate the implementation of more flexible processes, reduce waste, elevate quality and innovation, strengthen brand image, and enhance reputation. Additionally, improved employee satisfaction resulting from better working conditions may lead to lower turnover rates. From the consumer perspective, enhanced customer satisfaction, increased trust in the brand, and access to healthier, environmentally friendly products are key outcomes. However, barriers encountered during the pursuit of these benefits can significantly affect process performance.

**METHODOLOGY**

Decision-making is as old as civilization itself. Individuals often intuitively evaluate trade-offs between conflicting criteria to arrive at the optimal alternative in their personal

or professional lives. Different MCDM techniques are utilized in research studies. This research utilizes the DEMATEL method, one of the MCDM approaches, to elucidate the interrelationships among barrier criteria and their relative importance. The DEMATEL method was created to determine cause and effect relationships in intricate issues. DEMATEL is a multi-criteria decision-making technique that analyzes structural relationships among criteria, visually represents these relationships in a graphical form, and facilitates the weighting of criteria (Gabus and Fontela, 1972; Kobryń, A., 2017). The DEMATEL method is a calculation system based on pairwise comparison logic, and the steps of the method are outlined below (Ecer, 2020):

*Step 1: Pairwise Comparison of Criteria*

The degree of influence that the criteria listed in the question table have on each other, based on expert opinions, is determined according to the values presented in Table 1 below.

*Step 2: Direct Relationship Matrix X*

The element  $a_{ij}$  in the matrix represents the degree to which criterion  $i$  influences criterion  $j$ .

$$X = \begin{bmatrix} 0 & \cdots & x_{n1} \\ \vdots & \ddots & \vdots \\ x_{n1} & \cdots & 0 \end{bmatrix}_{n \times n}$$

*Step 3: Normalized Standard Direct Relationship Matrix  $\tilde{x}$*

$$\tilde{x} = \frac{X}{\max(\max \sum_{j=1}^n x_{ij}, \sum_{i=1}^n x_{ij})}$$

**Table 1.** Pairwise Comparison Scale

Degree of Importance	Definition	Explanation
0	No Effect	It has no effect on the other factor
1	Low Effect	It has a low effect compared to the other factor
2	Moderate Effect	It has a moderate effect compared to the other factor
3	High Effect	It has a high effect compared to the other factor
4	Very High Effect	It has a very high effect compared to the other factor

Step 4: Total Relationship Matrix *T*

*I* : Identity Matrix

( $\tilde{x}$ ) : Standard Direct Relationship Matrix

$$T = \tilde{x} \cdot (I - X)^{-1}$$

Step 5: (*D+R*) and (*D-R*) Values

(Identifying the influencing and influenced variables)

Li and Mathiyazhagan (2018) applied the DEMATEL approach to identify effective indicators for the benefits of SSC in the automotive component manufacturing sector. Singh et al. (2021) created a cause-and-effect relationship diagram analyzing barriers to green lean applications in the manufacturing industry, incorporating expert opinions on the impacts of these barriers.

Menon and Ravi (2022) analyzed barriers affecting the implementation of sustainable supply chain management in the electronics industry using the Grey-DEMATEL approach. Zhu et al. (2022) investigated the driving factors for collaborative integration of lean-green manufacturing systems in the context of Industry 4.0, utilizing a fuzzy AHP-DEMATEL-ISM approach.

Ada et al. (2023) examined barriers to the cement industry's transition towards a circular economy with the DEMATEL method. Salman et al. (2024) explored the intersections of lean manufacturing, circular economy, and sustainable development goals through the DEMATEL framework.

This study seeks to recognize barriers in SLSC management by employing structured in-depth interviews within SMEs, as well as to assess the effects and significance levels of the barriers encountered in SLSC applications. This study is among the pioneering investigations employing a mixed-methods approach, elucidating the barriers encountered in practice and how they structurally influence one another, utilizing structured in-depth interviews and model studies on barriers in SLSC management within SMEs. The research population comprises SMEs operating in the Kayseri OIZ and involved senior and middle-level managers through in-depth interviews. A systematic interview with clustering was performed and the information gathered from these interviews was evaluated using the DEMATEL method, a well-known MCDM technique. The proportion of industrial enterprises operating in the Kayseri Organized Industrial Zone (OIZ) is illustrated in Figure 2 (Kayseri Organized Industrial Zone, 2022).

85% of the SMEs operating in the Kayseri OIZ are involved in the metal products, furniture and wooden products, plastic packaging, construction building materials, textile and food sectors. In this research, a structured in-depth interview was conducted with ten experts representing the sector from the sectors that constitute 85% of the SMEs operating in Kayseri OIZ. According to the pareto analysis resulting from interviews and literature review regarding the barriers in SLSC management, 85% of the literature consists of 15 barrier categories:

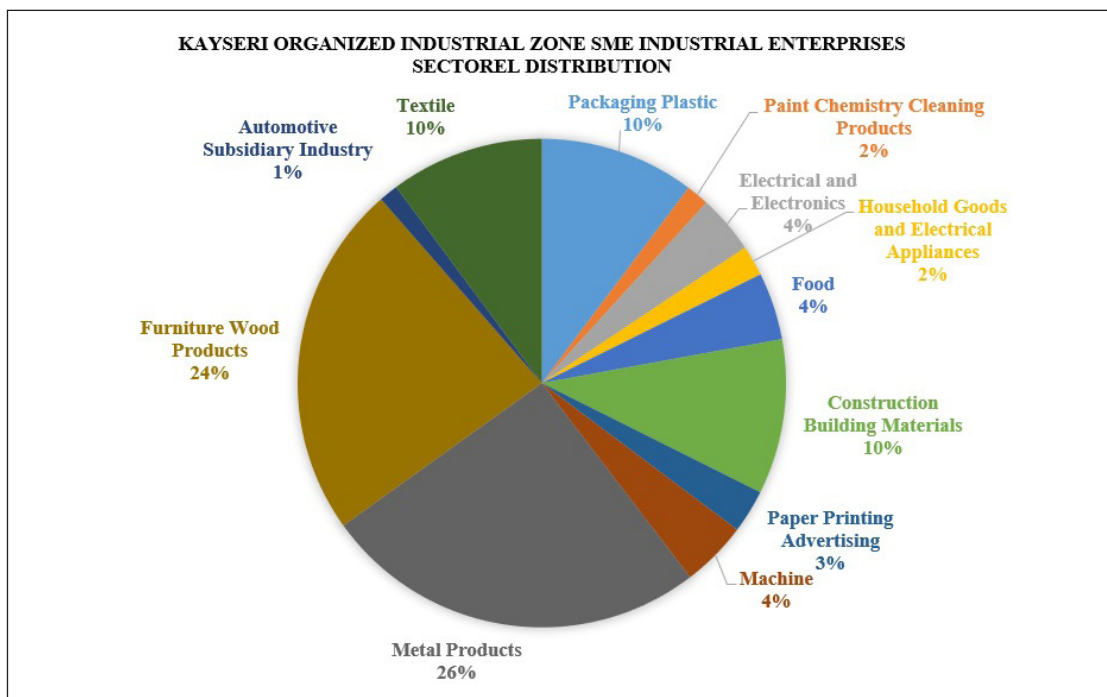


Figure 2. Kayseri Organized Industrial Zone SME Sectoral Distribution

- A. (A) Laws / Standards / Regulation / Legislation
- B. (B) Institution / Institutional Culture / Change Management
- C. (C) Top Management
- D. (D) Economics / Finance
- E. (E) Supply / Suppliers
- F. (F) Customers
- G. (G) Training / Expertise
- H. (H) Price / Cost
- I. (I) Strategies
- J. (J) Operational
- K. (K) IT / Technology / Innovation
- L. (L) Labor
- M. (M) Socio-Economic
- N. (N) Communication / Media
- O. (O) Scientific Information.

matrix was obtained from the data collected from the participants. The highest value from the calculations is “41,8”. The normalized direct relationship matrix was then calculated based on this value. In the matrix presented in Table 2, the value of 41.8, corresponding to the “C: Top Management” row — which has the highest sum of both the row and column totals — was used.

*Step 3: Normalized Standard Direct Relationship Matrix  $\hat{x}$*

To standardize X, each value in the X matrix was divided by the largest total value (41.8), thereby generating the normalized standard relationship matrix presented in Table 3.

*Step 4: Total Relationship Matrix T*

The total relationship matrix presented in Table 4.

*Step 5: (D+R) and (D-R) Values*

The D + R values, which represent the level of importance of the barriers in SLSC management, are presented in Table 5.

The D - R values, which represent the degree of impact of the barriers in SLSC management, are presented in Table 6.

The impact diagram, which illustrates the order of importance and the relationships among barrier criteria in SLSC management, is presented in Figure 3.

*Step 1 and 2: Pairwise Comparison of Criteria and Direct Relationship Matrix X*

A separate direct relationship matrix was created for each participant, and the participants performed pairwise comparisons by progressing from rows to columns, taking into account the comparison scale for the 15 elements. An average direct relationship

**Table 2.** Direct Relationship Matrix

SLSC MANAGEMENT BARRIERS		A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	TOTAL
Laws / Standards / Regulation / Legislation	A	0	3,3	3,3	3,1	2,7	2,7	2,3	2,9	3,1	2,9	2,4	2,6	1,9	2,5	2,4	38,1
Institution / Institutional Culture / Change Management	B	1,4	0	2,8	2,3	2,8	2,9	3,1	2,6	3,3	3	2,6	2,6	2,4	2,7	2,2	36,7
Top Management	C	1,4	3,9	0	3,2	2,8	2,9	3	3,3	3,9	3	3,1	3,1	2,6	3,4	2,2	<b>41,8</b>
Economics / Finance	D	1,6	2,7	3,2	0	3	3,1	2,3	3,4	3,4	3,1	3,1	2,8	2,9	2,4	2,1	39,1
Supply / Suppliers	E	1,9	2,1	2,2	2,6	0	2	1,2	3,5	2,6	2,9	1,6	2	1,3	1,3	1,2	28,4
Customers	F	1,5	2,9	2,3	3,3	1,9	0	1,9	3,4	3,4	2,7	2,3	2	2,2	2,7	1,6	34,1
Training / Expertise	G	1,9	2,7	2,4	2,4	2,1	2,6	0	2,6	2,9	2,9	3,1	2,9	2,8	2,5	3,4	37,2
Price / Cost	H	1,4	2,4	2,9	3,7	3,4	3,6	2,3	0	3,3	2,8	2,9	2,7	2,7	2,1	1,7	37,9
Strategies	I	2,3	3,3	3,2	3,1	2,8	3,1	2,7	3,4	0	3,1	3	2,5	2,6	2,7	2,5	40,3
Operational	J	2,2	2,6	2,2	2,5	2,6	2,6	2,5	3,3	2,4	0	2,7	2,9	2,1	1,7	1,7	34
IT / Technology / Innovation	K	1,4	2,6	2,6	2,7	1,9	2,4	2,6	2,9	2,9	3,1	0	2,4	1,8	3,1	3,3	35,7
Labor	L	1,7	2,4	2,3	2,8	1,8	2,1	2,2	3,2	2,6	3,1	1,9	0	2,4	1,6	1,2	31,3
Socio-Economic	M	1,3	2,2	1,8	2,3	1,9	2,3	2,4	2,5	2,4	2	2,2	2,7	0	2,1	1,6	29,7
Communication / Media	N	1,4	2,1	2,3	2,3	2,0	3,2	1,8	2,1	2,4	1,4	1,9	1,9	1,7	0	1,5	28
Scientific Information	O	2,3	2,5	2,4	2,1	2,1	2	2,9	2,3	2,4	2,2	2,9	2	1,6	1,8	0	31,5



**Table 3.** Normalized Standard Direct Relationship Matrix

SLSC MANAGEMENT BARRIERS		A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	TOTAL
Laws / Standards / Regulation / Legislation	A	-	0,08	0,08	0,07	0,06	0,06	0,06	0,07	0,07	0,07	0,06	0,06	0,05	0,06	0,06	<b>0,91</b>
Institution / Institutional Culture / Change Management	B	0,03	-	0,07	0,06	0,07	0,07	0,07	0,06	0,08	0,07	0,06	0,06	0,06	0,06	0,05	<b>0,88</b>
Top Management	C	0,03	0,09	-	0,08	0,07	0,07	0,07	0,08	0,09	0,07	0,07	0,07	0,06	0,08	0,05	<b>1,00</b>
Economics / Finance	D	0,04	0,06	0,08	-	0,07	0,07	0,06	0,08	0,08	0,07	0,07	0,07	0,07	0,06	0,05	<b>0,94</b>
Supply / Suppliers	E	0,05	0,05	0,05	0,06	-	0,05	0,03	0,08	0,06	0,07	0,04	0,05	0,03	0,03	0,03	<b>0,68</b>
Customers	F	0,04	0,07	0,06	0,08	0,05	-	0,05	0,08	0,08	0,06	0,06	0,05	0,05	0,06	0,04	<b>0,82</b>
Training / Expertise	G	0,05	0,06	0,06	0,06	0,05	0,06	-	0,06	0,07	0,07	0,07	0,07	0,07	0,06	0,08	<b>0,89</b>
Price / Cost	H	0,03	0,06	0,07	0,09	0,08	0,09	0,06	-	0,08	0,07	0,07	0,06	0,06	0,05	0,04	<b>0,91</b>
Strategies	I	0,06	0,08	0,08	0,07	0,07	0,07	0,06	0,08	-	0,07	0,07	0,06	0,06	0,06	0,06	<b>0,96</b>
Operational	J	0,05	0,06	0,05	0,06	0,06	0,06	0,06	0,08	0,06	-	0,06	0,07	0,05	0,04	0,04	<b>0,81</b>
IT / Technology / Innovation	K	0,03	0,06	0,06	0,06	0,05	0,06	0,06	0,07	0,07	0,07	-	0,06	0,04	0,07	0,08	<b>0,85</b>
Labor	L	0,04	0,06	0,06	0,07	0,04	0,05	0,05	0,08	0,06	0,07	0,05	-	0,06	0,04	0,03	<b>0,75</b>
Socio-Economic	M	0,03	0,05	0,04	0,06	0,05	0,06	0,06	0,06	0,06	0,05	0,05	0,06	-	0,05	0,04	<b>0,71</b>
Communication / Media	N	0,03	0,05	0,06	0,06	0,05	0,08	0,04	0,05	0,06	0,03	0,05	0,05	0,04	-	0,04	<b>0,67</b>
Scientific Information	O	0,06	0,06	0,06	0,05	0,05	0,05	0,07	0,06	0,06	0,05	0,07	0,05	0,04	0,04		<b>0,75</b>

**Table 4.** Total Relationship Matrix

SLSC MANAGEMENT BARRIERS		A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	D
Laws / Standards / Regulation / Legislation	A	0,22	0,41	0,40	0,42	0,37	0,40	0,35	0,44	0,44	0,41	0,38	0,38	0,33	0,35	0,31	<b>5,67</b>
Institution / Institutional Culture / Change Management	B	0,24	0,32	0,37	0,38	0,36	0,39	0,36	0,42	0,43	0,40	0,37	0,36	0,33	0,34	0,30	<b>5,43</b>
Top Management	C	0,27	0,45	0,35	0,45	0,40	0,44	0,39	0,48	0,49	0,44	0,42	0,41	0,37	0,40	0,33	<b>6,15</b>
Economics / Finance	D	0,26	0,41	0,40	0,35	0,38	0,42	0,36	0,46	0,45	0,42	0,40	0,39	0,36	0,36	0,31	<b>5,78</b>
Supply / Suppliers	E	0,21	0,31	0,30	0,32	0,24	0,31	0,26	0,36	0,34	0,33	0,28	0,29	0,25	0,25	0,22	<b>4,32</b>
Customers	F	0,23	0,37	0,34	0,39	0,32	0,31	0,31	0,41	0,41	0,37	0,34	0,33	0,31	0,33	0,27	<b>5,11</b>
Training / Expertise	G	0,25	0,39	0,37	0,39	0,35	0,39	0,29	0,42	0,42	0,40	0,38	0,37	0,34	0,34	0,33	<b>5,49</b>
Price / Cost	H	0,25	0,39	0,39	0,43	0,38	0,42	0,35	0,37	0,44	0,41	0,39	0,38	0,34	0,34	0,30	<b>5,62</b>
Strategies	I	0,28	0,43	0,41	0,43	0,39	0,43	0,38	0,47	0,39	0,43	0,41	0,39	0,36	0,37	0,33	<b>5,96</b>
Operational	J	0,24	0,36	0,34	0,37	0,33	0,36	0,33	0,41	0,38	0,31	0,35	0,35	0,30	0,30	0,27	<b>5,08</b>
IT / Technology / Innovation	K	0,23	0,38	0,36	0,38	0,33	0,37	0,34	0,41	0,41	0,39	0,30	0,35	0,31	0,35	0,32	<b>5,30</b>
Labor	L	0,22	0,34	0,32	0,35	0,30	0,33	0,30	0,38	0,37	0,36	0,31	0,26	0,29	0,28	0,24	<b>4,72</b>
Socio-Economic	M	0,20	0,31	0,29	0,32	0,28	0,32	0,29	0,35	0,34	0,32	0,30	0,31	0,22	0,28	0,24	<b>4,45</b>
Communication / Media	N	0,19	0,30	0,29	0,31	0,27	0,32	0,26	0,33	0,33	0,29	0,28	0,28	0,25	0,22	0,23	<b>4,22</b>
Scientific Information	O	0,23	0,34	0,32	0,34	0,30	0,33	0,32	0,36	0,36	0,34	0,34	0,31	0,27	0,29	0,22	<b>4,74</b>
	R	<b>3,58</b>	<b>5,57</b>	<b>5,33</b>	<b>5,70</b>	<b>5,07</b>	<b>5,59</b>	<b>4,95</b>	<b>6,13</b>	<b>6,06</b>	<b>5,68</b>	<b>5,32</b>	<b>5,23</b>	<b>4,68</b>	<b>4,87</b>	<b>4,28</b>	

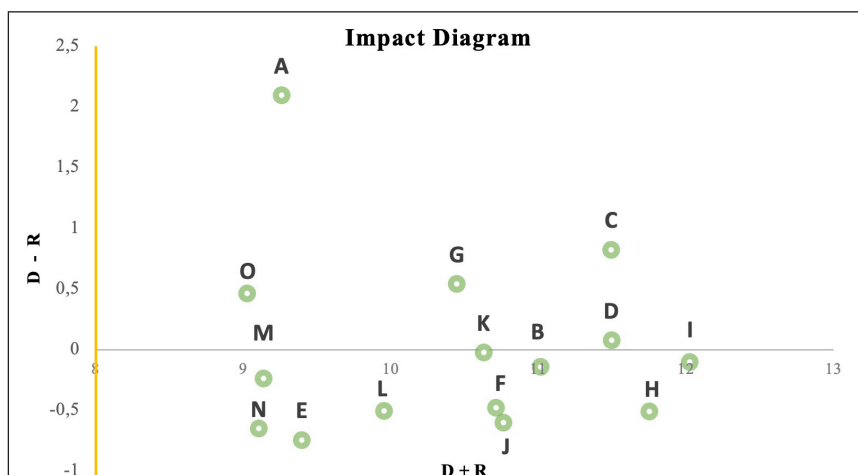


**Table 5. D+R**

SLSC MANAGEMENT BARRIERS		Di	Rj	Di+Rj	Level of Relationship
Laws / Standards / Regulation / Legislation	A	5,678	3,581	9,259	12
Institution / Institutional Culture / Change Management	B	5,438	5,578	11,016	5
Top Management	C	6,158	5,335	11,493	4
Economics / Finance	D	5,786	5,709	11,495	3
Supply / Suppliers	E	4,326	5,071	9,397	11
Customers	F	5,116	5,596	10,711	7
Training / Expertise	G	5,494	4,954	10,447	9
Price / Cost	H	5,620	6,132	11,751	2
Strategies	I	5,961	6,063	12,024	1
Operational	J	5,081	5,682	10,763	6
IT / Technology / Innovation	K	5,302	5,326	10,628	8
Labor	L	4,723	5,230	9,952	10
Socio-Economic	M	4,450	4,687	9,137	13
Communication / Media	N	4,227	4,877	9,104	14
Scientific Information	O	4,744	4,282	9,025	15

**Table 6. D-R**

SLSC MANAGEMENT BARRIERS		Di	Rj	Di - Rj	Impact Group
Laws / Standards / Regulation / Legislation	A	5,678	3,581	2,096	Influencing
Institution / Institutional Culture / Change Management	B	5,438	5,578	-0,139	Influenced
Top Management	C	6,158	5,335	0,823	Influencing
Economics / Finance	D	5,786	5,709	0,077	Influencing
Supply / Suppliers	E	4,326	5,071	-0,745	Influenced
Customers	F	5,116	5,596	-0,480	Influenced
Training / Expertise	G	5,494	4,954	0,540	Influencing
Price / Cost	H	5,620	6,132	-0,512	Influenced
Strategies	I	5,961	6,063	-0,102	Influenced
Operational	J	5,081	5,682	-0,601	Influenced
IT / Technology / Innovation	K	5,302	5,326	-0,023	Influenced
Labor	L	4,723	5,230	-0,507	Influenced
Socio-Economic	M	4,450	4,687	-0,237	Influenced
Communication / Media	N	4,227	4,877	-0,650	Influenced
Scientific Information	O	4,744	4,282	0,461	Influencing



**Figure 3. Impact Diagram**

## CONCLUSION AND SUGGESTIONS

The DEMATEL method was employed in this research to determine the importance and priority order of fifteen elements identified as barriers in SLSC management, as well as to reveal the levels of influence among these elements.

The barriers in SLSC management, ranked according to their degree of importance, are as follows, following the stages and analyses of the DEMATEL method:

1. Strategies (I)
2. Price / Cost (H)
3. Economics / Finance (D)
4. Senior Management (C)
5. Institution / Corporate Culture / Change Management (B)
6. Operational (J)
7. Customers (F)
8. IT / Technology / Innovation (K)
9. Education / Expertise (G)
10. Labor Force (L)
11. Supply / Suppliers (E)
12. Laws / Standards / Regulation / Legislation (A)
13. Socio-economic (M)
14. Communication / Media (N)
15. Scientific Knowledge (O)

The barrier factors in SLSC management, ranked according to their levels of impact, are as follows: The order of "influencing" barriers in SMEs, from the most effective to the least effective, is as follows:

1. Laws / Standards / Regulation / Legislation (A)
2. Senior Management (C)
3. Education / Expertise (G)
4. Scientific Knowledge (O)
5. Economics / Finance (D)

Among the barrier criteria in SLSC management within SMEs, the order of barriers that are 'influenced' by other criteria is as follows:

1. Supply / Suppliers (E)
2. Communication / Media (N)
3. Operational (J)
4. Price / Cost (H)
5. Labor Force (L)
6. Customers (F)
7. Socio-economic (M)
8. Institution / Corporate Culture / Change Management
9. Strategies
10. IT / Technology / Innovation

The findings indicate that strategies are of paramount importance among the barriers to SLSC management in SMEs. The barrier factors in SLSC management have been examined from two perspectives: influencing and influenced. It has been determined that *Laws/Standards/Regulations/Legislation* is the most significant influencing factor, while *Supply/Suppliers* is identified as the most critical influenced factor. It is posited that the barriers to SLSC management identified in this study, along with the importance levels of these barriers, can serve as a guide for SMEs operating in Turkey. Accordingly, policymakers and practitioners should concentrate on these barrier criteria and take proactive measures in SLSC management. The following recommendations are proposed for policymakers:

1. Sustainability strategies and policies should be established prior to the implementation of SLSC initiatives in SMEs. Key performance indicators aligned with these strategies and policies should be determined, and sustainability efforts should be monitored using these indicators.
2. The lean and sustainability maturity levels of SMEs should be assessed. A development roadmap should be prepared based on these maturity levels, and the implementation of actions outlined in the roadmap should be mandatory. Studies on pricing should be conducted in conjunction with lean practices that enable SMEs to reduce costs while aligning with their business strategies. Lean initiatives that contribute to the 4Ps should be integrated throughout the supply chain.
3. Economic and financial support should be

provided to SMEs for the implementation of their sustainability strategies. In this regard, enterprises should be encouraged to focus on SLSC initiatives.

applications from their suppliers, and they should organize supplier development programs focused on sustainability and lean transformation.

4. Scientific research on SLSC should be enhanced, and researchers should be encouraged to engage with this subject.
5. The operational lean transformation of SMEs should be encouraged and supported, with operational processes designed according to the principles of the 4Ps in sustainability.
6. Processes within SMEs should be designed innovatively with a lean perspective, utilizing technology to reduce operational risks while effectively and efficiently using resources and labor. Existing workflows and manual process steps should be identified, and digital roadmaps should be developed.
7. The media should create content that emphasizes the importance of sustainability and lean transformation, communicate best practices to the broader society, and prioritize SLSC management as a critical issue.

The following recommendations are proposed for practitioners:

1. Stakeholders, such as professional chambers, should provide guidance to the senior management of SMEs on sustainability and offer information and training support regarding legal frameworks, legislation, and other relevant areas during the implementation of strategies.
2. Organizational development strategies should be formulated for corporate culture and change management in SMEs engaged in SLSC management. Training and consultancy services should be sought in this regard, with financial incentives provided for such services.
3. In the management of SLSC within SMEs, significant emphasis should be placed on laws, standards, regulations, and legislation.
4. Practical training on sustainability and lean practices should be disseminated to the workforce throughout the supply chain. Experts in sustainability and lean methodologies should be trained, and their numbers should be increased.
5. Customers should actively demand SLSC

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# Do Factors Affecting Firms' Cash Holdings Differ Across Sectors?: Evidence from Türkiye

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## ABSTRACT

This paper explores whether the factors influencing firms' cash holdings vary across different sectors, such as (i) basic materials, (ii) consumer cyclicals, (iii) consumer non-cyclicals, (iv) energy, (v) healthcare, (vi) industrials, (vii) real estate, (viii) technology, and (ix) utilities. Firm-level factors encompass market-to-book ratio, size, cash flow, net working capital, capital expenditures, leverage, cash flow volatility, R&D expenses, and dividend payment. External factors include periods of economic uncertainty, that is, times of financial crisis. The paper's dataset includes 385 firms listed on Borsa Istanbul, Türkiye and 4,375 firm-year observations from 2001 to 2022. Data analysis is conducted using the Driscoll-Kraay robust standard errors panel data estimation method, which ensures unbiased and consistent results despite heteroscedasticity, autocorrelation, and cross-sectional dependence. The findings indicate that variables such as cash flow, net working capital, capital expenditures, leverage, R&D expenses, and dividends are key determinants shaping cash holding behavior in firms within Türkiye as a developing country, regardless of the sector in which these firms operate. In times of economic uncertainty, firms tend to increase their cash reserves. Moreover, the impact of the firm size and market-to-book ratio on cash holding levels varies across different sectors. In conclusion, although some factors have a consistent impact across various sectors, sector-level analyses reveal unique characteristics and dynamics within each sector that shape the factors influencing firms' cash management strategies.

**Keywords:** Cash Holdings, Cash Reserves, Cash Management, Sectoral Differences, Panel Data Analysis.

**JEL Classification Codes:** G30, G31, C23

**Referencing Style:** APA 7

## INTRODUCTION

Businesses generate and develop all kinds of strategies to make profits and grow; however, how companies handle their existing cash and maintain it within the firm is an important consideration. Studying these aspects provides deeper insights into the internal and external operational processes of companies. The management of cash flow and the factors that determine cash reserves are critical for any company. These aspects vary across companies due to their unique characteristics and over time for different reasons.

In perfectly frictionless capital markets, the decision to hold cash is irrelevant, as companies can readily obtain funds at minimal costs, but the practical challenges and complexities encountered in real-world scenarios render these policies both relevant and insightful (Jia and McMahon, 2019). When aligning cash holding policies to the real world, extensive literature discusses various cash holding theories such as free cash flow and pecking

order, along with various motives, including transaction, precautionary, and speculative reasons, which often yield conflicting results and make it challenging to generalize about cash holding determinants (Aftab, Javid, & Akhter, 2018).

Numerous papers have explored the factors determining cash holdings (i.e., Gounopoulos and Zhang, 2024; Opler, Pinkowitz, Stulz, & Williamson, 1999; Seifert and Gonenc, 2018). In particular, the specific context of a firm's sector has emerged as a crucial determinant of its cash holding decisions (i.e., Fukuda, 2018; Lee, 2024; MacKay and Phillips, 2005; Schoubben and Hulle, 2012). For instance, MacKay and Phillips (2005) demonstrate that industrial differences significantly affect firms' financial structures and, consequently, their cash holding strategies. Moreover, in the literature, the factors influencing cash holdings have been investigated independently across different sectors, such as: basic materials (Widiastuti, 2023), energy (Zafar, 2021), healthcare and technology (Li and Luo, 2020), sports and leisure (Dimitropoulos and Koronios, 2021), and tourism

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and hospitality (Zhang and Gao, 2023). Consequently, understanding sector-specific cash holding patterns is essential for developing tailored cash management strategies that align with the unique financial demands of each sector.

This paper aims to explore the factors that determine cash holdings of firms across various sectors listed on Borsa Istanbul (BIST), Türkiye. It addresses a gap in the existing literature by examining and comparing the determinants of cash-holding levels across different sectors, highlighting both commonalities and distinctions, as well as the unique dynamics of each sector in influencing cash-holding decisions. This approach provides significant value by examining how internal factors influence cash holdings at both aggregate and sectoral levels. Additionally, studying changes in cash-holding behavior during uncertain times improves our understanding of how firms adapt in crises. By identifying factors shaping cash-holding behavior across sectors, the paper offers insights on how businesses can adjust their financial strategies to sector-specific dynamics, ensuring alignment with broader risk management objectives. Sector-specific dynamics like market competition and innovation intensity influence company-specific cash-holding needs, and firms must design financial strategies accordingly. Considering these factors helps businesses build resilience and maintain stability amidst uncertainty, ensuring sustained competitiveness.

We rely on firms the listed on BIST and use a dataset that includes 385 firms and 4,375 firm-year observations from 2001 to 2022. To identify the most appropriate estimation model for our dataset, we first conduct specification tests for panel data models. The next step is testing the empirical model for autocorrelation, heteroskedasticity, and cross-sectional dependence. To address these problems and ensure the consistency and accuracy of the results, the paper utilizes the Driscoll-Kraay robust standard errors method for panel data estimation. Driscoll-Kraay is robust toward problems such as autocorrelation and heteroskedasticity and delivers consistent estimates under the existence of cross-sectional dependencies (Hoechle, 2007). This approach ensures reliable results despite the aforementioned issues in the model's error terms.

The findings from the overall sample reveal that firms in Türkiye generally show increased cash holding levels with higher market-to-book ratios, cash flow, R&D expenditures, and dividends. In contrast, increased levels of working capital, capital expenditures, and leverage are generally associated with lower cash holdings. Moreover, the findings reveal that while certain factors impacting firms' cash holding strategies vary by sector, most of the

other factors exert a uniform influence, such as cash flow, net working capital, capital expenditures, leverage, R&D expenses, and dividends, on cash holding strategies across various sectors. Specifically, during a crisis period characterized by heightened economic uncertainties and risks, firms augmented their cash reserves to maintain operational activities and manage unforeseen expenses. This behavior signifies a strategy to mitigate liquidity risks amid crises. The rise in cash reserves during the pandemic illustrates firms' efforts to preserve financial stability and enhance operational flexibility. As a result, this paper makes significant contributions to the existing literature through an in-depth examination of the factors influencing cash holding behaviors and the variations across different sectors.

Following the introduction, the second section of the paper presents the conceptual framework and theoretical background. The third section outlines the research methodology and introduces the panel data analysis approach. In the fourth section, the results are presented and discussed in relation to existing literature. The fifth section offers key insights drawn from the research.

## LITERATURE REVIEW

Integrating effective cash management practices into a firm's strategy enhances its competitive edge. Firms with well-managed cash flows can invest in innovation, expand their market presence, and respond swiftly to competitive pressures. This financial agility creates a sustainable competitive advantage, enabling firms to outperform rivals and secure long-term success. Therefore, effective cash management is not merely a financial function but a strategic tool essential to driving a firm's overall success. Effective cash management enables not only the successful implementation of strategic actions but also adapts to the different challenges and opportunities arising in varied sectoral environments (MacKay and Phillips, 2005; Schoubben and Hulle, 2012). The characteristics of innovation and the level of market competition determine a firm's cash requirements and payment practices. The extent of innovation efficiency, intensity of competition, and structure of the sectors will influence the cash balance of the firms. Lyandres and Palazzo (2016) indicate that a firm's ideal level of cash reserves is influenced by the anticipated intensity of competitive pressures it faces within its respective industries. Additionally, Morellec, Nikolov, & Zucchi (2013) highlight that competition in the product market has a substantial influence on a company's decisions regarding cash reserves and financing strategies, leading to higher cash reserves and more frequent equity issues in highly competitive markets.

Schoubben and Hulle, (2012) argue that a firm's position within its sector and its competitive environment are significant factors influencing its cash holding decisions. Lee (2024) posits that firms facing industry-wide shocks are more likely to increase their cash reserves as a precautionary measure. This insight is based on research into asset sales and market liquidity, which sheds light on the economic mechanisms driving this phenomenon. Fukuda (2018) suggests that cash holding ratios differ not only based on firm-specific characteristics but also across various sectors. For instance, the research indicates that service industries tend to have higher cash holding ratios. This trend may be attributed to the labor-intensive nature of these industries, which necessitates maintaining substantial working capital to cover employees salaries. This consistent requirement for liquidity ensures that firms can meet payroll obligations without interruption, thus maintaining operational stability.

MacKay and Phillips (2005) show that industrial differences significantly affect firms' financial structures and, consequently, their cash holding strategies. According to researchers, firms shape their financial structures and cash management strategies based on the dynamics of the sector they operate in. Lee (2024) supposes that literature examines how sectoral dynamics influence financial policy and finds that a firm's strategies, including those related to cash holdings, are shaped by its interactions with other companies in its industry. The researcher also mentions that companies facing high product market competition and increased industry cash-flow volatility, reflecting the general risk level of the sector, tend to have higher cash balances. These companies increase their cash reserves to mitigate predation risk.

In sum, sector-specific dynamics may be key determinants of firms' cash management practices and their general operational efficiency. For instance, an entity operating in a very competitive sector could face pricing pressures that squeeze its profit margins, possibly resulting in lower cash flow and hence a run-down in its cash holding. In the same way, technological changes or supply chain disturbances of any sector may result in facing cash flow problems and even complicate cash management. The explanation of these factors within a cash management framework is crucial for the structuring of adequate strategies. Competition intensity in a sector, technological progress, regulation frameworks, and other elements about specific sectors can have a significant influence on cash flows in a company and even lead to liquidity risks.

## METHODOLOGY

### Sample and Variables

In this paper, the determinants of cash holding behaviors across various sectors are analyzed utilizing financial statement data. The data, which encompass firms from nine distinct sectors excluding the financial sector, are sourced from the LSEG Eikon database. Sectoral classifications are conducted in accordance with the LSEG The Reference Data Business Classification (TRBC). The companies are classified into the following sectors: (i) basic materials, (ii) consumer cyclicals, (iii) consumer non-cyclicals, (iv) energy, (v) healthcare, (vi) industrials, (vii) real estate, (viii) technology, and (ix) utilities. After excluding observations with missing data, it comprises a total of 385 firms and 4,375 firm-year observations for the period from 2001 to 2022. To minimize the influence of outliers, each variable is winsorized at the 5th percentile for lower outliers and at the 95th percentile for upper outliers. The detailed definitions of the variables used in the paper are shown in Table 1.

**Table 1:** Variables Definitions

Variables	Definitions
CASH	Cash Ratio = Cash and Cash Equivalents / Total Assets
MB	Market-to-Book Ratio = (Total Assets - Equity + Market Value) / Total Assets
SIZE	Size = Natural logarithm of total assets
CASH FLOW	Cash Flow = (Net income + Depreciation) / Total Assets
NWC	Net Working Capital = (Current Assets – Cash and Cash Equivalents – Short Term Liabilities) / Total Assets
CAPEX	Capital Expenditures = Capital Expenditures / Total Assets
LEVERAGE	Leverage = Total Liabilities / Total Assets
CF_VOL	Cash Flow Volatility = The absolute difference between the percentage change in CASH FLOW from the previous year and the average of this change by firm
R&D	R&D Investment Ratio = Research and Development Expenses / Total Sales
DIVIDEND	Dividend Status = 1 for firms paying cash dividends, 0 otherwise
CRISIS_2008	Global Financial Crisis Indicator = 1 for the year 2008, 0 for other years
CRISIS_COVID	Pandemic Crisis Indicator = 1 for the years 2020 and 2021, 0 for other years

### Descriptive Statistics

Table 2 presents the changes in the number of observations and mean of cash over the years. There is a consistent upward trend in the number of observations from 2001 (12 observations) to 2022 (351 observations). This steady growth indicates an expanding market presence. The cash mean values exhibit some fluctuations over the years: In the early 2000s, the cash mean hovers around 0.1. A noticeable increase occurs in 2020, with the cash mean reaching 0.130, followed by 0.140 in 2021. The significant rise in cash mean, particularly after 2019, could suggest a response to economic uncertainties, increased market volatility, or a strategic shift towards higher liquidity for risk management. This steady increase indicates a substantial change in cash holding behavior among businesses.

Table 3 presents the sample distribution by sectors. The majority of observations are from the consumer cyclicals sector (26.6%), followed by basic materials (20.3%) and consumer non-cyclicals (14.1%). Sectors such as energy and healthcare have fewer observations, with 2.67% and 2.00% respectively. However, the energy sector has the highest average cash percentage at 0.182. The healthcare sector follows with an average cash percentage of 0.132. Consumer cyclicals and consumer non-cyclicals sectors have the lowest cash means at 0.087 and 0.078 respectively. This data suggests that while some sectors have a larger sample size, others, though smaller in sample size, might have higher average cash holdings. This distribution highlights the need to understand sector-specific financial characteristics and liquidity preferences.

Table 4 presents the mean, standard deviation, median, and other statistical metrics for the variables, providing a comprehensive overview of the financial standing of the sample firms. The average cash ratio is 0.104, suggesting that, on average, firms maintain approximately 10% of their assets in cash. The average MB ratio is 1.485, suggesting that firms are generally valued above their book value by the market. The average firm size is 19.93, with a wide range (16.42 to 23.05) demonstrating heterogeneity in firm sizes. The mean cash flow ratio is 8%, which reveals that while some firms incur cash outflow (with a minimum value of -8.7%), others report significantly high cash inflow ratios. The average net working capital is 6.3%. The range from -24.7% to 41.0% shows that some firms have negative working capital, indicating they might be using liabilities to finance their operations. The average investment rate is 4.6%, indicating that firms typically allocate a small portion of their assets to investments. Firms with

**Table 2.** Sample Distribution by Years

Years	Number of Obs.	%	CASH Mean
2001	12	0.27	0.196
2002	28	0.64	0.108
2003	54	1.23	0.086
2004	61	1.39	0.079
2005	156	3.57	0.093
2006	167	3.82	0.095
2007	169	3.86	0.099
2008	169	3.86	0.097
2009	172	3.93	0.107
2010	185	4.23	0.111
2011	202	4.62	0.108
2012	230	5.26	0.096
2013	245	5.6	0.096
2014	257	5.87	0.096
2015	261	5.97	0.103
2016	261	5.97	0.083
2017	263	6.01	0.085
2018	269	6.15	0.089
2019	271	6.19	0.101
2020	275	6.29	0.131
2021	317	7.25	0.140
2022	351	8.02	0.127

**Table 3.** Sample Distribution by Sectors

Years	Number of Obs.	%	CASH Mean
Basic Materials	892	20.39	0.110
Consumer Cyclicals	1,164	26.61	0.087
Consumer Non-Cyclicals	620	14.17	0.078
Energy	117	2.67	0.182
Healthcare	88	2.01	0.132
Industrials	644	14.72	0.121
Real Estate	434	9.92	0.104
Technology	270	6.17	0.155
Utilities	146	3.34	0.073

higher investments might hold less cash. The average leverage ratio is 21%, indicating a preference among firms for using other sources over debt. The average cash flow volatility is 2.040, with a high standard deviation indicating significant differences in cash flow volatility across firms. Additionally, research and development expenditures are notably low, with an average of 0.2%, highlighting that most firms dedicate minimal resources to R&D. The average dividend is 37.1%, with a median of zero, suggesting that many firms do not pay dividends.



**Table 4.** Descriptive Statistics

Variables	Number of Obs.	Mean	St. Deviation	Median	Minimum	Maximum
CASH	4,375	0.104	0.108	0.066	0.001	0.393
MB	4,375	1.485	0.838	1.197	0.583	3.798
SIZE	4,375	19.93	1.75	19.80	16.42	23.05
CASH FLOW	4,375	0.086	0.102	0.071	-0.087	0.380
NWC	4,375	0.063	0.171	0.046	-0.247	0.410
CAPEX	4,375	0.046	0.049	0.030	0.000	0.189
LEVERAGE	4,375	0.208	0.179	0.179	0.000	0.579
CF_VOL	4,375	2.040	2.711	0.983	0.065	10.72
R&D	4,375	0.002	0.004	0.000	0.000	0.017
DIVIDEND	4,375	0.371	0.483	0.000	0.000	1.000

**Table 5.** Correlation Matrix

	1	2	3	4	5	6	7	8	9	10	
CASH	<b>1</b>	1.00									
MB	<b>2</b>	0.22***	1.00								
SIZE	<b>3</b>	0.12***	-0.10	1.00							
CASH FLOW	<b>4</b>	0.35***	0.33***	0.18***	1.00						
NWC	<b>5</b>	-0.05***	0.04**	-0.27***	0.18***	1.00					
CAPEX	<b>6</b>	0.01	0.18***	0.07**	0.17***	-0.09***	1.00				
LEVERAGE	<b>7</b>	-0.23***	-0.14***	0.22***	-0.32***	-0.38***	0.14***	1.00			
CF_VOL	<b>8</b>	-0.11***	-0.06***	-0.16***	-0.15***	-0.04***	-0.04***	0.05***	1.00		
R&D	<b>9</b>	0.08***	0.03***	0.03*	0.11***	0.12***	0.10***	-0.07***	-0.09***	1.00	
DIVIDEND	<b>10</b>	0.19***	0.03***	0.33***	0.27***	0.05***	0.05*	-0.11***	-0.25***	-0.01	1.00

\*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

Table 5 presents the pairwise correlation coefficients among the variables. Upon examining the relationship between the dependent variable (cash) and the independent variables, it is observed that cash exhibits a positive and significant correlation with MB, size, cash flow, dividend payments, and R&D. This implies that an increase in these variables corresponds to an increase in cash holdings. Conversely, cash demonstrates a negative and statistically significant correlation with leverage, net working capital, and cash flow volatility, suggesting that increases in these variables are linked to a reduction in cash holdings. The correlation coefficient between capital expenditures and cash is not statistically significant, indicating no meaningful relationship between these two variables. Finally, since there is no high correlation coefficient ( $\pm 0.50$ ) among the independent variables, concerns regarding multicollinearity, a potential issue in multivariate analyses, are not present.

### Econometric Approach

To analyze the determinants of cash holdings among firms listed on BIST across different sectors, the paper incorporates the variables used by Opler et al. (1999). In their seminal work, Opler et al. (1999) analyze the factors that determine corporate cash holdings. Drawing upon established theoretical models like transaction costs, information asymmetries, agency costs, financing hierarchy theory, and precautionary motives, the study provides empirical evidence that variables such as the market-to-book ratio, size, cash flow, net working capital, capital expenditures, leverage, cash flow volatility, R&D expenses, and dividend payment significantly influence corporate cash holding decisions. Following Opler et al. (1999), these variables are incorporated into the empirical model as firm-level determinants of cash reserves. Furthermore, the model also considers crises as a key factor influencing corporate cash holding decisions. To achieve this, dummy variables representing specific crisis periods, such as the 2008 global financial crisis

and the COVID-19 crisis, have been incorporated. These variables are coded as 1 during crisis years and 0 in non-crisis years. Financial crises typically create environments of increased uncertainty, restricted access to capital markets, and a heightened precautionary stance among firms. Therefore, during such crises, companies are expected to hold more cash (Lozano and Yaman, 2020). By adding these dummy variables, the model not only facilitates the analysis of the impact of financial crises but also allows for a more precise evaluation of the influence of other determinants, addressing a significant gap identified in the study by Opler et al. (1999).

The model is as follows:

$$CASH_{it} = \alpha + \beta_1 MB_{it} + \beta_2 SIZE_{it} + \beta_3 CASH\ FLOW_{it} + \beta_4 NWC_{it} + \beta_5 CAPEX_{it} \\ + \beta_6 LEVERAGE_{it} + \beta_7 CF\_VOL_{it} + \beta_8 R\&D_{it} + \beta_9 DIVIDEND_{it} \\ + \beta_{10} CRISIS\_2008_{it} + \beta_{11} CRISIS\_COVID_{it} + \varepsilon_{it}$$

In the model, the indices  $i$  and  $t$  represent firms and years, respectively.  $\varepsilon_{it}$  is the error term. The detailed definitions of model variables are shown in Table 1.

The data are analyzed using panel data analysis. Panel data analysis involves the simultaneous examination of cross-sectional observations (countries, regions, firms, etc.) and time series data. In panel data analysis, it is crucial to first determine whether to use the classical-pooled model, random effects model, or fixed effects model. As in other econometric models, assumptions about the error terms are essential for the interpretation of regression coefficients in panel data analysis. This method considers deviations associated with both time series and cross-sectional analyses.

Tables 6 and 7 provide the results of the estimation model determination tests and the validity of the underlying assumptions tests conducted on the full sample, without sector-specific analyses. Given the comparison of the significance and direction of the coefficients for the independent variables in the research model across different sector samples, it is deemed more appropriate to apply the estimation model and robust standard errors method identified from the findings in Tables 6 and 7 consistently across all sub-samples.

Table 6 presents the test statistics applied to determine the most suitable panel data model for the dataset. The results of the F (Chow) test indicate that fixed effects are significant in this model, with an F value of 10.51 and a p-value of 0.000. The Breusch-Pagan LM Test, which examines the presence of random effects in the model, shows that random effects could be significant in the model, with an  $\chi^2$  value of 5746 and a p-value of 0.000. However, the Hausman test results indicate that the fixed

effects model is more suitable than the random effects model, with a  $\chi^2$  value of 71.7 and a p-value of 0.000.

Table 7 presents the results of tests conducted to assess the validity of the assumptions underlying the fixed effects panel data estimation model. Wooldridge Panel Data Autocorrelation Test reveals the presence of autocorrelation within the model, with an F value of 156.98 and a p-value of 0.000. The Modified Wald Test indicates that there is heteroscedasticity problem in the model, with a  $\chi^2$  value of 4.0e+34 and a p-value of 0.000. Furthermore, the Pesaran Cross-Sectional Dependence Test reveals the presence of dependence amongst residuals of cross-sectional units, showing cross-sectional dependence, with a CD value of 376.7 and a p-value of 0.000. Overall, these tests show the presence of cross-sectional dependence, heteroskedasticity, and autocorrelation. Using the Driscoll-Kraay robust standard errors technique corrects these problems and retrieves unbiased and consistent estimators. Hoechle (2007) pointed out that the method of Driscoll-Kraay adjusts the estimated standard errors by considering cross-sectional dependence, heteroskedasticity, and autocorrelation. The standard errors of the estimated regression coefficients are thus calculated in a more reliable manner, whereby this enhances the robustness and reliability of the analysis results.

Consequently, the data analysis is conducted using a fixed effects panel data estimation model, and the standard errors are adjusted by the Driscoll-Kraay method, which is robust to potential issues of cross-sectional dependence, heteroskedasticity, and autocorrelation.

## FINDINGS

The first column of Table 8 includes all publicly traded non-financial sector firms without sectoral differentiation. Subsequently, panel data analysis is conducted on sub-samples of firms across different sectors.

Initially, the coefficient estimates of the variables within the full sample are discussed as follows to ascertain whether the results align with theoretical expectations and prior research findings:

*Market-to-Book Ratio:* The coefficient for the *MB* variable is 0.003, with a t-statistic of 1.94. This coefficient indicates that as the market value/book value ratio increases, firms tend to hold more cash. This implies that firms with higher market value/book value ratios prefer to maintain larger cash reserves, potentially for future investment opportunities or operational needs. Opler et al. (1999) argue that higher market-to-book ratios lead to

**Table 6.** Panel Data Estimation Model Determination Tests

Test	F-Value	P> z	$\chi^2$	P> z	$\chi^2$	P> z	Decision
F (Chow) Test	10.51	0.000					Fixed Effect
Breusch-Pagan LM Test			5746	0.000			Random Effect
Hausman Test					71.70	0.000	Fixed Effect

**Table 7.** Test of Assumptions of Fixed Effects Panel Data Estimation Model

Test	F-Value	P> z	$\chi^2$	P> z	CD Value	P> z
Wooldridge Panel Data Autocorrelation Test	156.98	0.000				
Modified Wald Test for Heteroscedasticity			4.0e+34	0.000		
Pesaran Cross-Sectional Dependence Test					376.7	0.000

larger cash reserves due to higher potential costs from financial distress. Additionally, these firms' significant and intermittent investment activities necessitate maintaining larger cash reserves to cover these expenditures. This finding is consistent with previous studies (Gounopoulos and Zhang, 2024; Opler et al., 1999; Ozkan and Ozkan, 2004).

*Size:* The coefficient for the *SIZE* variable is -0.002, with a t-statistic of -0.93. The coefficient is not statistically significant; however, it exhibits a negative sign. It is frequently noted in the literature that larger firms generally have access to more resources, leading to lower cash holding ratios (Gounopoulos and Zhang, 2024; Opler et al., 1999; Seifert and Gonenc, 2018).

*Cash Flow:* The coefficient for the *CASH FLOW* variable is 0.185, with a t-statistic of 11.56. This coefficient indicates that as a firm's cash flow increases, its cash holding ratio also increases. Companies with strong cash flow generally keep larger cash reserves to improve their liquidity and take advantage of unexpected opportunities. Additionally, they may allocate more cash for investment and operational needs. This finding is consistent with prior studies (Gounopoulos and Zhang, 2024; Seifert and Gonenc, 2018; Opler et al., 1999).

*Net Working Capital:* The coefficient for the *NWC* variable is -0.157, with a t-statistic of -12.65. This finding indicates that an increase in working capital leads to a decrease in the cash holding ratio. Higher working capital implies that firms may need to hold less cash to meet operational needs (Dimitropoulos and Koronios, 2021). This finding is consistent with prior research (Gounopoulos and Zhang, 2024; Seifert and Gonenc, 2018; Opler et al., 1999).

*Capital Expenditures:* The coefficient for the *CAPEX* variable is -0.159, with a t-statistic of -4.10. This finding indicates that an increase in capital expenditures results in a reduction of the cash holding ratio. Capital expenditure pertains to the allocation of financial resources for the acquisition of fixed assets. This allocation can diminish the liquidity position of a corporation. This finding is consistent with previous research (Gounopoulos and Zhang, 2024; Seifert and Gonenc, 2018).

*Leverage:* The coefficient for the *LEVERAGE* variable is -0.092, with a t-statistic of -6.63. This finding indicates that an increase in leverage results in a reduction of the cash holding ratio. Firms with high leverage ratios generally hold less cash to meet their debt obligations. Moreover, firms may rely on alternatives such as borrowing to manage cash shortfalls, as leverage indicates their debt issuance capability. Higher debt financing increases the cost of liquidity investments, leading to reduced cash holdings (Ozkan and Ozkan, 2004). This implies that leverage negatively affects cash holdings aligning with previous studies (Gounopoulos and Zhang, 2024; Opler et al., 1999; Seifert and Gonenc, 2018).

*Cash Flow Volatility:* The coefficient for the *CF\_VOL* variable is -0.000, with a t-statistic of -0.55. The coefficient is not statistically significant. Opler et al. (1999), Ozkan and Ozkan (2004), and Seifert and Gonenc (2018) determined that cash flow volatility has a positive effect on cash holdings. Currently, there is no empirical evidence to support the claim that Turkish firms with more volatile cash flows hold higher levels of cash reserves.

*R&D Investment Ratio:* The coefficient for the *R&D* variable is 0.618, with a t-statistic of 2.59. This coefficient indicates that as a firm's R&D spending increases, its cash holding ratio also increases. Opler et al. (1999) argue that firms with significant R&D expenses are expected to have higher financial distress costs due to information asymmetries, as a result, these firms are likely to hold more liquid assets. This finding is consistent with prior studies (Seifert and Gonenc, 2018; Opler et al., 1999).

*Dividend Status:* The coefficient for the *DIVIDEND* variable is 0.015, with a t-statistic of 2.11. This coefficient suggests that firms distributing dividends possess greater cash holdings compared to their non-dividend-paying counterparts. This could indicate that dividend-paying companies are either in more robust financial positions or are adopting a more conservative approach to cash management. A study by Jia and McMahon (2019) suggested that higher dividend payouts lead firms to retain more cash, which aligns with the precautionary motive for maintaining cash reserves. However, this finding is not aligned with some prior studies (Seifert and Gonenc, 2018; Opler et al., 1999).

*Crises:* The coefficient for the *CRISIS\_2008* variable is 0.002, with a t-statistic of 0.64, indicating no significant effect on the cash holding ratio. While the coefficient for the *CRISIS\_COVID* variable is 0.023, with a t-statistic of 7.84, indicating that the COVID-19 crisis led to an increase in the cash holding ratio. Uncertainty compels firms to augment their cash reserves as a precautionary strategy, ensuring sufficient liquidity to support continuous operations and sustain investments (Lozano and Yaman, 2020). This finding is consistent with previous studies (Lozano and Yaman, 2020).

Afterwards, Table 9 is constructed to facilitate a more granular analysis of the sectoral variations initially presented in Table 8. Table 9 provides a comprehensive overview of the findings from the full sample and individual sectors. As illustrated in the table, the factors affecting cash holding levels exhibit some variation across sectors. The economic significance of certain variables shifts from positive to negative or vice versa, while the statistical significance of other variables changes from significant to insignificant or vice versa, when compared to the overall sample and findings from previous studies. This variation underscores the dynamics and market conditions of each sector and their influence on firms' cash management strategies. The most notable findings can be explained as follows:

*Firstly*, the market-to-book value of assets serves as an indicator of future investment opportunities. When these opportunities are projected to be profitable, companies are inclined to increase their cash reserves to fulfill forthcoming investment requirements (Purnamasari and Fitdiarini, 2016). Consequently, a positive impact on cash holdings is anticipated. However, unlike this expectation, the market-to-book ratio negatively affects cash holdings in the consumer non-cyclical, healthcare, technology and utilities sectors. In other sectors, this effect is either positive or statistically insignificant. Li and Luo (2020) posit that companies within the healthcare and technology sectors encounter heightened industry competition, leading to a substantial increase in their investments in new products and services to enhance their competitive edge. In these sectors, firms invest their cash reserves in remaining competitive in a highly competitive environment. When the market-to-book value increases, firms may be less enthusiastic about holding more cash reserves and prefer to use such resources to increase their edge above competitors rather than wait for another possible investment in the future. Furthermore, firms with higher growth opportunities in consumer non-cyclical and utility sectors may be able to benefit from economies of scale and superior access to capital, explaining the negative relation.

*Secondly*, in the full-sample analysis, it is observed that the size of a firm does not have a statistically significant impact on its cash holding levels in Türkiye. Literature often relates to the argument that larger firms usually enjoy more resources and, thus, have lower cash holding ratios. This pattern is observed specifically in the real estate and utilities sectors. Consequently, it can be inferred that financial institutions in Türkiye alleviate the cash holding requirements for large firms, particularly in these sectors, by providing easier access to financing. In contrast, firm size significantly positively impacts cash holdings in the consumer non-cyclical, energy, and technology sectors. The free cash flow hypothesis can be utilized to support this relationship in the sense that dispersed ownership in large firms enhances managerial discretion; thus, the accumulation of substantial cash holdings is viable (Aftab et al., 2018). Further, since the consumer non-cyclical sector is non-cyclical and is known to maintain steady cash inflow, companies in this sector can easily maintain big cash balances. Similarly, the capital-intensive nature of the energy sector and the rapid innovation cycles within the technology sector require significant liquidity to address operational demands and fund new initiatives.

**Table 8.** Panel Data Analysis Results

Variables	Full Sample	Basic Materials	Consumer Cyclicals	Consumer Non-Cyc.	Energy	Healthcare	Industrials	Real Estate	Technology	Utilities
MB	0.003 <sup>*</sup> (1.94)	0.001 (0.18)	0.016 <sup>***</sup> (4.00)	-0.022 <sup>**</sup> (-2.60)	0.020 <sup>*</sup> (1.90)	-0.018 <sup>*</sup> (-1.82)	-0.002 (-0.37)	0.006 (1.12)	-0.031 <sup>***</sup> (-3.29)	-0.014 <sup>**</sup> (-2.51)
SIZE	-0.002 (-0.93)	-0.004 (-1.00)	-0.002 (-0.46)	0.019 <sup>***</sup> (6.09)	0.050 <sup>***</sup> (2.93)	0.004 (0.30)	0.005 (1.16)	-0.039 <sup>***</sup> (-7.57)	0.006 <sup>*</sup> (1.86)	-0.010 <sup>*</sup> (-1.85)
CASH FLOW	0.185 <sup>***</sup> (11.56)	0.284 <sup>***</sup> (8.51)	0.184 <sup>***</sup> (3.72)	0.233 <sup>***</sup> (8.37)	-0.040 (-0.41)	0.264 <sup>**</sup> (2.46)	0.256 <sup>***</sup> (3.87)	0.151 <sup>***</sup> (5.77)	0.187 <sup>**</sup> (2.68)	0.305 <sup>***</sup> (3.36)
NWC	-0.157 <sup>***</sup> (-12.65)	-0.218 <sup>***</sup> (-4.90)	-0.188 <sup>***</sup> (-4.35)	-0.099 <sup>***</sup> (-4.81)	-0.079 (-0.77)	-0.352 <sup>***</sup> (-5.88)	-0.108 <sup>***</sup> (-6.13)	-0.132 <sup>***</sup> (-4.69)	-0.263 <sup>***</sup> (-5.35)	-0.173 <sup>**</sup> (-2.48)
CAPEX	-0.159 <sup>***</sup> (-4.10)	-0.176 <sup>***</sup> (-3.79)	-0.207 <sup>***</sup> (-7.93)	-0.072 (-1.02)	-0.174 (-0.61)	-0.168 <sup>*</sup> (-2.01)	-0.054 (-1.25)	-0.306 (-1.35)	-0.385 (-0.93)	0.065 (1.01)
LEVERAGE	-0.092 <sup>***</sup> (-6.63)	-0.125 <sup>***</sup> (-4.22)	-0.110 <sup>**</sup> (-2.68)	-0.027 (-1.55)	-0.153 <sup>**</sup> (-2.16)	-0.084 (-0.61)	-0.049 <sup>*</sup> (-1.96)	-0.062 <sup>***</sup> (-3.05)	-0.228 <sup>***</sup> (-5.28)	-0.042 (-0.88)
CF_VOL	-0.000 (-0.55)	-0.001 (-1.50)	-0.001 (-1.25)	-0.000 (-0.25)	0.005 (1.47)	-0.003 (-0.65)	0.003 (1.55)	0.002 <sup>***</sup> (3.54)	-0.003 <sup>**</sup> (-2.17)	-0.000 (-0.40)
R&D	0.618 <sup>**</sup> (2.59)	3.306 <sup>**</sup> (2.77)	-1.664 <sup>***</sup> (-3.61)	2.173 <sup>**</sup> (2.65)	6.238 <sup>*</sup> (1.79)	-1.814 (-0.66)	1.169 <sup>*</sup> (2.07)	16.582 <sup>**</sup> (2.80)	0.191 (0.20)	-21.430 (-1.01)
DIVIDEND	0.015 <sup>**</sup> (2.11)	0.023 (1.35)	-0.004 <sup>*</sup> (-1.73)	0.019 (1.50)	0.029 (1.54)	0.039 <sup>*</sup> (1.99)	0.007 (0.45)	0.015 <sup>*</sup> (1.76)	0.010 (1.00)	0.026 <sup>**</sup> (2.51)
CRISIS_2008	0.002 (0.64)	-0.001 (-0.26)	0.010 <sup>*</sup> (1.86)	0.001 (0.23)	0.023 (1.66)	0.023 <sup>*</sup> (1.81)	-0.006 (-0.75)	0.036 <sup>***</sup> (6.22)	-0.044 <sup>***</sup> (-6.55)	-0.000 (-0.01)
CRISIS_COV-ID	0.023 <sup>***</sup> (7.84)	0.026 <sup>***</sup> (4.24)	0.020 <sup>***</sup> (3.93)	0.032 <sup>***</sup> (5.25)	0.014 (1.41)	0.019 <sup>**</sup> (2.23)	0.015 <sup>***</sup> (3.67)	0.024 <sup>***</sup> (8.63)	0.014 <sup>***</sup> (3.46)	0.012 (1.70)
Intercept	0.159 <sup>***</sup> (2.97)	0.191 <sup>**</sup> (2.32)	0.135 <sup>*</sup> (1.72)	-0.288 <sup>***</sup> (-4.80)	-0.925 <sup>**</sup> (-2.64)	0.086 (0.34)	0.013 (0.14)	0.867 <sup>***</sup> (8.43)	0.151 <sup>*</sup> (1.95)	0.265 <sup>**</sup> (2.29)
Number of Obs.	4,375	892	1,164	620	117	88	644	434	270	146
Number of Firms	385	71	95	49	12	12	59	41	27	19
R <sup>2</sup> Value	0.564	0.545	0.543	0.522	0.697	0.638	0.580	0.619	0.615	0.569
F-Value	309.4	395.9	695	84.18	116.6	67.64	60.62	88.85	94.22	18.21

*t*-statistics are in parentheses. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$



**Table 9.** Summary of Analysis Results by Sectors

	Full Sample	Basic Materials	Consumer Cyclicals	Consumer Non-Cyc.	Energy	Healthcare	Industrials	Real Estate	Technology	Utilities
MB	+	Ø	+	-	+	-	Ø	Ø	-	-
SIZE	Ø	Ø	Ø	+	+	Ø	Ø	-	+	-
CASH FLOW	+	+	+	+	Ø	+	+	+	+	+
NWC	-	-	-	-	Ø	-	-	-	-	-
CAPEX	-	-	-	Ø	Ø	-	Ø	Ø	Ø	Ø
LEVERAGE	-	-	-	Ø	-	Ø	-	-	-	Ø
CF_VOL	Ø	Ø	Ø	Ø	Ø	Ø	Ø	+	-	Ø
R&D	+	+	-	+	+	Ø	+	+	Ø	Ø
DIVIDEND	+	Ø	-	Ø	Ø	+	Ø	+	Ø	+
CRISIS_2008	Ø	Ø	+	Ø	Ø	+	Ø	+	-	Ø
CRISIS_COVID	+	+	+	+	Ø	+	+	+	+	Ø

*+: significant and positive effect, - significant and negative effect, and Ø nonsignificant effect*

Thirdly, the remaining nuanced differences across sectors can be summarized as follows: firms in the consumer cyclical experience a reduction in cash holdings, due to higher R&D expenditures. Similarly, paying dividends depletes cash and might lead to a lack of liquidity in the majority of other operational requirements. These factors may indicate that companies in this sector may encounter difficulties in maintaining adequate cash levels when investing in R&D and paying out dividends. Additionally, firms in the technology sector experienced a reduction in cash levels during the 2008 global financial crisis. This decline in cash reserves was likely influenced by decreased consumer spending and the need for continued investment in innovation, despite the economic downturn.

Finally, factors such as cash flow, net working capital, capital expenditures, leverage, R&D, dividends, and crises tend to demonstrate almost similar patterns statistically and economically across different sectors.

In conclusion, this paper reveals several key insights into the determinants of cash holding behavior in Turkish firms, as a developing economy status. These results across different sectors underscore the importance of sector-specific factors when testing firm-level determinants of cash holdings. Nonetheless, while certain factors influencing firms' cash holding strategies may vary across sectors, many others exert a consistent influence regardless of the sector. Specifically, variables such as cash flow, net working capital,

capital expenditures, leverage, R&D, and dividends should be recognized as the primary determinants of cash holding behavior in Turkish firms. These findings are consistent with the broader literature (i.e., Dimitropoulos and Koronios, 2021; Gounopoulos and Zhang, 2024; Lozano and Yaman, 2020; Opler et al., 1999; Ozkan and Ozkan, 2004; Seifert and Gonenc, 2018) which identifies a similar set of variables – as significant drivers of corporate cash holding decisions. Furthermore, results confirm that firms in the Turkish market tend to increase their cash reserves during periods of economic uncertainty, aligning with the theoretical understanding of cash as a precautionary buffer against unexpected shocks.

However, while these core factors exert an almost uniform influence across sectors, the above-mentioned variations highlight the importance of nuanced, sector-level analysis. This observation is in agreement with previous studies that emphasize the importance of sector context in cash management. For instance, MacKay and Phillips (2005) argue that industry-specific dynamics are pivotal in shaping firms' financial structures and cash management strategies. Similarly, Schoubben and Hulle (2012) highlight the role of a firm's industry position and competitive landscape in determining cash holding behavior. The paper's findings lend further credence to these arguments, suggesting that while some drivers are universal, their impact can be moderated by sector-specific characteristics.

The connection between competition and cash holdings, supported by various studies, also offers further insight. Lyandres and Palazzo (2016) propose that competitive pressures directly affect a firm's optimal level of cash reserves. This is reinforced by Morellec et al. (2013), who find that increased market competition typically leads to larger cash reserves and a higher frequency of equity issuances. Furthermore, Fukuda (2018) points out the sectoral diversity in cash holding patterns, with labor-intensive service industries often holding more cash to secure operational stability. This point is important to consider in the analysis of the sector specific nature of the findings in the research. In addition to the competition aspect, disruptions within an industry are another important factor to consider. Lee (2024) notes that firms faced with industry-wide disruptions often respond by increasing their cash reserves as a protective action. Taken together, the existing literature and current findings of this paper indicate that cash holding practices may be influenced by a complicated interaction between financial considerations, sector dynamics, competitive conditions, and operational needs.

## CONCLUSION

Effective cash management is essential for implementing strategic initiatives and navigating sector-specific challenges and opportunities. This study examined the factors influencing cash reserves among firms across different sectors in Borsa Istanbul, Türkiye. The results reveal that the characteristics of firms are pivotal in determining their cash holding decisions. These findings align with existing research in literature.

The findings from the overall sample reveal that firms in Türkiye generally show increased cash holding levels with higher market-to-book ratios, cash flow, R&D expenditures, and dividend. Conversely, increases in working capital, capital expenditures, and leverage are associated with lower cash holding levels. More specifically, a high M/B ratio indicates a firm is valued highly in the market, prompting these firms to increase cash reserves to maintain investor confidence and seize opportunities. Cash flow tends to lead to larger cash reserves, which can be used to seize future investment opportunities and safeguard against financial uncertainties. High working capital enhances a firm's ability to finance daily operations, minimizing cash needs. Capital expenditures allow firms to channel their cash reserves into long-term growth and investment opportunities, lowering cash holding levels. Firms characterized by substantial leverage allocate their available cash primarily towards debt repayment, resulting in diminished cash reserves. As a firm's R&D expenditures rise, it tends to increase cash

reserves to alienate the financial distress costs that arise from information asymmetries. Dividend-payers maintain higher cash reserves compared to non-payers, which can likely be attributed to their stronger financial positions or more conservative cash management strategies, indicative of a precautionary motive. Lastly, firms increased their cash reserves during the economic uncertainty.

The findings derived from sectoral differences emphasize the variability of factors influencing cash holdings across various sectors. Key findings include the market-to-book value of assets having a negative impact on cash holdings in sectors like consumer non-cyclical, healthcare, technology, and utilities. It is attributed to heightened competition in healthcare and technology sectors, where firms prefer investing in competitive advantages rather than holding cash. Firms within the consumer non-cyclical and utilities sectors that possess growth opportunities may leverage economies of scale and improved access to capital, which could account for the observed negative relationship. Firm size shows no significant impact on cash holdings in the overall sample, but sector-specific trends reveal lower cash reserves in larger firms, particularly in real estate and utilities, due to possible easier financing access. Conversely, larger firms in consumer non-cyclical, energy, and technology sectors maintain higher cash reserves due to stability, capital intensity, and innovation needs, respectively. The impacts of cash flow, R&D, Dividend, and crises on cash holdings almost remain positive and consistent across sectors. In a similar vein, the variables of working capital, capital expenditures, and leverage generally exert a negative influence on cash holdings across various sectors.

Finally, the objective of this paper is to enhance comprehension of the determinants and sectoral distinctions in cash-holding practices. The findings offer fresh insights into how firms in diverse sectors manage their cash reserves, highlighting the importance of considering sector-specific factors in such analyses. These variations emphasize that cash management strategies must be adapted to the unique characteristics and risk profiles of each sector to support firms' sustainable growth and financial stability. Understanding these differences provides valuable guidance for financial managers and investors, enabling them to make more informed and effective decisions.

Future research that explores how macroeconomic factors influence cash holdings across different sectors will enhance our understanding of cash management dynamics. A comparable paper could also explore whether the factors influencing firms' cash holdings vary across different countries.

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# Exploring the Impact of Globalization, Economic Complexity, Urbanization, and Real Income on Environmental Degradation in E-7 Countries

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## ABSTRACT

Current society has been centered on the edge of calamity induced by environmental degradation. Providing comprehensive scientific evidence and designing reliable and accurate policies have been irreparable initiatives to mitigate and reverse the effects of environmental degradation and harmonize the economy with nature. Within this addressed objective, the study explores the impact of globalization, economic complexity, urbanization, and real income on CO2 emissions, the ecological footprint, and the load capacity factor in 7 Emerging countries (E-7). The study provides comprehensive evidence regarding environmental degradation and environmental quality by handling three environmental-related indicators. The second-generation panel methods involving Durbin–Hausman panel cointegration LM Panel Bootstrap Cointegration Test AMG and CCEMG estimators and Dumitrescu and Hurlin Panel Causality Test are performed on the data spanning from 1995 to 2020. According to the investigation, the explanatory variables are cointegrated with three dependent variables. The study proves that renewable energy and globalization are pivotal factors in lessening environmental degradation and enriching environmental quality. However, urbanization and economic growth impair the environment of E-7 countries, while economic complexity is found to be a statistically significant factor for all environmental-related variables.

**Keywords:** Macroeconomics; Sustainable Development; Ecological Footprint; Economic Complexity Index; Load Capacity Factor; Globalization; Urbanization.

**JEL Classification Codes:** B22, C82, O11, O13, Q43, Q56

**Referencing Style:** APA 7

## INTRODUCTION

Environmental quality is essential in terms of human health, ecosystem equilibrium, and sustainable development. It emphasizes the critical need for sustainable utilization and conservation of natural resources, as well as access to clean air, water, and soil, alongside the protection of ecosystems and biodiversity. A healthy environment directly impacts individuals' quality of life and provides a foundational basis for sustainable economic activities (Estoque and Wu, 2024).

Global warming significantly and extensively impacts environmental quality. This phenomenon, driven by increased greenhouse gas levels in the atmosphere, disrupts ecosystems and natural processes globally, resulting in climate change. Effects such as glacier melting, rising sea levels, extreme weather events,

and declining water resources pose serious threats to natural habitats and ecosystem services (Kumar et al. 2024). Climate change (hereafter, CC) adversely affects agricultural productivity, while events like droughts, floods, and erosion can disrupt economic and social systems. Therefore, it is crucial to mitigate global warming and its impacts to safeguard and enhance environmental quality (hereafter, EQ) (Rawat et al., 2024). The accumulation of greenhouse gases (hereafter, GHE) in the atmosphere, notably carbon dioxide, methane, and water vapor, causes global boiling. Deforestation, natural gas, coal, oil, human activities, elevate these gas concentrations in the atmosphere, thus triggering global warming. Figure 1 below illustrates the trend of global temperature change resulting from global warming (hereafter, GW) between 1990 and 2020.

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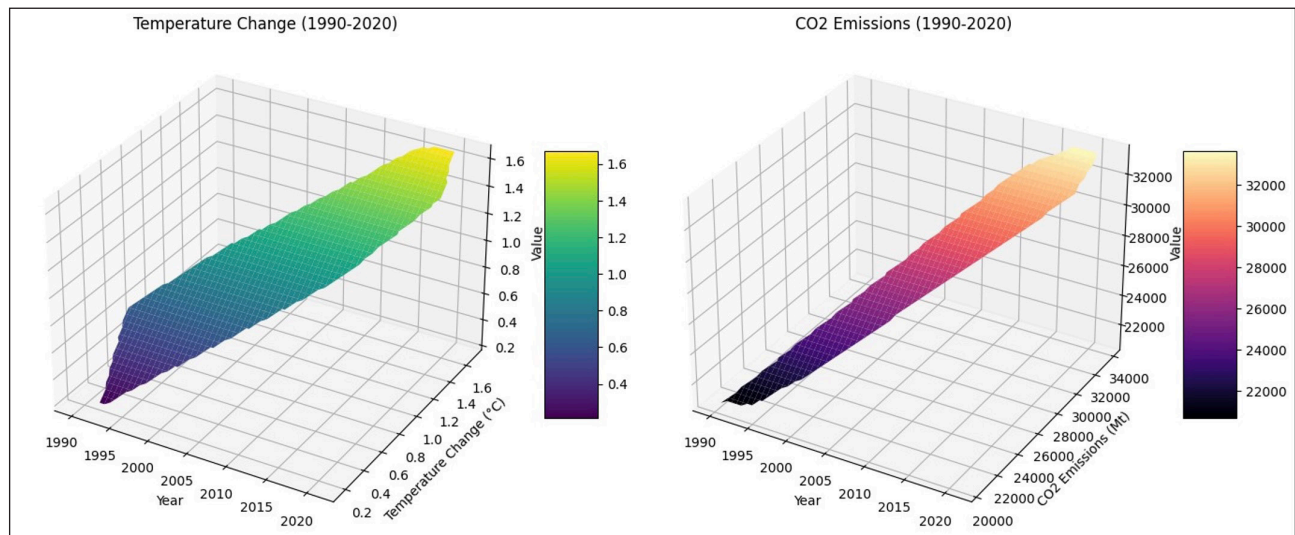
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**Figure 1.** Global temperature change and CO<sub>2</sub> emissions (1990-2020).

Source: FAOSTAT (2024) and IEA (2024)

Upon analyzing Figure 1, it is clear that global temperature change and global CO<sub>2</sub> emissions exhibit a predominantly upward trajectory. The temperature change, which stood at 0.633 in 1990, rose to 1.682 by 2020. Hence, the approximately 166% increase in global temperature change from 1990 to 2020 indicates a heightened pace of GW (FAOSTAT, 2024). Moreover, the roughly 55% increase in global CO<sub>2</sub> emissions during the same period intensifies the frequency and severity of extreme weather events, elevates sea levels, and profoundly affects ecosystems (IEA, 2024). International actors have responded to these challenges, with international treaties playing a pivotal role.

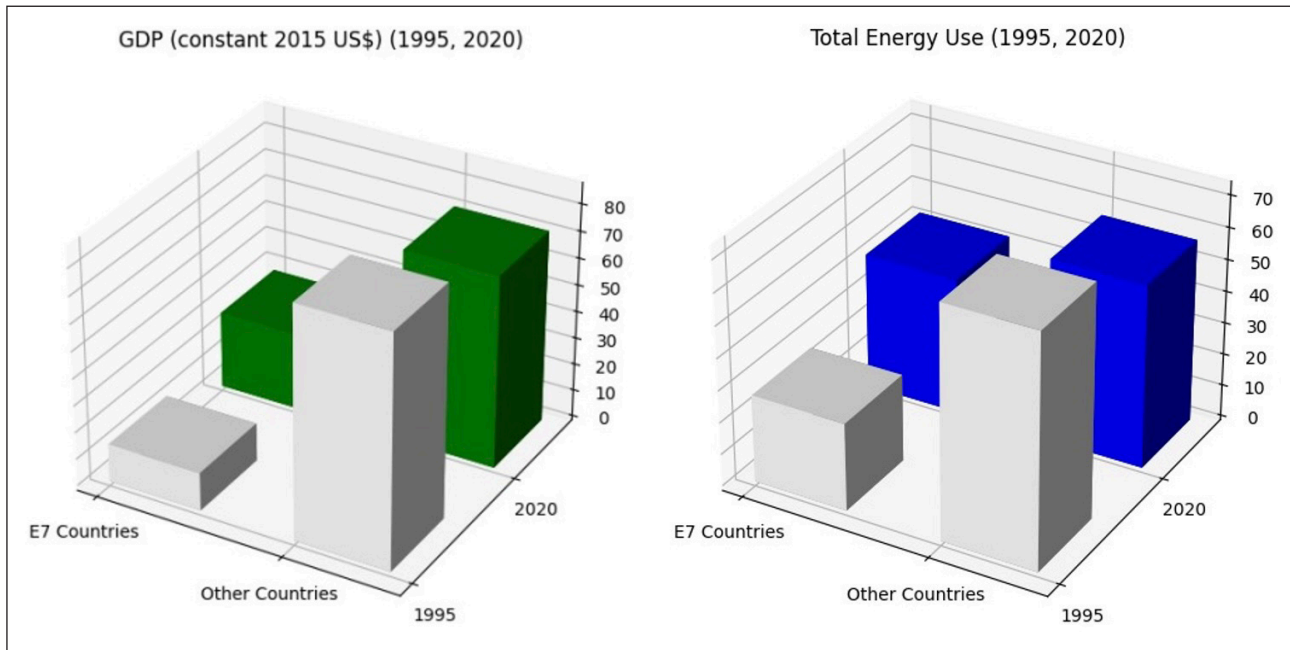
Several international agreements have been established to tackle GW including the United Nations Framework Convention on Climate Change (UNFCCC) in 1992, the Kyoto Protocol in 1997, and the Paris Agreement in 2015 (Pouikli, 2021). The Kyoto Protocol mandates industrialized nations to reduce GHE according to specified targets, while the Paris Agreement aims to limit global temperature rise to well below 2°C and ideally to 1.5°C (De Lassus St-Geniès 2024). These agreements incentivize countries to set emission reduction goals, transition to renewable energy (hereafter, RE) sources, and adopt sustainable development policies. Therefore, through international agreements, countries have committed to certain measures such as reducing emissions and investing in clean energy technologies.

In EQ literature, various variables are examined, with CO<sub>2</sub> emissions, the ecological footprint (hereafter, EF), and the load capacity factor (hereafter, LCF) being particularly important. This is because CO<sub>2</sub> emissions are a primary driver of GW. Fossil fuels (hereafter, FF),

deforestation, and industrial processes emit considerable amounts of CO<sub>2</sub> into the atmosphere. According to the IPCC, CO<sub>2</sub> emissions account for 60% of global temperature increases, highlighting the critical need for their reduction (Nsabiyeze et al. 2024). EF quantifies the overall impact of human activities on nature; a larger footprint signifies greater environmental damage and higher greenhouse gas emissions. Reducing EF can be achieved through sustainable resource use and effective waste management. LCF denotes the maximum number of individuals an ecosystem can sustainably support. GW decreases the carrying capacity of ecosystems by depleting water resources, reducing agricultural productivity, and increasing the frequency of extreme weather events (Erdoğan and Pata 2024; Kumar et al., 2024). CO<sub>2</sub> emissions, LCF and EF are crucial determinants of GW, and managing these factors is vital in combating CC. Addressing these elements is essential for ensuring a sustainable future and maintaining climate equilibrium. Therefore, advances in these parameters are critical variables in E7 countries, as in the rest of the world.

Similar to other nations, E7 countries (Russia, China, India, Mexico, Brazil, Indonesia and Turkey) wield significant influence on GW and have made diverse commitments. These countries, driven by their rapid economic growth (hereafter, EG) and expanding populations, command substantial portions of global energy consumption and GHE. E7 nations have pledged to reduce carbon dioxide emissions and promote RE sources. EG, industrialization, and energy consumption (hereafter, EC) patterns in these countries influence carbon dioxide emissions, EF, and LCF.





**Figure 2.** GDP and EC shares of E7 countries within the world (1995-2020).

Source: IEA (2024)

E7 countries constitute a substantial group based on their GDP and shares of global EC. Their GDP is utilized to offset the energy they consume. Figure 2 below illustrates the GDP and EC shares of E7 countries within the global context from 1995 to 2020.

In 1995, E7 countries accounted for 14.02% of the global GDP, a figure that significantly rose to 28.54% by 2020, more than doubling their share of the global GDP (World Bank 2024a). This expansion has resulted in increased levels of EC and GHE. Initially holding 27.32% of the world's total EC in 1995, E7 countries saw this figure climb to 42.66% by 2020. Moreover, FF comprised 78% of their total EC in 1995, increasing to 82.9% by 2020 (IEA, 2024). The use of high amounts of FF causes environmental issues such as air pollution (hereafter, AP), water pollution and CC (Ari, 2023). Conversely, RE accounted for 3% of their total EC in 1995, rising to 6.1% by 2020. Additionally, the shares of hydroelectric and other RE sources have also experienced significant increases (IEA, 2024). Figure 3 below illustrates the distribution of energy sources within the total EC of E7 countries from 1995 to 2020.

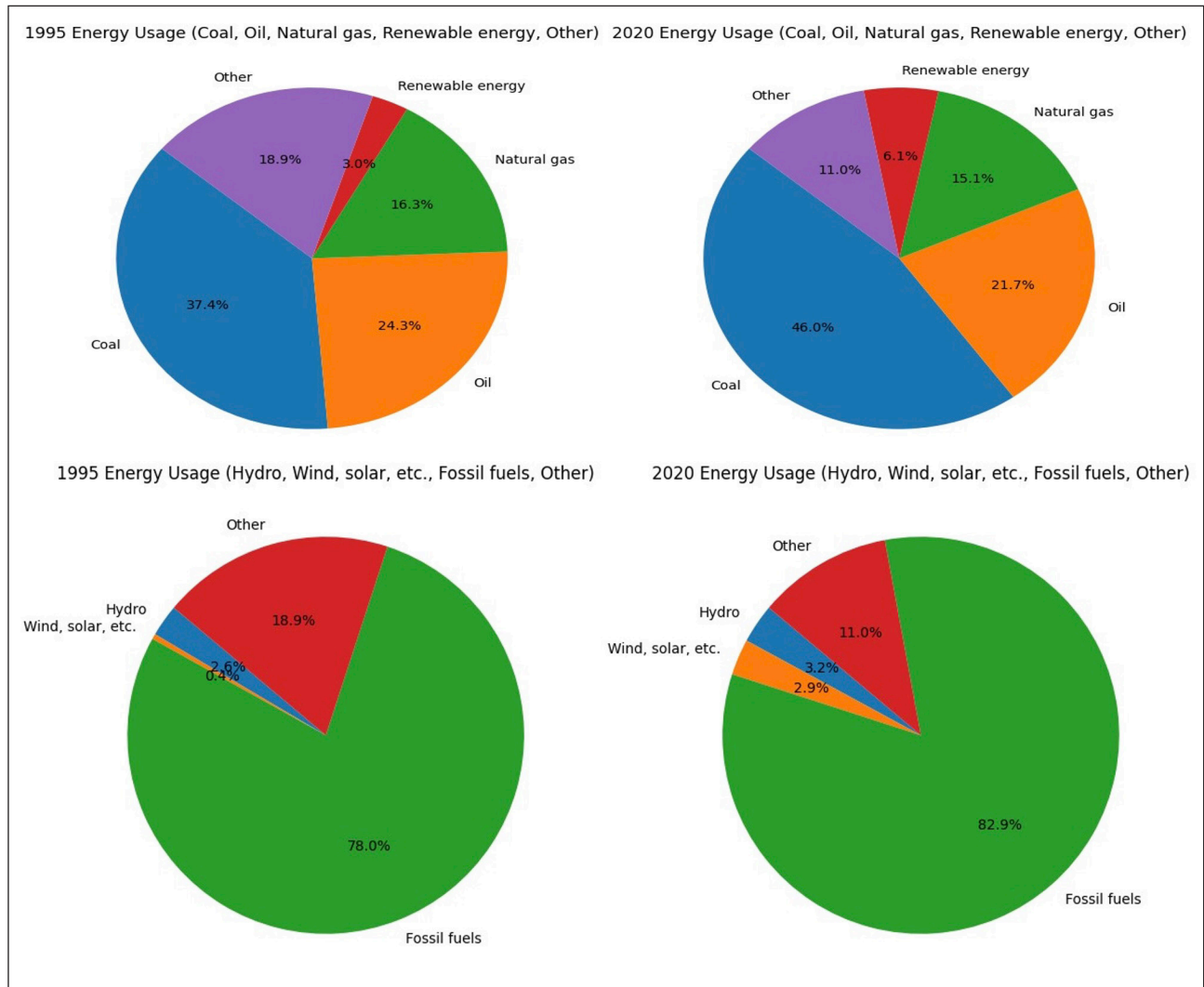
When analyzing Figure 3, it becomes evident that FF utilization in E7 countries rose from 78% of total EC in 1995 to 82.9% in 2020. Conversely, the proportion of RE increased from 3% in 1995 to 6.1% in 2020 (IEA, 2024). This indicates that E7 countries primarily generate their substantial income from FF, which constitute the largest share, while RE, crucial for EQ, has shown a significant but still inadequate increase. Therefore, it is crucial to focus

on other critical factors alongside energy sources to enhance EQ in E7 countries.

EQ in E7 countries is influenced by several significant variables, including globalization (hereafter, KOF), economic complexity, and urbanization (hereafter, URB). KOF has multifaceted effects on GW in E7 countries: it boosts energy demand through EG and industrialization (hereafter, IND), yet it can also facilitate the adoption of clean energy technologies through technology transfer and heightened environmental awareness (Qing et al. 2024). This can be assessed within the framework of environmental economics theories, particularly those anticipating the dissemination of cleaner technologies through trade and investment.

The Economic Complexity Index (hereafter, ECI) gauges the knowledge and skill intensity of a nation's economic output. For E7 countries, a high ECI holds potential for diminishing the environmental impacts of intricate and technology-intensive production processes. Advanced economies can mitigate GW by embracing more efficient and eco-friendly technologies, aligning closely with theories of technological innovation and sustainable development (Ren et al. 2024).

URB, on the other hand, can yield both positive and negative repercussions on GW in E7 countries. Elevated rates of URB amplify energy demand and GHE, yet urban centers can contribute to sustainable development through enhanced energy efficiency and environmental regulations (Adebayo and Ullah 2024). This aligns closely



**Figure 3.** Energy source shares within total EC of E7 countries (1995-2020).

Source: IEA (2024)

with theories of urban environmental planning and sustainable urban development. Well-managed URB can augment energy efficiency and promote the adoption of RE sources, thereby alleviating the impacts of GW.

This research holds significant importance for multiple reasons. Firstly, the choice of sample is paramount. The E7 nations, characterized by their high income and substantial EC, are influential not only in terms of global EQ but also regarding country-specific environmental standards. Secondly, RE sources are of global importance and hold particular relevance for the E7 countries. However, the heavy reliance on FF within these nations and the insufficient growth in RE usage render it inadequate for ensuring EQ independently. Consequently, the models incorporate additional variables such as KOF, economic complexity, and URB, which are critical in influencing EQ. Thirdly, the study broadens the scope of EQ assessment for the E7 countries by including variables such as EF and LCF, in addition to AP measured through CO<sub>2</sub> emissions.

Fourthly, the research employs second-generation panel data analysis techniques to effectively capture cross-sectional dependencies among the countries, reinforced by robustness tests. Lastly, causality tests are performed to evaluate not only the efficacy of economic policies and decisions but also the validity of economic models.

### LITERATURE REVIEW

EG and development are among the most important macroeconomic goals for country economies. When the globalization period is examined, it is seen that many world countries have grown economically (Kihombo et al. 2022). However, it is seen that the environment-economy relationship increases with EG. In this context, studies on the relationship between EG and the environment (hereafter, ENV) have gained momentum. There is a significant literature on the connection between EG and environmental degradation (hereafter, ED) or EQ. Among the studies in the literature, undoubtedly the most intensive empirical studies are related to

the Environmental Kuznets Curve (EKC) hypothesis. According to the EKC hypothesis, it is argued that ED will increase at the beginning of EG, and then ED will decrease and an inverted-U relationship will occur (Al-Mulali and Ozturk 2016; Bilgili et al. 2016; Apergis et al. 2017). The inverted-U relationship may be due to scale effect, composition effect or technical effect (Grossman and Krueger 1995). Often in the literature EKCs with cubic income and EKCs with quadratic income invaded. Studies have been conducted in many countries and periods to examine the hypotheses in question. In terms of empirical methods, it is determined that time series and panel data methods are frequently used. CO<sub>2</sub> emissions have often been used to determine ED in the EKC test. In this context, Holtz-Eakin and Selden (1995) is one of the pioneering studies on the quadratic form of the EKC. The authors tested the validity of the EKC hypothesis through 1951-1986 data from 130 countries. Empirically, the panel regression method was used. In the study where CO<sub>2</sub> was used as the environmental variable, the existence of an inverted-U connection was found. Shafik and Bandyopadhyay (1992) is the pioneer study regarding the cubic relationship regarding EKC. In this study, CO<sub>2</sub> was preferred as the environmental variable. In the study, which used data from 149 countries for the period 1960-1990, it was concluded that the shape of the EKC is monotonically increasing. In other words, it has been found that EG increases ED. When current studies using CO<sub>2</sub> in the EKC hypothesis are examined, the studies of Kostakis et al. (2023), Wang and Kim (2024), and Hassan et al. (2024) stand out.

It has been seen that EF variable has recently been used as an indicator of ED (Al-Mulali et al. 2015b; Ozturk et al. 2016; Yilanci and Pata 2020). Among the current studies examining the EKC hypothesis regarding the connection between EF and EG, Aydın et al. (2023) study examined the validity of the EKC hypothesis in G-7 countries. In the study, panel cointegration test and cointegration estimators that take cross-sectional dependence into consideration were used. In the study where CCEMG and DCCE methods were used, the results revealed that the EKC hypothesis is valid only in the USA. In other countries, it has been concluded that real GDP, which is an indicator of EG, reduces EF or causes statistically insignificant effects. In his study, Kamacı (2024) investigated the relationship between environmental variables and EG. The author also included KOF and hydroelectric energy variables in the model. Fractional Fourier ADL method was used in the study. FMOLS estimator was used in the long-term forecast. Fourier Toda-Yamamoto Causality test was used for causality analysis. In the study, the USA,

which has high CO<sub>2</sub> emissions and EF, was examined. 1971-2014 was chosen as the sample period. Study findings revealed that EG increases EF and CO<sub>2</sub>. In his study, Wang et al. (2024) tested the EKC hypothesis using CO<sub>2</sub> emissions and EF as environmental variables in 147 countries. Panel data methods were used in the study investigating the 1995-2018 sample period. Empirical findings emphasize that the EKC hypothesis is valid.

In terms of EQ, it is seen that LCF, which has become popular recently, is used in very few studies. In this context, Pata and Kartal (2023) tested the connection between EG and LCF using the LCF variable in their study. In the study, EKC and Load Capacity Curve (LCC) hypotheses were examined together. Various time series methods were used in the study investigating the period 1977-2018 in South Korea. Empirical findings have shown that both the EKC and LCC hypotheses are valid. In this study, similar findings were obtained by using the CO<sub>2</sub> variable to represent ED and the LCF variable to represent EQ. Raihan et al. (2023), who conducted similar research, examined the period 1971-2018 in Mexico. In the study using ARDL, FMOLS, DOLS and CCR methods, it was concluded that increases in EG reduce LCF. In other words, EG has increased ED. Among the current studies, Hakkak et al. (2023) examined the LCF-GDP relationship in the Russian example. 1992-2018 was used as the sample period. In the study where the ARDL method was used, it was concluded that EKC and LCC are valid together.

### Globalization-Environment

With KOF process, important structural changes have occurred in country economies. Naturally, the interaction between ENV and KOF has also emerged. On the other hand, it has been proven that KOF increases EG (Dreher 2006; Usman et al. 2022). It is seen that subheadings (economic KOF, political KOF, social KOF) or the general KOF index are used in the use of the KOF variable. It is determined that CO<sub>2</sub> is frequently used as an environmental variable. It is observed that EF and LCF variables are used as alternatives to the environmental variable. Shahbaz et al. (2015) examined the connection between KOF and ENV through data from India for the period 1970-2012. ARDL limit test was used in the study, which focused on the effect of the general globalization index and sub-indices on carbon emissions. Empirical findings have shown that only increases in KOF reduce CO<sub>2</sub> emissions. It has been concluded that general, social and political KOF increases ED. Shahbaz et al. (2017) conducted a similar study for the period 1970-2012 and obtained the same result.

It is also seen that the Kyoto protocol is used in some studies as an indicator of political KOF. Grunewald and Martinez-Zarzoso (2016) found in their study in 170 economies between 1992 and 2009 that the Kyoto protocol increased ED. Bozkurt and Okumuş (2017), who conducted a similar study for 33 countries in the period 1980-2013, found similar results. Destek (2020) investigated the relationship between different components of KOF and ENV in Central and Eastern European countries. Empirical findings have shown that increases in political KOF reduce ED. It has been concluded that other KOF indicators increase ED.

### **Economic Complexity-Environment**

Hausmann et al. (2014) that EG is driven by knowledge and that ECI is a fairly accurate predictor of growth. Based on this view, it is seen that ECI is used in many studies, especially the EKC hypothesis. Can and Gozgor (2017) are among the pioneering studies that use ECI in determining the validity of the EKC hypothesis. The authors tested the validity of the EKC in France in the period 1964-2014 with the DOLS method. Empirical findings have shown that higher ECI suppresses CO<sub>2</sub> levels. Neagu and Teodoru (2019) obtained the opposite result. More clearly, he found the existence of a positive connection between ECI and ENV. Doğan et al. (2019) investigated the connection between ECI and CO<sub>2</sub> in the economies of 55 countries in the period 1971-2014 within the scope of EKC. In the study using the panel quantile regression method, the findings showed that ECI has serious effects on ENV. According to the results, ECI reduced EQ in low- and high-middle-income country groups. In the high-income country group, ECI controlled CO<sub>2</sub> emissions. Therefore, the importance of production policies in low and middle-income countries targeting EG by taking environmental problems (hereafter, EP) into account has been emphasized. Aluko et al. (2023) investigated the connection between ECI and ED in 35 OECD countries in the period 1998-2017. EF, CO<sub>2</sub> emissions, N<sub>2</sub>O emissions and GHE were used as environmental variables. In the study using Method of Moments quantile regression model methods, it was concluded that ECI leads to an increase in EF, CO<sub>2</sub> emissions, N<sub>2</sub>O emissions and GHE at low income levels. On the other hand, it has been observed that these effects gradually decrease as income increases. Balsalobre-Lorente et al. (2024) investigated the relationship between ENV and ECI in the G-7 country group in the period 1991-2018. EF was used as the environmental variable. In the study using panel cointegration and panel causality methods, the results showed that ECI initially increases ED, and after a certain

turning point, ED decreases. Similar results were found in Pata (2021), Ahmad et al. (2021) and Nguyen and Doytch (2022) also obtained.

### **Urbanization-Environment**

It is known that URB also increases with the acceleration of IND Increasing URB causes significant effects on EG. On the other hand, the environmental effects of URB have become an important research area. Martinez-Zarzoso and Maruotti (2011) investigated the relationship between URB and ED in developing country economies. Panel data methods were used in the study examining the sample period of 1975-2003. CO<sub>2</sub> emission was used as the environmental variable. Empirical results have shown the existence of an inverted-U shape relationship between URB and CO<sub>2</sub> emissions. Sushinsky et al. (2013) and Al-Mulali et al. (2015a) argued that increasing URB increases ED. However, Al-Mulali et al. (2015b) emphasized the necessity of increasing trade openness (hereafter, TRO) to reduce ED. Liu et al. (2016), Ali et al. (2019), Khoshnevis-Yazdi and Golestani-Dariani (2019) proved the existence of a negative relationship between URB and CO<sub>2</sub> emissions. Researching the interaction between URB and ENV in SAARC countries, Kakar et al. (2024) used panel data methods. CO<sub>2</sub> emission was used as the environmental variable in the study. Findings showed the existence of bidirectional causality between CO<sub>2</sub> emissions and URB.

### **Renewable Energy-Environment**

Energy is among the most important inputs of production. EG occurs with increasing production. Therefore, increasing EC is among the important determinants of EG. This situation creates the relationship between EC and ENV. When the types of energy are examined, the existence of RE and non-renewable energy (hereafter, NRE) is reached. It is seen that RE is encouraged on an international scale in terms of increasing EQ. Although investments and incentives for RE sources have increased, the use of NRE is higher. This situation requires measuring the relationship between RE and ENV. It is known that the increasing use of RE increases biodiversity. On the other hand, there is evidence that RE improves EQ. López-Menéndez et al. (2014) examined the connection between RE and ENV in 27 European Union countries. In the study using the panel data method, the period 1996-2010 was investigated. Empirical evidence has shown that increased use of RE reduces CO<sub>2</sub> emissions. Similar results were found by Bölük and Mert (2014), Apergis and Payne (2015), Bilgili et al. (2016) obtained. Kartal et al. (2023) study, the relationship



**Table 1.** Abbreviations and sources.

Variables	Abbreviation	Description	Log Transformation	Data Sources
Carbon Dioxide Emissions	CO <sub>2</sub>	Metric tons per capita	lnCO2	The World Bank (2024b)
The Ecological Footprint	EF	Per capita	lnEF	The Global Footprint Network (2024)
The Load Capacity Factor	LCF	Biocapacity/ecological footprint	lnLCF	The Global Footprint Network (2024)
Globalization	KOF	An index includes economic, social, and political globalization	lnKOF	Gygli et al. (2019)
Economic Complexity Index	ECI	The index is estimated based on the variety of exports a country produces and their all-presence, or the number of countries able to create them.	-	OECD (2024)
Urbanization	URB	Urban population (% of total population)	lnURB	The World Bank (2024b)
Renewable Energy	REN	% of the total final energy consumption	lnREN	The World Bank (2024b)
Real Income	GDP	Constant 2015 US per capita	lnGDP	The World Bank (2024b)

between RE and ENV was examined with the Fourier Bootstrap Granger in quantiles approach. The period 1965–2018 is discussed. CO<sub>2</sub>, EF and LCF variables were used as environmental indicators in the study. Empirical findings have shown that RE improves EQ according to all environmental indicators used. Raihan and Bari (2024) focused on the relationship between energy and ENV in the Chinese economy in their study. The period 1965–2022 was examined in the study in which CO<sub>2</sub> emissions were used as the environmental variable. ARDL method was used. NRE use and EG are included in the model. Empirical findings have shown that RE improves EQ in both the long and short term. It has been emphasized that recovery is higher in the long term.

## DATA, METHODOLOGY AND EMPIRICAL RESULTS

In the study, we aim to address the evidence of the role of KOF, URB, REN, ECI, and GDP in EQ of Emerging seven (E-7) countries between 1995 and 2020. In the context of the countries' EQ, CO<sub>2</sub>, EF, and LCF are considered, promoting insight into comprehensive evidence. CO<sub>2</sub> is a primary culprit of CC and GW, while the EF promotes knowledge on the pressure of anthropogenic activities such as air, soil, and marine pollution. The LCF is employed to simultaneously consider the supply and demand sides of ENV. However, E-7 countries, comprised of *Brazil, China, India, Indonesia, Mexico, Russia, and Türkiye*, are the seven biggest emerging countries in terms of EG. Table 1 presents some properties and knowledge of the considered variables.

This study executes three separate models shown in Equations 1-3-5 to examine the effects of the GDP, KOF, ECI, URB, and REN on CO<sub>2</sub>, EF, and LCF.

$$CO2_{it} = f(GDP_{it}, KOF_{it}, URB_{it}, ECI_{it}); \quad (1)$$

$$\ln CO2_{it} = c_0 + \theta_1 \ln GDP_{it} + \theta_2 \ln KOF_{it} + \theta_3 \ln URB_{it} + \theta_4 \ln REN_{it} + \theta_5 ECI_{it} + \epsilon_{it} \quad (2)$$

$$EF_{it} = f(GDP_{it}, KOF_{it}, URB_{it}, ECI_{it}); \quad (3)$$

$$\ln EF_{it} = a_0 + \delta_1 \ln GDP_{it} + \delta_2 \ln KOF_{it} + \delta_3 \ln URB_{it} + \delta_4 \ln REN_{it} + \theta_3 ECI_{it} + \epsilon_{it} \quad (4)$$

$$LCF_{it} = f(GDP_{it}, KOF_{it}, URB_{it}, ECI_{it}); \quad (5)$$

$$\ln LCF_{it} = b_0 + \varphi_1 \ln GDP_{it} + \varphi_2 \ln KOF_{it} + \varphi_3 \ln URB_{it} + \varphi_4 \ln REN_{it} + \theta_3 ECI_{it} + \mu_{it} \quad (6)$$

The forms of the models with logarithmic series are disclosed in Equations 2, 4, and 6, respectively, to calculate the coefficient of elasticities. Only ECI is not used with logarithmic forms because negative values exist in the panel samples. In equations, the constant terms are presented by  $c_0$  and  $a_0$ . Moreover,  $\epsilon_{it}$  and  $\mu_{it}$  present the coefficient of the explanatory variables. Following the explanation of the performed models, Figure 4 discloses the flowchart of the estimations.

The study's first step of the empirical analysis is based on the descriptive analysis of all considered variables. The findings are shown in Table 2.

According to Table 2, there are 182 observations for each regarded variable, which confirms the balanced panel data in the empirical investigations. As a consequence of the descriptive analysis, it is revealed that lnKOF has the highest mean, followed by lnURB, lnREN, and lnCO<sub>2</sub>. Besides, lnURB has the maximum value, whereas lnLCF



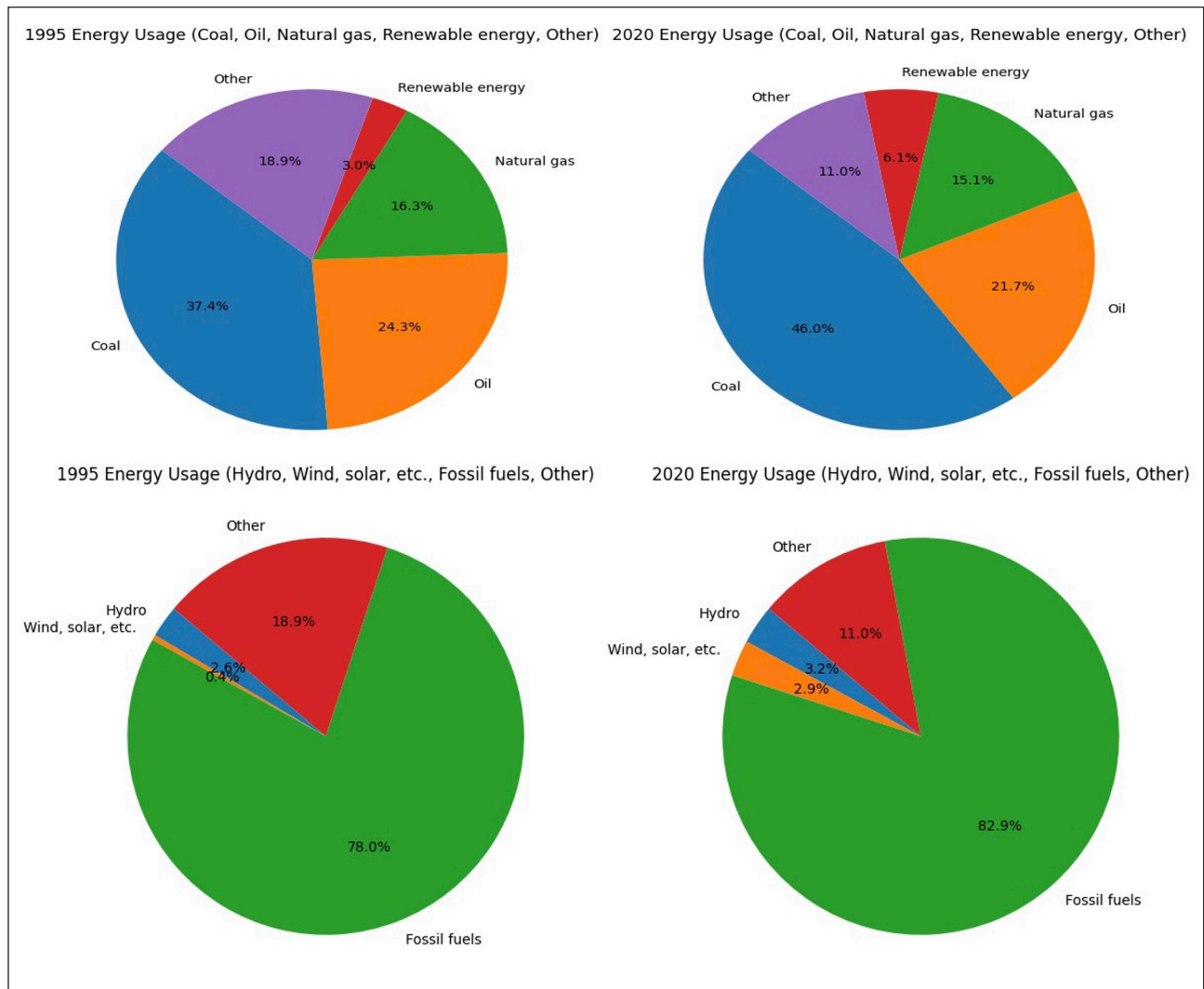


Figure 4. Flowchart of the estimation.

has the minimum value. Table 2 also points out that InLCF has the highest standard deviation.

After examining the descriptive analysis, the study scrutinizes the prior analysis, which addresses which panel generation methods are applicable. The panel's primary analysis is to investigate the validity of the cross-section dependence (hereafter, CSD) and the slope coefficient heterogeneity. The Breusch-Pagan LM, Pesaran scaled LM, Bias-corrected scaled LM, and Pesaran CSD tests are applied to the series, and the findings of the mentioned CSD tests are tabulated in Table 3. The null hypothesis (hereafter of the tests indicates the absence of CSD in the series.

As a consequence of Table 3, of all tests is rejected in each series except ECI. As for ECI, the Pesaran CD denies the validity of CSD, while the remaining tests confirm the rejection of. Therefore,  $H_0$  it can be claimed that CSD holds for all considered series, and any shocks in one country may dribble over to another country via the spillover

impact. The first-generation panel methods (hereafter, FGPM), assuming the absence of CSD, do not promote consistent and accurate results. The panel unit root tests (hereafter, PURT) and cointegration analysis based on the second-generation panel methods (hereafter, SGPM) should be performed within this context. However, the second prior analysis in the panel approach is the delta tilde and delta tilde adjustment tests, which determine whether the slope coefficients are heterogeneous. In the study, the delta tilde (hereafter, and delta tilde adjustment (hereafter,  $\Delta_{adj}$ ) tests are performed for all three models, and the results of the tests are shown in Table 4. As a consequence of Table 4, it is revealed that the presence of the heterogeneous slope coefficient is detected for all considered models. Therefore, it is indicated that the second-generation panel unit root tests (hereafter, SGPURT), cointegration analysis, and long-run estimators are applicable to the study.

**Table 2.** Descriptive statistics

	LNCO2	LNEF	LNLCF	LNKOF	LNREN	LNURB	ECI
Mean	1.175921	0.872361	-0.297382	4.109728	2.894238	4.051937	0.481446
Median	1.217945	1.024093	-0.582039	4.131613	3.011578	4.239186	0.384815
Maximum	2.471893	1.852293	1.351057	4.277038	3.925531	4.466747	1.393506
Minimum	-0.237455	-0.328619	-1.483105	3.668977	1.156881	3.281174	-0.351723
Std. Dev.	0.727229	0.573305	0.779191	0.120312	0.871496	0.361469	0.444059
Skewness	0.165176	-0.405748	0.714479	-1.102386	-0.634284	-0.763949	0.553895
Kurtosis	2.176771	2.405087	2.589461	4.442427	2.306705	2.165483	2.262688
Jarque-Bera	5.966858	7.677722	16.76269	52.64056	15.84856	22.98424	13.42879
Probability	0.050619	0.021518	0.000229	0.000000	0.000362	0.000010	0.001213
Sum	214.0177	158.7698	-54.12353	747.9704	526.7513	737.4525	87.62316
Sum Sq. Dev.	95.72400	59.49091	109.8920	2.619961	137.4703	23.64949	35.69105
Observations	182	182	182	182	182	182	182

Source: Authors' calculation.

**Table 3.** Outcomes of CSD tests.

Variables	Breusch-Pagan LM	Pesaran scaled LM	Bias-corrected scaled LM	Pesaran CD
LnCO2	300.8918***	43.18823***	43.04823***	14.44411***
lnEF	202.2702***	27.97059***	27.83059***	5.798017***
lnLCF	243.8532***	34.38699***	34.24699***	13.67439***
lnGDP	425.9286***	62.48184***	62.34184***	20.48857***
lnKOF	480.4347***	70.89231***	70.75231***	21.90262***
ECI	156.2842***	20.87481***	20.73481***	0.562746
lnURB	505.2600***	74.72294***	74.58294***	22.44627***
lnREN	237.0024***	33.32990***	33.18990***	11.09874***

Note: \*, \*\*, and \*\*\* are significance level at the 10%, 5%, and 1% level, respectively.

Source: Authors' calculation.

**Table 4.** Outcomes of slope heterogeneity test.

Dependent Variable	Test value		p-value	
	Delta tilde	Delta tilde adjusted	Delta tilde	Delta tilde adjusted
LnCO2	9.956***	11.937***	0.000	0.000
lnEF	5.122***	6.142***	0.000	0.000
lnLCF	6.643***	7.964***	0.000	0.000

Note: \*\*\* is significance level at the 1% level.

Source: Authors' calculation.

**Table 5.** Outcomes of CIPS PURT.

Variables	Level		$\Delta$	
	C	C+T	C	C+T
LnCO2	-2.17726	-1.7882	-4.326***	-4.467***
lnEF	-1.20576	-2.185*	-4.986***	-5.046***
lnLCF	-2.05318	-2.2366	-5.210***	-5.303***
lnGDP	-1.44559	-0.99466	-2.753***	-3.039***
lnKOF	-2.31002	-1.83166	-4.469***	-4.354***
lnECI	-2.127	-2.162	-5.396***	-5.422***
lnURB	-2.192	0.15930	-2.892***	-2.292
lnREN	-1.95875	-0.59803	-3.869***	-4.082***

Note: \*, \*\*, and \*\*\* are significance level at the 10%,5%, and 1% level, respectively.

Source: Authors' calculation.

**Table 6.** Durbin–Hausman panel cointegration test.

Tests	CO		EF		LCF	
	Test statistic	p-value	Test statistic	p-value	Test statistic	p-value
Durbin-H panel statistics	0.243	0.404	8.251***	0.000	4.344***	<b>0.000</b>
Durbin-H group statistics	-0.081	0.532	4.519***	0.000	5.333***	<b>0.000</b>

Note: \*, \*\*, and \*\*\* are significance level at the 10%,5%, and 1% level, respectively.

Source: Authors' calculation.

The CIPS PURTs are performed to examine the series' stationarity, and the outcome of the PURTs is presented in Table 5. When interpreting the CIPS PURT with constant and constant&trend terms, it is concluded that all series contain a unit root at the level while the first difference values of all series are stationary at the 1% significance level.

When scrutinizing the outcome of the CIPS PURT, each series is integrated at  $I(1)$ , and the panel cointegration tests are performed to determine whether the series are cointegrated. In the study, as the influence of the explanatory variables on three environmental indicators comprising CO<sub>2</sub>, EF, and LCF, the panel cointegration tests are applied for three models. Within this context, The Durbin-Hausan and the LM panel bootstrap cointegration proposed by Westerlund and Edgerton (2007) analysis are executed. The Durbin-Hausman panel cointegration (hereafter, PHPO) analysis involved in the second-generation panel techniques, allowing for considering the cross-section dependence, is the first employed cointegration test in the study, and this test is also applicable when the inclusion of a stationary independent variable in the panel exists. PHPO analysis reveals two different statistics. The Durbin-H panel statistic is the first

statistic assuming the presence of slope homogeneity. The Durbin-H group statistics is the second one, allowing for considering slope heterogeneity. The null hypothesis of the Durbin-Hausman panel cointegration analysis shows the absence of cointegration. The findings of the tests are disclosed in Table 6. The Durbin-H panel and group statistics on model 1 promote the exception of,  $H_0$  which means that there is no long-run connection between lnCO<sub>2</sub>, lnGDP, ECI, lnKOF, lnREN, and lnURB. In contrast, the validity of the long-run movement holds for the variables employed in Model 2 and Model 3.

The LM bootstrap panel cointegration analysis is the second applied method. The null hypothesis of the analysis argues that a long-run movement holds for the variables. The findings of the LM bootstrap panel cointegration analysis with constant (C) and constant & trend (C&T) terms are shown in Table 7. When the test statistics of C and C&T and the corresponding bootstrap p-values for lnCO<sub>2</sub>, lnEF, and lnLCF are examined, the rejection of the null hypothesis does not hold for all three models. In another explanation, the long-run relationship between the variables involved in all three models is verified according to the findings of The LM bootstrap panel cointegration analysis.

**Table 7.** LM panel bootstrap cointegration test results.

DependentVariable		DependentVariable				DependentVariable					
LnCO2		LnEF				LnLCF					
Statistics		Boostrapped p-values		Statistics		Boostrapped p-values		Statistics		Boostrapped p-values	
C	C&T	C	C&T	C	C&T	C	C&T	C	C&T	C	C&T
5.411	13.281	1.000	0.984	9.367	17.648	0.727	0.676	7.329	15.348	0.989	0.929

Source: Authors' calculation.

**Table 8.** Outcomes of AMG and CCEMG for the model 1.

Variables	AMG			CCEMG		
	Coefficients	Std. err.	p-values	Coefficients	Std. err.	p-values
Lngdp	0.2814052	0.1720815	0.102	0.38667***	0.0643093	0.000
LnURB	0.098752*	0.5094147	0.053	-1.394994	2.599609	0.592
LnREN	-0.54869***	0.1082357	0.000	-0.59800***	0.1156829	0.000
LnKOF	-0.476537**	0.1744812	0.006	-.2181291	0.184838	0.238
ECI	0.039426	0.0247282	0.111	0.0237335	0.0530554	0.655
Cons	-1.54396	1.781935	0.386	3.820116	5.263923	0.468

Note: \*, \*\*, and \*\*\* are significance level at the 10%, 5%, and 1% level, respectively.

Source: Authors' calculation.

**Table 9.** Outcomes of AMG and CCEMG for the model 2.

Variables	AMG			CCEMG		
	Coefficients	Std. err.	p-values	Coefficients	Std. err.	p-values
Lngdp	0.47968***	0.1501184	0.001	0.5871056	0.31764*	0.065
LnURB	1.11017*	0.662743	0.094	2.063982	1.17738*	0.080
LnREN	-0.26956**	0.1148384	0.019	-0.4613818	0.20933**	0.028
LnKOF	-0.63903***	0.1784822	0.000	-0.6359731	0.29169**	0.029
ECI	0.0289698	0.018348	0.114	0.0419256	0.0276184	0.129
Cons	-4.523819	3.130269	0.148	2.855519	10.99798	0.795

Note: \*, \*\*, and \*\*\* are significance level at the 10%, 5%, and 1% level, respectively.

Source: Authors' calculation.

The next path of the econometric process followed in the study is estimating the long-run effect of the explanatory variables on LnCO<sub>2</sub>, LnEF, and LnLCF. The AMG and CCEMG estimators are performed within this objective for three models. The finding of the AMG and CCEMG estimators for LnCO<sub>2</sub> is presented in Table 8.

As accompanying the validity of the cointegration connection in the variables of Model 1, the AMG and CCEMG estimators are applied to find the magnitude and direction of the explanatory variables on LnCO<sub>2</sub>. The finding of the estimators on Model 1 is documented

in Table 8. When considering the evidence obtained from the estimators, all explanatory variables promote a statistically significant influence on LnCO<sub>2</sub> at the 10% significance level, except ECI. The coefficient of LnGDP in AMG and CCEMG estimators is found to be 0.281 and 0.386, respectively, which shows that an increase in LnGDP impairs the air quality (hereafter AQ) of the considered countries. Moreover, the evidence of the AMG and CCEMG estimators on the nexus between LnURB is controversial. According to the AMG estimator, a 1% increase in LnURB impairs AQ by 0.987%, whereas LnURB enriches AQ in the CCEMG estimators by 1.394%.

**Table 10.** Outcomes of AMG and CCEMG for the model 3.

Variables	AMG			CCEMG		
	Coefficients	Std. err.	p-values	Coefficients	Std. err.	p-values
Lngdp	-0.44711***	0.1381567	0.001	0.24414	0.819197	0.766
LnURB	-0.00446	0.5884291	0.994	-0.32292	4.384502	0.941
LnREN	0.25506**	0.1027444	0.013	0.11410	0.1555246	0.463
LnKOF	0.64001**	0.2395693	0.008	-0.04681	0.7467854	0.950
ECI	-0.03488	0.021369	0.103	-0.03845	0.0356308	0.280
Cons	0.31765	2.728132	0.907	-6.3792	7.943553	0.422

Note: \*, \*\*, and \*\*\* are significance level at the 10%, 5%, and 1% level, respectively.

Source: Authors' calculation.

A 1% increase in LnREN mitigates INCO<sub>2</sub> by 0.548 in the AMG estimations, while a 1% rise in LnREN lessens INCO<sub>2</sub> by 0.598% in the CCEMG estimations. The finding of the estimators for the coefficient of LnKOF is statistically significant and negative, and AQ is improved by LnKOF, calculated as approximately 0.476% in the AMG estimator and 0.218% in the CCEMG estimator.

In the study, InEF is concentrated as another dependent variable, which presents a comprehensive knowledge of the demand side of ENV, reflecting air, soil, and marine degradations. Table 9 poses the findings of the AMG and CCEMG estimators. When examining the statistics on ECI, ECI is also found to be statistically insignificant in Model 2. As a result of the AMG and CCEMG estimators on lngdp, ED are increased by a 1% increase in lngdp measured as 0.479% and 0.587%, respectively. Table 10 shows that lnurb is a pivotal factor harming EQ, and the magnitude of lnurb on InEF in the AMG and CCEMG estimator is calculated as 1.11% and 2.063%, respectively. However, the finding of Table 9 verifies that lnren and lnkof have a favorable influence in mitigating ED.

Scrutinizing the effects of the explanatory variables on InLCF is the last long-run estimation; the estimators' results are shown in Table 10. When interpreting the evidence obtained from the CCEMG estimators, InLCF is not statistically associated with all explanatory variables. As for the finding of the AMG estimator, lnurb and ECI do not matter for sustainability in E-7 countries. Furthermore, the favorable role of lnren and lnkof in sustainability is verified by the result of the AMG estimator, and a 1% increase in lnren leads to a 0.255% increase in InLCF while a 0.64% improvement in InLCF is accompanied by a 1% increase in lnkof. However, the result of the AMG on lngdp shows that an increase in lngdp promotes a diminishing effect on sustainability, measured as 0.447%.

The last path of the empirical analysis is to perform the Dumitrescu and Hurlin (D-H) panel causality (hereafter, DHPC) analysis to determine the causality connection between the explanatory variables and environmental-related indicators. DHPC analysis outcome is presented in Table 11. Firstly, the causality connection between the explanatory variables and InCO<sub>2</sub> is interpreted. As a result of Table 11, it is shown that a one-way causality link operated from lngdp to InCO<sub>2</sub> and a one-way connection running from InCO<sub>2</sub> to lnurb are verified. Besides, a mutual causality relationship between lnkof and InCO<sub>2</sub> holds for the E-7 countries. When focusing on the nexus between the explanatory variables and InEF, it is concluded that a two-way causality link between three variables comprising lnurb, lnkof, and ECI and InEF is confirmed while InEF is induced by lnren. The finding of DHPC for Model 3 is the last examining evidence in the study, and it is underlined that InLCF causes all explanatory variables.

## DISCUSSION and CONCLUSION

In recent times, society has encountered severe challenges such as CC, GW, rapidly annihilating natural resources, and various forms of ED. The policymakers, intergovernmental organizations, and each global, regional, and local meeting and trace have currently addressed the urgent actions aimed at mitigating and reversing EP and establishing the economic and social structure based upon sustainability. Within this scope, outstanding agendas, traces, and goals such as the Kyoto Protocol, the Paris Conference, and SDGs have been introduced for the policymakers to protect the recent welfare and provide a liveable world for future generations. However, comprehensive scientific research is pivotal and contributes to policy actions. Within this scope, this study scrutinizes the impact of EG, URB, RE, KOF, and ECI on three environmental indicators in E-7 countries. CO<sub>2</sub> emissions are one of the concentrated



**Table 11.** Dumitrescu and hurlin panel causality test.

Null Hypothesis	W-stat	Zbar-Stat	p-value	Decision
lnGDP -/→ lnCO	7.5625	7.3585	0.0418	lnGDP --> lnCO
lnCO-/→ lnGDP	2.7169	3.2121	0.2142	-
lnURB-/→ lnCO	14.4834	6.4793	0.2902	-
lnCO-/→ lnURB	19.3159	10.1702	0.0266	lnCO--> lnURB
lnREN -/→ lnCO	2.8676	3.4940	0.2205	-
lnCO-/→ lnREN	6.8580	2.6735	0.3764	-
lnKOF -/→ lnCO	29.6375	18.0535	0.0025	lnKOF --> lnCO
lnCO-/→ lnKOF	3.5316	4.7362	0.0925	lnCO--> lnKOF
ECI -/→ lnCO	1.6598	-0.4500	0.8441	-
lnCO-/→ ECI	3.2512	4.2116	0.1698	-
lnGDP -/→ lnEF	2.7804	3.3308	0.3422	-
lnEF-/→ lnGDP	2.0686	0.0907	0.9683	-
lnURB-/→ lnEF	23.0976	13.0585	0.0253	lnURB--> lnEF
lnEF-/→ lnURB	29.3616	17.8427	0.0038	lnEF--> lnURB
lnREN -/→ lnEF	3.9153	5.4540	0.0583	lnREN --> lnEF
lnEF-/→ lnREN	4.2015	2.9124	0.2966	-
lnKOF -/→ lnEF	23.4635	13.3380	0.0051	lnKOF --> lnEF
lnEF-/→ lnKOF	4.6547	6.8373	0.0127	lnEF--> lnKOF
lnECI -/→ lnEF	4.1754	5.9407	0.0279	lnECI --> lnEF
lnEF-/→ lnECI	3.4476	4.5791	0.0545	lnEF--> lnECI
lnGDP -/→ lnLCF	14.2885	6.3304	0.2129	-
lnLCF-/→ lnGDP	4.4707	6.4931	0.0215	lnLCF--> lnGDP
lnURB-/→ lnLCF	17.9572	9.1325	0.1381	-
lnLCF-/→ lnURB	28.7469	17.3732	0.0063	lnLCF--> lnURB
lnREN -/→ lnLCF	0.9475	-0.0981	0.9531	-
lnLCF-/→ lnREN	1.5796	-0.5561	0.8378	-
lnKOF -/→ lnLCF	12.6895	5.1092	0.2193	-
lnLCF-/→ lnKOF	3.2577	4.2238	0.0963	lnLCF-/→ lnKOF
lnECI -/→ lnLCF	0.7053	-0.5514	0.7947	-
lnLCF-/→ lnECI	14.5381	6.5210	0.0735	lnLCF-/→ lnECI

Source: Authors' calculation.

variables because GW and CC driven by GHE, especially CO<sub>2</sub> emissions, are severe threats faced by the world, and they are also major culprits of the observed ED such as floods, droughts, deforestation, and melting glaciers. The study also employs EF as another dependent variable because air degradations are not only forms of pollution, and the pressure of human activities harms all ecosystems, such as marine, soil, and air. Employing EF provides comprehensive insights that examine the role of the explanatory variables of ENV. Moreover, neglecting the supply side of ENV and just focusing on the demand side of ENV does not promote sufficient knowledge, decreasing the performance of the policy action because

the policy aimed at addressing improving reproductive nature plays a vital role in sustainability. LCF is used as the third dependent variable within this context. Moreover, focusing on E-7 countries is an important example because of their social, economic, and political properties.

In performing to achieve more resilient and concrete evidence harmonized with utilizing all variables, the Durbin-Hausman panel cointegration analysis and LM panel Bootstrap Cointegration analysis, AMG and CCEMG estimators based upon the second-generation panel techniques are executed because of detecting

the presence of CSD and slope heterogeneity for three models. At the same time, the Dumitrescu and Hurlin Panel Causality Test is also employed to find the causality direction among the variables. The panel cointegration tests confirm the presence of the cointegrated connection between the variables for all models. Later, the long-run estimations are processed. When the evidence on the CO<sub>2</sub> emissions is considered, RE is detected as an essential solution for lessening the CO<sub>2</sub> emissions. Like RE, KOF also promotes a supportive role in mitigating air degradation. However, EG and URB impair AQ, whereas ECI does not matter for AQ.

When examining the influence of explanatory variables on EF, it is observed that the results concerning EF support the evidence on CO<sub>2</sub> emissions. In another explanation, RE and KOF are also found to be pivotal factors in lessening the pressure of anthropogenic activities on ENV, whereas higher URB and economic welfare are achieved at the cost of comprehensive ED. However, EF is not influenced by ECI. The LCF is regarded as the final dependent variable within this context. As a consequence of the outcome of the nexus between the explanatory variables and the LCF, EG of the E-7 countries impairs sustainability, whereas RE plays a vital role in sustainability. The EQ of the countries considered is not associated with URB or ECI. KOF decreases the pressure of the anthropogenic activities mentioned in Models 1 and 2. At the same time, The model 3 also proves that KOF enriches sustainability.

Following the explanation for the empirical evidence, this study reveals significant macro and micro-based policy insights, which hopefully contribute to the objectives and targets based upon the sustainability of the E-7 countries. The role of RE in lessening ED and enriching EQ is highlighted as a consequence of the investigation in the study. Although RE promotes a comprehensive supportive effect on ENV of the E-7 countries, more committed and urgent actions seem to be required because the share of E-7 countries' global EC is almost 42%, and these countries are liable for 46% of the world's carbon emissions. However, the economies of E-7 countries dominantly rely on fossil energy resources, and they are ranked as the top fossil energy consumers and producers in the world. Despite the detrimental effects of fossil energy resources on ENV, disturbance in the global fossil energy supply, highly volatile fossil energy prices, the reliance on fossil energy imports and the dominant share of fossil energy export in total income, and the fact that NRE resources will soon run out are pushing factors for the E-7 countries to implement urgent actions for

the renewable energy transition. Within this scope, the expansion of public-private partnerships and regional collaboration portfolios play a vital role in expanding green energy funds. The Joint actions and commitment of the E-7 countries on Feed-in tariffs, tax subsidies, and long-term loans with low interest rates stimulate private enterprises to adopt, invest, and develop new energy technologies. However, installing solar panels and energy efficiency-based technologies can be further promoted across the existing energy-intensity sectors.

The study also confirms that KOF has improved environmental impact, decreasing CO<sub>2</sub> and EF and increasing the LCF of the E-7 countries. Day by day, the E-7 countries have dramatically integrated into the global economy. The social, political, and economic structures have been reshaped and transformed due to KOF. However, inflows of advanced and greener technologies, know-how, and management knowledge have become available for the countries. In contrast, social awareness of ED and polluting production and consumption patterns have become more visible worldwide. In order to mature the supportive role of KOF in ENV, the E-7 countries may promote the exchange of goods and services by providing cleaner technologies and investing in green, energy-efficient technologies and high-tech industries. The leap forward in the mentioned fields will create dynamic comparative advantages that help the E-7 countries to lift the highest-income group. Another implication from the study is that economic expansion and economic complexity do not improve sustainability. Policymakers should determine and implement urgent efforts and initiatives because E-7 countries have the highest economic performance among developing countries, and these countries' economic objectives increase the pressure on the regional and worldwide ENV. The results of the ECI and EG confirmed the current properties of the E-7 countries. These countries' heavy industry process still relies on fossil energy resources. Some countries in the group are ranked the most fossil energy exporter, while the rest are the most fossil energy importers. At the same time, the current ECI in the E-7 countries does not encourage environmentally friendly technologies. Within this scope, the current polluted economic structure should be evolved into energy efficiency, less natural resources reliance, and the required energy fulfilled by RE. URB process is another detected impaired factor of EQ. Governments, urban planning agencies, and metropolitan officials should take more efficient steps to reduce the influence of urbanization on EQ. As the population grows in urban areas in the E-7 countries, infrastructure, transit emissions, traffic

jams, domestic solid and water waste, employing fertile soils, and deforestation have been some challenges and polluted factors in these countries. Within this scope, intelligent urban planning, energy-efficient and green methods and materials utilized in infrastructure, renewable energy sources, and fuel-efficient and hybrid cars in the big cities are essential policies to reduce the rising trends in contamination.

All in all, this study also provides some recommendations based on the limitations of the study for further research. Although the concentration on the E-7 countries is an essential example in terms of the nexus between the regarded explanatory and three environmental-related indicators, other economic and future research can be performed for political classifications such as BRICS, OECD, European Unions, Next-11 countries with the same methods used in the study. However, different explanatory variables such as R&D expenditures, investment in RE, financial development, and natural resources rents can be employed for the E-7 countries or other mentioned countries. Moreover, types of globalization comprise political, social, and economic sub-components of ecological footprints, and their LCF can be executed by novel research. The final offer of new research is that the quantile approach or the wavelet techniques may be used for the same variables.

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# Gramscian Theories of Hegemony: Class Politics Eclipsed?

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## ABSTRACT

Gramsci's concept of hegemony remains a highly contested topic, sparking a diverse body of literature that debates its historical, political, and theoretical relevance. This paper focuses on the theoretical debates surrounding hegemony, examining three key Gramscian frameworks: dominant ideology, discourse theory, and the neo-Gramscian approach in International Relations (IR) and International Political Economy (IPE). The central concern is how class and class struggle, central to Gramsci's original concept, have been marginalized or eclipsed in these interpretations. The paper argues that class struggle is often substituted with ideology, culture, and discourse in both theoretical frameworks and concrete analyses of hegemony, which limits the understanding of contemporary politics despite claims to the contrary. This shift toward the ideational and consensual aspects of hegemony results in a limited theorization, offering a one-sided and partial view that leaves aside its structural, material, and coercive dimensions. By critically engaging with these approaches, the paper highlights the need to reintegrate class struggle into contemporary Gramscian theories, allowing a comprehensive understanding of hegemony to address the evolving, structural and class-based dynamics of politics in both national and global contexts.

**Keywords:** Gramsci, Hegemony, Class, Dominant Ideology, Discourse Theory, Neo-Gramscian Approach, Political Theory, International Relations Theory, International Political Economy.

**JEL Classification Codes:** B24, D74, Z13, P16, H11

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## INTRODUCTION

The concept of hegemony, as articulated by Antonio Gramsci, has emerged as one of the most influential and widely debated theoretical tools for understanding politics, power dynamics, ideology, and social relations in both historical and contemporary contexts. Over time, Gramsci's notion of hegemony has been variously interpreted and adapted, leading to a rich and diverse body of literature that seeks to apply his insights across political, social, and cultural domains. This paper aims to explore key Gramscian theories of hegemony—dominant ideology, discourse theory and neo-Gramscian International Relations (IR) and International Political Economy (IPE) approach—while also demonstrating how they have marginalized or overlooked the central role of class and class struggle in establishing and contesting hegemony.

This paper argues that contemporary Gramscian theories of hegemony have largely abstracted the notions of class and class struggle as key analytical categories. It advocates for a reintegration of class struggle into the theories of hegemony. Gramsci's notion of hegemony,

when examined in its most abstract and theoretical form, is intrinsically linked to capitalist relations of production. It refers to the unstable equilibrium of class powers and politics and concerns the specificity of the political in reproducing fundamental class relations. To fully appreciate the explanatory power of Gramsci's concept in understanding political change, it is essential to position class struggle at the heart of hegemony, integrating it with a theoretical framework that emphasizes its contested, coercive, and structural features.

This paper proceeds as follows. It begins with outlining the main bones of contention surrounding the interpretation and application of Gramsci's ideas, with a focus on his concept of hegemony. It highlights ongoing discussions about its historical, political, and theoretical status and relevance. The historical perspective emphasizes the context-specific nature of Gramsci's work; the political interpretation links his thought to broader Marxist traditions; and more theoretical approaches seek to refine and extend his concept of hegemony. The second and more substantial section critically evaluates contemporary Gramscian theories of hegemony, demonstrating how class politics/struggle

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is often underrepresented or sometimes almost non-existent in these frameworks. The final section critiques interpretations of hegemony that focus primarily on ideology and discourse, proposing that a more class-conscious approach is necessary to unlock the full potential of Gramsci's concept.

### **READING GRAMSCI and DEBATING HEGEMONY**

The writings of Gramsci have been extensively analyzed for their profound insights into understanding politics of contemporary societies, as well as for their potential to overcome the limitations, particularly 'economism' and 'epiphenomenalist' or 'reductionist' views of politics and ideology, inherent in traditional Marxist orthodoxy (Sassoon, 1987; Laclau and Mouffe, 2001; Bieler & Morton, 2018: 14-20). Gramsci's works primarily engage with the superstructures, areas often neglected in the classical Marxist tradition, focusing on human agency and consciousness and the cultural and ideological dimensions of political life (Femia, 1981). Theoretically, his conceptual innovations and concrete analyses lay the foundation for distinctive perspectives on, among others, politics, power, and ideology at national and global levels (Poulantzas, 1973; Cox, 1983; Burawoy, 2003; Bieler and Morton, 2018). Central to Gramsci's work is the concept of hegemony—a 'philosophical linchpin' (Martin 2023) and a unifying thread that connects his diverse concepts, historical-concrete analyses and proposed political strategies. As such, any engagement with Gramsci's political thought entails examining the meaning and theoretical implications of hegemony within and beyond his reconstruction of historical materialism.

Gramsci's intellectual legacy, particularly his concept of hegemony, is both rich and diverse, yet highly contested. Existing interpretations of hegemony involve significant political and intellectual controversies, which include concerns over the 'political manipulation' of Gramsci's writings within the context of Italian political parties (Mouffe and Sassoon, 1977; Fontana, 1993; Morton, 2003, 2007) and the ongoing debate regarding the novelty and distinctiveness of Gramsci's use of hegemony in comparison to Lenin's (Anderson, 1976-77: 26-27; Femia, 1981; Mouffe, 1979; Bobbio, 1979). Scholars also raise questions about the meta-theoretical cohesion of the concept of hegemony and its ontological and epistemological openness and limits (Bieler & Morton, 2018; Joseph, 2002), its lack of a fully developed theoretical framework (Poulantzas, 1973; Buci-Glucksmann, 1980), and its empirical applicability (Scott, 1985, 1990). There is also considerable debate

about the contemporary relevance of Gramsci's ideas for addressing issues that may seem far removed from his specific historical and socio-political context (Hall, 1988b, 1996; Morton, 2003; Bieler and Morton, 2006; Germain and Kenny, 1998). Related to this, discussions arise over whether Gramsci's concept of hegemony, along with his other key concepts, can be effectively 'internationalized,' as suggested especially by neo-Gramscians in IR/IPE (Cox, 1983; Rupert, 2003; Ives & Short, 2013; cf. Germain and Kenny, 1998; Femia, 2005, 2009).

Gramsci's writings and his concept of hegemony are open to diverse interpretations, with no single, uncontested understanding or universally agreed-upon methodology (Thomas, 2013). Rather than diminishing the significance of his work, these debates affirm its relevance and ongoing impact. Gramsci's ideas and concept of hegemony can be viewed through three key perspectives—historical, political, and theoretical—each offering distinct readings and revealing the complexity of his intellectual legacy.

The first perspective focuses on 'historicizing' Gramsci's writings, aiming to contextualize his concepts and analyses within the specific political, economic, and social conditions of his time and place. In this view, Gramsci is primarily seen as a national theorist, with his central concern being the political and social challenges confronting Italy during his lifetime. This approach cautions against the uncritical application of Gramsci's ideas to different contexts, highlighting the need for adaptation. It emphasizes the importance of understanding his work as deeply rooted in the particularities of his historical and social context, suggesting that any attempt to directly transplant his concepts or political strategies to other political contexts may require substantial modifications. Scholars such as Richard Bellamy (1990, 2001), Bellamy and Darrow Schecter (1993), Benedetto Fontana (1993), and Randall Germain and Michael Kenny (1998) have been prominent proponents of this approach, urging consideration of the contextual limitations of Gramsci's insights when extending them beyond the Italian case.

A second line of interpretation situates Gramsci within the orthodox Marxist tradition, emphasizing the significant influence of Lenin on his thought. From this perspective, Gramsci's concept of hegemony is largely seen as derived from his Marxist predecessors, albeit with distinct amendments reflecting his political and social context (Anderson, 1976-77: 18-27). Often referred to as the 'Leninist school,' this interpretation positions Gramsci as the Italian counterpart to Lenin, asserting



that he adapted the Bolshevik experience in Russia to the specific conditions of Italy (Fontana, 1993: 2). Within this framework, readings of hegemony are often politically instrumental, with Gramsci's concept primarily understood through the lens of the historical-political struggles of the Italian working-class movement. This approach emphasizes the way in which Gramsci's ideas were deeply embedded in the political party debates in Italy, where his work was frequently invoked to justify a range of political positions (Mouffe and Sassoon, 1977: 35). This interpretation highlights the strategic and politically engaged use of Gramsci's thought within and beyond the context of Italian political movements and struggles.

A third approach is notably more ambitious, aiming to expand and refine Gramsci's ideas by developing analytical and theoretical frameworks. This line of inquiry is particularly relevant to the focus of this paper, as the latter seeks to explore whether and how class and class struggle are incorporated into Gramscian theories of hegemony. Our analysis concentrates on three distinct attempts to theorize hegemony: the dominant ideology theory of hegemony, the discourse theory of hegemony, and the neo-Gramscian IR/IPE approach. A critical review of these frameworks is presented here to demonstrate how they appropriate Gramsci's concept of hegemony and its relationship to class and class politics.

### **THEORIZING HEGEMONY and FORGETTING CLASS**

This section explores three foremost Gramscian theories of hegemony, highlighting how contemporary capitalism's specificities and the role of class struggle are often overshadowed by an overemphasis on ideologies and discourses, and the consensual aspect of hegemony. While a full discussion of why class struggle plays a diminished role or is nearly absent in these frameworks falls beyond the scope of this paper, it is worth noting that this oversight can be seen as symptomatic of the broader decline of class analysis in social and political research (Chibber, 2006). Some scholars attribute this neglect to shifting inter-disciplinary intellectual trends—particularly the upsurge of poststructuralist and postmodern thought—within academia, as well as to the changing politics of theory in Western Marxism, where class struggle as both a theoretical category and a driving force of historical change has lost much of its erstwhile prominence (Wood, 1983, 1995, 1998). Some others—more philosophically-minded ones—point to Gramsci's 'philosophy of praxis' or 'humanism', which put the accent on ideas, identities, and discourses, sometimes

at the expense of focusing on objective structures. In its most problematic form, praxis/humanist Marxism tends to obscure the material and deep structural realities underpinning the ontological status of classes and class struggle and setting the conditions of possibility for hegemony (Joseph, 2002). At its best, Gramsci's diverse scholarship involves either tensions, ambiguities, and alternative models (Anderson, 1976-77; Martin, 1998), or irreconcilable—idealist/intersubjective vs. realist/structural—ontologies (Joseph, 2008: 111-14), which allow for competing interpretations of hegemony, some of which downplay or even discard the role of class.

Another reason for the neglect of class struggle is that hegemony theorists have often interpreted Gramsci's insights in ways that advance the agendas of their respective research fields, offering innovative contributions but often at the expense of his historical materialist roots and revolutionary commitments. For instance, neo-Gramscian IR/IPE students have found in Gramsci's work and concept of hegemony valuable philosophical (Cox, 1981, 1983; Bieler and Morton, 2018), methodological/meta-theoretical (Gill, 1993) and theoretical resources (Cox, 1987; van der Pijl, 1998, 2012; Morton, 2007) for building historically and normatively oriented critical theories, often in opposition to the positivist and overly structuralist mainstream theories in IR/IPE. Crucially, scholars have turned to Gramsci's hegemony not only to rethink and theorize contemporary politics in Western societies but also to envision a more encompassing leftist-democratic political strategy beyond the confines of traditional class divisions. Hegemony has thus been applied to analyze a wide range of themes in contemporary societies, including populist ideologies, politics of consent, 'radical democracy', new social movements, or identity politics. Theorizing hegemony is closely tied to moving beyond the economic reductionist Marxist theory and the traditional (socialist) political strategy of class struggle over given (often narrowly construed) material interests.

Regardless of the underlying cause, the issue seems to be more theoretical than anything else. As will be demonstrated below, many Gramscian theories of hegemony obscure the class-divided nature of contemporary societies, the contested nature of hegemonic ideologies, and the class struggle as a driving force of social and political change. However, there are valuable opportunities for further conceptual and theoretical-methodological development of Gramsci's hegemony. The core conceptual elements and theoretical assumptions for such a framework can be found in

Gramsci's own writings, as well as in some Gramscian approaches to hegemony, which engage more explicitly and theoretically with the relationship between capitalist relations, class struggle and state than other versions (e.g., Thompson, 1966, 1978; Poulantzas, 2000; Jessop, 1982, 1985, 2002; Wood, 1995; Panitch, 1994, 2000; Panitch and Gindin, 2005; Bieler and Morton, 2018).

### Dominant Ideology Theory of Hegemony

Most Gramscians acknowledge that Gramsci made a profound contribution to Marxist tradition and political thought by emphasizing the moral and intellectual leadership and the element of consent in his conceptualization of hegemony, while downplaying the role of coercion and domination. For instance, Martin Carnoy argued that for Gramsci, hegemony referred to 'the ideological predominance of the dominant classes in civil society over the subordinate' (1984: 68). Giuseppe Fiori similarly noted that hegemony is rooted 'in the acceptance by the ruled of a "conception of the world" which belongs to the rulers' (1970: 238). Fontana interpreted Gramsci's notion of hegemony through the lens of Machiavelli's political thought, conceptualizing it as 'the unity of knowledge and action, ethics and politics, where such a unity, through its proliferation and concretization throughout society, becomes both the way of life and the practice of the masses' (1993: 5). Chantal Mouffe provided a more refined interpretation, arguing that Gramsci's politics, and his conception of hegemony, went beyond Lenin's strategy of 'class alliances' to emphasize 'the indissoluble union of political leadership and intellectual and moral leadership' (1979: 179). In her view, Gramsci's hegemony was not merely about a simple political alliance but about the fusion of economic, political, and moral values and objectives (1979: 181). As a result, the Leninist conception of working-class hegemony was not only extended to the dominant capitalist classes, but also reworked to include a moral and intellectual dimension, which Norbert Bobbio (1979: 39) referred to as 'cultural leadership'.

Some interpretations of Gramsci's concept of hegemony have taken a more explicitly cultural direction, contrasting his ideas with both classical Marxist and Leninist thought. Joseph Femia, for example, argued that the 'key *cultural* emphasis' of the term hegemony in Gramsci's treatment 'has no place in Lenin's theory of revolution' (1981: 25). For Gramsci viewed hegemony 'purely in terms of ideological leadership,' positioning it in contrast to 'the moment of force.' Even when referring to 'political hegemony' or 'political leadership,' Femia contended that Gramsci 'undoubtedly means

the *consensual aspect* of political control' (1981: 25, emphasis in original). In this interpretation, hegemony is understood as the predominance achieved through 'consent,' rather than just through the 'force' of one class or group over others. It is considered a 'superstructural phenomenon,' with its essential source of influence rooted in civil society (Femia, 1981: 29). According to this widely accepted reading, the distinctiveness of Gramsci's conception of hegemony lies in his emphasis on ethical and moral leadership within civil society, as opposed to the force and domination associated with the coercive power of the state. While hegemony does not exclude the role of force and domination, it privileges its ideological, cultural and consensual dimensions, integrating both kinds of elements into a more complex and comprehensive framework of power.

In substantive terms, the strong emphasis on the ideological and cultural aspects of hegemony was developed into a theoretical framework in British Cultural Studies by Stuart Hall and his colleagues in the *Centre for Contemporary Cultural Studies* at the University of Birmingham (Hall, Lumley, & McLennan, 1977; Morley & Chen, 1996) and in the journal of the 'revisionist' Left *Marxism Today* (Shock, 2020). Hall's analysis of 'Thatcherism' as a dominant political ideology, especially through his concept of 'authoritarian populism,' served as a key example of his ideology-based theory of hegemony, offering a framework for explaining a thorough political-ideological shift and the rise of neoliberalism in the United Kingdom (UK) during the early 1980s (Hall, 1988a, 1988b). This framework placed a central focus on Gramsci's related concepts of 'historical bloc' and 'common sense' and the themes of mass media 'discourse,' populist 'ideology,' and 'civil society' in discussions of hegemony, which also resonated within the discourse theory of hegemony (Laclau and Mouffe, 2001) and some neo-Gramscian studies in IR/IPE (Bruff, 2008). In contrast to Lenin's conception, Gramsci's notion of hegemony expands into the relatively autonomous realm of civil society, acquiring a broader meaning and conception of politics than simply vanguard party and class alliance. Hegemony, therefore, encompasses not only the party but all the ideas, practices and institutions within civil society that elaborate, disseminate, and organize popular 'consent' around the dominant ideology (Bobbio, 1979: 40).

In Hall's (1986: 42) framework, central to the process of hegemony—one 'by which a historical bloc of social forces is constructed and the ascendancy of that bloc secured'—is ideology in Gramsci's sense, serving not

only as a tool for legitimating the ruling class but crucially also as a field for political struggle. Hegemony is, in turn, a political project focused on mastering the ideological terrain (Filippini, 2017: 18). Whereas traditional Marxists tend to view ideology as a reflection of underlying production structures or as disparagingly ‘false consciousness’—an inverted and mystifying appearance of capitalist contradictions, Gramsci (1971: 407, 328, 322) conceived of it as ‘a conception of the world ... manifest in art, in law, in economic activity and in all manifestations of individual and collective life’, or as ingrained in ‘common sense’—‘the uncritical and largely unconscious way of perceiving and understanding the world’, whether accurate or misguided. Hall, Lumley and McLennan (1977: 49) regarded Gramsci as ‘the first Marxist to seriously examine ideology at its “lower levels” as the accumulation of popular “knowledges” and the means of dealing with everyday life.’ For Gramsci (1971: 376-77), ‘historically organic ideologies’, or ‘those which are necessary to a given structure’, are not mere abstract ideas; as material forces, they “organize” human masses and create the terrain on which men move, acquire consciousness of their position, struggle.’

Gramsci and his concept of hegemony sanctioned Hall’s revisionist stance on traditional Marxism.<sup>1</sup> Concerning the base-superstructure relationship, Hall (1986: 31) was also deeply influenced by Louis Althusser’s idea of ‘overdetermination’, that is social phenomena have multiple interrelated causes, yet he rejected the thesis of economic determination ‘in the last instance.’ In contrast to the ‘theoretical certainty’ and closure of orthodox Marxism, Hall challenged economic determinism and the teleological notion of a preordained, privileged role for the working class in historical change. However, his critique aimed to qualify, rather than dismiss, the importance of economy and class struggle. In fact, he saw the economy determining ‘in the first instance’, that is setting the conditions of possibility for hegemony (1986: 43). As he (1988b: 170) acceded: ‘hegemony is not an exclusively ideological phenomenon. There can be no hegemony without the “decisive nucleus of the economic.” The economy establishes conditions of its existence, sets

the boundaries and workings of the ideological terrain and provides the ‘raw materials’ for thought but hardly determines the precise content and class belonging of ideologies (1986: 42). By doing so, he allowed for relative autonomy for the political-ideological terrain in the formation of hegemony. Even if ‘consent is not maintained through the mechanisms of ideology alone’, Hall (1986: 29) argued, ‘the two cannot be divorced.’ In his view, economy does not ensure hegemony; hegemony arises when ‘a particular set of ideas comes to dominate the social thinking of a historical bloc ... and, thus, helps to unite such a bloc from the inside, and maintain its dominance and leadership in society as a whole (1986: 29).’ Ruling class ideological discourses do not achieve hegemony until they are aligned with a historical bloc of social or class forces.

Hall’s interpretation of hegemony in ideological terms went beyond mere theoretical inquiry; it was central to developing and advocating a more expansive and inclusive political vision that moved past conventional class-based divisions or alliances. Robin Blackburn (2014: 86) considers him ‘a cultural and historical materialist making crucial arguments for a fully political stance.’ As he himself acknowledged, ‘the decision to focus on politics and ideology was the result of a deliberate strategy ... in order to make a more general point about the need to develop a theoretical and political language on the left which rigorously avoids the temptations to economism, reductionism or teleological forms of argument (1988a: 3).’ For the British Left, entrenched in orthodox Marxist political culture, failed to grasp both the true, ‘organic’ nature of the crisis of the 1970s and 1980s, and the significance of Thatcherism as a response to the crisis. Thatcherism as a ‘hegemonic project’ resisted being understood solely through the lens of traditional class politics. This failure left the Left unable to devise a viable and inclusive political-ideological strategy to counter Thatcherism and to lead British society in a progressive direction.

Hall did not observe that class or class struggle disappeared, nonetheless; rather he argued that ‘the underlying social and cultural forces which are bringing the era of organized capitalism to a close, coupled with the vigour of Thatcherite restructuring, have decomposed and fragmented class as a unified political force, fracturing any so-called automatic linkages between economics and politics (Hall, 1988a: 281).’ British society underwent such a profound transformation in its class structure, like earlier shifts that had shaped the Labour Party and modern democratic politics, that the

<sup>1</sup> Hall himself explicitly acknowledged the significant influence Gramsci had on his thinking about and theorizing (British politics: ‘He [Gramsci] works, broadly speaking, within a Marxist framework, but in some ways like me, he was not a classical or traditional Marxist at all. ... I feel drawn to him, not just intellectually, but temperamentally as well. I’ve been working with his concepts, trying to expand, trying to do what he’s done in relation to lots of old concepts—which is to expand, develop, and apply them, put them to new uses, shift the direction, etc. (Hay, Hall, Grossberg, 2013: 15).’

material foundations and the 'social imagery of class' has been redefined (Hall, 1988a: 5). Class struggle in contemporary Western societies has taken new forms, in which ideological struggle, especially struggles over 'common sense' and 'the national-popular' became more salient in the more general social and political battle for hegemony (1988a: 168).

Yet, Hall (1988a: 4) disputed the idea that classes enter the political and ideological arenas as fully constituted and unitary agents with given ideologies and interests of the mode of production. Instead, ideology consists of diverse and often contradictory discursive elements, with individuals or groups being positioned in different ways within it. A key function of organic ideology is that 'it articulates into a configuration different subjects, different identities, different projects, different aspirations. It does not reflect. It constructs a "unity" out of difference (Hall, 1988b: 166).' Therefore, political and ideological levels must be studied in their own right, without reducing them to their material or class base.

Through hegemony, Hall (1988b: 168) embraced an expanded conception of politics, power, and authority. He viewed politics as 'fundamentally contingent and open-ended,' a terrain where 'traditional political identities were collapsing' (1988b: 169), and power and authority are overdetermined (1988b: 170). As the working-class fractured, new social movements and identities, and new points of struggles emerged, shifting the focus from class politics to identity politics, from class struggle to ideological struggle, and from conflicts over material interests to battles over images and representation. Hall's vision of a new politics sought to open the British Left to new social movements and ethnic and racial identities, positioning them as political allies in building a counter-hegemonic project against Thatcherism (Shock, 2020). Because counter-hegemonies in 'hybrid social formations' demand not simply class alliances but 'political identities and principles that combine culture and class in new ways (Blackburn, 2014: 85):'

By emphasizing how ideological discourses are overdetermined and how they constitute class or social group identities and interests, Hall tends to substitute class with ideology. His view of ideology (or culture, or common sense) as neutral and discursively 'productive' ultimately blurs the class-based nature and bias of hegemonic projects. But he does not fully embrace the discursive notion of the 'total free-floatingness of all ideological elements and discourses' (1986: 40). Even so, lacking a classical Marxist negative and critical conception of ideology as a 'distorted idea,' Hall failed

to offer a robust critique of Thatcherism, particularly in exposing its nature as a bourgeois ideological project whose primary function is to obscure capitalist contradictions, including class struggle (Larrain, 1991: 23). The term 'authoritarian populism' falls short in capturing the essence of Thatcherism, as it fails to recognize its 'crucial historic novelty' and overlooks its core bourgeois ideological aspect: 'the revival of market fundamentalism' (Blackburn, 2014: 88).

In Hall's theory of hegemony, class struggle is generally acknowledged and retained within the framework, but it is framed in terms of the discursive articulation of ideological elements at the expense of its economic and structural bases. While he addressed the shifting balance of class powers in the UK under Thatcher, he underestimated the socio-economic changes that preceded her rise to power. By privileging ideological constituents of hegemony, Hall neglected both the socio-economic foundations and coercive aspects of Thatcher's political hegemony. Specifically, his analysis did not account for the changing structural context of the British state and economy in the late 1970s, and, as a result, he failed to explain 'the material conditions of transmission and reception of ideologies' (Jessop *et al.*, 1985: 91-92). Furthermore, he overlooked the shifting relationship within the ruling class and between this class and the state, as his focus remained exclusively on the interaction between the dominant and subordinate classes and the production of 'common sense' as hegemony in the UK (Jessop *et al.*, 1984). Consequently, his explanation of the changing balance of class powers and relations was only partial, and his framework was better suited to analyzing 'conjunctural' changes at the political-agential level (such as alliances, consent, leadership, common sense) rather than the social structural one (Joseph, 2008: 120-22)—shifts in dominant public/political discourses or strategies or what Poulantzas referred to as the 'political scene'. Despite his stress on ideological discourses, Hall fell short of recasting hegemony purely as a discursive formation, a task later taken up by his friend Ernesto Laclau and Chantal Mouffe.

### Discourse Theory of Hegemony

In *Hegemony and Socialist Strategy* (2001), Ernesto Laclau and Chantal Mouffe developed a discourse theory of hegemony. They identified Gramsci's primary contribution to political theory as his novel analysis of 'ideology' and, his rejection of 'economism' and class 'essentialism' in Marxist orthodoxy. Although Gramsci did not offer an "obvious" theory of ideology' (Hall, Lumley and 1977: 71), Mouffe (1979: 178) recognized in his *Prison*



*Notebooks* 'a radically anti-economistic problematic of ideology'. She argued that the foundation of this theory lies 'in the practical state in Gramsci's conception of *hegemony*' which provides 'its actual condition of *intelligibility*' (Mouffe, 1979: 178 emphasis original)

Laclau and Mouffe's theory of hegemony, like Hall's, builds on Gramsci's insights into the non-reductionist, neutral and productive nature of ideology, but extends them further. Drawing on post-structuralist philosophy, they shift the focus from ideology to discourse, conceptualizing the latter not merely as one aspect of hegemony, but as its principal constitutive structure. This move sets their theory apart from other hegemony theories, which typically treat ideologies as appendages to class positions. In this way, Laclau and Mouffe break with the classical Marxist view of ideology as an 'epiphenomenon' of economic structures or as 'false consciousness', as well as Georg Lukács' (1971) 'humanist' interpretation of ideology as 'class consciousness' within the social totality of capitalist relations. Their key contribution lies in reframing hegemony as a discourse, rather than as a set of ideological assumptions (Laclau, 1977).

Laclau and Mouffe first critiqued the class-ideology coupling or the view that all ideological elements necessarily align with a particular social class. In contrast, they argued that, for Gramsci, 'ideology is not the mystified-mystifying justification of an already constituted class power'; rather, it represents a strategic terrain where ideological struggles unfold, through which 'men acquire consciousness of themselves' (Mouffe, 1979: 196). As such, 'hegemony cannot be reduced to a process of ideological domination' (Mouffe, 1979: 196). By freeing ideologies from their presumed class character, Laclau and Mouffe advocate for a more autonomous and constitutive role for the national-popular ideologies articulated by the masses. Secondly, they contended that ideologies are more fragmented and incoherent than often assumed. Finally, they sought to broaden the notion and domain of politics by incorporating new political subjects and identities constituted by autonomous ideologies. Laclau (1977: 134) observed that in most historicist *and* structuralist views of hegemony, 'the coherence and degree of condensation of the ideologies of the dominant bloc are overestimated while the role of the popular-democratic ideologies is extremely underestimated.' An exclusive focus on dominant classes and their contradictions, Laclau (1977: 131) argued, overlooks the fundamental struggle between the 'people' and the dominant classes in the 'power bloc',

as well as 'the specificity and autonomy of the popular-democratic ideologies'. While Hall attributed hegemony primarily to the dominant classes, and both Althusser and Poulantzas highlighted the central role of ideological structures in shaping classes and hegemony, Laclau and Mouffe emphasized, especially in their early works, the more autonomous role of the dominated classes or social movements and their popular-democratic ideologies.

Discourse theorists were neither alone, nor even the first in highlighting the role of ideological discourses in the formation of class subjects and hegemony (see Wood, 1998). Prominent neo-Marxists, Althusser (1971) and Poulantzas (1973, 1975, 2000), had already placed ideological structures at the centre of their theorizations of hegemony. Influenced by Poulantzas' theoretical framework, particularly his concrete analysis of Fascism, Laclau developed his own non-reductionist analysis of ideology and proposed a more autonomous role for it, one where democratic-popular ideologies no longer belong strictly to specific classes. Laclau (1977: 109) argued that Poulantzas, operating still within an orthodox class-reductionist framework, 'ignored the autonomous domain of the popular-democratic struggle and tried to find a class belonging in every ideological element.' Despite his critiques, Laclau, in his early works, retained the concepts of class and class struggle, while seeking to expand the domain of politics to include democratic-popular struggles, often waged by the 'middle classes,' 'intermediary strata,' or the 'people' more broadly, rather than fundamental classes (1977: 114). As he observed, politics is increasingly shaped by manifold and varying identities that transcend traditional class categories. Laclau (1977: 114) argued that 'the identity of people plays a much more important role than the identity as class,' and that 'popular democratic interpellations are much more significant than their specific class interpellations in determining the overall ideological structure.' Rejecting the idea that all political subjects are class subjects, Laclau and Mouffe claimed to advocate for a more inclusive conception of politics—'radical democracy'—one that embraces broader political participation and struggles for the recognition of diverse, especially suppressed identities. The existence of various forms of political struggle are acknowledged but they cannot be strictly categorized as 'class struggle'. Ultimately, they substituted class struggle with hegemony as a discursive formation, whereby various 'subject positions' or political identities beyond classes are formed.



Discourse theorists understand hegemony as a process of discursive articulations and disarticulations that constitute political subjects or identities. They move it beyond any form of class struggle rooted in capitalist relations of production. While Laclau and Mouffe claimed to transcend Gramsci, arguing that he remained trapped in the economism and class essentialism he sought to confront, some other post-structuralists, such as Peter Ives (2004), found in Gramsci's work an expansive conception of language, which plays a central role in forming hegemony by shaping key elements like 'common sense', 'popular philosophies' or conceptions of the world, or collective will of 'the national-popular'. Even though Gramsci is taken as rejecting the traditional material-ideational, state-civil society, and force-consent dichotomies, the heavy focus on the linguistic aspects of hegemony tends to reduce the concept to merely organizing and securing consent. However, many Gramscian theorists have resisted such abstraction, emphasizing the connection between hegemony, social classes, and relations of production, much like neo-Gramscian scholars in IR and IPE.

### Neo-Gramscian IR/IPE Theory of Hegemony

It was Robert Cox (1981, 1983, 1987) who introduced Gramsci to IR/IPE, advancing a distinct conception of hegemony in world politics to challenge its narrow and imprecise uses within mainstream, especially (neo)realist and (neo)liberal institutionalist, IR theories. In developing a 'critical theory' of 'world orders' that was both explanatory and critical-normative, Cox, alongside other neo-Gramscian scholars in IR/IPE, sought to uncover the historically specific structures of 'social forces', 'institutions', and 'ideas', as constitutive of hegemony at the international level, while also posing questions about the dynamics of historical change (Cox, 1981, 1987, 1996, 1999; Gill and Mittelman, 1997). Central to their research agenda has been this inquiry into the constitution and transformation of hegemonic world orders.

In developing his theory of 'world orders', Cox turned to Gramsci's hegemony, supplemented by a constellation of conceptual and methodological tools drawn from his writings. Successive neo-Gramscians have largely followed him, Stephen Gill (1990, 1993, 1995, 1997, 1998, 2000) and Herman Van der Pijl (1998, 2012) in interpreting Gramsci's concepts in a flexible manner, adapting them to the international level. The concept of hegemony has been reinterpreted within the context of a supposedly global 'civil society', with transnational hegemonic projects being linked to the practices of an emergent 'transnational capitalist class' (Van der

Pijl, 1998, 2012). Unlike structuralist and discourse theorists of hegemony, neo-Gramscians have been less committed to constructing a definitive theoretical framework and have instead applied Gramsci's concepts and insights to explore issues related to contemporary global transformations.

The substantive issues addressed by neo-Gramscians include, but are by no means limited to, transformations in international institutions and the global political economy (Cox, 1987; Gill, 1990; Germain, 1997), the formation of the 'transnational capitalist class' and its 'structural power' (Van der Pijl, 1984, 1998; Robinson and Harris, 2000; Robinson, 2004; Gill and Law, 1988; Rupert, 2005; Jessop & Overbeek, 2019), and the rise of neoliberal globalization and its contestation (Gill, 1995, 2000, 2002; Rupert, 2000). Neo-Gramscians examined the crucial role of the US in global hegemony of neoliberalism (Rupert, 1995; Robinson, 1996; Augelli and Murphy, 1988), and explored the processes of European integration (Gill, 1998; Bieler, 2002; Van Apeldoorn, 2003) and, more recently the crisis of the liberal international order (Babic, 2020).

From the perspective of IR/IPE theory, the neo-Gramscian contributions are invaluable. The neo-Gramscian approach has provided IR/IPE students with a fresh perspective, along with conceptual and methodological tools to analyze the rise and decline of world orders, as well as the associated transformations in social forces, state forms, ideas and ideologies. The origins of the neo-Gramscian theory of hegemony and its primary contributions are rooted in key debates and questions within IR/IPE theory. These contributions can be organized into three key areas: the methodological critiques of positivist IR/IPE, the re-conceptualisation of power and structure in IR/IPE, and a political-normative interest in explaining historical change.

First, neo-Gramscians have primarily advanced methodological or meta-theoretical critiques of mainstream IR theory. They have been drawn to Gramsci's ideas, especially his 'historicism', which they argue provides 'an epistemological and ontological critique of the empiricism and positivism which underpin the prevailing theorizations' in IR/IPE (Gill, 1993: 22). For many, as Germain and Kenny (1998: 6) observed, 'getting beyond the limitations of positivism constitutes one of the most compelling reasons to deploy a Gramscian approach within IR theory'. While there is no doubt that the methodological tools and theorizations of hegemony developed by neo-Gramscians are inspired by Gramsci's own writings and methodologies, it is also evident that

their interpretation of Gramsci has been shaped by their primary goal: to present a fundamental critique of the overly structuralist and status-quo oriented mainstream IR/IPE theories and their positivist methodological conventions. In this context, neo-Gramscians argue that the concept of hegemony has the potential to overcome structural stasis and determinism by incorporating agency, politics and ideology into the construction and transformation of hegemonic world orders (Gill, 1993; Rupert, 1995).

Second, the neo-Gramscian theory has re-conceptualized 'hegemony,' 'power,' and 'structure' in IR theory, moving beyond the realist focus on military and economic power or the liberal-rationalist emphasis on institutions. In line with the broader Gramscian tradition, neo-Gramscians have framed hegemony as a new form of power—'structural power'—which incorporates intellectual and moral dimensions, extending beyond the conventional compulsory, institutional, and relational conceptions of power (see Barnett and Duvall, 2005). When hegemony is applied at the global level, neo-Gramscians have highlighted an emergent 'historical bloc' on a global scale, with their key contribution being the identification of the underlying bases of its 'structural power' (see Lukes, 2005). According to Stephen Gill and David Law (1988: 78, 74), the structural dimension of power pertains both to the 'economic and ideological' or 'material and normative' aspects of international life. Its concrete bases are found not only in market or production structures, the relative mobility of capital, the fragmentation of political authority in the international system and the growing dominance of transnational capital over labour (Gill and Law, 1993: 105-113), but also in the 'shared values, ideas, and material interests of both ruling and subordinate classes' (Gill and Law, 1988: 78). The concept suggests that the interests, ideas, and institutions embedded in the intellectual framework of politically and economically dominant groups come to be seen as natural and legitimate (Gill and Law, 1988: 78). Similarly, Cox (1983, 1987: 4) revisited the concept of structure in IR theory, emphasizing its historical and mutable nature. He introduced the concept of 'historical structures,' which he defined as comprising three interacting categories: 'material capabilities, ideas, and institutions.'

Third, as 'critical' theorists of 'historical structures' underpinning world orders (Cox, 1981, 1996: 89), neo-Gramscians have engaged with the theoretical and normative issue of historical change, bringing it to the agenda of a discipline often seen as oriented toward

the status-quo (Cox, 1983; Gill, 1993; Bieler and Morton, 2004). Unlike mainstream IR theory which tend to be 'problem-solving' in nature and explain mainly systemic continuity, critical theory, as Cox (1996: 89) defined, 'does not take institutions and social power relations for granted but calls them into question by examining their origins and whether and how they might be in the process of changing.' Cox himself has explained the rise and fall of historical structures at the global level, using the concept of hegemony as a 'fit between power, ideas, and institutions' (1996: 104). He (1987) examined the shift from the post-war hegemony of *Pax Americana*, which replaced the preceding *Pax Britannica*, illustrating how structural changes can be traced within these hegemonic transitions in world orders.

Despite their significant contributions to IR/IPE, neo-Gramscian attempts to internationalize Gramsci's concepts, particularly hegemony, reveal several theoretical limitations and analytical silences, especially in explaining historical and contemporary changes. One major challenge for neo-Gramscians has been incorporating class, class struggle, and the capitalist state—with its institutional specificity—into their theories of world hegemony. These gaps are particularly evident in their insufficient attention to the mode of production, its contradictions, and the dynamic and specific character class struggles take within it. Absent analyses of "'free" wage labour,' 'exploitation,' 'uneven development,' 'competitive accumulation' or incessant production 'crises' as inalienable constituents of capitalism, neo-Gramscian accounts of hegemony are bound to 'produce a shallow or conjunctural historicism that tends to naturalize capitalism and render it invisible (Budd, 2013: 7, also 87-116)'. There has also been inadequate focus on the geopolitical structure and power of the capitalist state and its specific institutions, especially the distinct institutional characteristics of liberal-democracies, in shaping the political hegemony of capital (Jessop, 1982, 2002). These omissions limit the ability of neo-Gramscian frameworks to fully account for the material structures and class relations that underpin the exercise of power in capitalist societies and world politics.

Neo-Gramscians have fallen short in providing a sufficiently radical challenge to mainstream IR/IPE theories, primarily because their conception of hegemony remains rooted in a state-centric ontology. As William Robinson (2005: 560) points out, neo-Gramscians conceive of hegemony as the combination of 'some preeminent state power in the world system with the

more specific sense of the construction of consent or ideological leadership around a particular historic project.' This formulation reduces hegemony to a process orchestrated by dominant states, which claim moral and ethical leadership over the world order. In doing so, neo-Gramscians obscure the essentially class-based nature of hegemony—the idea that dominant classes establish and maintain their rule through consensual political projects. Instead of foregrounding class relations, the neo-Gramscian approach tends to relegate them to secondary or derivative roles.

While neo-Gramscians acknowledge the role of social classes, they still place the state at the forefront as the primary agent of world hegemonic leadership. Cox (1983: 171) contends that world hegemony begins as an outward expansion of the internal (national) hegemony established by specific social forces. Andreas Bieler and Adam Morton (2004: 93), further developing Cox's idea, argue that once domestic hegemony is firmly in place, it can transcend the national social order and expand globally, becoming embedded in the world order. However, critics contend that in this theoretical framework, classes and social forces are incorporated only as agents of national hegemonies, after which their agency is absorbed by states and international organizations.

Despite the emphasis on the state in the theory of world orders, neo-Gramscians have not developed a distinct understanding of it—particularly the capitalist state—that departs from the state-as-actor models dominant in IR/IPE. Instead, by implicitly accepting the state as a corporate actor, they have grounded their theories of hegemonic world orders and advanced accounts of hegemonic transitions within a state-centric framework of world politics (Robinson, 2005). Even when neo-Gramscians attempted to explore the state and its transformation, especially within the context of the 'state-society complex,' they have largely treated the state as an aggregation of institutions—an approach that mirrors some mainstream perspectives in IR/IPE and political theory (Burnham, 1991; Cammack, 1990). As institutional subjects, states primarily function as 'transmission belts' between the global and national political-economic spheres, particularly in the context of hegemonic projects like neoliberal globalization (Cox, 1992: 31). This framework, despite claims to the contrary, fails to dismantle the 'great divide' between the internal (state) and external (global) realms in the discourse on globalization and the state in IR/IPE theory and reinforces the internal-external binary (Clark, 1999).

By maintaining this framework, neo-Gramscians are unable to overcome the limitations of traditional state-centric models in their analysis of global power relations. They have also struggled to properly conceptualize state power. Instead of viewing the state as a social relation, or a site of class struggle and considering its 'institutional materiality'—including its territoriality, institutional specificity and juridical-coercive powers—just as Poulantzas (2000) did, they categorize states according to some 'ideal types' derived from Weberian methodology (Cox, 1993). By denying states any agency in the formation of world orders (see Panitch, 1994, 2000; Panitch & Gindin, 2005) and overlooking the materiality of their institutional structures (see Poulantzas, 2000), which are rooted in capitalist relations of production, they fail to recognize the class-biased nature, active role and strategic interventions of the capitalist state in the formation of hegemony (Jessop, 2002). As a result, they discount the importance of legal frameworks and the role of individual rights in securing consent to a constitutional order (Germain and Kenny, 1998: 19). This failure to fully grasp the state's active involvement in hegemonic processes limits their theoretical capacity to understand the dynamics of power and consent within capitalist societies.

However, Cox also invoked the term 'internationalization of the state,' originally coined by Nicos Poulantzas in *Classes in Contemporary Capitalism* (1975: 37-88), to explain the changing form of the state and its institutions. Cox (1996: 107-109) and other neo-Gramscians have since argued persuasively that the global political economy has not been characterized by 'the retreat of the state,' as suggested in mainstream IR/IPE (e.g., Strange, 1996), but rather by 'state restructuring' since the early 1970s (Cox, 1993, 1996; Shields, 2004, 2012). Their focus has largely remained at the global level nonetheless, and the internal sources of state transformation are often overlooked or treated with insufficient theoretical specificity. In studies of neoliberal globalization, for instance, the constitution of neoliberal practices within states is frequently sidelined, with national processes being depicted merely as a reflection of transnational hegemonic forces. This framework conceptualizes hegemony as originating at the global level, with national dynamics considered secondary or derivative. Cox's perspective on this process is particularly revealing, as it highlights the way in which states are conceptualized and abstracted from social classes and class struggles, thereby obscuring the role of domestic forces and conflicts in the formation of hegemony.

'First, there is a process of interstate consensus formation regarding the needs or requirements of the world economy that takes place within a common ideological framework. Second, participation in this consensus formation is hierarchically structured. Third, the internal structures of states are adjusted so that each can best transform the global consensus into national policy and practice, taking account of the specific kinds of obstacles likely to arise in countries occupying the differently hierarchically arranged positions in the world economy (Cox, 1987: 254).'

Lacking a distinct, class-based conception of the state and its institutions, neo-Gramscians interpret the 'internationalization of the state' as little more than a restructuring of state institutions in response to external or global structural pressures. This top-down approach often leads to a one-sided conception of hegemony, in which it is formed globally and imposed from above. As Leo Panitch (1994) argued, neo-Gramscians, particularly Cox and his followers, operate within an 'outside-in' theoretical-methodological framework when explaining state transformation. This approach begins with international consensus formation and the accompanying agreements and obligations, to which internal state structures are subsequently adjusted (Panitch, 1994: 69). By excluding class struggle from their frameworks, this mode of explanation tends to echo structuralist-functionalist approaches, which overlook the dynamic and contested nature of political power, especially at the domestic level.<sup>2</sup>

A critique by Germain and Kenny (1998), and Femia (2005, 2009) of the neo-Gramscian IR theory of global hegemony questions the historical validity and theoretical legitimacy of internationalizing Gramsci's concepts. They argue that interpretations of Gramsci's concepts should be more closely aligned with his original text and context. However, the key issue here is not so much the process of internationalizing Gramsci's concepts, but rather the way in which hegemony is often theorized in abstracting from the underlying relations of production and class struggles

occurring both at the national and global levels. In much of the neo-Gramscian substantive research, hegemony is portrayed as a form of ideological domination by an emergent transnational capitalist class over national capitalists, the working class, and other subordinate classes. This depiction treats the transnational capitalist class as a unitary entity, free from internal struggles and contradictions, and overlooks the contestation of its hegemonic ideology by subordinate classes. For instance, in his conceptualization of neoliberal globalization as a hegemonic 'new constitutionalist' project of 'disciplinary neoliberalism' in Gramscian-cum-Foucauldian terms, Gill and Law (1989), and Gill (1995) have overstated the power of neoliberal ideas, practices and institutions. As a result, Gill and other neo-Gramscians have been charged with 'totalizing hegemony and inadequately addressing the nature of counter-hegemonic resistance' (Germain and Kenny, 1998: 18).

Neo-Gramscians have favoured historical theorizing and the development of explanatory frameworks tailored to specific periods, rather than grounding their theories in abstract templates. Cox (1996: 87) himself has emphasized the need to build theory based on 'changing practice and empirical-historical study'. However, their frameworks often overlook crucial questions, such as the theoretical status of class, state, and the explanatory role of class struggle. While they have recognized (Augelli and Murphy, 1993: 129, 141-146; Rupert, 1995) how Gramsci fundamentally reconceptualized the state, particularly in terms of stressing its 'integral-extended' and 'ethical' character, they have not fully engaged with the logical and theoretical implications of this recognition when internationalizing the concept. Not only has the Gramscian conception of the state—along with its capitalist nature and class bias—been overlooked, but the question of class struggle has also been analytically side-lined in favour of institutional-discursive analyses (Burnham, 1991; Cammack, 1990). As one critic noted, 'by attributing explanatory power to hegemony at the level of world order, Cox finds it necessary to first evacuate the historical specificity of the correlation of social forces in Gramsci's conception of hegemony' (Shilliam, 2004: 82).

In the process of the internationalization of the state, 'class relations,' when recognized at all, are at best incorporated as external forces to the 'process of [state] restructuring' (Burnham, 1999: 39). For some neo-Gramscians, class formation is no longer confined to the nation-state but, in the context of capitalist globalization, has been transnationalized (Van der Pijl, 1998, 2012; Robinson, 2004, 2005). This theoretical shift has been

<sup>2</sup> Cox (1999:12) viewed the role of the state in the following terms: 'There is something that could be called nascent historic bloc consisting of the most powerful corporate economic forces, their allies in government, and the variety of networks that evolve policy guidelines and propagate the ideology of globalisation. States now by and large play the role of agencies of the global political economy, with the task of adjusting national economic policies and practises to be perceived exigencies of global economic liberalism.'



crucial in registering the formation of classes and hegemony at transnational levels, yet the state (Panitch and Gindin, 2005) and political power is abstracted from the process (Montalbano, 2022). Since hegemony is no longer understood as being formed or contested within the state but as effectively transnationalized, national and local social/class forces seem to get omitted from the analytical framework. At best, they are relegated to passive elements, merely responding to external pressures, without any explanatory role in the overall theory. In short, as Peter Burnham (2000: 14) observed, neo-Gramscians have failed to ‘develop a coherent theory of the state and its relationship to class.’

It appears that the ideology- and discourse-based conceptions of hegemony have been uncritically appropriated by neo-Gramscians within IR/IPE. Despite invoking production relations and class struggles, neo-Gramscian scholars have often emphasized the ideological discourses and practices of transnationally-oriented dominant classes—predominantly the neoliberal ‘transnational capitalist class’—at multiple levels, rendering them susceptible to charges of ‘historicism’ and ‘voluntarism’ (Joseph, 2008; Pass, 2018). The notions of the ‘power bloc’ and ‘state’ have been internationalized through the concept of the transnational ‘historical bloc,’ which is understood in Gramsci’s (1971: 366) terms as an ensemble of ‘structures and superstructures.’ However, by neglecting to situate the formation and functioning of this bloc within the structures of capitalist accumulation and associated class relations and struggles, neo-Gramscians focus exclusively on international and transnational elites and institutions. Cox (1999) defines class so broadly as any form of social stratification that it becomes nearly indistinguishable from other markers, such as gender, ethnicity, or race. As Alfredo Saad-Filho and Alison Ayers (2008: 113) argue, this renders class ‘a static, positional, ideal-typical, and descriptive category, rather than a dynamic, historically specific relationship that shapes the capitalist system and its evolution.’

The capitalist nature and class bias of the modern state have not also been adequately addressed. While the neo-Gramscian concept of the ‘internationalization of the state’ offers a useful framework for studying historical and institutional change, particularly in the context of neoliberal globalization, its explanatory purchase remains limited. Neo-Gramscians have failed to develop a clear understanding of the state and its ‘institutional materiality’ as ‘a social relation,’ distinct from mainstream IR theory (see Poulantzas, 2000). As a result, transnational

class power and dominant neoliberal ideologies are seen as external forces rather than as being constituted within the state. This oversight, combined with an exclusive international focus, overlooks the varying patterns of change across nations, despite similar international pressures and transnational capitalist practices.

### THE PITFALLS OF SUBSTITUTING CLASS POLITICS WITH IDEOLOGY AND DISCOURSE

Gramsci’s hegemony should be understood as a dynamic and constitutive interplay between ‘force’ and ‘consent’ rather than merely their combination. However, for many Gramscians, the focus often falls on the latter—in Gramsci’s terms earning ‘consent ... through the exercise of political, moral, and intellectual leadership’ or through a specific political strategy, ‘the war of position,’ within ‘civil society,’ which he defines as encompassing non-economic social relations (1971: 238-9). This emphasis on consent, hailed as the distinctively Gramscian character of the concept of hegemony, has led to a burgeoning body of literature, with theoretical efforts primarily centring on the roles of ideology and discourse in building hegemony.

Some Gramscian theorists, such as Hall (1978, 1986; see Rojek, 2003) and neo-Gramscian scholars in IR/IPE, have retained, albeit somewhat inadequately, class connotations of hegemony, whereas Laclau and Mouffe (2001), by defining hegemony in terms of the articulation of hegemonic discourses, abstracted it both theoretically and methodologically, ultimately moving it beyond its class-based origins. Discourse theorists, as Ellen Meiksins Wood (1986: 151, emphasis original) forcefully argues, ‘tend to expel *class struggle* from the concept of hegemony.’ As a result, Gramscian theories of hegemony risk undermining some core insights of Gramsci’s broader scholarship—especially his ‘absolute historicism,’ his methodology of the subaltern, and his analysis of Fordism—which situates the foundations of hegemony in specific class relations, practices and institutions within a social formation, ultimately linking them to relations of production (Gramsci, 1971: 465, 279-318; Joseph, 2008: 113-14).

The Gramscian concept of hegemony, as articulated within the theoretical frameworks discussed above, confronts at least three methodological and theoretical challenges. From a methodological-empirical standpoint, questions have been raised regarding the utility of the concept as defined by ideological domination or a cultural/discursive construct. Critics who foreground class struggle in their analyses argue that the consent and



active submission of subordinate classes to hegemonic projects, if it occurs at all, is rarely realized. Any apparent or declared consent is often little more than a façade, concealed under the ruling class' dominant discourse. By closely examining the everyday lives of working-class people and other subordinate groups—including their identity and interest claims, cultural practices, ideological discourses, and political mobilizations—one can reveal and recover their (class) agency and specific forms of struggle, defying would-be hegemonic ideologies (Thompson, 1966:11, 1978). Through his ethnographic research on peasants, James Scott (1985: 322) argued that the seemingly conformist behaviour of subaltern groups does not necessarily reflect their ideological convictions. As he observed (1985: 331), 'subordinate classes—especially the peasantry—are more likely to be radical at the level of ideology than at the level of behaviour, where they are more effectively constrained by the daily exercise of power.'

This suggests that ideologies claiming hegemonic status are frequently and variously contested. Nonetheless, dominant official ideologies often appear hegemonic precisely because resistant or counter-hegemonic ideologies seldom emerge in the public domain, much less gain formal or institutional recognition. These alternative, subaltern ideological discourses and practices form what Scott (1985: 321) terms 'hidden transcripts'—'the insinuations beneath the surface, the discussions outside the context of [overt] power relations, and the anonymous, quiet acts of routine practical resistance that occur daily'—which often evade the notice of researchers. In contrast, what is typically recognized as hegemonic ideology or discourse often consists of 'public transcripts' or 'official stories' propagated by dominant classes. Therefore, an exclusive focus on the public domain and outward appearances can obscure the unofficial or marginal narratives, including folk cultures and local symbols, that might otherwise challenge the more visible discourses, symbols, and values of the dominant classes. What often appears as, or is frequently perceived as, the active 'consent' of the subordinate may, in fact, be the expression of the 'public transcript' itself—namely, the official discourses and practices of the ruling classes that mask resistance or alternative discourses (see Scott, 1985, 1990).

Critics of the conceptions of hegemony as consent or ideological domination extend beyond empirical refutations. Identifying counter-hegemonic movements or forms of resistance, even in their subtle expressions, exposes the limitations of theorizing hegemony solely

as the active and willing consent of subordinate classes. Such movements underscore the rarity and difficulty of ascertaining instances of 'expansive hegemony,' in which 'a hegemonic group fully adopts the interests of its subalterns, and those subalterns come to "live" the worldview of the hegemonic class as their own' (Jones, 2006: 53). In contrast, historical records more commonly reflect economic, social and political crises and conflicts, clashes over material and symbolic resources, protests, rebellions, revolutions, violence, social antagonisms, and wars. Gramsci's (1971: 109, 106-114) concept of 'passive revolution,' defined as revolution without mass participation, or as 'molecular changes which progressively modify the pre-existing composition of forces,' and his analysis of cases such as the Italian *Risorgimento* and *trasformismo* (the gradual incorporation of political elites, both allied and opposed, into the political order), illustrate that hegemony as a fully consensual rule or a thorough socio-cultural domination should be regarded as an exception rather than the rule. At issue here is understanding how political or ideological transformations occur within the dialectical nexus of state formation and class struggle especially in peripheral capitalist formations, without leading to a corresponding shift in the fundamental social relations (Morton, 2010). As Scott (1990: 79) argued, 'If there is a social phenomenon to be explained here, it is the reverse of what theories of hegemony and false consciousness purport to account for.'

Thirdly, the theoretical issue with the hegemonic ideology thesis is its exclusion of class struggle over material interests from the analytical framework. By focusing exclusively on consensual rule at the ideological and discursive levels, this approach risks overlooking economic struggles that may be obscured or yet to be articulated in the political realm. Those who attribute hegemony to the entirety of socio-cultural dominance engage in a totalizing discourse that leaves little space for resistance, conflicts, contradictions, or disjunctions across the political, economic, cultural, or ideological domains. Considering these concerns, one could argue that many Gramscian theorists have effectively 'substituted a kind of ideological determinism for the material determinism they sought to avoid' (Scott, 1985: 317).

Another important challenge for hegemony theories concerns the difficulty in explaining how social change could originate from below, from subordinate classes or groups. Indeed, Gramscian theories, with their overemphasis on ideological or discursive reproduction, are better suited to explaining continuity and stasis

than accounting for change. As Scott (1990: 78) points out, hegemony is often viewed as 'a self-perpetuating equilibrium that can only be disturbed by an external shock.' This perspective, Scott (1990: 78) argues, limits the ability of hegemony theories to explain change without resorting to a "big-bang" theory of disruption. This limitation is evident in both agent-centric or humanist and structuralist interpretations of hegemony. The former, by failing to recognize relative autonomy from ruling class ideology, must either ignore contradictions within the dominant ideology or the influence of subaltern ideologies, or collapse the entire complexity of class struggle into the ideological domain. The latter, by granting ideological structures/discourses a high degree of relative autonomy from their socio-economic contexts, tend to focus exclusively on the discursive reproduction of ideological domination, neglecting the material and social class forces and struggles at play. By collapsing the link between the objective class determinations and the ideological discursive field, hegemony in Laclau and Mouffe's post-structuralist framework is reduced to a set of purely discursive practices, in which class or any other agency capable of effecting change disappears.

The theory of hegemony as ruling class ideological domination fails to address the material contradictions and conflicts inherent within the content and form of the dominant ideology itself. This perspective is grounded in a 'historicist' view of class, or what could be described as a 'collectivized individual' with its own unified 'consciousness, unity, autonomy, and self-determination' (Eagleton, 1994: 187). The hegemonic ideology is, in this framework, seen as a mere reflection of the material existence of a unitary and autonomous class, primarily expressed through the realization of its consciousness and worldview in the institutions, practices, and discourses that shape and govern society. As Lukács observed, 'For a class to be ripe means that its interests and consciousness enable it to organize the whole society in accordance with those interests' (cited in Eagleton, 1994: 186).

In this voluntarist interpretation of hegemony, as Eagleton (1994: 186) explains, 'each social class has its own peculiar, corporate "world-view," one directly expressive of its material conditions of existence; and ideological dominance then consists in one of these world-views imposing its stamp on the social formation as a whole.' This view seeks 'to locate the "essence" of bourgeois society within the collective subjectivity of the bourgeois class itself.' In his attempt to avoid the mechanical determinism of orthodox Marxist class analysis, Lukács entertains the

notion of a 'social totality'; however, as Eagleton (1994: 186) points out, 'this social whole risks becoming a purely "circular" one, where each "level" of social reality is granted equal effectivity.' In this formulation, hegemony as class ideological power dramatically 'simplifies the true unevenness and complexity of the ideological "field" (Eagleton, 1994: 186).'

In restating the hegemony problematic within Poulantzas' (2000) structuralist framework, any single ideological field is not granted autonomy within the social structure. His conception of hegemony challenges the view that ideology can exist independently from the social classes that produce it. Rather than understanding the ideology-class relationship as one of mere correspondence or reflection, Poulantzas views it as more complex, emphasizing that the relationship between class and ideology is shaped by dynamic interactions, rather than a straightforward alignment.

Nonetheless, this perspective also makes change difficult to explain because social and political institutions are seen as mere reflections and mechanisms of a self-autonomous and cohesive hegemonic ideology. In such a framework, social and political relations and institutions appear stable within the discursive structure of hegemony. Structuralist views of hegemony, as a result, tend to minimize the role of class struggle and the potential for change, instead placing undue emphasis on the stability and reproduction of existing ideological-institutional structures. As Peter Willis (1977: 175) noted, 'Structuralist theories of reproduction present the dominant ideology (under which culture is subsumed) as impenetrable. Everything fits too neatly. Ideology always pre-exists and preempts any authentic criticism. There are no cracks in the billiard ball smoothness of the process.' This critique underscores how structuralist approaches to hegemony overlook the contradictions, struggles, and potential for ideological change.

While the concept of hegemony as an amalgam of 'force' and 'consent' has been influential, its focus on ideological domination often neglects the social-material contradictions, complex and coercive class struggles that shape social formations. When hegemony is conceived as a discursive formation, classes and class struggle are effectively substituted by discursive practices. As critiques suggest, these frameworks risk oversimplifying the ideological terrain, portraying dominant ideologies as self-contained and impermeable, while neglecting the agency and resistance of subordinate groups. Moreover, the conceptualization of hegemony as an unchanging, self-perpetuating equilibrium fails to adequately explain

social change, which is often driven by class conflicts and contradictions emanating from underlying capitalist relations of production that are obscured by overly idealistic and discursive interpretations.

The challenges discussed—ranging from empirical issues to theoretical rigidity and full autonomization and oversimplification of the ideological field—underscore the need for a more dynamic, historically and socially-grounded understanding of hegemony. This approach should account for the variability of class relations, political-ideological struggles, while recognizing the potential for counter-hegemonic social/class forces, contradictions and alternatives within the ideological terrain, and the role of class struggle in driving social and political change.

## CONCLUSION

This paper argued that Gramscian and neo-Gramscian studies, spanning dominant ideology, discourse theory, and neo-Gramscian approaches in IR/IPE, often emphasize the ideational, ideological, and consensual aspects of hegemony, neglecting its structural, class-based, contested, and coercive dimensions. In discourse theory, the concepts of class and class struggle have become overly abstracted, distancing theorists from class-based political analysis. Those focused on ideational and cultural elements tend to downplay structural and institutional dynamics in hegemony formation, overlooking the connection to capitalist relations of production and ongoing class struggles. Additionally, the role of the capitalist state and its institutions in shaping class and hegemony is often neglected. The failure to incorporate class struggle into hegemony theory limits these frameworks to explaining continuity and stability, while struggling to account for change.

This paper also revealed that, despite differences in their disciplinary or social contexts, all three Gramscian theories of hegemony were shaped by the organic crisis of the 1970s and 1980s and the subsequent neoliberal transformations at both national and global levels. Hegemony became a tool not only for analyzing these transformations but also for rethinking class struggle and revitalizing leftist democratic politics in more pluralistic and inclusive directions within socially transformed, complex Western societies. The diminishing emphasis on class struggle was, in part, a reaction to and correction of traditional Marxist conviction that privileged the labour movement's role in revolutionary change. Hall's ideological interpretation of hegemony arose from his need to understand Thatcherism as a hegemonic project

in order to confront it on its own terms. As Blackburn (2014: 75) noted, this 'political impulse' permeated Hall's entire scholarship. Similarly, Laclau and Mouffe's use of hegemony in *Hegemony and Socialist Strategy* was driven by their need to reformulate a socialist strategy for 'radical democracy', moving beyond the class-based notions of social democracy at the time (Carpentier & Cammaerts, 2006: 970). Cox (1999, 2004) also advocated global political and inter-civilizational dialogue for non-exclusionary pluralist world orders. In Gramscian terms, hegemony theorists waged a 'war of position' against both strictly class-centric and neoliberal conceptions of politics. As with Gramsci's work, the theories of Hall, Laclau and Mouffe, and Cox are best understood within their own historical and socio-political contexts.

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# The Political Economy of Japan's Net-Zero Vision in the Context of Energy Security

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## ABSTRACT

This article analyzes Japan's ambitious 2050 net-zero emissions target and its effects on energy security with a primary focus on the strategic role of hydrogen technology. Japan's energy security dilemma lies in its dependence on fossil fuels and nuclear power, and the challenges of transitioning to renewable energy sources. Understanding how Japan's 2050 Net-Zero Vision shapes its foreign and security policies is essential, especially as hydrogen technology plays a central role in these changes. This work posits that while Japan's hydrogen ambitions offer promise, the challenge of balancing energy security with net-zero goals is complex. The high costs of hydrogen production and ongoing reliance on fossil fuels complicate Japan's energy transition and international energy partnerships. The article employs a political economy framework to evaluate the feasibility and practicality of Japan's hydrogen-centric energy strategy, taking into account both domestic policy implications and its impact on global alliances. Why environmental and climate security is often secondary to economic security in energy discussions requires further examination. The article presents theoretical perspectives on the reduction of fossil fuel dependence, the enhancement of energy self-sufficiency, and the advancement of technologies that can mitigate long-term vulnerabilities. Hydrogen plays a pivotal role in Japan's energy and climate agenda, serving as a cornerstone for both domestic objectives and international collaboration. Furthermore, the article analyses Japan's hydrogen collaborations with ASEAN and Middle Eastern countries, along with the geopolitical and economic implications. This study identifies the opportunities and challenges in Japan's transition to new energy sources and examines the broader implications of Japan's energy security for global energy dynamics. The article maps the scope of major challenges Japan faces in balancing its net-zero targets—a critical issue for both regional and global policy—while ensuring its energy security.

**Keywords:** Japan's Hydrogen Diplomacy, Climate Change, Energy Security, Energy Transition, Renewable Energy.

**JEL Classification Codes:** N00, N15, N25, N45, N75, N85, N95, O38, O53, P00

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## INTRODUCTION

As the climate and energy landscape rapidly evolves, the emphasis on sustainable and reliable energy sources has become critical. Energy supply, network connectivity, energy security concerns and geopolitical dynamics play an important role in the development of climate-related policies and actions. Recognizing the impact of these factors is crucial in developing comprehensive strategies to address the climate challenges (Kumar et al., 2021; Tanaka, 2013). Given the complexity of these challenges within an often-tumultuous international system, countries may adopt diverse measures tailored to their unique contexts. In this complex environment, it is crucial to maintain a variety of technological options to accelerate the shift towards carbon neutrality (MUFG, 2022, p. 14; Peña et al., 2022).

In response to global trends and the urgent challenges posed by climate change, nations around the world are striving to redefine their energy strategies to achieve

sustainability. In line with these efforts, the Japanese government, as first announced by former Prime Minister (PM) Yoshihide Suga (2020-2021), is targeting 41% for fossil fuels, 20%-22% for nuclear power, and 36%-38% for renewables in its energy mix. Under the leadership of PM Fumio Kishida (2021-2024), this vision has been maintained, with the aim of achieving a balanced energy mix by 2030. Japan's 2050 Vision also calls for the strengthening of hydrogen technologies to support the energy sector in the Middle East and the promotion of green hydrogen in the ASEAN region.

Japan's 2050 Net-Zero Vision is influenced by a number of critical political and economic factors, including the country's limited domestic energy resources, geographic constraints, reliance on undemocratic states, and vulnerability to geopolitical disruptions (Ohta & Barrett, 2023, p. 8; Watanabe, 2021, pp. 40-41). The long-standing relationship between Japan and Middle Eastern nations, which has been shaped by their shared interests in energy

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security and the global political landscape, is a key factor in understanding the region's role in Japan's foreign policy and energy security. The 1973 Oil Crisis, which was initiated by the Organization of the Petroleum Exporting Countries (OPEC), is a notable example of the influence of these nations on Japan's energy landscape. The enduring partnership between Japan and these states is expected to continue well into the 21st century, as they remain critical to meeting Japan's energy demands.

Despite the stabilization of energy flows from the Middle East, the ongoing aggression of Russia in Ukraine has brought to the fore the challenges of ensuring energy security and supply diversification (Imahashi, 2022). Japan's heavy reliance on fossil fuels poses a substantial obstacle to the achievement of the ambitious targets outlined in its 2050 Vision, and there are significant uncertainties, particularly regarding the role of nuclear power in the energy transition. Without a definitive and efficacious transition to renewable energy sources, Japan's endeavours to attain energy independence and its net-zero emissions target could be substantially hindered.

Japan, significantly dependent on energy imports, is focusing on advanced technologies to improve resource efficiency and transportation, highlighting their essential impact on economic growth and national security. As Asia progresses in its shift to renewable energy, Japan is taking steps to lower Carbon dioxide emissions by incorporating sustainable energy sources such as ammonia. The increasing emphasis on sustainable energy storage, backed by existing suppliers, represents a crucial shift in Japan's energy security approach, reconciling environmental issues with national interests. Nonetheless, as an advanced country, Japan's 2050 Vision necessitates a comprehensive assessment of the political and economic factors that affect its viability and robustness. Mentel et al. (2020) emphasize that "economic, energy, and environmental security indicators exhibit systemic interconnections" (p. 177), illustrating the complex challenges that Japan encounters. Even with these links, in Japan's energy strategy, environmental and climate security continue to take a backseat to economic security, prompting important inquiries about the reasons for not flipping these priorities (McDonald, 2013; Nyman, 2018). Tackling these problems requires additional examination and thought.

Japan's energy security is significantly influenced by its reliance on energy imports, notably fossil fuels. In pursuit of its ambitious 2050 Net-Zero Vision, the nation faces mounting pressure to achieve a sustainable energy mix

while safeguarding national security. Goldthau and Sitter (2015) underscore the evolving nature of energy as a commodity and its substantial impact on global economic and national security policies. Utilising these insights, the present research adopts a political economy perspective to analyse Japan's energy security, emphasising how its 2050 net-zero goals shape its foreign and security policies, particularly through the lens of hydrogen technology. The hypothesis suggests that Japan's strategic focus on hydrogen is driving a transformation in its foreign policy and energy strategy, creating both opportunities and challenges for its regional and global influence.

The article will assess how these strategies affect Japan's energy security, relationships with key Middle Eastern energy suppliers, and leadership in the ASEAN region. Ultimately, the article aims to evaluate the feasibility of Japan's net-zero ambitions by examining the interplay between domestic energy policies, international partnerships, and the political economy of energy security. By examining strategies centered around hydrogen, this paper advances knowledge of the challenges of attaining both economic and geopolitical stability and sustainable energy security.

This paper is organized into six sections. First, it introduces "New Concepts of Understanding the Paradox of Energy Security", offering a theoretical framework that underpins novel discussions. The next section, Japan's 2050 Vision in Policies and Practices, delves into Japan's specific policies, with subsections on Hydrogen Technology for Japan's Energy Security, A Hydrogen-Based Diplomacy in the ASEAN and Middle East, which analyze Japan's strategies and international collaborations. The paper then broadens the scope to discuss the current dynamics of energy politics, placing Japan's energy policies in a global context. Finally, the findings highlight the implications of Japan's energy transition for its foreign and security posture, and discuss the challenges Japan faces in reconciling energy security with its ambitious net-zero goals.

### **NEW CONCEPTS OF UNDERSTANDING THE PARADOX OF ENERGY SECURITY**

In the conservative classical approach, energy consumption data serve as crucial indicators of a country's level of development (Cader et al., 2021; Gao et al., 2017). Japan's overarching grand strategy is to promote and maintain prosperity and technological advancement, which are essential for the country's economic security (Samuels, 2011). Energy is one of the most significant input of the Japanese economy, which produces and



provides advanced technological transformation. Samuels (1994) coined the term “techno-nationalism” for Japan, which refers to the belief that “technology is an essential component of national security and must be indigenized, diffused, and nurtured to make a nation prosperous and powerful” (Samuels, 1994, p. x). In the 1970s, following the “1973 Oil Crisis”, Japan began to address energy security as a national security issue within the Comprehensive Security Concept (Akaha, 1991). This was motivated by a techno-nationalist mindset. On the 50th anniversary of the oil shock, Japan is implementing new sustainable energy strategies in a security context due to the imminent effects of the Ukraine War, global warming, and climate change (Sekiyama, 2023). It is anticipated that the attainment of this significant goal will become a more central priority in Japan’s foreign and domestic policy.

The aspects of energy security and the environment interact in systemic behaviors and functioning of living and non-living systems and create a new global environment. This complexity is indicative of a paradigm shift, as Milina (2007; 2013) stated as she called for new energy security solutions based on renewables, electrification, and digitalization to cope with modern-day surface problems. Drawing from this, scholars such as Luft and Corin (2009), Nuttall and Manz (2008), and Sovacool and Brown (2010) delve deeper into how energy security technologies have revolutionized the conduct of international relations and the environment, which expands the debate. In this debate, Nyman’s “The Energy Security Paradox” offers a rather nuanced understanding of the various contradictions contained within energy security for large global energy consumers, including the US and China. Nyman’s framework could be highly instrumental in explaining Japan’s present dilemma of energy security as well. She posits that the complete elimination of risk is unfeasible in the context of continued reliance on fossil fuels, and underscores the imperative for a transition towards low-carbon alternatives. The work of Nyman indicates the direction in which the various resistances to traditional models of energy security are increasing, with a set of new paradigms centered on renewables starting to take hold. Furthermore, Nyman’s work also considers the role of transition in the context of mobilizing energy transitions toward a low-carbon future, as explored in greater depth by Newell (2021).

Nyman’s analysis assisted us in interpreting Japan’s energy policy as a traditional two-dimensional approach to energy security. While the first dimension focuses

on a secure supply of energy, the second dimension aims at limiting the harmful environmental impact caused by energy consumption. Japanese policy has traditionally focused on the first dimension since 1973, but this necessary focus now needs to shift to the second dimension related to climate change. This is in accordance with the global initiatives of the “UN Sustainable Development Goals” (SDGs), COP26, COP27, and the G7 Declaration (Sekiyama, 2023), which collectively emphasise the advent of a new energy era, one that is defined by a connection between power, security, and energy independence.

The Japanese 2050 Vision epitomizes the Nyman paradox of sustaining the double agenda: environmental sustainability while coupled with dependence on conventional sources. Similarly, Nyman underlines such contradiction in energy policy between the US and China, while Japan also struggles between the pursuit of sustainability and the indelible mark of conventional energy source use.

### JAPAN’S 2050 VISION IN POLICIES AND PRACTICES

Japan, as a pacifist actor in the international system<sup>1</sup>, has the lowest rate of energy independence among the G-7, at just 11%, and, remarkably, the country continues efforts to pursue the transition to greener energy sources. For the first time in history in 2023, ammonia was mentioned Leaders’ Communique, as the G-7 nations, in Japan, emphasized the significance of developing and utilizing low-carbon and renewable hydrogen. Furthermore, the G-7 countries have recognised that a number of nations are investigating the potential of utilising renewable and low-carbon hydrogen and its derivatives in the energy sector with the objective of generating thermal power with zero emissions. This depends on whether this approach is consistent with the 1.5°C objective and the shared goal of a fully or largely decarbonised power sector by 2035 (*G7 Hiroshima Leaders’ Communiqué*, 2023). Despite energy security and climate change being considered the primary concerns for G20 countries in recent years (Doğrul & Akpınar, 2022, pp. 9–12), disagreements that arose at the G20 Energy Ministers’ Meeting once again highlighted the significance of the G7’s decision made during Japan’s presidency in 2023.

<sup>1</sup> Article 9 of the Japanese Constitution: “Aspiring sincerely to an international peace based on justice and order, the Japanese people forever renounce war as a sovereign right of the nation and the threat or use of force as means of settling international disputes. In order to accomplish the aim of the preceding paragraph, land, sea, and air forces, as well as other war potential, will never be maintained. The right of belligerency of the state will not be recognized.”

Russia and Saudi Arabia both opposed the G20's proposal to triple countries' renewable energy capacity, which was discussed at the India-hosted G20 summit (Iwase, 2023).

Yet, Japan's "Strategic Energy Plan" (2021) has encountered challenges in determining which energy sources to prioritize, leading to a lack of clarity on the concept of balancing energy security and environmental concerns (Odeyemi & Sekiyama, 2022, p. 18; Ohno et al., 2022, pp. 3, 20). Despite the focus on nuclear, renewable, and hydrogen energy technologies as potential alternatives, the country finds itself caught in a dilemma due to the intricate nature of the energy, the country's energy needs, and their impacts. Some point that Japan, once referred to as a "nuclear village" (Koppenborg, 2021, p. 117) must rely on nuclear energy for the foreseeable future to decarbonize, and that the government should accept this reality (Harding, 2021; Nikkei Asia, 2021). Some posit that Japan's international competitiveness may decline further due to its comparatively slower progress compared to other major industrialised countries in the global advancement of new renewable energy technologies (The Asahi Shimbun, 2022; Akimoto, 2022). Others advocate for fossil hydrogen and suggest that the government investigate zero-emission hydrogen initiatives as well as onshore wind project alternatives (Kan, 2020, p. 14). Government policy dilemmas and hesitancy also have a significant effect on public opinion regarding climate change action. Yet Japan has substantial technological potential to support behaviour modification and introduce advanced energy facilities, such as nuclear and hydrogen technologies (Ogawa et al., 2022, p. 17). By harnessing this potential, the country can enable its citizens to embrace sustainable practices and contribute to global efforts in combating climate change.

Japan has achieved notable progress in reducing greenhouse gas emissions, with a 5% decline in 2020 marking the seventh consecutive year of reductions and a total decrease of 18% since 2013 (Ministry of the Environment, 2021). However, this progress remains insufficient to meet the revised target of a 46% reduction by 2030, partly due to the impact of the global pandemic. While the temporary decrease in emissions during the pandemic was encouraging, Japan's continued reliance on polluting fuels highlights the need for substantial increases in carbon taxes and more ambitious measures to achieve its net-zero goals (Ito & Takeo, 2022). Environment Minister Tsuyoshi Yamaguchi has emphasised that achieving net-zero emissions will necessitate measures beyond the implementation of a carbon tax and the establishment of a \$17.5 billion green

fund (Oda & Nobuhiro, 2022). Moreover, during a visit to Gulf countries in July 2023, PM Kishida emphasised Japan's commitment to collaborating with oil-producing nations to develop sustainable and cleaner energy solutions (Kantei, 2023), thereby reinforcing the need for both domestic and international efforts to address climate challenges.

Japan's revised goal of reducing emissions by 2030 has not been met, and the pandemic has exacerbated this challenge. In January 2022, Japan requested Indonesia's assistance in lifting the one-month ban on coal exports. Furthermore, Australia provided over 40 percent of Japan's LNG imports, and the two countries recently concluded nearly \$1 billion in agreements for LNG extraction in Australia (Stringer, 2023). Japan is actively pursuing diversification of its LNG import sources by investigating the possibility of additional supplies from Qatar and the UAE (Kumagai, 2023). Russia is a significant energy supplier for Japan, providing 4% of the country's crude oil imports and 9% of its LNG imports. (Nikkei Asia, 2022). In the wake of the 2011 nuclear meltdowns at the Fukushima nuclear power plant, which precipitated a significant decline in the utilisation of nuclear power reactors, there has been a discernible surge in the reliance on carbon-based energy sources (Koppenborg, 2021). Japan is still reliant on nuclear energy for decarbonisation due to the lack of viable alternatives, despite the unfortunate consequences of the Fukushima disaster. In this context, the current progress and achievement levels towards the 2030 goals provide essential data for the assessment of the feasibility of Japan's 2050 Vision. In this sense, hydrogen technology is recognized as one of the pivotal technologies for achieving Japan's challenging targets for 2050.

## **HYDROGEN TECHNOLOGY FOR JAPAN'S ENERGY SECURITY**

In many industries, including cement, steel, chemicals, and long-distance transportation, hydrogen can take the place of fossil fuels (Mundy, 2023). Hydrogen is frequently regarded as a pivotal solution for curbing emissions in industries where regulation is challenging due to its pervasive availability, minimal emissions, and adaptability. However, the majority of hydrogen is derived from fossil fuels, representing 6% of global natural gas consumption and 2% of coal consumption (MUFG, 2022, p. 102; IEA, 2023). The production of hydrogen results in the emission of approximately 830 million tonnes of CO<sub>2</sub> on an annual global basis. In order to realise its full potential as a clean energy source, it is necessary to produce hydrogen using either fossil

fuels in conjunction with “Carbon Capture, Utilisation, and Storage (CCUS)”, nuclear power (referred to as blue hydrogen), or renewable energy (referred to as green hydrogen) (IRENA, 2022). Based on the current state of hydrogen fuel development, initiatives are underway to improve hydrogen capabilities. Several regions and countries, including the European Union and its member states such as Germany and the Netherlands, as well as Australia, have developed national strategies for hydrogen development (METI, 2021b). In countries where decarbonisation presents significant challenges, the utilisation of hydrogen is becoming increasingly prevalent in both commercial vehicles and the industrial sector. This is facilitating the introduction of hydrogen power generation and the establishment of hydrogen supply chains (MUFG, 2022, p. 102).

Japan was among the first countries to implement a comprehensive national hydrogen strategy, having established the “Basic Hydrogen Strategy” by December 2017 (METI, 2017a). Germany and France created their national hydrogen strategies in 2020. Japan is now at the forefront of global initiatives to create a society based on hydrogen as a result. This milestone was preceded by the government’s 2014 “Strategic Roadmap for Hydrogen and Fuel Cells”, which was updated in 2016 and 2019 following the development of the “Basic Hydrogen Strategy” (Ohno et al., 2022, p. 3). In accordance with this strategy, the government has disclosed its intention to invest 15 trillion yen (approximately \$107 billion) in the hydrogen supply over the subsequent 15-year period. This investment is intended to facilitate the increased utilisation of hydrogen and accelerate the decarbonisation process by 2023 (The Japan Times, 2023a).

Overcoming value chain obstacles is crucial to advancing a hydrogen economy, especially the high cost of green hydrogen in comparison to hydrogen derived from fossil fuels. Hydrogen’s low energy density also makes it difficult to store and transport, necessitating the use of carriers like synthetic fuels, which have drawbacks of their own and infrastructure needs specific to their use (MUFG, 2022, p. 103; IEA, 2019). Furthermore, it takes a significant amount of time and money to set up the infrastructure required for the distribution of hydrogen as fuel. According to the national and international financial ramifications of hydrogenation and dehydrogenation processes, this technology might not be ready for the market just yet (METI, 2022a, p. 103).

In general, infrastructure and costs typically differ between carriers. The introduction of ammonia as a

substitute fuel is consistent with three fundamental government goals in Japan. First, the nation must secure its electricity supply, especially considering that 27% of its energy is presently generated by coal-fired power plants (Venditti, 2023). At the same time, Japan is dedicated to cutting Carbon dioxide emissions from coal, a major source of greenhouse gases, as quickly as possible. Ammonia is a desirable alternative for Japan because of its developed supply chain, affordability, and technological maturity (MUFG, 2022, pp. 102–103). The Institute of Energy Economics, Japan (IEEJ, 2020) report places emphasis on the targets set out in Japan’s 2020 “Green Growth Strategy.” The objective is to increase the demand for hydrogen to 3 million tons by 2030 and 20 million tons by 2050. Green hydrogen, which has a minimal carbon footprint, is in alignment with Japan’s commitment to reducing greenhouse gas emissions. It also mitigates risks associated with global market volatility and political pressures against the use of fossil fuels, thereby enhancing energy security. Green hydrogen offers a stable alternative to blue hydrogen and its derivatives. The latter are highly vulnerable to price fluctuations in volatile fossil fuel markets. The greater availability of renewable resources in various regions enables the exploitation of green hydrogen production potential, allowing any nation to become an exporter of green hydrogen. Diversifying green hydrogen supply chains reduces susceptibility to supply disruptions and ensures a reliable and consistent energy source (Shibata et al., 2021). These factors drive Japan’s efforts to develop a robust hydrogen industry, positioning it as a pivotal element in the country’s transition towards a sustainable energy infrastructure.

The biggest corporations in Japan have undertaken significant global climate change mitigation projects. Thus, it is clear that creating solutions that meet the nation’s energy and climate goals by 2050 will require a strong innovation and technology environment (METI, 2017b). Nevertheless, the financial outlay required to produce renewable hydrogen in Japan is greater than in other major economies. While the European Union has set itself the objective of producing 10 million kg of ecological hydrogen on an annual basis by 2030, Japan is still lagging behind China and Europe in this regard (Ohno et al., 2022). In contrast to \$2 to \$4 in the US and \$3 to \$6 in Germany, the cost of producing one kilogram of hydrogen in Japan ranges from \$6 to \$9 (Mukano, 2021).

In their endeavours to address climate change on an international scale, countries are investigating the potential for new commercial opportunities in the

development of hydrogen-related technologies (Take, 2022). For example, Japan is seeking to establish a collaborative partnership with Germany in the field of hydrogen technology (Kurmayer, 2023). Mitsubishi entered into a memorandum of understanding (MoU) with a municipal utility in Hamburg to investigate the viability of converting the recently decommissioned Moorburg coal-fired power plant into a hydrogen production facility (Mitsubishi Heavy Industries, 2021). This collaboration exemplifies the joint endeavours of Germany and Japan to leverage their respective expertise in hydrogen technology and expedite the transition to cleaner energy sources.

In a recent work Goichi Iwama (2023, p. 24) presents an overview of cutting-edge hydrogen companies in Japan, with a particular focus on notable developments such as Chiyoda Corporation's establishment of a hydrogen supply base in Kawasaki, which commenced construction in 2015 and commenced power generation in 2020. In addition, Osaka Gas introduced more efficient hydrogen production equipment in 2013, while Tokyo Gas began selling hydrogen at 1,100 yen per kg and opened a hydrogen station for fuel cell buses in 2019. ENEOS improved the efficiency of hydrogen production by 20% and, together with JERA, will open Japan's largest hydrogen station in Shinagawa in 2020. Taiyo Nippon Sanso halved the price of key hydrogen station equipment, and Iwatani Corporation established a large-scale hydrogen production plant in Fukushima Prefecture, producing 900 tons per year and expanding to 53 hydrogen stations by 2020. Toshiba developed hydrogen storage for wind-powered microgrids, while Kawasaki Heavy Industries partnered with Royal Dutch Shell for hydrogen transportation (The Japan Times, 2022a). Toyota established a hydrogen refueling company, expanded production facilities, and had success with a hydrogen-powered vehicle in a 2021 race. Mitsui invested in a California hydrogen station company, and Nippon Yusen Kabushiki Kaisha collaborated with Kawasaki Heavy Industries to commercialize fuel cell ships. Toray Industries increased carbon fiber production for fuel cell vehicles, while Toyota Tsusho Corporation conducted a feasibility study for hydrogen supply at the Port of Los Angeles. Mitsubishi Power is developing a hydrogen-fired natural gas turbine by 2023, and Mitsubishi Heavy Industries produced 300,000 tons of Bakken Energy and Blue Hydrogen in North Dakota in 2022. Asahi Kasei plans to operate an alkaline water electrolysis system in 2024, Kubota aims to demonstrate a fuel cell tractor in 2023, and Nippon Steel Corp. plans a demonstration test of hydrogen-reduced iron production in Kisarazu in 2026.

The focus and investment areas for hydrogen technologies are already quite advanced in Japan. The main priority of companies is to reduce costs and to enrich carbon fuels with green and blue ammonia. However, the key factor in this process will be the central policy to be pursued in relation to the demands for technology transfer from the energy supplier countries.

### **HYDROGEN-BASED DIPLOMACY IN ASEAN AND THE MIDDLE EAST**

In the 1980s, Japan enacted its first alternative energy law, requiring utilities to use renewable energy and natural gas (Yamamoto, 1986). Later, in order to achieve a "hydrogen society", Japan prepared a basic hydrogen strategy in 2017 (Dellatte, 2023; JEMA, 2024). Because of its proximity to Japan and wealth of renewable energy sources, the ASEAN region has a great deal of potential (Janardhanan et al., 2021, pp. 3–4) to become Japan's primary supplier of environmentally friendly hydrogen, as stated in the "Strategy and Approaches of Japan's Energy Diplomacy" (Ministry of Foreign Affairs, 2024). Japan's energy imports would be diversified and its dependence on fossil fuels would be reduced if hydrogen were produced and shipped to Japan from this region. Given the region's access to renewable electricity and hydrogen sources, this strategic decision would also improve Japan's energy security. In addition, green hydrogen production in Japan will benefit from enhanced access to renewable resources made feasible by the ASEAN electric power industry's increased decarbonization efforts (Obayashi & Golubkova, 2023). Producers and distributors of green hydrogen have the opportunity to capitalise on the ASEAN region's potential to establish an early presence in a promising market, thereby positioning themselves as leaders in the emerging hydrogen economy.

In 2023, Japan marked the "50th anniversary of ASEAN-Japan friendship and cooperation" (Ministry of Foreign Affairs, 2023b). Within the bounds of this partnership, Japan may lend assistance to ASEAN nations in formulating decarbonization policies that are both ambitious and doable, considering the unique conditions and requirements of the area. This aid can take many forms, including financial and technological aid, the exchange of useful information, and the promotion of mutually agreeable standards for infrastructure, transportation, storage, rule-making, and safety. Master plans might be based on in-depth research that was undertaken to identify local difficulties and generate specialized solutions. Stakeholder dialogues, meanwhile, may help important players in the energy transition process work together and coordinate their efforts.



The prospect of ASEAN-Japan collaboration (Ministry of Foreign Affairs, 2022) presents a tempting opportunity to advance sustainable energy practices. The geographical proximity and renewable energy resources of ASEAN nations provide an opportunity for the development of a mutually beneficial partnership is a strategic advantage for Japan. Through a series of concerted initiatives, this collaborative effort could expedite the adoption of sustainable energy technologies in the ASEAN region. There is a general aversion to security-focused alliances in this region. The enabling of major Japanese technology companies to play a crucial role in strengthening energy security, in conjunction with their investments in renewable energy sectors, could serve to enhance the effectiveness of Japanese foreign policy, while simultaneously avoiding the pursuit of short-term financial objectives. The transition to a green society, in its current form, indicates a long-term energy transformation and timetable.

On the other side the Japanese government invested approximately \$1.8 trillion in fossil fuel imports between 2010 and 2022, representing a yearly average of over 3% of the country's GDP (METI, 2022b). The majority of these imports originated from Middle Eastern countries. Japan's Energy Strategy underscores the importance of fostering multifaceted collaboration with Middle Eastern oil-producing nations, extending beyond the realm of resources and energy to encompass political and security concerns. Takashi Endo (2023), General Manager of Mitsubishi Research Institute (MRI) points that "The Middle East is a key region that will have a tremendous impact on energy security as well as the Net Zero Challenge in Asia and around the world".

Concurrently, Middle Eastern energy suppliers have launched research and development programs to investigate zero-emission energy sources such as ammonia and hydrogen (Iwama, 2023, p. 21) and Qatar has 2050, Saudi Arabia 2050, and the UAE has 2060 Net Zero Vision (Iwama, 2023, p. 12). Regional policymakers have stressed the importance of fossil fuels in their energy programs, aided by Japan's sophisticated technology. This reflects a shared interest in maximizing the potential of both existing and future energy sources via the use of creative technologies. Japan has signed bilateral agreements with numerous nations, including the United Arab Emirates (UAE), Saudi Arabia, Brunei, and Australia, as part of its 2050 Vision (IRENA, 2022, p. 71). Australia, the UAE, and Saudi Arabia will be the main importers of blue and green ammonia into Japan's supply chain (IEEJ, 2020; METI, 2021a; MUFU, 2022, p. 105). The International

Energy Agency (IEA) (2019) revealed that Gulf nations have set a goal of exporting one million tons of low-emission hydrogen by 2030.

In 2023, Japan initiated diplomatic negotiations with the UAE with the objective of ratifying a recent agreement pertaining to the transfer of defence equipment (Ministry of Foreign Affairs, 2023a). Furthermore, the two countries investigated prospective avenues for collaboration in the field of energy transition, with a particular focus on the advancement of the hydrogen and ammonia sectors. It is noteworthy that the UAE provides approximately 25 percent of Japan's crude imports, which serves to illustrate the significance of their energy relationship. Furthermore, the UAE has hosted the COP28 climate conference in 2023 and has expressed its readiness for a transition to new energy technologies (Michaelson & Greenfield, 2022).

As a major step to deepen their bilateral cooperation, Saudi Arabia and Japan decided in July 2023 to start a "strategic dialogue" between their foreign ministers. The signing of 26 memoranda of cooperation and understanding between Tokyo and Riyadh, in which the former committed to providing the latter with advanced technologies to enhance its solar power generation capabilities and to explore advancements in using hydrogen and ammonia as clean fuel sources, served to reinforce the decision (The Japan Times, 2023c). Following the meeting with Crown Prince Mohammed bin Salman, former PM Kishida underscored the necessity of transitioning from the conventional relationship between an oil importer and exporter to cultivate a novel global partnership in the context of the decarbonisation era (Koyama, 2023a).

In April 2020, the world's inaugural international hydrogen supply chain was established by the "Advanced Hydrogen Energy Chain Association for Technology Development in Saudi Arabia (AHEAD)". This project sought to produce methylcyclohexane (MCH) by removing hydrogen from natural gas. After that, the MCH is shipped to Japan, where the hydrogen is released through dehydration. By May 2020, the gas turbine at the "Mizue Thermal Power Plant" (Kanagawa, Japan) was powered by hydrogen that had been regenerated from MCH. Thus, in September 2020, Saudi Arabia shipped 40 tons of carbon-free ammonia to Japan, the first shipment of its kind in history (Global Status of CCS Report, 2020, p. 47). To improve research cooperation, the IEEJ and the "King Abdullah Petroleum Studies and Research Center (KAPSARC)" extended their Memorandum of Understanding on July 16, 2023. The



Saudi Arabia's pivotal role in the shift to carbon-neutral energy is what makes it significant. It actively contributes to the development of supply networks for ammonia and hydrogen, which lowers Carbon dioxide emissions. The promotion of environmentally friendly technology transfer has the potential to reinforce Japan's diplomatic ties with a Middle Eastern nation (Re-Sign of MOU with KAPSARC, 2023).

As was the case in the aftermath of the 1973 Oil Crisis, when Japan initiated a programme of resource diplomacy, this approach to securing resources has resulted in a heightened awareness of the religious, ethnic, political and policy issues that exist within the region (Yokota, 2023; Doğrul, 2019). Similarly, Japan has pursued a comparable strategy in response to its growing energy demands and expanding engagement "in the Middle East since the 1990s" (Evron, 2018). The Japanese government is keenly aware that the 2050 Vision requires the implementation of more robust measures to transform the relationship between Gulf states into a sustainable and environmentally responsible partnership. To achieve this, Japan is placing a high priority on expanding its commercial capacity in the region, which can be significantly enhanced through strategic investments in its animation, robotics, and space industries (Keidanren, 2022).

Japan's hydrogen diplomacy intersects with broader geopolitical dynamics, particularly in the context of China's expanding influence in the Middle East (Temiz, 2021). China represents a significant factor shaping Japan's prioritization of maintaining strategic ties with this region. Over the past two decades, Japan has observed a decline in its trade position, dropping from fourth to sixth place among Saudi Arabia's largest importers, while Chinese exports to the UAE have more than doubled, underscoring Beijing's growing dominance (Ninivaggi, 2023b). Despite the fact that Japan's vision for a "Free and Open Indo-Pacific (FOIP)" does not explicitly focus on the Middle East, the region's geographical significance and vast energy resources make it critical to China's Belt and Road Initiative (BRI) and an area of strategic concern for Japan (Ninivaggi, 2023b).

Japan's hydrogen strategy provides an opportunity to strengthen its influence in the region by positioning itself as a leader in clean energy technology. As China deepens its multilateral ties with the Gulf Cooperation Council (GCC), Japan closely monitors these developments to ensure it can compete effectively in fostering energy partnerships (Hui, 2016; JETRO, 2022). Expanding hydrogen diplomacy could enable Japan to

counterbalance China's growing presence and solidify its role in the global energy transition, aligning its economic and strategic interests while addressing the competitive pressures posed by other global players.

Japan's foreign direct investment (FDI) has had a significant impact on the energy sectors in the Middle East. However, during the late 1980s and early 1990s, a phenomenon known as "Gulf phobia" constrained investment in the region. With the growing impact of climate change, it is increasingly anticipated that the region's economic transition from Japan to oil-producing nations will accelerate (Koyama & Krane, 2021, p. 10). Yet the Senior Manager at the Renewable Energy Institute Yuko Nishida was pointing out a shattering truth that "Historically, Japan has been highly dependent on fossil fuel imports. This is a security issue for the country, and plans to import hydrogen will only continue this trend" (Bassetti, 2022). Nishida emphasizes both the disadvantages of blue ammonia and the advantages of green ammonia as a matter of national security for Japan. She also expresses security concerns regarding China's developments in solar technology and renewable hydrogen electrolyzers. Because of this, the Japanese government is actively pursuing emerging hydrogen technologies, seeing them as promising prospects for the future.

The convergence of Japan's renewable energy objectives and the Middle East's emphasis on sustainable technology creates new opportunities for Japan's energy security policy. Japan's expertise in offshore wind energy, coupled with the Middle East's abundant fossil fuel reserves and growing interest in zero-emission technology, sets the groundwork for a thriving collaboration in energy research, development, and deployment. Such partnerships have the potential to affect the trajectory of energy systems in both regions, thereby fostering greater sustainability and resilience in the global energy landscape. While Japan's hydrogen-based diplomacy is indicative of its efforts to strengthen international partnerships and secure diverse energy sources, addressing the internal dynamics of energy politics remains crucial to ensure the feasibility of its energy transition and long-term sustainability.

## THE CURRENT DYNAMICS OF ENERGY POLITICS IN JAPAN

The allocation of financial resources and the creation of policies aimed at resolving these issues are currently Japan's most important energy security concerns. Notwithstanding the government's laudable objective

of achieving net-zero emissions and the proposal by the former PM Kishida to secure \$1 trillion in public and private investments for his major green transformation initiative (Japan Kantei, 2023), Japan's reliance on fossil fuels remains substantial. Shuji Hosaka, a member of the IEEJ's board of directors, underscores the pivotal function of these incentives and policies in ensuring Japan's energy security and facilitating its transition to more sustainable practices. Japan is vulnerable to geopolitical changes and variations in regional energy prices because of its reliance on Middle Eastern imports of fossil fuels (Ninivaggi, 2023b). This emphasizes how important it is for Japan to invest in domestic renewable energy resources and diversify its energy sources.

The fact that the US has a major influence on Japanese foreign policy gives rise to a second important factor in energy security policies. This restricts the nation's ability to implement autonomous policies amid Middle Eastern conflicts and crises. After the energy crises of the 1970s, there is a chance to develop a better Middle Eastern foreign policy in the long run that will secure energy demand (Doğrul, 2019). Given that energy is a key factor in strategic decision-making, it's possible that Japan's Middle East policy will eventually deviate from American policy (Ninivaggi, 2023b). Kishida, the former PM, is well-versed in the complexities of this procedure. In fact, from 2012 to 2017, he served as Foreign Minister for almost five years. He was given the duty of strengthening ties with the six "GCC members, Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, and the UAE" during that time. The goal of this action was to ensure a consistent and dependable supply of natural gas and oil (The Japan Times, 2023c).

Japan's pursuit of an autonomous Middle Eastern policy is shaped by its intricate relationship with the US its principal ally and one of the globe's largest energy consumers, greenhouse gas emitters, and foremost oil producers in the wake of the shale revolution (Koyama, 2021a). While Japan's foreign policy has traditionally prioritised direct threats to national security, encompassing territorial integrity and regional stability, energy security has assumed heightened importance for Japan, given its energy dependency. For Japan, energy security is fundamental to national security and economic resilience. This perspective differs from that of the US, which has achieved greater energy independence. This dependency necessitates stable and independent relations with Middle Eastern oil producers for Japan, allowing it to secure its energy needs without being overly impacted by US policy shifts or global market fluctuations (Koyama, 2021b). Therefore,

Japan's autonomous policy in the region is not merely a diplomatic preference, but rather a strategic imperative for its long-term security and economic stability.

Achieving carbon neutrality by 2050 is a significant challenge, particularly in light of Japan's high consumption of fossil energy sources. It is therefore essential to acknowledge the crucial part that renewable energy plays in enabling Japan to achieve significant growth in energy independence. Nevertheless, the transition to a decarbonised energy system requires a comprehensive strategy that encompasses enhancements to the electrical grid, advancements in renewable energy technologies and the development of energy-efficient storage batteries (Stein, 2022). Japan is actively engaged in research and development projects with the objective of increasing the use of renewable energy sources. A significant long-term objective is to achieve a 10 gigatonne offshore wind energy capacity, which would contribute 5% of the country's electricity production from renewable sources (Reuters, 2020). Japan is in a difficult position because of the complex dynamic created by the obvious oligopolistic nature of these essential materials in comparison to traditional fossil fuels (Ogawa et al., 2022, p. 11; Shiraishi, 2022). Reducing these vulnerabilities requires the development of a circular economy framework and the application of resource circulation principles. By adopting resource reclamation, wise procurement, and technological innovation practices, Japan can reduce its dependency on outside resources and promote a more resilient and sustainable energy landscape. These initiatives have global implications with regard to the mitigation of climate change and the assurance of energy security.

Japan's endeavors to embrace renewable energy sources as a transformative cornerstone are partially constrained by a substantial dependence on external resources necessary to achieve its energy transition objectives. Nevertheless, Japan's considerable technical capacity mitigates this potential barrier, positioning it as a potential leading actor in furthering energy transformation throughout the ASEAN region. Concurrently, Japan recognizes the utmost significance of establishing long-lasting institutional connections with Middle Eastern oil-producing states, a strategic approach designed to negotiate the intricate interplay of energy security, environmental transformation, and foreign policy dynamics. As these countries pursue new energy trade opportunities, their changing landscape is driving this strategic direction. Moreover, by engaging

major regional actors such as Israel and Türkiye (Doğrul, 2019), Japan's Hydrogen Society program may serve as an example of the operationalization of an energy-centered foreign policy, thereby enhancing the initiative's impact and significance. Essentially, the pursuance and dissemination of an energy-centered foreign policy emerge as decisive outcomes, harmonizing Japan's strategic imperatives with the evolving global energy landscape and diplomatic complexities.

## CONCLUSION

This article has examined Japan's 2050 net-zero vision through the perspective of energy security, highlighting the strategic importance of hydrogen technology. While hydrogen offers Japan the opportunity to become a leader in the global green energy sector, significant challenges remain in reconciling these aspirations with the realities of energy security and geopolitical dependencies. The Nyman Energy Paradox has been used as a framework to illustrate the complexity of Japan's energy security challenges. Japan's 2050 vision embodies Nyman's concept of reconciling environmental sustainability with continued reliance on traditional energy sources. This contradiction, which Nyman identifies in the energy strategies of the US and China, is also evident in Japan's efforts to reconcile its bold net-zero goals with its heavy reliance on fossil fuels. For Japan, this contradiction is particularly acute because of its substantial reliance on energy imports and the systemic difficulties of transitioning away from entrenched conventional energy systems. A closer analysis of Nyman's framework provides valuable insights into the policy trade-offs facing Japan as it seeks to achieve its sustainability goals.

The political economy framework also highlights the complex interplay between Japan's energy policy and economic stability, particularly in its foreign relations with the ASEAN region and the Middle East. Strategic partnerships in these regions have been crucial in securing energy supplies and promoting technological cooperation, underscoring the importance of international cooperation in Japan's energy transition.

Japan's commitment to hydrogen technology is in line with its broader goals of achieving energy independence and reducing dependence on fossil fuels. However, this commitment faces significant obstacles, including continued reliance on gas and oil imports from the Middle East, the high cost of hydrogen production, and the challenge of integrating renewable energy sources while maintaining the role of nuclear power in the energy mix.

To address these challenges, Japan needs to adopt actionable strategies. First, strengthening its domestic energy infrastructure and accelerating the development of renewable energy technologies are essential steps. Second, reducing the cost of hydrogen production by promoting innovation and scaling up green hydrogen solutions will improve competitiveness. Third, diversifying partnerships with global suppliers and investing in hydrogen storage technology will mitigate market and geopolitical risks. In addition, addressing public concerns about nuclear energy and integrating renewables into broader public and policy frameworks can build confidence and support for the energy transition.

Japan's multi-faceted approach to hydrogen is critical to achieving its 2050 goals and positioning the nation as a leader in sustainable energy policy. As a leader in the hydrogen revolution, Japan has the potential to shape not only its energy landscape, but also the geopolitical dynamics of Asia and beyond. However, a rebalancing of priorities is needed to ensure that environmental and climate security are not secondary to economic security. By focusing on renewable infrastructure, diversifying hydrogen partnerships and fostering technological innovation, Japan can effectively align its economic and environmental goals while contributing to the global energy transition.

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