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The empirical analysis of cereal production under the climate exchange and examining the effects of banks' domestic credit on cereal production: Evidence from Türkiye

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ABSTRACT

This study, it aims to examine the linkage among climate change, banks' domestic credit, and cereal production such as Turkey's CO2 emissions, average rainfall, and average temperature in the period 1980-2019. In the study, firstly, the stationarity properties of the variables are examined by KPSS, ADF and Ng-Perron tests, and the presence of cointegration between the variables is investigated through the ARDL boundary test. Then, the long-run elasticities of the independent series are estimated by applying the ARDL model, and the causality linkage among the series is detected through the VECM method. Empirical findings show that there is cointegration among the variables and that in Turkey, banks' domestic credit, CO2 emissions, average rainfall, and increase in cereal production area increase cereal production, while average temperature increase reduces cereal production. At the same time, it is determined that there is a bidirectional causality between banks' domestic credit, CO2 emissions, average rainfall, and average temperature and grain production, while there exists a uni-directional causality extending from the grain production area to the grain production. Finally, as a result of the examinations, it is detected that there exists a mutual linkage between the financial sector and cereal production.

I. Introduction

The concept of climate change is defined as significant changes in the average state of climatic conditions (precipitation, temperature) over many years (Türkeş, 2008). There is a serious increase in emissions of greenhouse gases in the atmosphere that trigger climate change. In addition, human activities that interfere with nature such as fossil fuel use, deforestation, and agricultural activities cause and continue to cause the deterioration of the natural greenhouse effect and the warming of the atmosphere (Keskin & Kanat, 2018). Therefore, with the United Nations Framework Convention on Climate Change-UNFCCC, measures against climate change have been initiated. Then, it takes its final form with the expansion of the Kyoto Protocol and the Paris Climate Agreement made today (Kaya, 2020). The Paris Agreement, which was adopted by 195 countries including Turkey in 2016, is becoming a turning point in the fight against climate change on a global scale (Köse, 2018).

Events that occur as a result of climate change affect the agricultural sector, which depends on natural conditions, and especially the countries that are dependent on the agricultural sector. The impact of climate change on productivity in agricultural production is seen as a threat to the economic and financial sectors (Acharya & Bhatta, 2013). With the fluctuations that climate change may create in agricultural production, it is thought that there may be a loss of yield and quality in products. While climate-related changes directly affect the agricultural economy, it is foreseen that they may also indirectly lead to negativities such as food inflation, land price increases, farmers' distancing from the sector, and a decrease in agriculture-based exports (TAGEM, 2001; Ozcatalbas, 2014; Koç et al., 2016). Many studies conducted globally and regionally also indicate that the adverse effects of climate change will increase in the future, especially on water, soil, and agricultural products (Calzadilla et al., 2013; Chandio et al., 2020, Kumar et al., 2021).

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At the same time, it is seen that the financial sector development element evaluated in this study is necessary for the sustainability of agricultural production. Thus, the agricultural sector is developing a comprehensive agricultural policy that meets financial needs and attracts investment. Financial institutions also utilize carbon finance as a key instrument to interfere in the stock market to raise funds for the implementation of cleaner generation policies, the development of agriculture, and the use of best practices in sustainable production (Chandio et al., 2021). On the other hand, the main role of the financial sector in the agricultural sector is due to the provision of agricultural credit and financing. The financial sector enables farmers to invest in innovative agricultural development technologies and helps poor farmers to receive the latest agricultural inputs such as seeds, chemicals, and fertilizers of a quality that can increase their agricultural productivity. For this reason, it seems that affordable financial services are necessary to increase productivity in agriculture (Chandio et al., 2022).

Beause the climatic conditions in Turkey are suitable for cereal production, cereal products have the largest share in the agricultural sector (Koday, 2000). While the amount of cereal production in Turkey was 31.869.886 tons in 2021, it is determined that it is 38.671.839 tons by increasing by 21.3% in 2022 (TÜİK, 2022). However, it is foreseen that Turkey will be among the countries that will be most affected by climate change, as well as countries such as Albania and Russia (Talu, 2015; Çaltı & Somuncu, 2019; Irdem, 2022). Therefore, Turkey is accepted as a sample in this study to determine whether climate change affects cereal production. In this direction, the study aims to investigate the impact of climate change on cereal production, which are series (e.g. CO2 emissions, rainfall amount and temperature) in Turkey's 1980-2019 period, and also to investigate the impact of the banks' domestic credit on this cereal production.

While creating the study model, Chandio et al. (2020) for Turkey, Kumar et al. (2021) for low-middle-income countries, Chandio et al. (2021) for Pakistan, Chandio et al. (2022) for Agrarian economy and Asfew and Bedemo (2022) for Ethiopia are taken into consideration and the regression model of this study is created and analyzed with the time series approach. First, the stationarity of series are examined by KPSS, ADF and Ng-Perron tests. In the second stage, banks' domestic credit, CO2 emissions, rainfall, temperature and the cointegration relationship between cereal production land and cereal production are examined by applying the ARDL boundary test. In the next stage, forecasters are used to determine the long-term coefficients of the series. In the final stage, the VECM approach is performed to state the causality linkage among the series. The study provides important advices to the literature. The first of these is that it is determined that climate change in Turkey in the period 1980-2019 has affected cereal production. Secondly, it provides an opportunity to evaluate that one of the most important factors for the continuity and increase of production in agriculture in Turkey and other countries is the financial sector/markets.

The rest of the work is designed as follows. In the second part, the studies on the subject of study in the literature are evaluated by opening. In the third part, the model and data created in line with the purpose of the study are explained. In the fourth section, the study methodology is mentioned. In the fifth section, the findings of the study subject analyzed by the time series method are evaluated by explaining and comparing them with first studies. In the last section, the result of the study is described.

2. Literature Review

Today, the focus of economists, agronomists, and policymakers is to study the impact of climate change and domestic credit as financial sector development on the agricultural sector and cereal production. Many studies on this subject focus on different countries and use different methods, and some of these studies are mentioned in this section. In the literature, when we examine the studies using time series analysis; for example, Loum and Fogarassy (2015) examined the effects of rainfall and temperature on cereal crops by examining Gambia's data from 1960-2013 in their study. According to the findings of the regression analysis, it is determined that the increases and decreases in rainfall and temperature adversely affect cereal production, but CO2 emission has a positive effect on cereals. Bayraç and Doğan (2016) investigate the factors affecting the agricultural sector by using data from 1980-2013 in Turkey. Their findings show that climate change harms the agricultural sector. Chandio et al. (2020) examines the relationship between climate change factors such as CO2 emissions, temperature, precipitation and cereal yield in Turkey between 1968-2014. As a result of the analysis carried out using the ARDL model, it is concluded that there is a long-term relationship between climate change factors and cereal yield. It is also found that there is a positive effect between the average amount of precipitation and the yield of cereal in both the long and short term. In their study, Ali et al. (2021) examine the effects of climate change in Pakistan on agriculture and crop production in particular. Using regression analysis, the study suggests that between 2006 and 2016, climate change was a threat not only to Pakistan, but to the entire world's agriculture.

When we examine the studies that perform panel data analysis on the agricultural sector and cereal production; Lee et al. (2012), for example, address the negative effects of climate change on the agricultural sector in 13 Asian countries between 1998 and 2007. Using regression analysis, the study found that higher temperatures and more rainfall in the summer months increased agricultural production, while high-temperature autumn temperatures were found to be harmful in South and Southeast Asia. Hayaloğlu (2018) examines the impact of climate change on the agricultural sector and economic growth in the 1990-2016 periods for the 10 countries most affected by climate change. As a result of the panel data analysis, it is determined that climate change negatively affects economic growth and the agricultural sector. In their research, Kumar et al. (2021) address the effect of climate change on grain production between 1971 and 2016. According to the findings obtained by applying DOLS, FGLS and FMOLS tests, the existence of co-integration between grain production and climate change is determined. Another finding is that an increase in temperature decreases grain production, but precipitation and CO2 emissions have a favorable impact it.

In addition to this effect, when we evaluate many studies to evaluate the effect of financial sector on cereal production; Shahbaz et al. (2013) address the relationship between Pakistan's financial development and agricultural growth during the period 1971-2011. Using the ARDL and VECM methods, the research determines that financial development has a positive impact on agricultural growth and that there exists a bidirectional causal linkage between agricultural growth and development of financial sector. Yalçınkaya (2018) states that there is a causality extending from agricultural production to agricultural credits, that is, the amount of credit will increase as agricultural production increases for

Turkiye. Yalçınkaya (2018) states that there is a causality extending from agricultural production to agricultural credits, that is, the amount of credit will increase as agricultural production increases for Türkiye. Raifu and Aminu (2019) conduct a study for Nigeria. In this study, which deals with the period of 1981-2016, the ARDL model is used. According to the findings, financial development is found to have a favorable effect on agricultural performance in Nigeria. Zakaria et al. (2019) examines the effects of financial development on agricultural productivity in South Asia between 1973 and 2015.

According to the findings of this study, FMOLS method is preferred; It is concluded that financial development has an inverse U-shaped effect on agricultural productivity. Chandio et al. (2020) examine the impact of financial development on agricultural production for China between 1989 and 2016. As a result of the study using FMOLS and ARDL models, it was determined that there was a long-term relationship between the variables.

Similarly, as mentioned in the study of Tiryaki and Göker (2021), one of the most important factors for the continuity and increase of production in agriculture is the provision of the source of financing. Financing can be obtained from a variety of sources, and these are organized or unorganized markets. Therefore, ensuring the continuity of production in agriculture with the loans received shows the success of this financial management, financial market and financial sector. This, in turn, contributes to the development of financial markets and the sector. Similarly, Chandio et al. (2021), which examines whether Pakistan's financial sector development affected cereal production during the period 1977-2014, obtains that CO2 emissions have a negative impact on cereal production in the short and long term with the ARDL model. It is established that the increase in climate change will reduce cereal production, and financial development also is a stimulative for grain production.

In addition, researchers state that the credit of agricultural sector play an important role in enhancing farmers in Pakistan. In the agricultural sector, credit helps to adopt the efficient apply of resources and modern technologies and promotes the development of the agricultural sector through institutional support such as subsidies, taxes, and crop insurance. Chandio et al. (2022) also examine whether climate change and financial development are affecting agricultural production for ASEAN-4 countries. Researchers analyzed data from 1990-2016 using the CS-ARDL model. According to their findings; It is determined that climate change adversely affects agricultural production and that there is a U-shaped relationship between financial development and agricultural production. Furthermore, Grivins et al. (2023) find that banks play an important role in facilitating the transition to more sustainable models of agriculture in Latvia, Denmark, and the UK. In this context, it is foreseen that the financial sector in Türkiye and other countries is developing the financial sector in the agricultural sector where the agricultural sector is developing. Thus, information and communication technologies develop financial institutions and banks (Shahbaz et al., 2023), and these institutions develop the grain sector.

Thus, as a result of the disclosure of previous studies in the literature, it is seen that climate change has a significant impact on the agricultural production of many countries. At the same time, according to another conclusion, it is found that the development of the financial sector in countries such as Pakistan, Nigeria, South Asia, and China has significantly affected agricultural production in both the long and short term. These results from the studies in the literature motivate us to investigate whether climate change in Türkiye will affect grain production and to investigate the impact of banks' credit on cereal production.

3. Model and Data

This study aims to examine the effect of climate change on grain production and the effects of the economic and banks' domestic credit on this cereal production. Here, series like CO2 emissions, rainfall, and temperature are added to the study model as indicators of climate change, banks' domestic credit, and the cereal production area variable as the other explanatory variable. While creating the study model, the studies by Chandio et al. (2020) for Türkiye, Kumar et al. (2021) for low-middle-income countries, Chandio et al. (2021) for Pakistan, Chandio et al. (2022) for Agrarian economy and Asfew and Bedemo (2022) for Ethiopia are taken as a basis and the following model is created to examine the linkage between series for Türkiye.

$$lnCP_t = \delta_0 + \delta_1 lnCO2_t + \delta_2 lnRF_t + \delta_3 lnTP_t + \delta_4 lnLCP_t + \delta_4 lnDC_t + \mu_t \quad (1)$$

In the model, CP shows cereal production (Metrics tons) (Pickson et al., 2020; Rehman et al., 2021; Chandio et al., 2023); CO2 refers to per capita CO2 emissions (metric tons) as an indicator of climate change (Adzawla et al., 2019; Adam & Drakos, 2022); The RF specifies the average annual rainfall (mm) as an indicator of climate change (Alagidede et al., 2016; Castro et al., 2020); TP shows the annual average temperature (Celsius) as an indicator of climate change (Jatuporn & Takeuchi, 2023); LCP refers to the cereal production area (Pickson et al., 2020; Chandio et al., 2023); DC is domestic credit to private sector by banks (% of GDP) as banks' domestic credit (Chandio et al., 2022).

t shows the period 1980-2019; μ shows the residual value, the constant coefficient δ_0, and the long-term coefficients of CO2 emissions, precipitation, temperature, and cereal production area per person δ_1,δ_2,δ_3, and δ_4 respectively.

The study uses time series from 1980 to 2019 and the reason the series started from 1980 is because there are gaps in the data of the CO2 emission variable from previous years. Cereal production, per capita CO2 emissions, domestic credit to the private sector by banks (% of GDP), and cereal production area series are obtained by the World Bank-World Development Indicators (2023), and rainfall and temperature series are collected from the Climate Change Knowledge Portal of World Bank (2023) database. Table 1 shows the symbols, units of measurement and sources of the variables. Table 2 shows the summary statistical values of the variables, while Table 3 indicates the correlation matrix of the series.

Fig.1 shows the trend of variables over the period 1980-2019.

Table 1. Descriptions of variables.

Variables	Symbol	Measure	Source
Cereal production	CP	Metric tons	WDI
CO2 emissions	CO2	CO2 emissions (Metric tons per capita)	WDI
Rainfall	RF	Millimeter	CCKP
Temperature	TP	Celsius	CCKP
Land under cereal production	LCP	Hectares	WDI
Banks' domestic credit	DC	Domestic credit to private sector by banks (% of GDP)	WDI

Table 2. Summary statistics.

	CP	CO2	RF	TP	LCP	DC
Mean	30911272	217633.7	706.593	11.382	12947137	28.833
Median	30810625	195815.0	712.185	11.350	13530117	19.070
Std. dev.	3748087	99332.68	70.423	0.862	1076055.	17.620
Min.	38632438	415900.0	848.240	13.350	14066559	65.937
Max.	23498600	75763.89	541.620	9.290	10746739	13.588
Skewness	-0.019	0.434549	-0.094	0.188	-0.796	1.140
Kurtosis	2.320	2.093	2.692	3.132	1.991	2.683
Obs.	40	40	40	40	40	40

Source: Authors' findings.

Table 3. Correlation matrix.

	CP	CO2	RF	TP	LCP	DC
CP	1.000					
CO2	0.798	1.000				
RF	0.060	-0.023	1.000			
TP	0.471	0.713	0.090	1.000		
LCP	-0.540	-0.861	0.012	-0.606	1.000	
BC	0.676	0.881	0.088	0.594	-0.911	1.000

Source: Authors' findings.

4. Methodology

In this study, it was aimed to investigate the effects of banks' domestic credit climate change on the production of cereal products in Turkey. The methodology used to test the model for the purpose of the study consists of four basic stages.

First of all, Kwiatkowski, Phillips, Schmidt, and Shin-KPSS, Augmented Dickey–Fuller-ADF, and Ng-Perron tests analyzes whether the variables contain unit roots and their stationary properties. The KPSS unit root test proposed by Kwiatkowski et al. (1992) is calculated by the LM statistic that the random gait has zero variance around a deterministic trend of the series (Kwiatkowski et al., 1992). The ADF unit root test was developed by Dickey-Fuller (1981) and is estimated to be fixed and fixed-trend (Dickey & Fuller, 1981). Ng-Perron test is being developed against the low power problem of ADF, Philips Perron (PP), and KPSS unit root tests (Ertuğrul & Soytaş, 2013). The Ng-Perron unit root test ADF, developed by Ng and Perron (2001), is applied to eliminate PP constraints and proposes four statistics for stability analysis: MZa, MZt, MSB, and MPT (Ng & Perron, 2001).

Since the variables in the model include unit roots at the difference level, the second stage of the methodology applies the ARDL boundary method to test the existence of a cointegration relationship between banks' domestic credit, CO2 emissions, rainfall, temperature, and cereal-producing land and cereal production. The ARDL boundary test developed by Pesaran et al. (2001) has several advantages. The first of these is utilized in the form of variables I(0) or I(1) or a mixture of the two. Second, cointegration between variables is investigated by taking into account the level values of the variables. The dynamic unrestricted error correction model is developed with the ARDL to examine short-run and long-run (Pesaran et al., 2001).

It is as follows:

$$InCP_t = \alpha_0 + \sum_{i=1}^{p} \alpha_{1i}\, \Delta InCP_{t-i} + \sum_{i=0}^{q} \alpha_{2i}\, \Delta lnCO2_{t-i} + \sum_{i=0}^{q} \alpha_{3i}\, \Delta lnRF_{t-i} + \sum_{i=0}^{q} \alpha_{4i}\, \Delta lnTP_{t-i} + \sum_{i=0}^{q} \alpha_{5i}\, \Delta lnLCP_{t-i} + \sum_{i=0}^{q} \alpha_{5i}\, \Delta lnDC_{t-i} + \beta_1 InCP_{t-1} + \beta_2 lnCO2_{t-1} + \beta_3 lnRF_{t-1} + \beta_4 lnTP_{t-1} + \beta_5 lnLCP_{t-1} + \beta_5 lnLCP_{t-1} + \beta_5 lnDC_{t-1} + u_t \quad (2)$$

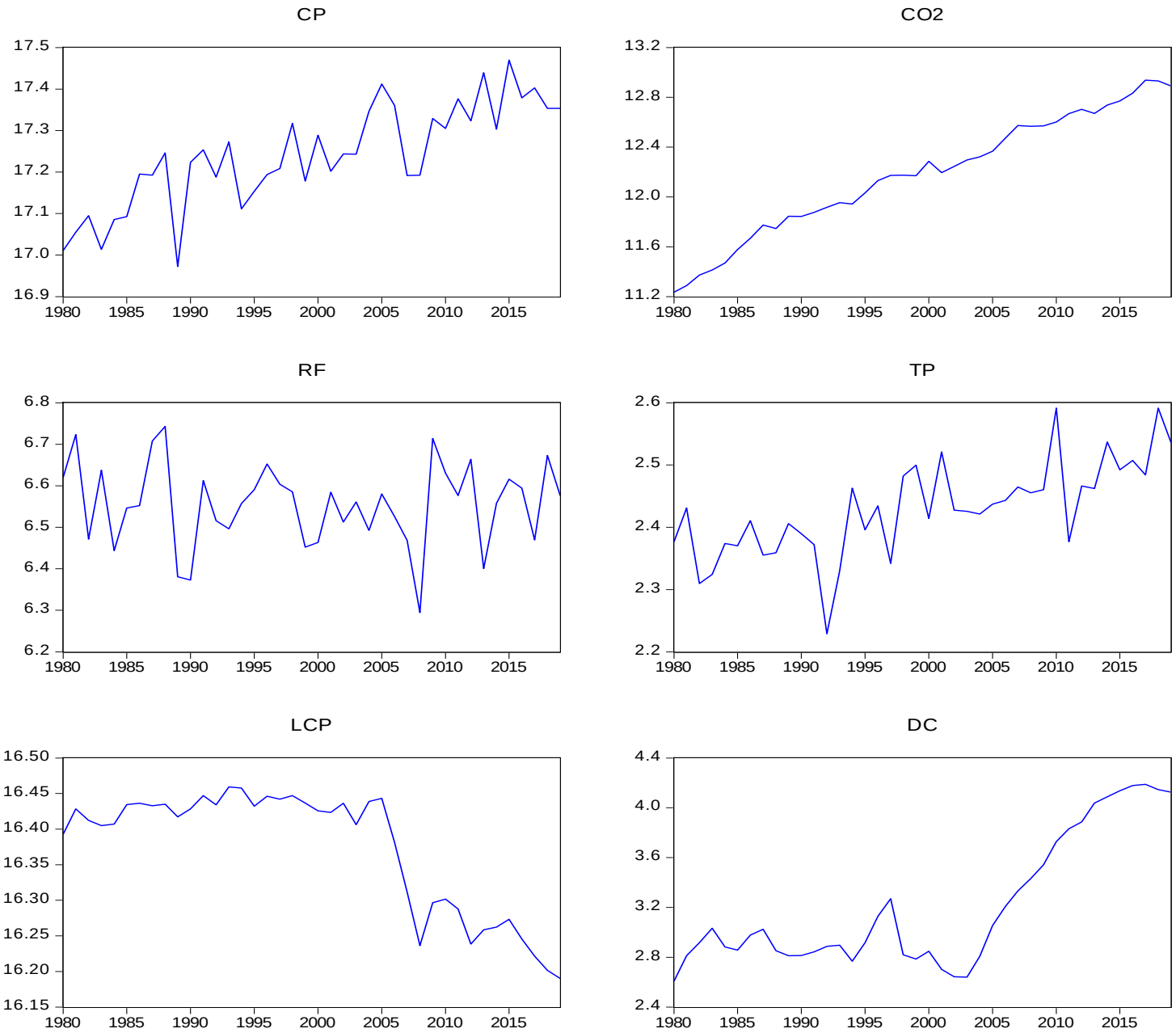

Fig. 1. The trend of variables (1980-2019)

Here, the constant term α_0 at time t is the first difference of Δ series, and u_t is the stochastic run and series. The lag length is detected via the Schwarz Information Criteria. The zero hypothesis of cointegration is H_0: $\beta_1 = \beta_2 = \beta_3 = \beta_4 = \beta_5 = 0$ and the alternative hypothesis against H_1: $\beta_1 \neq \beta_2 \neq \beta_3 \neq \beta_4 \neq \beta_5 \neq 0$. By applying the *F*-test proposed by Pesaran et al. (2001) to check for the existence of a long-term relationship between the variables in the model, the calculated F-statistic is contrasted through the upper and lower boundary values. If the *F*-statistical value exceeds the upper value, the null hypothesis is rejected and the variables are cointegrated. However, if the *F*-statistical value falls below the lower value, the null hypothesis of cointegration is not rejected, indicating that there is no cointegration among the series. If the *F*-statistic is between these two limit values, the decision is inconclusive (Pesaran et al., 2001). In addition, to demonstrate the robustness of the ARDL boundary test approach to cointegration, autocorrelation, varying variance, normality of the error term, and model stability were used to perform graph drawing tests. A number of diagnostic tests are performed (CUSUM and CUSUMS) (Salahuddin et al., 2018).

In the third part, Canonical Cointegrating Regression (CCR), Fully Modified Least Square (FMOLS), and Dynamic Ordinary Least Square (DOLS) methods are used together with the Autoregressive Distributed Lag (ARDL) model to predict the direction or sign of the series used in the study and the long-term elasticities of series are estimated. The variables in the ARDL model become *I*(0) and *I*(1), while the CCR developed by Park (1992), FMOLS introduced by Stock and Watson (1993), and DOLS put forward by Philips and Hansen (1990) state that the variables should be *I*(1) (Chandio et al., 2020; Raihan & Tuspekova, 2022).

After determining the long-term coefficients, finally, the causality linkage among the variables used in the study is examined utilizing the VECM Granger method. The ECT_{t-1} which is an error correction term is added to the classical Granger test by Engle and Granger (1987).

5. Findings and Discussion

Preliminary tests are carried out to confirm the results of the study. The first analysis is the unit root. Therefore, unit root tests are performed to determine the stationarity of variables before any operation. There are three tests to state whether the variables are stationary or not, and both the Augmented Dickey-Fuller (ADF) test, the Kwiatkowski, Phillips, Schmidt, and Shin (KPSS) test, and the Ng-Perron Modified test are used to perform the unit root test on the variables examined. Table 4 reports the empirical findings of ADF, KPSS, and Ng-Perron Modified tests. Empirical results state that each of the series includes a unit root at the level. However, with the unit root tests performed by taking the first differences of the variables, it is expressed that the variables become stationary and the integration levels are *I*(1). These findings correspond to the results of the ADF test with the findings of the KPSS and Ng-Perron Modified tests. The results confirm that the integration levels of the series are *I*(1).

Table 4. Unit root tests.

		ADF test	KPSS test	Ng-Perron Modified test			
	Variables	Constant	Constant	MZa	MZt	MSB	MPT
Level	lnCP	-2.045	1.002	0.360	0.345	0.958	56.363
	lnCO2	-1.752	1.090	0.246	0.145	0.589	24.998
	lnRF	-1.805	0.353*	-5.685	-1.685	0.296	4.310
	lnTP	-1.797	0.935	-1.068	-0.492	0.460	14.128
	lnLCP	-0.037	0.825	0.118	0.055	0.469	17.968
	lnDC	-0.194	0.798	0.841	0.526	0.625	30.470
First difference	lnCP	-5.987***	0.076***	-1143.45***	-23.910***	0.020***	0.021***
	lnCO2	-6.641***	0.291***	-19.637***	-3.022***	0.153***	1.634***
	lnRF	-3.055**	0.437**	-10.676**	-2.271**	0.212**	2.444**
	lnTP	-7.004***	0.068***	-792.269***	-19.897***	0.025***	0.034***
	lnLCP	-4.738***	0.410**	-17.065***	-2.902***	0.170***	1.505***
	lnDC	-4.844***	0.155***	-16.204***	-2.817***	0.173***	1.619***

Source: Authors' findings. Note: *** and ** demonstrate significance at %1, and %5.

In addition, delay length criteria based on the VAR model are used to detect the available lag length for long-run relationship analysis and to predict the ARDL model. Table 5 shows the findings of all criteria for selecting the available lag length. Using the Schwarz Bayesian Criterion (SC), and the Hannan–Quinn Information Criterion (HQC), a distinct and appropriate delay sequence exists as one (1). Furthermore, the ARDL model is designed for analysis to assist in the appropriate delay sequence (1, 0, 0, 0, 1) of the detailed regressors.

Table 5. Appropriate lag length

Lag Length	LR	FPE	AIC	SIC	HQ
1	237.376*	4.98e-15	-15.934	-14.105*	-15.289*
2	50.964	4.89e-15*	-16.111	-12.715	-14.914
3	41.676	5.36e-15	-16.481*	-11.517	-14.731

Source: Authors' findings.

After checking for the stationarity of the series, the ARDL boundary test with F statistic is carried out to test the cointegration relationship in the model using the optimal lag length determined according to the VAR model. The results are stated in Table 6 and demonstrate the existence of a long-term equilibrium cointegration link among the series under consideration. According to the results in Table 6, the calculated statistical value *F* is 6.035, which is superior to the upper limit value at the significance level of 1%. This also rejects the null hypothesis that there exists no cointegration among the variables, proving the presence of a long-term linkage among the series. In addition, the fact that the $ECT_{(t-1)}$ is adverse and significant at 1% indicates the presence of cointegration between the variables. Thus, the findings confirm that there is a cointegration between cereal production, and banks' domestic credit, CO2 emissions, average rainfall, average temperature, and cereal production area.

After confirming cointegration with the ARDL boundary test approach in the study, the long-run elasticity of the variables is estimated. First, the findings predicted by the ARDL model in Table 7 are summarized. Table 7 shows that the coefficient of CO2 emission is 0.251 and it is statistically significant at the level of 1%. This means that a 1% increase in CO2 emissions also increases cereal production by 0.251%. In other words, it is stated that there exists a favorable linkage between climate change and grain production in Turkey in the period 1980-2019, or that the level of CO2 emissions is a stimulative for the growth of cereal production. As Kumar et al. (2021) point out, the negative impacts of climate change may be beneficial for grain production in some cases, meaning that CO2 is expected to have a stimulative impact by reducing sweating

Table 6. Cointegration test results

Panel A: *F*-Test		
Estimated Equation	F(CP/CO2, RF, TP, LCP, DC)	
Optimal Lag Structure	[1, 0, 0, 0, 0, 0]	
F-Statistic	5.892***	
$ECT_{(t-1)}$	-1.131***	
	Critical Values	
Significance level	Lower Bounds,*I*(0)	Upper Bounds,*I*(1)
1%	2.82	4.21
5%	2.14	3.34
10%	1.81	2.93

Source: Authors' findings. Note: *** and ** indicate 1% and 5% significance level, respectively.

rates and enhancing growth rates. That's because crops with increased CO2 levels can increase cereal production by using water more efficiently and effectively. This finding is in line with the outcomes of other studies (Ahsan et al., 2020; Kumar et al., 2021; Asfew & Bedemo, 2022; Abdi et al., 2023). However, this finding does not coincide with the findings of Chandio et al. (2020), who found that CO2 emissions negatively affect cereal production in the sample of Turkey using annual data for the period 1968-2014.

In the long term, the effect of average rainfall on cereal production is favorable at the level of 1%. In this case, it is suggested that the 1% increase in the average rainfall in Turkey during the period 1980-2019 stimulated a 0.093% increase in cereal production. This result, as noted in the study by Attiaoui & Boufateh (2019), appears to be the strong dependence of cereal farming on rainfall, with the best harvests recorded in the wettest years. Therefore, it indicates that a decrease in rainfall in the long term will have more harmful repercussions on cereal production. This finding of the study is in line with the finding of Pickson et al. (2020), which proved that China's average rainfall positively affects cereal production. A finding of this study is that the long-term effect of average temperature is positive and statistically significant at the level of 1%. This means that a 1% enhancement in average temperature leads to a proportional reduction of cereal production by 0.163% over the long term. In other words, there is a negative correlation between the average temperature and cereal production in Turkey in the period 1980-2019. The negative impact of the average temperature on cereal production is similar to the study findings obtained by Attiaoui & Boufateh (2019) for Tunisia during 1975-2014 and Abdi et al. (2023) for East Africa during 1990-2018.

According to the long-run findings of the ARDL model estimator, the coefficient of cereal production area is positive and statistically significant at the level of 1%. This, in turn, shows that the increase in the area of cereal production increases cereal production. In other words, it is stated that when the cereal production area in Turkey increased by 1% in the 1980-2019 period, the cereal production increased by 0.830%. Our results for the cereal production area coincide with the outcomes of Ahsan et al. (2020), Chandio et al. (2021), and Xiang & Solaymani (2022), who found that the effect of cereal cultivation area on cereal production is positive.

The long-term findings show that the elasticity of banks' domestic credit is stimulative and statistically significant at the level of 1%. This, in turn, demonstrates that the enhancement in the banks' domestic credit increases cereal production. In other words, this means that when the banks' domestic credit in Turkey increased by 1% in the 1980-2019 period, the cereal produced increased by 0.110%. Our results are in line with the findings of Shahbaz et al. (2013) and Tiryaki and Göker (2021), who reveals that the effect of banks' domestic credit on cereal production is positive. Table 7 also reports the results of diagnostic tests resulting from the ARDL estimator. The Breusch-Godfrey LM test confirms that there is no autocorrelation, while the ARCH LM test states that there is no problem of varying variance. In addition, the normality test results indicate that there is no normal distribution problem. Figure 2 shows the stability of the long-term forecasts confirmed by CUSUM and the CUSUM of Squares chart. In other words, it states that the estimated coefficients are between the upper and lower critical limits at the 5% significance level.

Table 7. ARDL Long-run results

Variables	Coefficient	*t*-statistics
lnCO2	0.251	36.126***
lnRF	0.093	3.978***
lnTP	-0.163	-6.146***
lnLCP	0.830	96.689***
lnDC	0.110	31.441***
Diagnostic Tests		
R^2	0.513	
Adj. R^2	0.439	
Breusch-Godfrey LM Test[a]	0.431 (0.653)	
Breusch-Pagan-Godfrey Test[b]	1.746 (0.142)	
Ramsey Reset	0.005(0.944)	
J-B Normality Test[c]	2.270 (0.321)	

Source: Authors' findings. [a], [b], [c] state autocorrelation, heteroscedasticity, and normality test. *** and ** show 1% and 5% significance level.

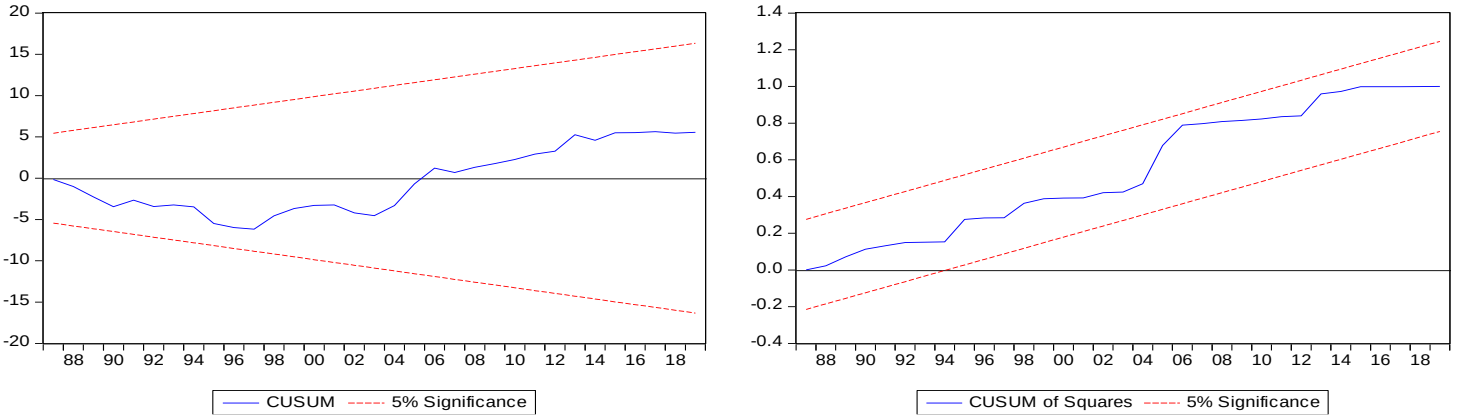

Fig.2. CUSUM and CUSUM²

In order to check the findings of long-run, CCR, FMOLS, and DOLS methods are performed in addition to the ARDL model. The findings of the FMOLS, CCR, and DOLS estimators are summarized in Table 8 and are similar to the long-run results of the ARDL approach to cereal production of each variable given in Table 7. This tells us that in the period 1980-2019, banks' domestic credit, CO2 emissions, rain amount, and cereal production area in Turkey have a positive relationship and temperature prevents cereal production.

Table 8. Robustness check

Methods	FMOLS		DOLS		CCR	
Variable	Coefficient	t-statistics	Coefficient	t-statistics	Coefficient	t-statistics
C					0.174	0.080
lnCO2	0.246	14.719***	0.260	57.311***	0.249	15.649***
lnRF	0.111	2.566***	0.027	1.846***	0.104	1.920***
lnTP	-0.197	-2.634***	-0.233	-9.557***	-0.220	-2.321***
lnLCP	0.831	41.894***	0.859	129.329***	0.825	6.245***
lnDC	0.113	7.856***	0.122	32.835***	0.112	4.833***
Diagnostic Test Results						
R^2	0.740		0.784		0.741	
Adj. R^2	0.710		0.717		0.702	
SE of Regression	0.064		0.063		0.064	
SSR	0.139		0.115		0.138	

Source: Authors' findings. Note: *** state 1% significance level.

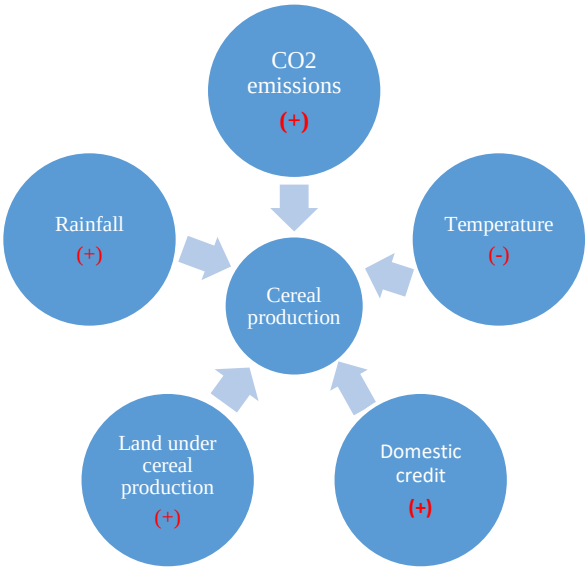

Fig. 3. The summary of long-run tests

The long-term relationship implies that there is at least one causality between the variables. In this study, the VECM Granger causality test is used to investigate the direction and validity of the causality relationship among independent variables and grain production. The findings of the test are summarized in Table 9. In this study, it is obtained that CO2 is the cause of grain production in the short run. At the same time, the findings indicate a bidirectional causality between CO2 emissions and cereal production in Turkey in the long term. This finding of the study is in line with the finding of Xiang and Solaymani (2022), who found that there is causality from Malaysia's CO2 emissions to grain production and from cereal production to CO2 emissions using the Toda Yamamoto test. The findings of Koondhar et al. (2021) and Chandio et al. (2022) also support the conclusion of the study. The causality findings reveal that both the average precipitation amount is the cause of the cereal production and the cereal production is the cause of the precipitation amount at the 1% significance level in the long run. However, Attiaoui and Boufateh (2019) prove that there exists unidirectional causality spanning from average precipitation to cereal production for Tunisia during the 1975-2014 period.

In addition, the findings indicate a bidirectional causality between CO2 emissions and cereal production in Turkey in the long term. This finding of the study is in line with the finding of Xiang and Solaymani (2022), who found that Malaysia casualized from CO2 emissions to cereal production and from cereal production to CO2 emissions using the Toda Yamamoto causality test. The findings of Koondhar et al. (2021) and Chandio et al. (2022) also support this conclusion of the study. At the same time, it is seen in Table 9 that there exists a long-term bidirectional causality at the significance level of 1% from the average temperature to cereal production and from cereal production to the average temperature in Turkey and that the average temperature is also the cause of cereal production in the short term. Similarly, Kumar et al. (2021) reveal a bidirectional causality between the average temperature of 11 low-middle-income countries and cereal production over the period 1971-2016. Thus, there appears to be a bidirectional causality between cereal production and climate change, which includes indicators of CO2 emissions, rainfall, and temperature. The causality findings demonstrate that there is a causality both from banks' domestic credit to cereal production, and cereal production to banks' domestic credit causality at the significance level of 1% in Turkey. But Chandio et al. (2021) reveal that banks' domestic credit as a financial sector development indicator is the cause of the cereal production in Pakistan. Finally, according to the VECM Granger causality finding in Table 9, it is obtained that there is a unidirectional causality spanning from cereal production land in Turkey to cereal production in the long term. Our finding is in line with the findings of Chandio et al. (2023) for four ASEAN countries over the period 1991-2018.

6. Conclusion

The purpose of the study is to search the relationship among climate change, banks' domestic credit, and cereal production in the period 1980-2019 in Turkey, including CO2 emissions, average precipitation, and average temperature variables. In the study, firstly, KPSS, ADF, and Ng-Perron tests are used to evaluate the variables. In the second stage, the cointegration among variables is examined by the ARDL boundary test. In the third stage, CCR, FMOLS, and DOLS methods are used in conjunction with the ARDL estimator to determine the long-term elasticity of the independent variables. In the final stage, the VECM approach is used to examine the causality between independent variables and cereal production.

Table 9. VECM Granger test

Dep. Variable	Independent Variables Short-run *F*-statistics(p-value)						LR t-statistics (p-value)
	ΔlnCP	ΔlnCO2	ΔlnRF	ΔlnTP	ΔlnLCP	ΔlnDC	ECT_{t-1}
ΔlnCP	-	-0.550	-0.577	0.410	0.618	1.146	-3.142***
		(0.586)	(0.567)	(0.684)	(0.540)	(0.260)	(0.003)
ΔlnCO2	-1.841*	-	-0.269	-0.748	1.131	1.090	-2.319**
	(0.075)		(0.789)	(0.460)	(0.266)	(0.284)	(0.027)
ΔlnRF	0.915	-0.203	-	-2.297**	-0.962	0.284	-5.564***
	(0.367)	(0.840)		(0.028)	(0.343)	(0.777)	(0.000)
ΔlnTP	2.170**	0.697	-1.252	-	0.617	-1.303	-4.622***
	(0.038)	(0.491)	(0.220)		(0.541)	(0.202)	(0.000)
ΔlnLCP	-0.033	-0.696	-0.850	0.162	-	-0.281	-1.125
	(0.973)	(0.491)	(0.401)	(0.872)		(0.780)	(0.269)
ΔlnDC	-0.209	0.813	-0.922	1.964*	0.857	-	-
	(0.835)	(0.422)	(0.363)	(0.058)	(0.398)		2.987***
							(0.005)

Source: Authors' findings. Note: ***, **, and * indicate 1%, 5%, and 10% significance levels, respectively.

Empirical findings in the study determined that the variables are cointegrated at the *I*(1) level and that there is a long-term relationship between cereal production and banks' domestic credit, CO2, average precipitation, average temperature, and cereal production area. In addition

it is concluded that banks' domestic credit, CO2 emissions, average precipitation and increase in cereal production area also stimulate cereal production in Turkey and that the average temperature increase also reduces cereal production. According to the latest finding, CO2 emissions, average precipitation, and average temperature are the cause of grain production, and grain production is the cause of climate change, which includes CO2, average precipitation, and average temperature indicators. There is also a unidirectional causality that extends from grain production field to the grain production. In addition to these findings, as a result of the examinations, it is stated that there is a bidirectional relationship between the banks' domestic credit and grain production.

The findings from the study offer important advice for policymakers, agronomists, and economists alike. As Chandio et al. (2020) and Chandio et al. (2022) point out in their study, they should make long-term plans against temperature effects in the long term, primarily because temperature adversely affects cereal production in the long term. Therefore, planning the frequency of irrigation, the types of fertilizer to be used and the selection of the type of seed can be ensured to prevent the long-term negative effects of temperature. Secondly, new reforms should be made by the state to increase the production areas so that cereal production can be increased. Finally, according to the study of Grivins et al. (2023), reaching finance is important for farmers to improve competitiveness and farmers can access funds, which helps them stay profitable and integrate sustainable farming practices.

In addition, the study has some limitations and these limitations present suggestions for further studies. First of all, in this study, the relationship between banks' domestic credit, climate change, and cereal production are tested. But future studies may also test the impact of the financial sector on cereal production for different countries. Secondly, in this study, while empirical analysis and evaluation of cereal production is made and evaluated only based on Turkey, this issue can be examined by considering the group of countries formed by more than one country (such as OECD countries, G7 countries, developing countries, developed countries group) in future studies. Third, variables such as CO2 emissions, rainfall, and temperature are added to this study model as indicators of climate change, but future studies may examine the issue based on different climate change indicators. Finally, the ARDL model is utilized in this study. But the new methods such as the NARDL method can be applied in the future studies

Data availability: The datasets generated and analyzed during the current study are available in the World Bank Indicator, World Intellectual Property Organization repository.
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Compliance with ethical standards
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Human resource accounting disclosure (HRAD) practices: Evidence from banking industry in Bangladesh

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ABSTRACT

The study investigates 28 banks listed on the Dhaka Stock Exchange's degree of human resource accounting disclosure standards. The study took into account a two-step procedure to gauge the extent of HRA disclosure in the annual reports of each distinct bank for each year: Building the human resource accounting disclosure index and grading the disclosure items are the first two steps. The data were analyzed using descriptive statistics, tabulation, and graphical representation. The outcome shows that banking organizations' accounting disclosures for human resources are still in their infancy. Standard, Southeast, and Mercantile Banks collectively disclose the most HRA information, while ICB Islamic Bank Ltd. discloses the least information. The study has the implication for current professional practice and is an important addition to existing literature in the arena of human resource accounting disclosure.

I. Introduction

The effectiveness of individuals must be increased in the proper context in order to assure growth and development as well as overall advancement of any business (Işık, 2010, 2023a-b). The other resources cannot be operationally effective without human resources. The human behavior characteristics reveal the organization's founding strength. The abilities, qualities, perceptions, and character of the employees have a significant role in the effective and efficient utilization of the physical assets (Knauf, 2011). Human Resource Accounting (HRA) is described by the America Accounting Association (1973) as the procedure of gathering and disseminating data pertaining to human resources. Human resource accounting was actually first proposed in the 1960s in an effort to include employees on the balance sheet, and it only became a well-known research topic in the 1970s. Human resource concerns and methods for evaluating these resources have taken on a distinctive and significant position in contemporary management difficulties. Today, there is no question that human resources must be valued, included as assets in the balance sheet, and subjected to a certain technique of calculation and consideration for depreciation (Flamholtzet al., 2002). Since the introduction of the single and double entry systems, accounting has expanded internationally. The concepts and practices of accounting contributed more to the field of accounting.

However, the use and treatment of human resources in the proper dimension were constrained by conservatism and other accounting principles and notions. There have been earlier studies about the treatment and valuation of human resources from both an investment and cost standpoint. Over the past 15 years, human capital reporting has attracted significant academic and professional interest from throughout the world (Stewart, 1994; Abeysekera and Guthrie, 2004; Bassi et al., 2000). Companies in industrialized nations typically publish HR information in accordance with established patterns, but in developing nations like Bangladesh, the concept of HR disclosure is still in its infancy. Although it is not required, some Bangladeshi businesses voluntarily disclose some HR information (Hossain, et al., 2004). There hasn't been much research on HR disclosure from the standpoint of developing economies (Khan & Khan 2010). The accounting and disclosure components of the human resource, which has been regarded as tactical capital, are becoming crucial for the performance of the firm. Determining the pattern of Human Resource Accounting disclosure practices in Bangladeshi banks is the goal of the research study.

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2. Literature Review

Many researchers have conducted research for human resource accounting disclosure practices (Hermannson, 1964; Flamholtz, 1985; Sackmann et al., 1989; Owusu-Ansah, 1998; Flamholtz, Bullen, & Hua, 2002; Akhtaruddin, 2005. Ahmed, 2009; Ullah, 2013; Rahman et al., 2020; Mohammad Ali, et al., 2021, Wiyadi et al., 2021; Ali & Barda, 2022; Islam et al., 2023). In the 1960s, HRA was introduced in the accounting literature as a way to quantify human value as a component of goodwill (Flamholtz, 1985). First use of the term "human resource accounting" was made in 1968 by Brummet, Flamholtz, and Pyle. HRA was described as "the process of discovering and measuring data on human resources and distributing this information to interested parties" by the American Accounting Association's Committee on Human Resource Accounting in 1973. It gives details on the costs and values of human resources, aids in decision-making, and encourages decision-makers to adopt a human resource viewpoint (Sackmann et al., 1989). The rise in human resource accounting may be traced to the business community's apparent growing realization of the significance that key stakeholders place on ethical and sustainable corporate activity. It is also important to keep in mind that modern economies are shifting from operations focused on manufacturing to operations focused on services, reviving interest in human resources accounting.

Numerous empirical studies have been done on the topic of accounting for human resources in corporate settings. Many of these studies have emphasized the requirement for human capital assets to be capitalized in a company's balance sheet as opposed to being written off as expenses in the profit and loss accounts. In his groundbreaking study on the valuation of human assets, Hermannson (1964) tries to give human capital a monetary value on the balance sheet. According to Barney (1991), accounting for human resources has aided in the resolution of the majority of workplace issues. Barney continued by saying that a company has a lasting competitive advantage when it has a human resource pool that cannot be duplicated or replaced by its competitors. People should be managed with a long-term perspective and as assets rather than only as variable costs, according to Flamholtz, Bullen, and Hua (2002). According to Sveiby (1997), corporate organizations invest in human resources to produce future revenues; as a result, human resources should be taken into account when valuing a company by capitalizing them rather than deducting them from current expenses. Mohammad Ali, et al. (2021), Studied that the human resource accounting disclosure (HRAD) procedures of financial institutions with DSE listings and an analysis of how organizational characteristics (service length, size, profitability, overall staff count, and total number of pages) affect HRAD in annual reports. For the years 2014 to 2018, a total of 90 annual reports from 18 financial institutions were used as the sample size. The disclosure items have been given a dichotomous (0 and 1) score in order to establish the level of HRAD for each yearly report. The findings show that the size of the organization and the total number of pages have a considerable positive impact on the extent of HRAD, but the total number of employees is just a negligibly favorable driver. However, service length has a considerable negative impact, while profitability has a little impact. Another study conducted by Wiyadi et al. (2021), the Study's goal was to describe HRAD practices among top-ranked businesses in Indonesia, Malaysia, Vietnam, Philippines, Thailand, and Singapore, according to the ASEAN Corporate Governance Scorecard. Sixteen criteria from earlier studies were used to evaluate HRAD methods. 195 businesses in total were evaluated based on their annual reports from 2014 and 2015. According to the report, Indonesia (71%), Thailand (66%), Vietnam (65%), Malaysia (59%), Singapore (43%) and the Philippines (40%), have the highest rates of HRAD practices. It is also discovered that independent HRAD is nearly nonexistent, with the exception of a few businesses in Malaysia and the Philippines. This suggests that institutionalizing HRAD methods is necessary for better governance in Asean countries. According to Ali & Barda (2022), they found that there was a moderate level of HRAD across IT companies in India.

The question of the extent of human resource accounting disclosure procedures and its link with corporate characteristics of corporate organizations has also been the subject of a number of empirical studies. In their content analysis study on the Intellectual Capital (IC) disclosure procedures of selected Bangladeshi enterprises, Ali et al. (2008) found that corporations reveal very little IC material, including data on human resources. Similar results are reported in Khan and Ali's (2010) study on the IC disclosure of Bangladeshi commercial banks. According to a much older study by Bala and Habib (1988), separate financial reporting to employees is not required in Bangladesh. As a result, organizations were only required to disclose certain types of employee-related information, such as employee salaries and remuneration, provident fund, gratuity fund, welfare fund, festival bonuses, and other cash incentives based on employees' annual performance. Similar to this, Hossain et al. (2004) reported that only a small percentage of the businesses in their sample disclosed HR-related information.

According to a study by Ullah (2013), there is a substantial correlation between reporting data and the age of Islamic banks in Bangladesh. Age was also utilized as an independent variable in a study on disclosure by Ahmed (2009). As it is argued that more disclosure is more likely from established, older companies than it is from newer ones. The scope of a company's disclosure may be determined by its age, or stage of development and growth, according to Owusu-Ansah (1998) and Akhtaruddin (2005).

3. Methodology of the study

3.1 Sample selection

Based on secondary and primary data sources, the study is empirical in character. 28 randomly chosen listed banking businesses from the Dhaka Stock Exchange (DSE) were taken into consideration for this study. The study focused on Bangladesh's publicly traded banking companies. The banking industry was specifically chosen since information on HRAs is crucial for service-oriented businesses. The sample for the study consisted of 28 banks out of the 30 listed banking businesses on the Dhaka Stock Exchange (DSE), or 93.33% of the population.

3.2 Selection of period

In 2022, the study was carried out. The data should be from the most recent and current year to keep the study current and relevant. Since the annual report from 2022 is the most recent, 28 annual reports from the 28 sample banking businesses of that year were gathered.

3.3 Data sources

The annual reports of the relevant banks during the time period were the source of all the data painstakingly gathered for this study. The secondary data were gathered through research papers, annual reports, and other sources by the chosen sample banking companies. The annual report, which serves as a company's primary form of communication (Lang & Lundholm 1993), is selected as the study's credible source of data due to its accessibility (Hooks, Coy & Davey 2002). The majority of annual reports were obtained from the websites of the relevant banking companies, and those that could not be obtained from the websites were obtained via Banks Branch. Additionally, research papers from websites were gathered.

3.4 Content analysis

To accomplish the goals of the study, a content analysis approach was used to examine the annual reports of the listed banking organizations. The most popular research technique in the fields of human capital, intellectual capital, and CSR disclosure is content analysis (Guthrie et al. 2004). The primary source of data for earlier studies on HRA disclosure in developed and developing nations was also annual reports. 15 predicted human resource accounting disclosure items were chosen for the study divided into 5 categories, including "Separate HRA statement items" (03), "HRA item valuation" (03), "HR item development" (03), "HR item performance & remuneration" (03), and "In & end support items" (03), (03). The chosen 15 elements were compiled from research papers, annual reports from various companies, and IAS-19 of employee benefits.

3.5 Development of HRA disclosure index

A Human Resource Accounting Disclosure Index (HRADI) was created for this study by studying the pertinent literature and consists of 15 Human Resource Accounting Disclosure (HRAD) variables (table 1). A dichotomous technique was used in the studies by Ullah (2013), Ahmed (2009), Wallace, Naser & Mora (1994), Cook (1991 & 1992), and Ahmed & Nicholls (1994), in which an item received a score of "1" if it was disclosed and a score of "0" if it was not. The use of weighted and unweighted scores for the things revealed in the corporate annual reports and calculation, according to Coomba&Tayib (1998), can have little to no impact on the results. This study adopted the unweighted disclosure index methodology as a result. In accordance with Cooke's (1992) advice, the unweighted disclosure technique calculates the selected company's total disclosure (TD) score is as follows:

$$TD = \sum_{i=1}^{n} di$$

Where,
d = 1 if item di is disclosed
0 = if the item is not disclosed
n = number of items

However, the main theme of the un-weighted disclosure index is that all items of the disclosed information in the index are considered equally crucial to the average users.

Table 1: Disclosure Items

No.	Disclosure Items
Separate HRA Statement	
01.	Separate HRA statement in Annual Report
02.	Human Resource Policy in the contents
03.	Employments Report
Valuation of Human Resource	
04.	Number of Employees
05.	Total value of Human Resource (Cost of HR maintenance)
06.	Employees Value Creation/Added
Human Resource Development	
07.	Human Resource Development Fund
08.	Training and Development
09.	Management Succession Plan
Performance and Remuneration	
10.	Performance recognition
11.	Employee Category
12.	Managerial Remuneration
Support In & End Service	
13.	Employee Fund
14.	Pension Fund, Provident fund
15.	Retirement Benefit

Source: International Accounting Standards (IAS)-19

3.6 Techniques Used for Data Analysis

The techniques used for analyzing data include the descriptive statistics, tabulation and graphical representation.

4. Data Analysis and Findings

4.1 HRA Disclosure

The data in Table No.1 reveals that, the banking companies in Bangladesh disclosed information relating to Human Resource Accounting in the annual report. The score received by all individual banks in the sample has been made. A summary descriptive statistic of values for the Banks are provided in the Table 1

Table 2: Descriptive statistics of the Human Resource Accounting Discloser in Banks

	N	Range	Minimum	Maximum	Mean	Standard Deviation
HRADI	28	5	9.0	14.0	11.8214	1.30678
Valid N (list wise)	28					

Source: Computed by the Author, 2015.

Comparison of Human Resource Accounting disclosure patterns may also be made by comparing the distribution of scores under the disclosure index. Table 2 contains data on the dispersion of the disclosure scores (range as given by the differences between minimum and maximum scores and standard deviation). The table 3 shows that, the score range of the HRA Disclosure and the Situation is clear that all banks are concern about HRA but Some are less concern about the disclosure of HRA item in the annual report and it also shows that Height number of banks are on Average level of Score Range 10-12 and the lowest Score range is on 7-9. From that it is clear to all that banking companies are not in full satisfactory level about HRA Disclosure.

Table 3: Level of Human Resource Accounting Disclosures

Score Range	No. of Banks	% in the sample	Cumulative %
0-3	00	0.00	0.00
4-6	00	0.00	0.00
7-9	01	3.60	3.60
10-12	19	67.85	71.45
13-15	08	28.55	100.00
Total	28	100.00	-

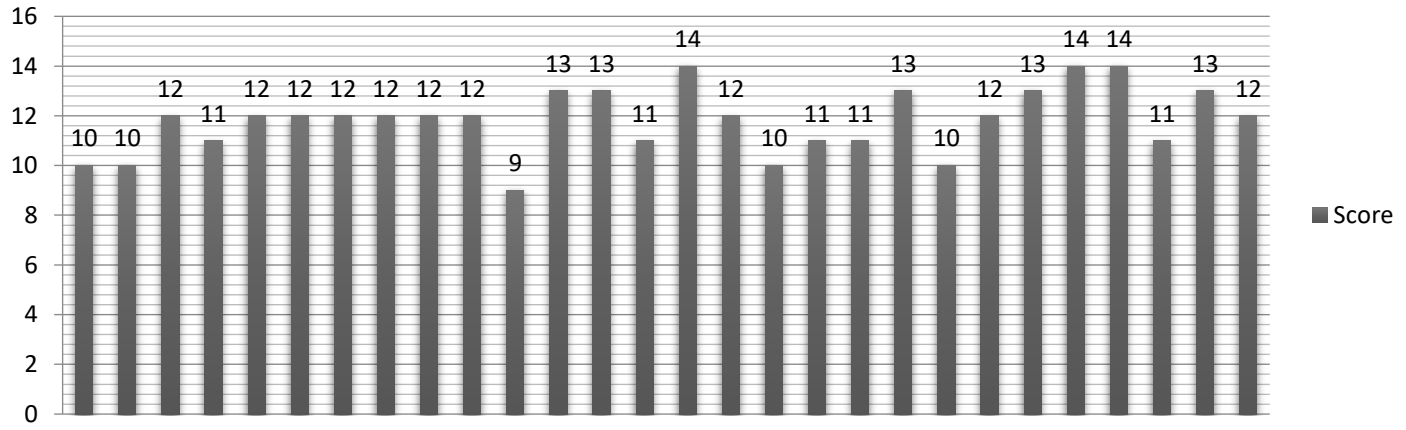
Source: Computed by the Author, 2015.

4.2 Top and Lowest Ranking Companies

The sample Banks were ranked on the basis of the value of the disclosure for each of the Banks. Table 4 shows the top and bottom ranked Banks by the size of the disclosure index. The table provides the disclosure score made by the Banks under study. Further, these provide insights about which banks are disclosing more HRA information in the corporate annual reports.

The following table-4 and Figure 1 report the overall Human Resource Disclosure position of the banking companies in Bangladesh in 2014. It is found here that Standard Bank Limited, South East bank and Mercantile Bank achieved the highest Score by disclosing 14 (93.33%) of the selected HR items in annual report in 2014. ICB Islamic Bank Limited ranked the last 28th position by disclosing only 09 (60%) of the selected HRA items.

Figure 1: HRA Disclosure Score



Source: Prepared by the Author, 2015.

Table 4: Ranking of the Banking Companies Based on Total HRA Disclosure Score

Name of the Banks	Number of items Disclosed	Percentage (%) of Total item disclosed	Ranking
Standard Bank Ltd.	14	93.33	01
Southeast Bank Ltd.	14	93.33	01
Mercantile Bank Ltd.	14	93.33	01
IFIC Bank Ltd.	13	86.66	02
Islami Bank Bangladesh Ltd.	13	86.66	02
Prime Bank Ltd.	13	86.66	02
Social Islami Bank Ltd.	13	86.66	02
United Commercial Bank Ltd.	13	86.66	02
Bank Asia	12	86.66	03
City Bank Ltd.	12	86.66	03
Dhaka Bank Ltd.	12	86.66	03
Dutch Bangla Bank Ltd.	12	86.66	03
Eastern Bank Ltd.	12	86.66	03
EXIM Bank Ltd.	12	86.66	03
First Security Islami Bank Ltd.	12	86.66	03
Mutual Trust Bank Ltd.	12	86.66	03
ShahjalalIslami Bank Ltd.	12	86.66	03
Uttara Bank Ltd.	12	86.66	03
BRAC Bank Ltd.	11	73.33	04
Jamuna Bank Ltd.	11	73.33	04
One Bank Ltd.	11	73.33	04
Premier Bank Ltd.	11	73.33	04
Trust Bank Ltd.	11	73.33	04
AB Bank Ltd.	10	66.66	05
ALARABANK	10	66.66	05
NCC Bank Ltd.	10	66.66	05
Pubali Bank Ltd.	10	66.66	05
ICBI Bank Ltd.	09	60.00	06

Source: Developed by the Author, 2022.

4.3 Items not/less Disclosed by any Sample banks in Bangladesh

There is one item of information, which was not disclosed by any of the banks in the sample under study and some are less disclosed. These items of information belong to the category of voluntary disclosure. However, the number of such items of information disclosed by the sample banks varied from one bank than another.

Table 5: Items of HRA information not disclosed and less disclosed

Items	Disclosed by no. of Bank
Human Resource Development Fund	00 out of 28 banks
Separate HRA Statement in annual report	06 out of 28 banks
HR Policy in the content of annual report	07 out of 28 banks

Source: Developed by the Author, 2022.

5. Conclusion and Future Research Directions

There is an urgent need for stronger regulations and standards for the disclosure of information, not just more disclosures, in light of the numerous scandals and frauds that have surfaced in the last ten years. The academic and accounting communities are aware of this as well as the significance of releasing standards to enhance both financial and non-financial reporting. However, the study has shown how poorly HRA and its use in Bangladeshi banking businesses are doing. As HRA statements are not audited, the HRA application and disclosures are not only inadequate but also inconsistent, incomparable, and unreliable.

There is still more work to be done about HRA disclosures. The necessity for accounting authorities, governmental organizations, and regulatory bodies to step up and publish accounting principles about disclosures being more impartial and user-worthy is urgent. Companies can utilize the HRADI as it was created in the study as a benchmark to enhance their HRA disclosures. In making decisions about criteria for HRA disclosures, accounting bodies and corporate regulators may also use it. Investors can also use HRA disclosures offered by businesses as a starting point to comprehend their financial situation and potential moving forward. The present research has so many limitations. It covers only banking industry and a single time period. Further research might be conducted in considering the several industries and time periods. Furthermore, organizations attributes like, size, age, profit structure etc might be considered to explore the influence of these factors on human resource accounting disclosures by the organizations.

Data availability: The datasets generated and analyzed during the current study are available in the World Bank Indicator, World Intellectual Property Organization repository.

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Compliance with ethical standards

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Analysis of Turkey's classic and financial kuznets curves in regards to the level of development and increased distribution+

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ABSTRACT

In this research, we probe the authenticity of both the Financial Kuznets Curve hypothesis and the classical Kuznets curve within the Turkish economy, exploring the interrelation between financial development and income distribution. By employing the ARDL bounds test approach in the econometric analysis, we ascertain that the Financial Kuznets Curve is applicable to Turkey. This means the correlation between income distribution and the extent of financial development adopts an inverted U-shaped pattern. Moreover, the interrelation between GDP and income distribution doesn't form an inverted U pattern, demonstrating that the classical Kuznets curve is not pertinent in the context of Turkey. From the derived outcomes, it is inferred that prioritizing policies that accentuate financial development would constitute a more judicious economic strategy in Turkey, particularly for redressing disparities in income distribution, instead of merely focusing on economic growth.

I. Introduction

One of the core responsibilities of economic administration is to rectify inequalities in income distribution. The propulsion of development is largely contingent on financial evolution, which is notably influenced by liberal policies. Financial development fundamentally pertains to the realm where, beyond banking and stock exchanges, financial assets are channeled, offering an array of funds and credit options to potential borrowers and integrating both local and foreign assets. This progression in finance enables more efficacious utilization of savings, propelling economic enhancement by translating savings to investments. The prevailing explicative nature of scientific inquiries into individual income distribution in Turkey is predominantly due to the limited availability of pertinent studies and the ensuing data shortfall. This renders the available knowledge on income distribution trends in Turkey rather restricted. Addressing this knowledge gap is pivotal for a deeper understanding of the dynamics of income distribution and the symbiotic relationship between growth and income distribution and is essential for the development of relevant policies.

This study seeks to scrutinize the relationship between financial development, total loans disbursed, foreign direct investments, and income distribution in the Turkish economy from 1995 to 2022. Additionally, the study assesses the applicability of both classical and financial Kuznets curves by incorporating variables such as growth and the financial development index and their respective squares. This analysis is anticipated to make a substantial contribution to existing literature, as there are scarce studies in both national and international domains that concurrently examine the financial and classical Kuznets curves. The incorporation of credit utilization and foreign direct investment as variables is also expected to augment the uniqueness of this study. To achieve these objectives, the study will initially delve into outlining the theoretical framework, followed by a review of both national and international literature. In the concluding sections, econometric analyses will be deployed to investigate the interrelationships between the variables, and the resultant estimations will be delineated.

Kuznets (1955) posited that as development and economic growth occur, the distribution of income would initially experience a decline in equity, but as growth and income continue to rise, the inequality in income distribution would subsequently diminish. Kuznets maintained that due to more pronounced income disparities in developing nations compared to their developed counterparts, the escalating income inequality at the onset of economic development could impede the subsequent phases of the developmental trajectory (Kuznets, 1955).

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Referred to as the Kuznets Hypothesis in scholarly literature and represented as an inverted U-shaped curve, the Kuznets curve has undergone several adaptations over the years. One such adaptation is the Financial Kuznets Hypothesis introduced by Greenwood and Jovanovic (1990). This hypothesis posits a relationship between financial development and income inequality analogous to the classical Kuznets curve. Both development and financial development amplify economic growth by fostering the accumulation of physical and human resources. Thus, the enactment of policies that enhance the developmental state of the financial system within countries is crucial (Hepsağ, 2017).

The interconnections between income distribution and both development and financial development are interpreted through two distinct perspectives within the framework of the Kuznets Hypothesis. Greenwood and Jovanovic (1990) depict the relations between these elements as an inverted U Curve, aligning with the classical Kuznets curve, while Galor and Zeira (1993) advocate for the linear hypothesis. It uses the Lorenz Curve for the GINI coefficient developed by Gini (1912) to measure income distribution inequality. Developed by Lorenz (1905), the Lorenz curve is a graphical expression of the inequality in the distribution of income to the population. The curve intersects the diagonal of a square at its extreme points. The GINI coefficient takes a value between 0 and 1, and as it approaches 1, income inequality increases.

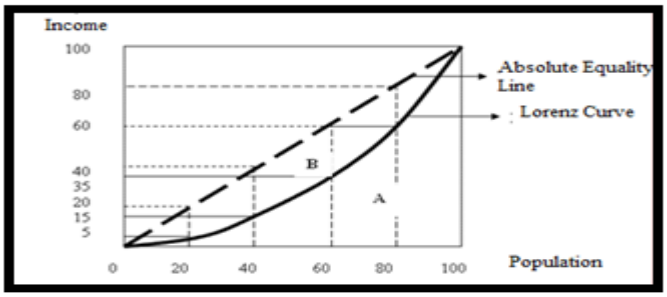

Figure 1: Lorenz Curve

In Figure 1's Lorenz curve, the vertical axis depicts the accumulated income percentages, while the horizontal axis indicates the accumulated population percentages (%). The entirety of society's income is reflected on the vertical side, with the total population that shares this income shown on the horizontal side. A diagonal line at 45 degrees, shown as dashed, represents perfect equality, where every portion of the population gets an equal income percentage.

When we drift further from this dashed diagonal, it signifies a growth in income equality. The two reverse L-shaped lines originating from the bottom left corner, moving first horizontally and then ascending vertically, stand for absolute inequality. In essence, a GINI coefficient of 0 suggests that the income is shared with utmost equality across the population. Conversely, a coefficient value of one implies a skewed distribution of national income. The Lorenz curve for any given distribution can be articulated either through the cumulative distribution function, F(X), or the probability density function, f(X), as shown in equation (1) (Altunöz, 2021).

$$\mathbf{L(F)} = \frac{\int_{-\infty}^{\mathbf{x(F)}} \mathbf{xf(x)dx}}{\int_{-\infty}^{\infty} \mathbf{xf(x)dx}} = \frac{\int_0^{\mathbf{F}} \mathbf{x(F')dF'}}{\int_0^{\mathbf{1}} \mathbf{x(F')dF'}} \qquad (1)$$

In Figure 1, the GINI coefficient is the ratio of the area between the Lorenz curve and the diagonal to the area under the line of full equality. The area between the exact equality line and the Lorenz curve is shown as B in figure 1. The area under the Lorenz curve is shown with A. In this context, the GINI coefficient is expressed as in equation (2).

$$\text{Gini coefficient} = B / (B+A) \qquad (2)$$

If the Gini coefficient is lower than 0.20, it indicates low inequality, between 0.20 and 0.50 indicates moderate inequality, and above 0.50 indicates high inequality. Another income distribution measurement method is the share method. In this method, households are grouped as 1% 100%, 5% 20%, 10% 10% and 5 20%, and the shares of the groups from the total income are compared. Although the Turkish economy has made significant progress in income distribution in recent years, the problem has not been fully resolved. This situation can be observed in Table 1.

Per Table 1, a diminishing P80/P20 ratio signifies a reduction in income inequality. Between 2006 and 2021, the GINI coefficient and P80/P20 ratios didn't showcase substantial betterment. The GINI coefficient, initially at 0.428 in 2006, dwindled to 0.40 in 2021, while the P80/P20 ratio contracted from 9.6 to 7.6. In this regard, the P80/P20 ratio, reflecting the income disparity between the wealthiest 20% of the populace and the poorest 20%, has descended by 2 points. A noteworthy observation in Table 1 is the non-stable yet discernible reduction in the rate compared to 2006, with a notable decline particularly in 2020 due to the pandemic. Accordingly, Table 2 displays the 20 percent Individual Groups in Turkey.

Income and Living Conditions Survey data for 2021 in Table 2 are presented with reference to the previous calendar year 2020. In the income calculations in the aforementioned report, household incomes are converted into equivalent household disposable income considering the household composition and size. According to the results of Table 2, the share of the high 20% group in total income decreased by 0.8 points compared to the previous year and decreased to 46.7%, while the share of the lowest income 20% group increased by 0.2 points to 6%, increased to 1. Gini coefficient sharing in the regional sense, which was announced by TURKSTAT until 2019, left its place to the P80/P20 ratio as of 2019. This situation can be observed in Table 3.

Table 1: Turkey's GINI Coefficient and P80/P20 Ratio (2006-2021)

Date	GINI Coefficient	P80 / P20 Ratio
2006	0,428	9,6
2007	0,406	8,1
2008	0,405	8,1
2009	0,415	8,5
2010	0,402	7,9
2011	0,404	8,0
2012	0,402	8,0
2013	0,400	7,7
2014	0,391	7,4
2015	0,397	7,6
2016	0,404	7,7
2017	0,399	7,5
2018	0,408	7,6
2019	0,395	7,4
2020	0,410	8,0
2021	0,401	7,6

Source: TURKSTAT (2022), Income and Living Conditions Report 2021

Table 2: Individual Groups of 20 Percent in Turkey

Year	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Income reference year	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Total	100	100	100	100	100	100	100	100	100	100
First %20	5.9	6.1	6.2	6.1	6.2	6.3	6.1	6.2	5.9	6.1
Second %20	10.6	10.7	10.9	10.7	10.6	10.7	10.6	10.9	10.6	10.8
Third %20	15.3	15.2	15.3	15.2	15	14.8	14.8	15.2	14.9	15.1
Fourth %20	21.7	21.4	21.7	21.5	21.1	20.9	20.9	21.4	21.1	21.3
Last %20	46.6	46.6	45.9	46.5	47.2	47.4	47.6	46.3	47.5	46.7

Source: TURKSTAT (2021 Income and Living Conditions Report)

Table 3: Regional Income Distribution Status in Turkey (2013-2021)

Dates	Provinces and Regions with the Lowest Gini Coefficients	Provinces and Regions with the Highest Gini Coefficients
2013	Eastern Blacksea 0,315	Mediterranean Region 0.399
2014	Zonguldak, Karabük, Bartın 0,304	Erzurum, Erzincan, Bayburt 0.413
2015	Kırıkkale, Aksaray, Niğde, Nevşehir, Kırşehir 0,308	Şanlıurfa, Diyarbakır 0,420
2016	Zonguldak, Karabük, Bartın 0,315	Adana, Mersin 0.414
2017	Erzurum, Erzincan, Bayburt 0,291	İstanbul 0.443
2018	Malatya, Elazığı, Bingöl 0,305	İstanbul 0.444
Dates	The Province with the Highest Income According to P80/P20 Ratio	The Province with the Lowest Income According to P80/P20 Ratio
2019	İstanbul 7,8	Zonguldak, Karabük, Bartın 4,2
2020	İstanbul 7,7	Zonguldak, Karabük, Bartın 4,2
2021	İstanbul 7,6	Malatya, Elâzığ, Bingöl, Tunceli4,1

Source: Compiled by the author announced by TURKSTAT.

According to Table 3, there are serious differences between regions and provinces in Turkey, and these differences are not stable on a yearly basis. Considering the years 2013-2018, which are reported as GINI coefficient, the average of the provinces with the lowest GINI coefficient is 3, and the average of the provinces with the highest GINI coefficient is 0.41. When we examine the year 2019, Istanbul ranked first among the provinces with the highest income with a P80/P20 ratio of 7.8 in income distribution inequality and maintained its position in 2020 and 2021 as well. Zonguldak, Karabük and Bartın share the last three in 2020 and 2021 in the ranking of the provinces with the lowest income distribution inequality with a P80/P20 ratio of 4.2. Zonguldak, Karabük and Bartın regions, which have a P80/P20 ratio of 4.2, appear as the cities with the lowest rates. This means that the income inequality in the region formed by these three cities is relatively less. In 2022, while Istanbul kept its place, Zonguldak, Karabük, Bartın were replaced by Malatya, Elazığ, Bingöl and Tunceli.

2. Literature

Chen (2003) conducted an analysis using panel data to examine the validity of the Kuznets curve in 43 selected countries from Africa, Asia, and Latin America. She found the relationship between the variables to exhibit an inverted-U shape. Ang (2008) scrutinized the validity of the financial Kuznets hypothesis for India spanning the years 1951-2004, concluding that investments in both foreign and domestic financial sectors intensify disparities in income distribution. Law and Tan (2009) applied the ARDL bounds test approach in their study, assessing the relevance of the financial Kuznets hypothesis to the Malaysian economy from 1980-2000. The study included variables like financial development, Gini coefficient, GNI per capita, institutional quality, and inflation. The results implied that economic growth, enhanced institutional quality, and diminished inflation alleviate disparities in income distribution. Malinen (2012) examined the classical Kuznets hypothesis for Latin American countries, postulating a long-term equilibrium relationship between growth and income distribution, with the relationship being negative in developed countries. Hoi and Hoi (2012) explored the influence of financial development on income distribution in Vietnam over 2002-2008, using panel data analysis. They concluded that financial development mitigates income distribution inequality, but no strict U-shaped relationship exists between the two variables. Park and Shin (2015) delved into the impact of financial development on income inequality, analyzing 162 developing Asian countries between 1960 and 2011. Preferring panel data analysis, they found the nature and magnitude of the relationship between income distribution and financial development to vary across countries, and they observed a U-shaped relationship in every country included in the analysis. Also, Altunöz (2015) investigated the Kuznets curve's validity in the Turkish context between 1991 and 2014, relating income to financial development. He concluded that variables like GDP per capita, trade, and private sector loans play a positive role in addressing income inequality. Topuz and Dağdemir (2016) examined the applicability of the Kuznets curve across 94 nations between 1995-2011, affirming the hypothesis's validity. The study revealed that in countries with low to middle incomes, economic growth was associated with a rise in income inequality, whereas in affluent nations, it resulted in a decrease. Destek et al. (2017) scrutinized the same hypothesis for Turkey from 1977-2013, concluding that escalations in inflation rate and public expenditures magnified income disparity, while a surge in national income equitably distributed the income. Their findings corroborated the inverted-U shaped Financial Kuznets curve within the surveyed period. HepSağ (2017) applied the ARDL bounds test approach to evaluate the Financial Kuznets Curve's validity in G7 countries. The outcomes revealed its applicability to Italy and Germany but not to Canada, England, or the USA. Torusdağ and Barut (2020) evaluated both the classical and financial Kuznets hypotheses for Turkey, establishing the validity of the Environmental Kuznets curve but not the Financial Kuznets Curve. Pata (2020) explored multiple relationships, including financial development and Gini coefficient, in Turkey between 1987-2016, discovering that while inflation and fixed capital stock accentuate income inequality, urbanization diminishes it.

Altunöz (2021), using ARDL bounds test method for his analysis on Turkey, concluded the classical Kuznets curve as invalid and the financial one as valid, while Dumrul et al. (2021) found no long-term cointegration relationship between financial development and income inequality in the context of the Financial Kuznets Curve Hypothesis in Turkey. Özdemir (2021) researched the Financial Kuznets curve's validity across 27 OECD countries from 1990-2017, the empirical findings of which contested the conventional belief in the hypothesis's validity, illustrating a U-shaped structure instead. Efeoğlu (2022), researching newly industrialized countries between 1987-2019, asserted the validity of both the classical and financial Kuznets curves, uncovering an inverted-U relationship between financial development and income inequality, with per capita GDP and its square as control variables, thereby substantiating the inverted-U relationship between income per capita and income inequality in such nations. Çay and Akan (2023) investigated the relationship between economic growth and environmental pollution in their study by testing the Environmental Kuznets Curve (EKC) hypothesis using data from 37 OECD countries. In their analysis, they used variables such as energy consumption, per capita real gross domestic product (GDP), the square of per capita real GDP, urbanization rate, trade liberalization, and CO2 emissions for the period covering the years 1990-2015 for OECD countries. As a result of the analysis; the coefficient of energy consumption has been found to be positive and statistically significant. Generally, energy consumption has a positive impact on carbon emissions. The increase in trade liberalization has increased carbon emissions in some countries, while it has reduced carbon emissions in others. The increase in the urbanization rate has reduced carbon emissions in some countries, while it has created a positive impact in others. The openness index has generally been observed to have a negative effect on carbon emissions. As a result of the study, the EKC hypothesis was found to be valid in 14 countries, while it was concluded that the EKC hypothesis was not valid in 23 countries. İmamoğlu and Onbaşıoğlu (2023) have examined the role of globalization on environmental quality by applying the Environmental Kuznets Curve (EKC) hypothesis for Pakistan between the years 1975–2015. Variables and the Autoregressive Distributed Lag (ARDL) methodology and the error correction model were used to examine the short and long-term relationship between globalization and environmental quality. Empirical findings reveal that independent variables such as CO2 emissions, GDP, energy, and globalization have a long-term relationship. In the case of Pakistan, the findings of this research have been corroborated by the EKC hypothesis, also supported by the impulse response function. Moreover, Granger causality indicates that there is a long-term unidirectional causality involving GDP, energy usage, globalization, and carbon dioxide in Pakistan.

3. Econometric Analysis of the Kuznet Curve Hypothesis

In this section, the validity of the classical and financial Kuznets hypothesis for the Turkish economy (whether it is an inverted U-shaped or not) in the Turkish economy will be analyzed for the years 1995-2022. The variables included in the analysis, their symbols and the sources obtained can be viewed in Table 4.

Table 4: Variables, Abbreviation and Sources

abbreviation	Variables	Sources
logGINI	GINI	OECD and Worldbank
logGDP	Gross Domestic Product (Current)	TURKSTAT and Worldbank
$(logGDP)^2$	Gross Domestic Product (Current) squared	TURKSTAT and Worldbank
$logloan$	Total Credit / GDP	Banks Association and TURKSTAT.
$logFDI$	Financial Development Index	IMF
$(logFDI)^2$	Financial Development Index squared	IMF
$loginv$	Foreign Direct Investments / GDP	Ministry of Commerce

Based on Table 4, the GINI coefficient serves as the variable representing income distribution, while GDP (current prices 2013), the ratio of net inflow foreign direct investments to GDP, and the financial development index, which assesses the functionality of financial institutions and markets, act as variables reflecting economic development. The loan variable is represented by the sum of loans extended by both the public and private sectors, and it is expressed as a proportion of GDP. Given that the Financial Kuznets Curve hypothesis fundamentally posits an inverted U-shaped and non-linear relationship, the squares of the FDI and GDP variables are incorporated into the model. All variables are logged for the analysis, and they are considered on an annual basis. Economic models primarily aim to explore the enduring relationships between varying elements.

In econometric analyses, the presence of unit roots in time series, meaning non-stationarity, can lead to spurious regression issues. To mitigate this, the variables under scrutiny should be stationary and devoid of a unit root. The ascertainment of this condition is executed through unit root tests, with a preference for the Philips-Perron (PP) unit root test initially. Although the Augumented Dickey-Fuller (ADF) unit root test often used in scholarly literature assumes that the error terms are statistically independent with constant variance, the Phillips and Perron (1988) test extended this assumption concerning error terms (Altunöz, 2013).

The regression equations applied in the ADF test align with those used in the PP unit root test. Nonetheless, the autocorrelation issue is addressed by applying a non-parametric adjustment in the τ statistics of the preceding term's parameter (δ). The established regression catering to this need is elucidated in equation (3).

$$\Delta Y_t = \beta' D_t + \pi Y_{t-1} + u_t \quad and \; u_t \sim I(0) \qquad (3)$$

PP unit root test results can be viewed in Table 5.

Table 5: Philips Perron Unit Root Test Results

Seri	PP Unit Root Test			
	I(0)		I(1)	
	not constant	constant	not constant	constant
$logGINI$	-1.261(0)	-1.301 (0)	-6.521(1)*	-6.651(1)*
$logGDP$	-0.105(0)	-4.322 (0)	-4.019(1)*	-5.886(1)*
$logGDP^2$	0,422(0)*	0,587(0)*	-	-
$logloan$	-1.302(0)*	-1.431(0)*	-	-
$logFDI$	-4,871(0)*	-5,920(0)*	-	-
$logFDI^2$	-6,179(0)*	-6,827(0)*	-	-
$loginv$	-0.449(0)	-1.698(0)	-6.415(1)*	-5.723(1)*

Note: *,** and *** denote stationarity at the significance level of 1%, 5% and 10%, respectively.

According to Table 5, while the total credit and financial development index variables were stationary at the 1% significance level, all the remaining variables became stationary at the 1% significance level with and without a trend when their first difference is taken. It is stationary at level when squared while the growth variable is first stationary. Perron (1989) states that erroneous results may arise in cases of structural break in the analysis. The unit root test developed by Zivot and Andrews (1992) recommends 3 different models. In model A, it assumes that the series will be broken all at once, and the constant term contains a dummy variable. In model B, a one-time break in the slope of the trend function is predicted and the slope coefficient includes the dummy variable. In the C model, both the constant coefficient and the training coefficient contain a dummy variable and combine the first two models. This situation is seen in equations (4), (5) and (6). (Zivot ve Andrews, 1992: 261).

Model A: $Y_t = \mu + B_t + \delta Y_{t-1} + \emptyset_1 DU(\lambda) + \sum_{i=1}^{k} \delta_i \Delta Y_{t-i} + \varepsilon_t$ (4)
Model B: $Y_t = \mu + B_t + \delta Y_{t-1} + \emptyset_2 DT(\lambda) + \sum_{i=1}^{k} \delta_i \Delta Y_{t-i} + \varepsilon_t$ (5)
Model C: $Y_t = \mu + B_t + \delta Y_{t-1} + \emptyset_1 DU(\lambda) + \emptyset_2 DT(\lambda) + \sum_{i=1}^{k} \delta_i \Delta Y_{t-i} + \varepsilon_t$ (6)

In models, dummy variables are expressed as DU and DT. DU denotes a break in level and DT denotes a break in the slope.

$$\boldsymbol{DU}(\lambda) = \begin{cases} 1, t > T_B \\ O, \ t < T_B \end{cases} \quad \boldsymbol{DT}(\lambda) = \begin{cases} t - T\lambda \ t > T_B \\ O, \quad t < T_B \end{cases}$$

Here, t=1,2,....T denotes time, break date $T_B$and break point $\lambda = \frac{T_B}{T}$, Unit root test results are shown in Table 5.

Table 6: Zivot - Andrews Unit Root Test Results

		Zivot-Andrews					
		Model A		*Model B*		*Model C*	
Variables	*K*	*t*	*TB*	*t*	*TB*	*t*	*TB*
logGINI	1	-3,18**	2001: Q1	-3,01*	2000: Q3	-5,42**	2001: Q3
logGDP	0	-7,66	2000: Q3	-7.65	2001: Q2	-7,00	2000: Q2
$logGDP^2$	2	-7,67	2000: Q3	-7,91	2001: Q2	-7,21	2001: Q2
logloan	1	-2,61	2001:Q1	-3,11	2000: Q2	-4,12	2001: Q2
logFDI	1	-6,99	2008:Q3	-7,90	2008:Q3	-8,11	2008:Q3
$logFDI^2$	2	-7,99	2007:Q3	-8,01	2008:Q3	-8,34	2008:Q3
loginv	5	-8,94*	2008: Q2	-9,90	2008: Q3	-9,94	2008: Q2

Note: ** and * denote 5% and 1% significance level, respectively. Critical levels are -5.19 and -4.21 for Model A; Model B: -5.25 and -4.90; Model C: -6.60 and 6.11. The number of delays is expressed as k.

Structural breaks of the time series in Table 6 are considered by the Zivot-Andrews Unit Root test. According to the test results, the null hypothesis could not be rejected at the significance levels of the GINI and credit variables for all three models, and this result means that the GINI and credit variables are not stationary with the breakout dates in the table.

For the other variables, the null hypothesis was rejected according to each model result, so it was concluded that they were integrated in the first order (Altunöz, 2013 :187). The results show that while the dependent variable is stationary at the first difference, some of the variables subject to the other analysis are stationary at the level and some are stationary at the first difference. The ARDL Bounds Test Approach allows cointegration analysis for level and first order stationary variables, and the important constraint is that the dependent variable is not stationary at the level and no variable subject to the analysis is second order integrated (Pesaran et al., 2001). According to the obtained unit root test results, ARDL approach was decided to be the most appropriate model. The bounds test is based on the estimation of the constrained error correction model using the least squares (LCS) method. The model with the bounds test estimated can be followed in equation (7).

$$GINI_t = \alpha_0 + \sum_{i=1}^{n} \alpha_1 GINI_{t-1} + \sum_{i=0}^{n} \alpha_2 GDP_{t-1} + \sum_{i=0}^{n} \alpha_3 loan_{t-1} + \sum_{i=0}^{n} \alpha_4 FDI_{t-1} + \sum_{i=0}^{n} \alpha_5 inv_{t-1} + \beta_1 GINI_{t-1} + \beta_2 GDP_{t-1} + \beta_3 loan_{t-1} + \beta_4 FDI_{t-1} + \beta_5 inv_{t-1} + \varepsilon_t$$

In Equation (7), delta denotes the difference in the lags of the variables, and n stands for the lag length. For analyzing sequential dependency, Breusch-Godfrey was chosen as the test, and to ascertain the lag length, both Akaike Information Criteria (AIC) and Schwarz Information Criteria (SIC) were utilized. The execution of the ARDL Bounds test approach involves testing the null hypothesis, rooted in equation (6). Given this framework, to ensure the proper functionality of the F statistics derived from the Wald test, it is crucial that there exists no autocorrelation in the error terms. The hypotheses are established in the following manner.

$H_0 = \beta_1 = \beta_2 = \beta_3 = \beta_4 = \beta_5 = 0$ (No long-term relationship between GINI and independent variables)
$H_0 \neq \beta_1 \neq \beta_2 \neq \beta_3 \neq \beta_4 \neq \beta_5 \neq 0$ There is a long-run relationship between GINI and independent variables)

The results of the determination of the lag length are presented in Table 7.

Table 7: Determination of Lag Length for Bound Test

m	*AIC*	*SIC*	$X^2(1)BREUSCH - GODFREY$	$X^2(4)BREUSCH - GODFREY$
1	5.69	6.51	12.09(0.000) **	16.500(0.010) **
2	5.72	6.51	11.47 (0.001) *	12.66(0.014) *
3	5.88	6.20	11.134(0.005)	14.49(0.024)
4	5.16	6.00	10.30(0.071)	12.88(0.040)
5	5.12	6.03	12.219 (0.010) *	12.31(0.0100) *
6	5.81	6.11	10.100(0.010)	16.16(0.071)
7	5.83	6.52	15.256(0.105)	18.71(0.0243)
8	5.90	6.33	8.124(0.550)	10.07(0.8511)

Note: * and ** denote 1% and 5% significance level, respectively. Probability values are shown in brackets.

Based on the outcomes attained through Schwartz and Akaike information criteria, the lag length showcasing the smallest values is identified as 5. However, according to the autocorrelation test conducted using the BREUSCH-GODFREY test, a problem of autocorrelation is evident at a lag length of 5. Consequently, 4 was selected as the lag length, as this second smallest value didn't exhibit any autocorrelation issues. Subsequent to determining the lag length, the boundary test analysis progresses to scrutinize the presence of a cointegration relationship. In this regard, if the result of the F-statistics test surpasses the upper limit of the F-statistic, a conclusion regarding the existence of a cointegrating relationship among the variables is drawn. If not, the null hypothesis is upheld. When the acquired F value resides between the lower and upper limit values, it remains uninterpretable. The results of the F statistic are displayed in Table 8.

Table 8: F Statistics Test Results (Wald Test)

Critical Values at 10% Significance Level			
k (number of dependent variables)	f stat.	Lower limit I(0)	Upper limit I(1)
	7,11	3,12	4,14

According to the results of Table 8, the F statistic is above the upper limit and there is a long-term relationship between the variables. The results of the Boundary Test and the predicted long-term ARDL models can be viewed in Table 9.

Table 9: Estimation Results of Long-Term ARDL Models

Variables	Coefficient	t stat.
logFDI	0,074	10,431 *
$logFDI^2$	-0,011	- 12,671*
logGDP	12,712	9,212*
$logGDP^2$	-4,890	-0,710
loglon	-0,081	-8,114*
loginv	0,076	5,333*

Note: * denotes the significance at 1% significant level

Based on the findings presented in Table 8, all the coefficients, aside from the square of GDP, are significant at the 5% level. The variables FGE and the square of FGE are statistically significant at the 5% level. Moreover, the FGE variable has a positive value, while its square has a negative value. These outcomes validate the Financial Kuznets Curve hypothesis in Turkey, indicating an inverted-U-shaped relation between financial development and disparities in income distribution. Within the Turkish economy, the disparity in income distribution escalates alongside financial development until it reaches a certain threshold, after which enhancements in financial development diminish income distribution inequalities.

Furthermore, in exploring the Classical Kuznets Curve hypothesis, the GDP variable is significant at the 5% level, while the coefficient of the GDP variable's square is not significant. This demonstrates the absence of an inverted-U-shaped relationship between economic growth and inequality in income distribution in Turkey. Additionally, credit utilization is found to positively impact income distribution, while it is evident that foreign direct investments exacerbate injustices in income distribution.

Table 10: Diagnostic Tests for Long-Term Estimates

Diagnostic Tests				
$R^2 = 0{,}77$	*F Stat: 5,440(0,01)*	$Breusch - Godfrey\ LM$: 0,36(0,08)	*Ramsey Reset:1,88(0,01)*	
$Adj\ R^2 = 0{,}71$	*ARCH-LM:2,39(0,10)*	*Jarque-Berra Normality:0,043(0,60)*		

When the Diagnostic tests in Table 10 were examined, the autocorrelation problem was tested with the Breusch-Godfrey LM Test and no autocorrelation problem was found. In addition, it was understood that there was no problem of varying variance with the ARCH LM Test, and that there was no problem of model building with the Ramsey Reset test. In addition, the Jarque-Bera Normality test indicates that the error term has a normal distribution.

Short Term Relationship

The model used for the analysis of the short-term relationships between the error correction model and the variables can be seen in equation (7).

$$\Delta GINI_t = \alpha_0 + \sum_{i=1}^{n} \alpha_1 \Delta GINI_{t-1} + \sum_{i=0}^{n} \alpha_2 \Delta GDP_{t-1} + \sum_{i=0}^{n} \alpha_3 \Delta loan_{t-1} + \sum_{i=0}^{n} \alpha_4 \Delta FDI_{t-1} + \sum_{i=0}^{n} \alpha_5 \Delta inv_{t-1} + \beta_1 GINI_{t-1} + \beta_2 GDP_{t-1} + \beta_3 loan_{t-1} + \beta_4 FDI_{t-1} + \beta_5 inv_{t-1} + ECT_{t-1} + \varepsilon_t \quad (7)$$

In Equation (7), the error correction term (ECT) represents the one-term lagged value of the series of error terms obtained from the long-run relationship. The value is expected to be negative and between 0 and 1. Short-term forecast results can be viewed in Table 11.

Table 11: ARDL (4,1,0,1) Error Correction Model Results

Variables	Coefficient	t Stat.
logFDI	fdı	2.102(0.00)***
$logFDI^2$	-1.011	-2.49(0.02)
logGDP	10,.008	-2.610(0.00)***
$logGDP^2$	-1.121	3.111(0.00)***
logloan	-1.221	2.032(0.60)*
loginv	0.241	1.601(0.00)**
ECT	-1.09	-3.71(0.00)***
C	0.004	-0,0323(0,889)

Note: ***,** and * indicate statistical significance at the 1%, 5% and 10% levels, respectively.

The fact that the ECT (Error correction term) is between (-1) and (-2) values indicates that the process has been reached with decreasing fluctuations around the long-term equilibrium values, while a smaller or positive value of the error correction term than (-2) indicates that the balance has been moved away (Eriçok and Yılancı,2003). The resulting error correction term (-1.02) indicates that the short-term imbalances are eliminated in the long-term. Diagnostic tests for short-term predictions can be viewed in Table 12.

Table 12: Diagnostic Tests for Short-Long-Term Estimates

Diagnostic Tests				
$R^2 = 0{,}75$	*F Stat. 5,555(0,00)*	$Breusch-Godfrey\ LM: 0{,}34(0{,}07)$	*Ramsey Reset:1,88(0,01)*	
$Adj.R^2 = 0{,}72$	*ARCH-LM:2,41(0,10)*	*Jarque-Berra Normality:0,043(0,70)*		

When the Diagnostic tests in Table 12 were examined, the autocorrelation problem was tested with the Breusch-Godfrey LM Test and no autocorrelation problem was found. In addition, it was understood that there was no problem of varying variance with the ARCH LM Test, and that there was no problem of model building with the Ramsey Reset test. In addition, the Jarque-Bera Normality test indicates that the error term has a normal distribution. Brown et al. (1975) carried out Cusum and CusumQ analyzes to measure whether the long-term coefficients included in the analysis are stable to reach the error term in econometric analysis. Cusum and CusumQ graphs can be seen in figure 2.

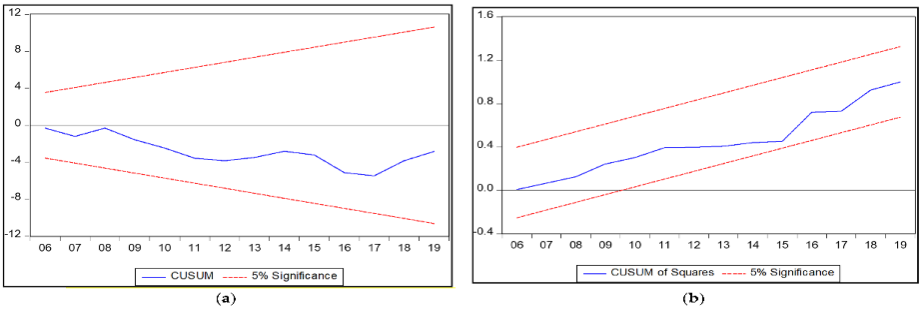

Figure 2: Cusum and CusumQ Charts

In Figure 2, CUSUM (left graph) and CUSUMQ (right graph) are between dashed lines, indicating that the model is stable.

4. Conclusion

In this research, the presence of an inverted-U-shaped correlation between financial development and income distribution inequality in the Turkish economy is scrutinized. Based on the econometric analysis results, it's concluded that the Financial Kuznets Curve hypothesis holds true in Turkey, showcasing an inverted-U-shaped connection between financial development and disparities in income distribution. Furthermore, the analysis reveals that the incorporation of credit amplifies the impact on income distribution, while direct capital investments distort income distribution. The Classical Kuznets Hypothesis, using Gini coefficient-GDP variables, was also probed in this study, and no evidence was found of an inverted-U-shaped relationship in Turkey. The insights derived from the econometric analysis are deemed crucial for informing the creation and execution of economic policies. Given the validation of the Financial Kuznets Curve hypothesis in the Turkish economy, it is perceived that focusing on enhancing financial development as a policy to mitigate income inequality and disparity would be more rational and effective than solely emphasizing economic growth. Assessing the results collectively, it's discerned that financial development is a pivotal component of economic development in the Turkish economy. In nations where the financial system operates efficiently and effectively, a probable reduction in income inequalities is anticipated, thereby elevating the populace's welfare levels. For upcoming research in this domain, it is posited that more dependable conclusions can be drawn by constructing an optimal dataset incorporating variables like financial scale and institutional quality, which are anticipated to augment the efficacy of financial markets.

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Political public relations and crisis communication of the government: The case study of the earthquake of 6 February 2023 in Türkiye

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ABSTRACT

On February 6, 2023, a massive 7.8 earthquake struck southeast Türkiye and caused killing thousands of people and leaving devastation across a wide swath of the country. In this context, this paper examines the government communications and crisis communication in the context of the disaster responses of the emergency management agencies during the earthquake of February 2023 in Türkiye in terms of image repair strategy and aims to reveal how the government responds to the opposing political circles' claims. It was concluded that the ruling party used communication channels intensively to refute the opposition's arguments and presented its own efforts and actions through visual and numerical proof and the main character of the government's crisis communication was based on highlighting what they made well.

I. Introduction

The earthquakes that struck ten southern Turkish provinces on February 6, 2023, marked the country's worst humanitarian disaster in modern history. One-sixth of Türkiye's population —more than 13 million people— was affected by earthquakes (Cagaptay, 2023). The two significant earthquakes that hit Türkiye on February 6, 2023, have left the country in a terrible state in terms of physical and psychological damage and caused nearly 50.000 deaths. The political opponents have assessed the rescue operation after Türkiye's earthquake as a failure and accused the Turkish government of a lack of preparation and coordination.

In the critical initial hours and days after the earthquake, the Erdoğan government was criticized for being slow, in particular, to mobilize the military. It was thought that the military could help not only the direct rescue but also build or repair critical infrastructure necessary for the rescue efforts, things as field hospitals and damaged airstrips. In addition, the civilian office responsible for emergency relief, the Turkish Disaster and Emergency Management Presidency (AFAD) was the other agency discussed due to being poorly managed and uncoordinated. The government also faced reactions to its lack of tolerance for criticism. The government-friendly Turkish media attempted to show by using the argument "the disaster of the century," that the magnitude of the earthquake was so great that no steps could have been taken to prevent mass destruction. State media and pro-government media had a clear narrative: "the devastation was an act of God, not a result of mismanagement, the state is doing everything that can be done, and anyone who says otherwise is a liar or a traitor" (Eissenstat, 2023).

The opposition criticized the Justice and Development Party (AK Party) government for having been ineffective in responding to the disaster. It was discussed that the response could have been more effective. Discussions focused on two major areas. The first relates to the lack of enforcement. In other words, the lack of resilience, so tragically demonstrated, is essentially the consequence of ineffective enforcement. The second issue has to do with top-level governance. The constitutional change of 2017 has introduced a presidential system with few checks and balances and a hyper concentration of power at the top. The system was introduced as an institutional design allowing for faster decision-making. Be that as it may, the cost of weakening checks and balances, for instance by disempowering the legislative to the advantage of the executive, has nurtured a climate of non-accountability (Ülgen, 2023). Türkiye's executive presidential system has created a form of governance

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in which institutions are politicized, and almost every decision comes from the top—meaning the presidency. Leadership roles have been distributed to like-minded AK Party confidants, debilitating institutions' ability to produce apolitical, truly professional policy suggestions. More importantly, ministries and government agencies are unwilling and unable to act without a green light from above (Coşkun, 2023).

The earthquakes have also affected the economic situation and required a million citizens need to be supported financially and their accommodation, heating, and food expenses which cover for six months or more. The government held the fundraising campaign on Feb. 15 to aid recovery and support programs. It was a 7-hour-long jointly broadcast TV program titled "Türkiye, One Heart" that took in donations of TL 115.1 billion ($6.1 billion) from civil society and business associations. It has been declared that these funds will be allocated to the Disaster and Emergency Management Presidency (AFAD), the Turkish Red Crescent (Kızılay), the largest humanitarian organization and counterparty of the Red Cross, and the Housing Development Administration (TOKİ). In this context, the Turkish government has built its political strategy on the basis of threefold: emphasizing the unprecedented magnitude of the quake (which they have dubbed the "disaster of the century"), claiming that their initial response was better than that following the 1999 İzmit earthquake, and highlighting the government's financial and technical capabilities to rebuild the damaged areas (Kubilay, 2023). Both this narrative and this situation which was defined by the insufficiency of the government mark a crisis due to the critics of the public, so it deserves to be analyzed in terms of political public relations and crisis communication literature.

Crisis can be self-inflicted through poor management practices and actions, or be a result of external factors such as a terror attack or natural disaster. Crisis communication can address both the performance of the crisis response and the nature of the crisis itself (Coombs, 2020). Coombs (2020) has argued the crisis communication methods of public relations are highly relevant to the political field and compared corporate and political crisis communication with each other in terms of five important similarities: (1) the shared rhetorical roots, (2) the emphasis on framing, (3) the use of auto-communication, (4) interest in negative affect, (5) a need to cope with scandals. Accordingly, symbolic-focused crises involve damage to the reputation of a corporation, individual, or political institution and frequently a conflict over how the situation is being defined. Benoit (2015) points out that crisis communication includes image repair discourse, and the theory of image repair discourse also focuses exclusively on messages designed to improve images tarnished by criticism and suspicion. Accordingly, image repair discourse is a persuasive message or group of messages that respond(s) to attacks or suspicions that promote a negative attitude about the source of image repair.

Moreover, in the digital age, the crisis communication notion focuses on social media and the social-mediated crisis communication (SMCC) model. For over a decade, social media and crisis communication has become not only an emerging research agenda in communication science but also one of the predominant public relations research areas. Jin and Austin (2022), in their book Social Media and Crisis Communication, have dealt with updated theories that describe, explain, and predict current and emerging crisis phenomena, and provided evidence-based insights for effective and ethical crisis communication practice. They have also examined specific crisis arenas (i.e., health, corporate, nonprofit, sport, politics, and disaster) in further depth and investigated the role of emerging social media platforms and newer technology in crisis communication management.

In order to contribute to global discussions in the crisis communication literature, this paper has examined government communications and crisis communication in the context of the disaster responses of the ruling party (AK Party) and the emergency management agencies during the earthquake of February 2023 in Türkiye. For this purpose, it has been selected two organizations for this case study: 1) The Disaster, and Emergency Management Presidency which is a governmental disaster management agency under the Turkish Ministry of Interior, and 2) The Ministry of Interior which is one of the main actors in taking necessary measures for effective emergency management. In addition to these public organizations, the tweets of the ruling party and the main opposition party have been analyzed to map the strategy of crisis communication in the context of the earthquake. By using Benoit's (2015) image repair categories, this paper has focused on press releases to identify crisis communication discourses of the government emergency management agencies. It has aimed to reveal whether the government adopts defensive utterances and persuasive attempts to reshape the public's attitudes and how it responds to the critical arguments of opposing political and social groups.

2. Literature Review

There is an interaction among the fields of politics, public relations (PR), and the media. Understanding the relationship among politics, PR and the media involves thinking holistically as they cannot be divorced from the society and culture in which they operate. Indeed, the concept of political PR itself involves many different elements, some of which may be disputed and offers the possibility to mislead and manipulate others in the quest for power. Without discussing civil society, no conversation about public relations, politics, or the media would be complete, and it has a connection to the public sphere and the idea of political communications. Organizations in the public sector have a moral and legal duty to disclose their activities to the public. They need to be accountable, but should not be "partisan". Government communication falls into two broad categories. First, public information campaigns are typified by one-way communication, conveying specific information to groups about a particular subject. The second category reflects public communication campaigns with greater interaction, often involving persuasion to bring about some form of behavior change. Themes underpinning political PR consist of three constituents of strategy, implementation, and behaviors. Framing, persuasion, agenda setting and issues management are placed under the strategy. In terms of implementation, political PR is tied to the concept of the PR state and how media channels, digital tools and the role of celebrities is impacting how citizens, consumers and voters receive and process information. Therefore, political PR covers a diverse and broad field and can engender optimism for its support for

democracy or cynicism by distorting debate and favoring the elite (Roberts-Bowman and Walker, 2021). Strömbäck and Kiousis (2020) have evaluated political public relations as an intertwining notion with political communication and tried to bridge the gap between theory and research in public relations, political communication, political science, and other relevant fields and defined the field of political public relations. When the term political public relations is used in political communication research, it is primarily used to refer to purposeful activities by political actors to influence the media, their agendas, and how they frame events, issues, and processes. Political public relations is much broader than the strategies and tactics for influencing the media. Similarly, public relations strategies and tactics are relevant in many other areas of political communication activities aside from those related to news management and media relations.

Government communication is related to the concepts such as political public relations, government public relations and government political marketing. José Canel and Sanders (2013) suggest that political communication viewpoint offers theoretical stances for the study of government communication, ranging from propaganda studies, voting studies, mass media effects, and the interaction of influence between the press, government, and public opinion. The range of government communication covers tasks like reputation and issues management in addition to media relations. When considering key dimensions of crisis communication, we can utilize Coombs's (2020) concepts of rhetoric and framing. Political crisis communication is rooted in rhetoric and the use of frames. As Coombs (2020) noted, political crisis communication includes a crisis framework intended to define problems and indicate how best to solve them. Framing has become a central feature of communication about political crises in general. Crisis frames are identified in three ways: (1) denial, claiming that the crisis does not exist; (2) threat, the crisis exists and is a threat; (3) opportunity, the crisis exists and is an opportunity for change. The three frames have different effects on the political stance and policy stance. There are two ways to frame causality for a crisis: endogenize, which places the responsibility on certain politicians or policies, or exogenize, which says that factors outside of human or natural control were to blame for the uncontrollable catastrophe. In reality, several competing frames are natural because politics is characterized by a variety of interests. Crisis framing includes two political spheres, as policy game and political game. While the policy game means a struggle between those wanting policy change and those wanting the status quo, the political game is the struggle between government officials and their opposition.

Johnston et al. (2020) have examined government communication relating to emergency management preparedness in an Australian context and concluded that the messages suggest a “paradox of the positive” in public communication for preparedness in emergency management communication. In other words, messages have overemphasized the capacity of local agencies to respond to crises and underemphasized citizen-shared responsibility. Johnston et al. (2020)'s study is important in terms of problematizing government preparedness communication. Furthermore, as the use of social media between organizations and stakeholders in crises has significantly increased, there has been a growth in literature to uncover how and why social-mediated communication is applied during crises. When analyzing social media use in crises on a global scale, scholars have noticed that it is significant to consider not only the messages being exchanged, but also the contexts within which information is transmitted online. A variety of contextual factors (e.g., political, social, cultural, and economic) play a crucial role in influencing how organizations, governments, corporations, and stakeholders respond to crisis situations (Cheng et al., 2022). Cheng et al. (2022) argue that the traditional crisis communication theories (Benoit, 2015; Coombs, 2020) and strategies have originated from Western societies and there is a lack of theoretical development and model explorations originating from non-Western contexts in the current social media and crisis communication (SMCC) research. Cheng et al. (2022) also suggest that crisis communication scholars should expand their reach to include theories that are used in non-U.S. studies, and this will help to diversify crisis communication scholarship and encourage the need for theoretical development.

Political public relations draws on a rich interdisciplinary foundation from fields such as public relations, political science, political marketing, and political communication and covers major domains such as news management and agenda building, issues management, event management, crisis communication, assessment in political public relations, and digital communication (Kiousis and Strömbäck, 2014). The state of the art of crisis communication and social media research is elaborated upon, including main approaches to studying social media and crisis communication; key concepts, models, and theories (e.g., the social-mediated crisis communication model); and current research in different practice areas. New research agendas and future directions for crisis communication and social media are suggested, including the integration of different methodologies and research approaches, visual social media and their emotional impact, as well as social media in crisis communication arenas (Jin and Austin, 2020). The mass media have the central role in the very construction of crises in a number of ways. First, the mass media are a key location for the development and circulation of discourses that when transgressed becomes crises. Similarly, mass media help to construct narratives of organizations and then report on breaks (crises) in those narratives. Mass media also draw attention to specific events over others (agenda-setting effect) and then decide what to include or exclude in their stories, which can affect how a crisis is perceived by audiences (framing effect) (Koerber, 2020).

3. Research Design and Findings

This paper is based on the case-study method that seeks an understanding of a social situation or process and enables adequate evaluative description (Richards and Morse, 2013) and it uses Benoit's (2015) typology for the analysis of crisis communication. Benoit (2015) has provided five general approaches to crisis communication strategies for organizations. Benoit's (2015) typology of image repair strategy composes of five categories: denial, evasion of responsibility, reducing offensiveness, corrective action, and mortification. These categories include particular patterns as follows: One strategy for dealing with attacks is simply to deny the undesirable action. Denial may be supplemented with explanations of apparently damaging facts or lack of supporting evidence. In evasion of responsibility, those who are unable

to deny performing the act in question may be able to evade or reduce their apparent responsibility for it. In reducing offensiveness, a person accused of misbehavior may attempt to reduce the degree of ill feeling experienced by the audience. This approach to image repair has six variants: bolstering, minimization, differentiation, transcendence, attacking one's accuser, and compensation. In corrective action strategy for image repair, the accused vows to fix the problem. This approach can take the form of restoring the situation to the state of affairs before the objectionable act and/or a promise to "mend one's ways" and make changes to prevent the recurrence of the undesirable act. Mortification is a particularly complex image repair strategy. No universally agreed conception of "apology" stipulates exactly what an apology must include. It can include an explicit acceptance of blame, expression of regret or remorse, or a request for forgiveness. Benoit (2015) points out that image repair research is political because politicians have opponents who often promulgate or repeat attacks, and politicians also daily make decisions that influence the lives of constituents.

By referencing this typology, this paper focuses on the image repair discourse of the emergency management agencies, The Disaster, and Emergency Management Presidency, and the Ministry of Interior of Türkiye on the earthquake of February 2023 in press releases and their tweets. It also analyzes the tweets of the ruling and the main opposition parties to identify the political crisis communication strategy. Thus, it aims to reveal what kind of strategy the government implemented to persuade the public and respond to opposing social groups. The Disaster and Emergency Management Presidency (abbreviated as AFAD) is a governmental disaster management agency operating under the Turkish Ministry of Interior, but it also has been evaluated as unprepared and insufficient. Evaluating crisis communication case studies on regional, national, and international levels is important to compare different contexts.

Table 1. Image Repair Strategies of AFAD in the Press Releases (February-March 2023)

General Strategy	Tactic	Utterances of the Organization/Agency
Denial	Simple denial	*"The news about the decrease in the number of AFAD Search and Rescue Technicians in some written and visual media does not reflect the truth."* *"The allegations in some media outlets that "the families are allowed to be paid for cranes under the control of AFAD" do not reflect the truth."*
Evade responsibility	-	-
Reduce offensiveness		*"...In 2022, the number of our search and rescue personnel was increased to 2,681...."* *"...Within the scope of the State of Emergency Law and the Disaster Law, the land vehicles were commissioned in return for payment by us...."* *"...In the event that even an individual situation that abuses the process in a humane and moral sense is detected despite all necessary precautions that have been taken after the disaster of the century, the necessary legal process will be initiated immediately and followed up. ..."*
Corrective action		*"...From the very first moment of the disaster, our personnel, security units, Civil Administrative Officers, and all relevant public institutions have been on the field and at their duty...."*
Mortification	-	-

The Disaster and Emergency Management Presidency (AFAD) is a governmental disaster management agency operating under the Turkish Ministry of Interior. Disaster and Emergency Management Authority defines itself as an institution working to prevent disasters and minimize disaster-related damages, plan and coordinate post-disaster response, and promote cooperation among various government agencies. Firstly, it was examined the press release responding to the allegations regarding the number of AFAD search and rescue technicians and seen that it was denied the allegations and informed the public of the correct number. The second press release is about the allegation that AFAD condoned the crane trade. The main strategy of the text is to defend the agency's operations and refuse the allegations strongly (see Table 1).

The Ministry of Interior has responded to the allegations of child abductions and rejected them totally, and also stated that it would be taken against legal action. It is seen that the Ministry of Interior has tried to highlight the positive actions in compensating for the negative effects of the earthquake and combined the three strategies of denial, reduce offensiveness, and corrective action (see Table 2).

There were a total of 51 tweets from two public organizations' accounts through the "earthquake" keyword. It was seen that tweets verified the image repair strategy of the press releases and attempted to convince the public that the negative effects were minimized, and the government worked. Furthermore, it has also reproduced a belief about preventing the recurrence of the problem. The communicative styles of the agencies have combined denial, reduced offensiveness, and corrective action. In addition, the negative comments and allegations have been disregarded and more focused on conducting actions. In order to evaluate the crisis communication strategy of the government, the critical

thoughts of the main opposition party (CHP- The Republican People's Party) should be considered. The faults and shortages pointed out by CHP during and after the earthquake have provided insight into how the government deals with the rescue and recovery process (see Table 3).

Table 2. Image Repair Strategies of Ministry of Interior in the Press Releases (February-March 2023)

General Strategy	Tactic	Utterances of the Organization/Agency
Denial	Simple denial	*"After the earthquake disaster that took place in Kahramanmaraş on 06.02.2023, it was seen that some social media accounts made unfounded statements that child abductions took place in the earthquake region…."*
Evade responsibility	-	-
Reduce offensiveness	Attack accuser	*"...Action is taken against those who bring up and spread unfounded allegations…."*
Corrective action		*"8 thousand earthquake victims were placed in the largest container city in Malatya. In the city, which was affected by the earthquakes centered in Pazarcık and Elbistan, which is described as the "disaster of the century", the studies started to solve the housing problem of the citizens continue…."* *"... One of the earthquake survivors, Mustafa Eser, said, 'They bring everything and deliver it to us. We have nothing left. The interest of the authorities is very good towards us.' he said…"*
Mortification	-	-

Table 3. The Thematic Analysis of Tweets (February-March 2023)

Keyword: Earthquake	@TC_icisleri (Ministry of the Interior)	@AFADBaskanlik (Disaster and Emergency Management Presidency)
Workings on reducing the effects of the earthquake and improving the victims' lives	12	37
The responses to negative comments	1	1

Table 4. The Thematic Analysis of Tweets of the Main Opposition Party (February-March 2023)

Keyword: Earthquake	@herkesicinCHP (The Republican People's Party)	@herkesicinCHP Popular tweets
Negative comments on the government's earthquake management process	14	Our Chairman, Kemal Kılıçdaroğlu: "I am calling out to the Red Crescent officials... Bring us how many tents you have left in your warehouse that were not sold, we will buy them all, we will send them to the earthquake zone." (Feb 28, 2023). Our Chairman Kemal Kılıçdaroğlu: "Look at the last 10 months, you'll see earthquake experts talking on all TV channels and begging, 'Take precautions'. What has been done? Plenty of zoning amnesties have been issued. They buried people in their dwellings." (Feb 12, 2023).
Aids, policies and commitments on reducing the effects of the earthquake	11	-

It was collected 25 tweets through the "earthquake" keyword between Feb-March 2023, identified them according to their themes, and found that the main opposition party (CHP) criticized the government for the earthquake-related processes and the improvement actions in 14 tweets. On the other hand, the other 11 tweets were related to their own policies and aid actions for reducing the negative effects of the earthquake. The main opposition party has highlighted not taking action against the earthquake in terms of the resistance from the buildings and condoning the low-quality buildings via zoning amnesty policies (see Table 4).

Table 5. The Thematic Analysis of Tweets of the Ruling Party (February-March 2023)

Keyword: Earthquake	@Akparti (The Justice and Development Party)	@Akparti Popular tweets
Support and aid actions during and after the earthquake	39	Our President @RTErdogan: The number of residences that have reached the construction phase after the completion of ground surveys throughout the earthquake zone has reached 309 thousand. (Feb 27, 2023). Our President @RTErdogan: We are not content with even a single citizen of mine to leave the city they live in because of the earthquake. Whatever we will do, we will do here, what we will achieve, we will achieve here. (March 12, 2023).
Responses to the Opposition's claims and criticisms	2	-

Table 5 shows the government, in particular, President Erdoğan's approach to the criticisms and how they dealt with crisis management on Twitter. Similarly, researching the tweets through the keyword "earthquake", 41 tweets were classified and found 39 were related to the government's actions for reducing the negative effects of the earthquake and reconstructing the buildings in the earthquake-hit zones. There were only two tweets responding to the critical comments. It was concluded that the government's crisis management strategy was based on explaining the action plan and showing its performance via visual and numerical data instead of responding to opposition circles.

4. Discussion and Conclusion

This paper has dealt with the earthquake as the matter at the top of Türkiye's political agenda ahead of the 2023 elections beyond just a natural disaster issue. As McLean and Ewart (2020) argue, disasters are inherently political events, but not all information provided during a disaster is political. For example, emergency management organizations are focused primarily on providing information that is aimed at preventing the loss of lives and, after the initial phase of a disaster, assisting with recovery. The information provided to the news media by those who witness or directly respond to disasters or crises is not driven by political concerns. On the other hand, Benoit (2015: 73) also notes politics is inherently partisan, competitive, and newsworthy. Accordingly, image repair is an important aspect of this context. Kiousis and Strömbäck (2014) point out that political public relations is a central component of political communication and the primary area of political public relations is crisis communication and management. The domain of political public relations involves digital communication for efforts. Digital communication activities have quickly become a central area of focus for public relations professionals because of their conversational and dialogic nature.

Therefore, this paper has evaluated the earthquake both as a natural disaster and a political matter in terms of its impacts. This topic is important to monitor before the elections in May 2023 the political parties' vision for support and recovery efforts and evaluate both the government's crisis management skills and the opposition's potential performance. Since the earthquakes caused enormous damage, the performance and flaws of the government led to public discussions in the public sphere, at the same time fed political polemics. When looking at the press releases and tweets of the relevant public organizations from Benoit's (2015) model, it is seen that they adopted denial, reducing offensiveness, and corrective action as general strategies and strongly underlined their relief workings on reducing the effects of the earthquake. In addition, the tweets of the ruling party (AK Party) are in line with this strategy and bring the earthquake-related actions of the government to the forefront and try to reverse the allegations of the opposition that the government is "responsible for this". To sum up, it can be said that the ruling party uses communication channels intensively to refute the opposition's arguments and presents its own efforts and actions through visual and numerical proof. The main feature of the government's crisis communication can be defined as telling by highlighting what they did well.

The general election of 14 May 2023 and the presidential election of 28 May 2023 (second round) were ended by the victory of the ruling Justice and Development Party (AK Party). In spite of February's deadly earthquake, the incumbent president won support in 9 out of the 11 regions most devastated by the natural disaster. Thus, the results of the elections verified that the public relations strategy of the ruling party in the earthquake zones was successful. Although this analysis covers the strategies and discourses of the government with regard to aiding the victims in the first moments when the effects of the earthquake are felt, it can be argued that the election victory of the government is linked to

promising to rebuild victims' lives and homes. In future studies, discussions can be examined about the political figures on repairing the earthquake's harm during the election campaign and how the public evaluates these efforts.

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Bibliometric analysis and mapping with vosviewer in neet-head research in social sciences

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ABSTRACT

The concept of NEET, which is derived from the initials of the words "Not in Employment, Education or Training", is a classification used to describe only the idle young unemployed in the labor market between the ages of 15-65. Starting from England, which we can accept as the birthplace of the concept, it has emerged as a research field that has been increasing day by day since the 2000s. At this stage, bibliometric analyzes gain importance in order to see the historical process, interaction power, scientific and political effects of scientific research related to NEET, and to measure its quality and quality. In order to make this analysis, references to scientific studies are an important indicator. In this study, citation analysis was performed with the help of VOSviewer open source software, which works on a cluster-based basis thanks to its special algorithms, and the relations between researches, countries, keywords and authors were analyzed. As a result of this analysis, relationship networks were mapped and interpreted.

I. Introduction

It has been observed that since the 1980s, when the effects of globalization began to show, especially in developed countries, young people are not in employment as well as in education and training, and the number of young people not taking part in education, employment and training is increasing day by day. Structural change in emerging markets with globalization has caused various problems in the labor market. Concepts such as youth unemployment and youth employment were insufficient to explain the size of the emerging problem and new concepts have emerged to explain these problems. One of these emerging concepts is the concept that young people are not "neither in employment, education or training". It is the concept expressed as NEET (Not in Employment, Educationa or Training) in short, which covers the fact that young people do not take part in education and training in addition to not being in employment. When examined on a global scale, it is seen that the young people in this group are made up of a heterogeneous structure, that is, they come from different social sections, and they are in this group for different reasons. However, the number of young people in the NEET group is increasing every year (Köken and Koç, 2022).

The aim of this concept is to focus on youth at risk who are unemployed and passive outside of their education processes. With the rapid technological development experienced after the millennium (Işık, 2013), the transition from education to business life has become increasingly complex for young people in a world that has undergone a significant transformation with the impact of the 2008 Global Financial Crisis and the COVID-19 pandemic. New working and training models have emerged, which have increased the variety and ways of doing business. Therefore, there is a need to address young people with NEET separately. Youth defined as NEET generally includes young people between the ages of 15-24 or 15-29. With this indicator, it has become possible to develop a broader perspective on young people. This term appears as an economic indicator for development, as well as a social indicator used to reveal the economic and psycho-social status of young people (Tolgay and Çakır, 2022). The fact that young people enter a job after completing their education, have to change jobs constantly, and have a high risk of social exclusion in this process, revealed the need for different alternative concepts and determinations, and this gap was sought to be filled with the concept of NEET (Bruno et al., 2014).

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Therefore, in addition to youth unemployment, which is seen as an important problem in the labor market, the concept of NEET also emerges as a problem that should be carefully monitored. NEETs conceptually cover the young population who are unemployed and not included in the labor force, but also those who do not attend education (formal education, non-formal education, apprenticeship training, courses). From this point of view, the concept of NEET is derived from the initials of the words "Not in Employment, Education or Training" (Çolak and Koç, 2023a).

It is also extremely important to analyze the determinators of the NEET rate, which are also associated with the concept of NEET: information of determinants, and therefore the risk factors that can help policy makers implement the necessary measures to make analytical efforts against the social and economic consequences of the exclusion of young people from social and working life. The concept of NEET, which is observed in the young population today and lies at the basis of socioeconomic inequalities, has also become a phenomenon that causes disadvantaged groups to be left behind. Several key factors leading to the NEET problem include gender discrimination, low wages, insecure jobs, vulnerability to the effects of the financial crisis, continued unemployment, inefficient transition from school to work and inadequate on-the-job training. In addition, the distributive effects of skill-oriented technological change or the decline in the effectiveness of tax and benefit systems to redistribute market income, non-standard forms of employment and the lack of social protection between jobs, and their potential relationship with NEET rates (Maynou et al., 2022) have begun to be examined in intensified studies since the 2000s. Researchers are trying to understand and explain the concept of NEET in depth as a result of the relationships between the mentioned factors.

However, no study has been conducted to understand the trend of scientific research in the field of NEET, since when, which authors and their cooperation, influence or interaction, and bibliometric analysis of the studies. Bibliometrics actually allows the historical development of a scientific field to be examined through publications, citations, authors, countries, sources and institutions using mathematical and statistical methods, and provides researchers with a functional method for evaluating the increasing number of studies every year, allowing a more effective understanding of the field (Arslan, 2022).

In this context, the aim of our study is to analyze the authors, co-authors, keywords, countries and their connections between the studies scanned in the Web of Science and Scopus databases in the literature and contain the concept of NEET in the title, and the relations between them will be mapped using VosViewer version 1.6.19. As it is known, considering the increase in the number of scientific studies, it is almost a necessity to use computer-based programs to evaluate the development in a particular field of science.

Thus, it will be the first general bibliometric analysis in the NEET literature. In this way, the literature contribution of the study will contribute with a quality that includes the bibliometric analysis of the keywords determined as "NEET", "NEETs", "Not in Employment, Education or Training" and shows the development of the literature. It is the most important expectation from this study that it will direct the development of new studies to be conducted in the field of NEET.

2. Conceptual Framework and Literature

First coined in the United Kingdom in the late 1980s, "not in employment, education or training" was used to meet the need for an additional indicator to statistically identify young people. This was mainly due to changes in the UK benefits regime that deprived most 16-18 year olds of unemployment benefits (Furlong, 2007). In the United Kingdom, the Social Exclusion Unit, which drew particular attention to policy makers in its 1999 Bridging to Gap report, defined the group as those who spend a significant amount of time outside of any form of education, employment or training (NEET) during the critical period of late adolescence. Based on this important report from the UK Government's Social Exclusion Unit, an office called "ConneXions" was established to pursue a new policy of counseling and support for these young people, specifically devoted to the problems of this group, to help them make a successful transition to adulthood (Bynner and Parsons, 2002).

Following this step, the concept rapidly gained importance beyond the UK and, especially since the 2010s, equivalent definitions were adopted in all EU member states and subsequently incorporated into social policies and government programmes. Many European countries have defined NEET as young people aged 15-24 who are not in employment, education or training, have developed new indicators and have begun to measure and evaluate NEET groups within the young population by redesigning their Labor Force Surveys to measure the NEET phenomenon. Countries such as Japan, South Korea, New Zealand, Taiwan and Hong Kong have developed NEET definitions in accordance with their own cultures and social structures (Güngör, 2017).

Most European countries defined NEET as youth between the ages of 15 and 24 who are not in employment, education or training and used national data from the Labor Force Survey (LFS) to measure the phenomenon. But there are different definitions and statistical measurements of NEET across countries. For example, in the United Kingdom (Coles et al., 2002; McGregor et al., 2006) and New Zealand (Hill, 2003), the term NEET continues to cover mainly young people. When the term NEET is discussed in Japan, it usually takes into account the wider age range, such as 15-34, while it defines the NEET group as 'people aged 15-34 who are not in the workforce, do not go to school and do not clean at school' (Yuji, 2007 and OECD, 2008a). For Korea, the NEET group "has not been registered in formal education institutions, private institutes for college examinations, or private/public institutes or organizations for employment, not employed, engaged in housework or childcare, unmarried, and age range" (OECD,2008b and Nam, 2011). From this point of view, in Japan and Korea, the category tends to be associated with a societal phenomenon that is not only geared towards the labor market, but also integrating younger generations into society (Mascherini et al., 2012). Unlike these countries, in New Zealand, it is defined as youth between the ages of 15-19 who are not in education, employment or training for at least one hour per week (Hill, 2003). Although the determination of the NEET age group differs between countries, the general acceptance consists of young people aged between 15-24 or 15-29 who are not in the workforce and are not involved in education and training (Köken and Koç, 2022).

Recently, NEET has become an increasingly important labor market indicator, especially for international organisations. NEET is an indicator that is taken into account and evaluated by policy makers especially in Europe. In fact, it has been declared that it is the most important indicator for defining the situation of young people in the labor market today, as it is the only indicator in the 2030 Sustainable Development Goals Agenda (SDG) signed by the United Nations Member States in 2015 (Mascherini et al., 2012, Kılıç, 2019, Neagu et al., 2021).

As a result of this, although it is very new, researches and publications related to the concept have started. However, there is still a large area in the literature that needs to be explored and understood. In particular, the technological and sociological effects of time, as well as the changes created by globalization, cause the NEET groups to constantly change their profile characteristics, expectations and behavior patterns. In this case, both researchers and policy makers will always need to understand this group and learn about the changes in them. Therefore, the NEET problem will always be an issue that needs to be investigated and solutions found.

In recent years, there has been a certain increase in systematic review, meta-analysis, meta-evaluation and similar studies in social and educational sciences (Yılmaz, 2021). When the databases are examined, although the studies on the concept of "Not in Employment, Education or Training" have increased in recent years, a systematic compilation and meta-analysis, that is, a general bibliometric analysis, has not been done yet.

The only partially done work is the article Scrutinising the Exceptionalism of Young Rural NEETs: A Bibliometric Review by Simoes et al. (2022). In this study, they specifically analyzed studies of rural NEETs aged 15 to 24 years. In their work, they aimed to highlight how reports on NEETs have evolved into the main thematic trends found in the literature. However, their findings were that the literature on young rural NEETs is scarce and it is an unstructured field that focuses on different themes over the main concept.

Another bibliometric study is the article titled "A bibliometric study of reference literature on youth unemployment" by Ralph and Arora (2022) on youth unemployment, which is closely related to the concept of NEET. They also made a bibliometric analysis of citations to scientific studies published between 1983 and 2022, also addressing the relationship of NEETs to youth unemployment in the labor market. However, since this analysis is an analysis based on the youth unemployment criterion, two concepts are associated with each other through keywords.

Apart from these two studies, there is no other bibliometric study that includes the concept of NEET. Although these studies are not a complete bibliometric study of the NEET concept, they are preliminary. In this study, we plan to continue where the studies of Simoes et al. (2022) and Ralph and Arora (2021) left off and the scope of the study at the center of the concept of "NEET".

3. Material and Method

One of the ways of producing scientific knowledge and distributing it to interested parties is to write scientific articles. The way and content of the subjects and the responsibility of always guiding the researchers are part of the work of the article. For this purpose, the orientation of the study topics in the articles is important. Studies examining this aspect of the research produced are bibliometric studies. These studies are especially guides for scientists who will do academic studies. Bibliometric studies are studies that reveal the desired details of the studied area. Especially in the field of social sciences, there has been an increasing volume of work in recent years (Sönmez, 2020). Bibliometrics deals with the quantitative analysis of the data set resulting from statistical examination of certain criteria such as author, subject, cited author, publication information, cited sources of publications or documents.

Based on the statistical data obtained during the bibliometric analysis process, it is possible to determine how the scientific communication process occurs in various disciplines and to reveal the general structure of a particular discipline (Al and Tonta, 2004). Bibliometric analysis aims to reveal the basic dynamics of scientific communication by applying quantitative methods on environments where scientific communication takes place, such as books, journals, symposium/congress proceedings. And again, biblometric analysis aims to make inferences for a specific discipline, subject area or journal (Yalçın and Esen, 2016). With bibliometric research, on the one hand, the most productive researchers on any subject are determined, and on the other hand, the dimensions of the interaction between them can be visualized and presented in a more understandable way. Likewise, these studies also enable comparisons to be made between countries, institutions or schools on various subjects with a similar approach.

Bibliometric methods allow researchers to base their findings on aggregate bibliographic data produced by other scientists working in the field and to express their ideas through citation, collaboration, and publication. When these data are brought together and analyzed, insights into the structure of the scientific field, its social networks, and current interests can be revealed. (Zupic and Cater, 2015). In addition, giving information about the strengths and weaknesses of the research area also contributes to the researcher (Patra, Bhattacharya, and Verma, 2006). Bibliometric analyzes can be descriptive in the form of determining the number of articles published in a certain time period, or they can be evaluative in the form of citation analysis in order to reveal how an article affects subsequent research (McBurney and Novak, 2002). Since bibliometric reviews are generally studied with large data sets, both the efficiency and effectiveness of the search processes should be considered in order to optimize the results (Hallinger, 2019).

There are two main uses of bibliometric methods: "performance analysis and science mapping". Performance analysis, in its simplest form, evaluates the research and publication performances of individuals and institutions. Science mapping, also known as bibliometric mapping, aims to reveal the building blocks and dynamics of scientific fields and map the relationship networks between them. Science mapping is a bibliometric analysis method that is based on a quantitative approach in terms of analysis methods and is increasingly used to map the structure and development of scientific fields and disciplines (Zupic and Cater, 2015).

While maps of distance-based, graphic-based and timeline-based approaches used in the context of visualization approach in bibliometric

analyzes are used (Van Eck and Waltman, 2014), distance-based and graphic-based approach map types are more remarkable (Garfield, 2009). In graphic-based maps, while the relations between the items in the outputs obtained as a result of the analysis are revealed, no finding of the relationship strength is expressed. On the other hand, in distance-based maps, the distance and closeness of the items in the outputs reveal the strength of the relationship between the items (Van Eck and Waltman, 2009). VOSviewer, an open source software developed in recent years to create, visualize and explore maps based on network data, is one of the programs mentioned. The program provides researchers within the framework of co-authorship, co-citation, bibliographic matching and concept association analyzes based on network, bibliographic and text data of studies carried out in a particular field; It enables the mapping of the literature by performing measurement and analysis in units of analysis such as author, institution, country, document, key concept, abstract and resources. It has been increasingly preferred in the literature as of 2010, due to its functionality, user-friendly interface and reliable outputs (Arslan, 2022).

3.1. Research design

There are two approaches to science or bibliometric mapping, "traditional and modern". In the traditional approach, analyzes are mostly made with the help of tables, while in the modern approach, some software or internet sites are used. One of the important tools in modern approaches is visual mapping parts. Visual mapping technique is essentially one of the approaches and tools used by the science mapping discipline and is important for the visualization of information. Among the software used in science mapping studies, "Citespace, HistCite, SciMAT, Gephi, Sci tool, Microsoft Academic Search, Jigsaw, Carrotssearch, Power Grid Analysis, Action Science Explorer (iOpener), VOSwiver" website "Google Fusion, Google Map, Google Ngram and Google Trend". Apart from these, there are some tools (Yılmaz, 2021).

In this study, VOSviewer 1.6.19 open source software was preferred to perform bibliometric analysis and mapping. VOSviewer makes use of items in networks consisting of scientific publications, scientific journals, researchers, research institutions, countries, keywords and/or terms; Networks are formed through co-authorship, co-occurrence, citation, bibliographic coupling or co-citation links. These links also constitute the basic analysis of the program. In order to create a bibliometric map of a particular area, bibliographic data obtained from databases such as Dimension, Lens, Scopus, Web of Science and reference manager programs such as EndNote, RefWorks and RIS can be used (Van Eck and Waltman, 2022). Study design in this type of systematic literature review involves selecting the most appropriate method to address the research question, such as co-citation analysis, keyword analysis, country-citation or co-occurrence analysis, etc. If we wanted to summarize the iterative scanning and bibliometric analysis process; It begins with selecting appropriate databases to compile bibliometric data. It then involves refining the data to include only the most relevant literature. The next step in the data collection process is using Scopus, WOS, etc. It is data collection that involves summarizing raw data from databases and formatting this data into a more meaningful and manageable format. This is followed by data analysis, which involves selecting the most appropriate software, further elaborating, distilling the data and identifying groups, networks and clusters if relevant to the research. The next step is to select the appropriate visualization method and software to provide a visual summary of the bibliometric data obtained and to obtain bibliometric outputs by running the selected software. Finally, interpreting software outputs involves completing the science mapping process and discussing and interpreting its findings (Al Fozaie, 2023). In our study, the same systematic was followed, and the necessary data were first collected from the Web of Science database, and the "refine" process was performed as it should, or the "exclude" process was performed to leave some parameters separately. Web of Science has been used because it is a database indexing effective and reliable international publications. Another reason for choosing the Web of Science database is that it offers a lot of content in the academic literature. Conducting the research in the form of a topic; this is due to the search for the words “NEET”, “NEETs” and “Not in Employment, Education or Training” used in the title, abstract and keywords of the studies.

3.2. Data set

In all fields in the Web of Science database, the concept of NEET, which is the main concept in the study, both its clear expression in English, “Not Employment, Education or Training”, and another frequently used expression of the concept, NEETs, are associated with each other with the conjunction “or” and the search process is performed. has been made. In this way, as a result of the search made on 26.05.2023, 1351 different scientific studies were categorized in all categories in the Web of Science. The date range of the studies is determined as 1975-2023.

However, the concept of NEET also has different meanings in the fields of medicine (NEET: the name of a protein group) and nuclear chemistry (NEET: The nuclear excitation by electron transition). There are also authors with the surname Neet (Çolak and Koç, 2023b). For this reason, the headings in the field of social sciences were selected in the screening "citation topics meso" criteria and the selected topics are shown in Table 1.

In the distribution of documents according to their types, “article”, “early access”, “book chapters” and “review article” options are marked and “refined”. Since the first studies on “Neet” started in 2002, the studies in 1975 and 1995 were “excluded” and the results were filtered. As a result, 422 scientific studies were found. This obtained data set was taken for analysis in the VOSviewer program with the ".txt" extension.

As can be seen in Figure 1, 422 publications received a total of 2851 citations, and the total number of citations excluding the authors' own publications was 2574. The average of 4614 citations to these studies was 10.93 per publication. The H-index of these 422 studies was determined as 30. As it is known, the h-index deals with how many of the author's publications are cited above a certain value (Al, 2008). As a performance indicator, the H-index of 422 studies on NEET is 30, meaning that there are 30 articles whose total number of citations exceeds 30. This information will be used in the future as critical information in the VOSviewer citation index analysis in our study.

Table 1. Citation Topics Mezo

Citation Topics Meso	Record Count	% of 422	Citation Topics Meso	Record Count	% of 422
6.11 Education & Educational Res.	215	50.948	6.110 Law	3	0.711
6.10 Economics	51	12.085	6.146 Anthropology	3	0.711
6.24 Psychiatry & Psychology	25	5.924	6.153 Climate Change	3	0.711
6.73 Social Psychology	24	5.687	6.185 Communication	3	0.711
6.178 Gender & Sexuality Studies	16	3.791	6.69 Language & Ling.	3	0.711
6.27 Political Science	15	3.555	6.294 Op.Res. & Man. Sci.	2	0.474
6.3 Management	14	3.318	6.303 Sociology	2	0.474
6.263 Agricultural Policy	13	3.081	6.321 Social Reform	2	0.474
6.86 Human Geography	12	2.844	6.115 Sustainability Sci.	1	0.237
6.223 Hosp., Lei., Sport & Tour.	4	0.948	6.256 Religion	1	0.237
6.277 Asian Studies	4	0.948	6.314 Homelessness & H.T.	1	0.237
9.92 Statistical Methods	4	0.948	6.317 Risk Assessment	1	0.237

Figure 1. WoS Analysis Results Screenshot

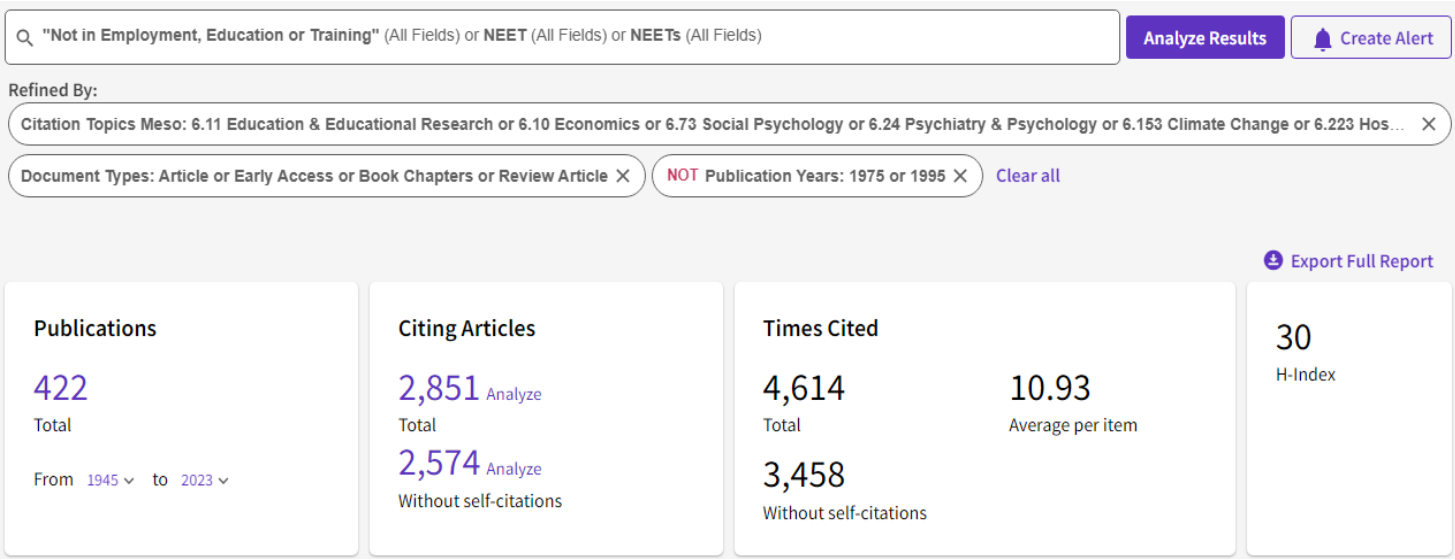


Table 2. Distribution of Publications and Citations by Years

Years	Number of Documents	Number of Citations	Years	Number of Documents	Number of Citations
2002	1	2	2013	21	93
2003	0	0	2014	28	156
2004	0	0	2015	21	140
2005	0	0	2016	23	178
2006	2	5	2017	26	278
2007	3	2	2018	38	358
2008	5	11	2019	41	514
2009	2	11	2020	57	605
2010	8	23	2021	60	768
2011	12	57	2022	56	883
2012	12	51	2023	6	487

Source: Compiled by Authors from Web of Science Analysis Results

Table 2 shows the distribution of these studies by years and the distribution of citations to these studies by years. As can be seen from the table, studies have started to intensify since 2013. The subject has been studied at the highest level for the last three years. Considering the increase in the number of citations, we can see that the subject is given more importance in scientific studies every year. As the 2019-2021 period coincides with the COVID-19 process, it can be expected that the studies on the disadvantaged group will increase. However, contrary to what is thought, three different studies have been conducted examining the effects of the pandemic on NEETs. In the same period, the number of studies related to the global economic crisis experienced in 2008-2009 was not as much as expected, and 10 scientific publications were published examining the effects of the economic crisis on NEETs. The distribution by WoS categories according to the Web of Science search results is also shown in the table below.

Table 3. Web of Science Categories

Web of Science Categories	Record Count	% of 422	Web of Science Categories	Record Count	% of 422
Education Educational Research	105	24.882	Psychology Multidisciplinary	10	2.370
Social Sciences Interdisciplinary	90	21.327	Area Studies	9	2.133
Sociology	51	12.085	Family Studies	9	2.133
Economics	35	8.294	Psychology Applied	8	1.896
Industrial Relations Labor	21	4.976	Public Administration	8	1.896
Environmental Studies	20	4.739	Psychiatry	7	1.659
Public Env. Occup. Health	19	4.502	Psychology Social	7	1.659
Environmental Sciences	16	3.791	Psychology Developmental	6	1.422
Social Work	16	3.791	Business	5	1.185
Green Sustainable Sci. Tech.	15	3.555	Development Studies	5	1.185
Social Issues	11	2.607	Demography	4	0.948
Management	10	2.370	Geography	4	0.948
Political Science	10	2.370	Showing 25 out of 71 entries		

Table 3 shows the distribution of 422 publications written about the definition of NEETs within WOS categories. When the table is examined carefully, it is seen that the subject of Not in Employment, Education or Training is mostly collected under the title of educational research, and interdisciplinary social research comes second. However, economic science publications come in fourth place. Although it is an economic problem, the reason why educational research is at the forefront is due to the fact that educational research centers, especially in England, are engaged in intensive publications and research on the subject. However, considering the diversity of subject areas, it is a clear indication that the NEETs issue is a multidisciplinary subject.

4. Findings

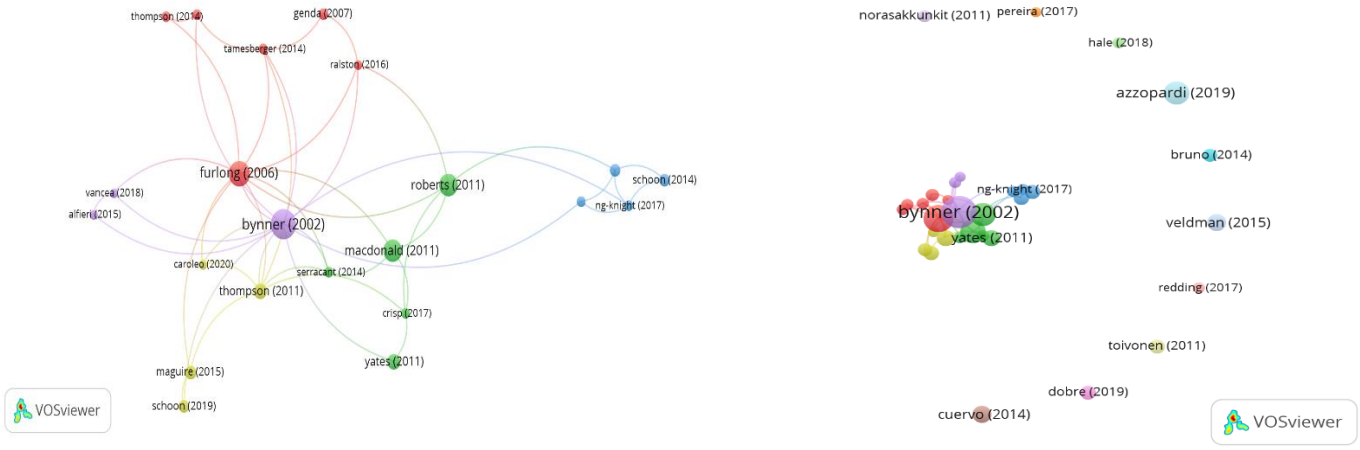
As a result of all these explanations, the data from WoS will be analyzed and mapped with the help of VOSviewer 1.6.19 software. The program offers text mining functionality thanks to special algorithms and works based on clustering. The colors formed in the program show the cluster to which the item belongs (Van Eck et al., 2010). The importance of the item is determined by the size of its circle, and the assignment of the colors of the items is related to the cluster they belong to (Van Eck & Waltman, 2010). The close positioning of the elements indicates that the relationship between them is strong, while their distant positioning indicates that there is not enough relationship between them (Boyacıoğlu & Elmas, 2022). In this study, citation analysis, keyword analysis, country analysis and collaboration analyzes will be made and mapped according to the H-index with the help of software.

Document Citation Analysis and Mapping by H-Index: As mentioned above, it was stated that the H-index of 422 documents related to NEET was 30. In the analysis performed by citation-document matching in the VOSviewer program, when the minimum number of citations the document receives is determined as 30, 32 of 422 documents are matched. In other words, there are 32 studies that meet the lowest 30 citation criteria. Among these studies, the studies of Bynner (2002) and Furlong (2006) constitute the center of the field with 275 and 193 citations, respectively. The mapping of documents based on citation analysis is shown in the figure below. The software established and mapped strong relationship links in 22 of 32 studies. The mapping also visualized the time dimension of the studies. Due to the intensity of Bynner (2002) and Furlong (2006) studies on the map, the larger colored spheres are shown, while the spheres representing other publications become smaller as the effect level decreases. These two studies form the center of the network in mapping.

In this mapping, the interaction of 22 studies in the link with each other from the first 32 studies cited in the H-index value among 422 studies were mapped. These studies are also the studies with the highest interaction power in the whole field. Bynner (2002), Furlong (2006) and Thompson (2011) studies are at the center of mapping. These 22 studies also form the basis of the literature on NEET. However, the map on the left in Figure 2 shows all 32 studies. 10 independent publications from 22 interrelated studies, which are located around the publications

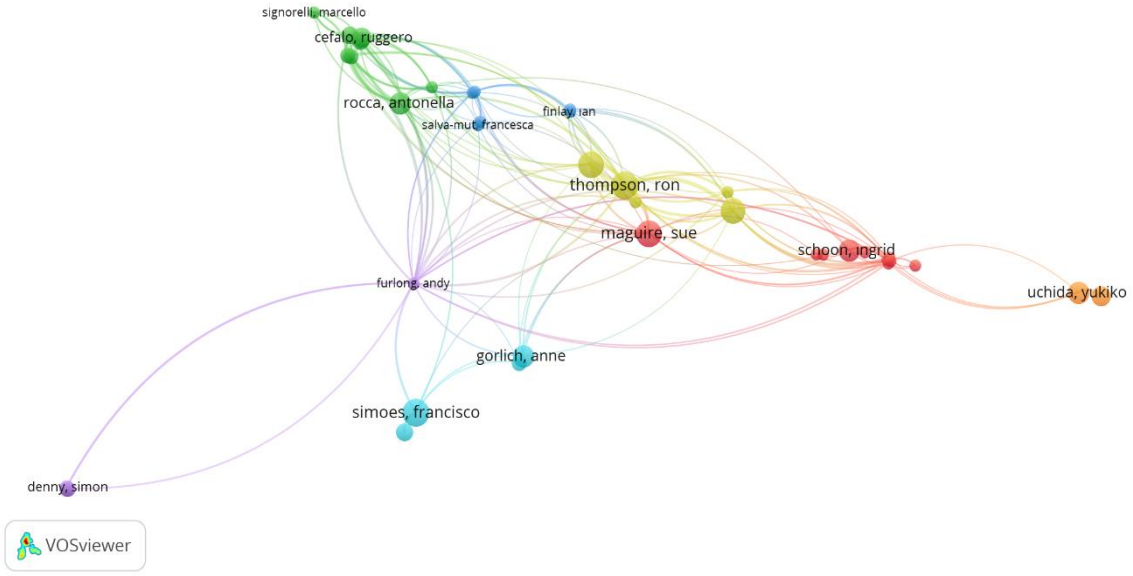
in the center and meet the screening criteria of at least 30 citations per document, were mapped together. If we had done this analysis to the citation average of 422 studies, which is 10.93, that is, 11 citations, then there would be a match in 117 out of 422 documents.

Figure 2. H-index Citation Link Map



Citation Author Analysis and Mapping: In the citation analysis made according to 875 authors, the minimum number of documents was determined as 2 and the minimum number of citations as 30. The threshold value in these criteria is met by 45 authors. In order to make the map more understandable, a mapping was made among 39 authors with high total link strength and meeting the threshold value. While determining the critical numbers, it was taken into account that the H-index was 30 and the average number of researchers per document in 422 studies was 2. According to these criteria determined in Figure 3, the citation analysis among the authors was mapped.

Figure 3. Citation-Author Analysis Link Map



The 39 authors shown in Figure 3 are shown in 7 different clusters. The distribution of the authors according to the clusters is also given in Table 4. The red cluster, in which Bynner is located, constitutes the center of NEET researches according to the determined criteria and is called cluster 1. Researchers who establish a strong network of relations with each other are in the first three clusters. In particular, we can see from this network map that researchers in the red and green clusters also form the center of NEET studies and direct the field. The cluster with the least impact and interaction on the network map is Cluster 7, which is colored orange. The interaction and influence level of the authors in this cluster is the least compared to the other clusters. However, a dense network of interactions between Cluster 1 and Cluster 4, highlighted in yellow, is clearly visible on the map.

Table 4. VOSviewer Citation-Author Cluster

	Author
CLUSTER 1	Feng, Zhiqiang
	Ralston, Kevin
	Dibben, Chris
	Everington, Dawn
	Schoon, Ingrid
	Dickens, Lisa
	Bynner, John
	Dorsett, Richard
	Sabates, Ricardo
	Maguire, Sue
CLUSTER 2	Kazepov, Yuri
	Scandurra, Rosario
	Rocca, Antonella
	Cefalo, Ruggero
	Mazzocchi, Paolo
	Quintano, Claudio
	Signorelli, Marcello
	Caroleo, Floro Ernesto
CLUSTER 3	Tamesberger, Dennis
	Finlay, Ian
	Sheridan, Marion
	Quintana-Murci, Elena
	Salva-Mut, Francesca
	Bacher, Johann
CLUSTER 4	Holte, Bjorn Hallstein
	Thompson, Ron
	Beck, Vanessa
	Russell, Lisa
	Simmons, Robin
CLUSTER 5	Denny, Simon
	Hazenberg, Richard
	Seddon, Fred
	Furlong, Andy
CLUSTER 6	Marta, Elena
	Katznelson, Noemi
	Simoes, Francisco
	Gorlich, Anne
CLUSTER 7	Norasakkunkit, Vinai
	Uchida, Yukiko

Although they met the specified criteria, hammerton, viner, bultmann, reijneveld, toivonen, veldman were not included in any clustering in this analysis. In other words, the publications of these researchers do not establish any connection with the clusters that make up the center. Despite their relatively high number of citations, their impact levels are also very low as they do not interact. We can think of them as independent studies from the studies that make up the NEET center. Table 5, which shows the level of attribution and influence of these authors, is compiled from the outputs obtained from the VOSviewer software below.

Table 5. Authors Not Connected to Clusters

Authors	Documents	Citation	Total Link Strength
Hammerton, Gemma	2	32	1
Viner, Russell M.	2	179	1
Bultmann, Ute	2	80	0
Reijneveld, Sijmen A.	2	80	0
Toivonen, Tuukka	2	65	0
Veldman, Karin	2	80	0

Country Citation Analysis and Mapping: The number of citations is considered as an indicator of the quality and effectiveness of a publication, as well as the scientific and technological activity of the country to which it is affiliated. (Karasözen et al., 2011). Seeing which countries come to the fore in references to the concept of NEET provides important clues to researchers in terms of reflecting research collaborations and networks. In addition, the performances of the countries related to the chosen subject also indicate the extent to which they shape the concept scientifically. In Table 6 below, there is a table showing the 29 most active countries out of 64 producing scientific work in the field of NEET and their connection strength along with the number of research and citations.

As it can be understood from the table, England is in the first place with 133 studies from 29 active countries in the NEET literature. The total number of citations taken to these openings is 2323. We can say that it is the result of the emergence of the concept in England and that British researchers are closer to the subject for this reason. It also constitutes the center of the literature as the first publications to be scanned when researches on other researchers or similar subjects are conducted. However, among the top four countries, Italy, Spain and the USA are the countries that feel the NEET issue as a problem in their countries. For this reason, they stand out as the countries that do the most work compared to other countries. Especially Italy and the USA are countries above the OECD average in terms of NEET rates. Based on this observation, it would be natural to expect countries that have a strong sense of the NEET problem to do more research on this issue.

Table 6. Intercountry Document-Citation Table

Country	Documents	Citations	Total Link Strength	Country	Documents	Citations	Total Link Strength
England	133	2323	509	Netherlands	10	100	28
Italy	47	302	274	Norway	10	231	52
Spain	37	366	182	Austria	8	118	84
USA	27	437	56	Belgium	8	198	10
Germany	22	211	80	PRC	8	18	11
Denmark	16	99	50	Romania	8	70	31
South Africa	16	93	36	Ireland	8	58	48
Australia	14	323	56	Bulgaria	7	20	23
Portugal	14	93	87	Poland	7	14	27
Finland	13	113	66	South Korea	7	36	18
Scotland	13	349	216	Croatia	6	24	9
Japan	12	198	39	France	6	15	19
Russia	12	29	12	Greece	5	16	14
Sweden	12	105	69	Switzerland	5	20	0
Turkey	11	29	22				

Table 7. Country Clustering by Country-Citation Analysis

CLUSTER 1	Bulgaria	CLUSTER 2	Denmark	CLUSTER 3	Australia
	Croatia		England		Austria
	Ireland		Finland		Belgium
	Italy		Norway		Spain
	Portugal		Poland	CLUSTER 4	Japan
	Romania		Scotland		Russia
	Turkey		South Africa		South Korea
					USA

CLUSTER 5	France Germany
CLUSTER 6	Netherlands Sweden
CLUSTER 7	CLUSTER 8
PRC	Greece

Table 6 was prepared from the VOSviewer software. The network map that emerged as a result of the analysis is shown in Figure 4. Again, the clusters seen in the network map are shown in Table 7. While creating the network map with the scientific mapping analysis technique, the threshold value was determined so that the minimum number of publications belonging to a country would be "5". The strength of the bibliographic matching links of each of the 29 countries meeting the threshold value with other countries was calculated and the map was created by choosing the countries with the highest link strength. In this process, a total of eight clusters were obtained and the green cluster (Cluster 2), where England is the core of the studies, and the red cluster (Cluster 1), where Italy is a separate center, formed the center of the NEET literature. While these two countries are the center of their own clusters, they are also seen as the center of all NEET literature. Two other important centers, Spain and the USA, are both the center of their own clusters and an important focal point in the literature. Together with the other countries in these four country clusters at the centre, they dominate the NEET literature.

To date, 133 scientific studies have been published from England, and the fact that these studies have received 2323 citations in total and the calculation of the impact power of 509 causes this country to be at the center of the literature. As we mentioned before, the emergence of the concept in England has a significant impact. Due to the fact that Italy is experiencing the NEET problem with the highest rate among OECD countries, it has directed researchers to examine this concept and has made it another center of the literature. 47 studies of Italian researchers received a total of 302 citations, and the total link strength, which explains the power of influence in the literature, was calculated as 274. However, among these eight clusters and 28 countries, the two countries that have the least impact with the work of other countries are the PRC and Greece. These two countries had little interaction with other countries' publications, so they remained outside the center.

Mapping Analysis Based on Bibliographic Matching: Citing one or more sources in the reference list is called bibliographic matching. Bibliographic matching is mostly used to complete the citation-author analysis (Boyacıoğlu and Elmas, 2022). To put it briefly, bibliographic matching occurs if two documents quote another third study (Merigó et al., 2016).

Mapping Analysis Based on Bibliographic Matching by Authors was applied just like the criteria in the citation-author analysis. Again, according to 875 authors, the minimum number of documents in the analysis was 2; the minimum number of citations has been determined as 30 and these thresholds are met by 45 authors, as in other citation-author analysis. A total of 7 clustered mapping was created according to 45

authors with high total connectivity and meeting the threshold value. At the same time, this analysis can be seen as a proof of citation-author analysis in a way.

Figure 4. Country-Citation Analysis and Mapping

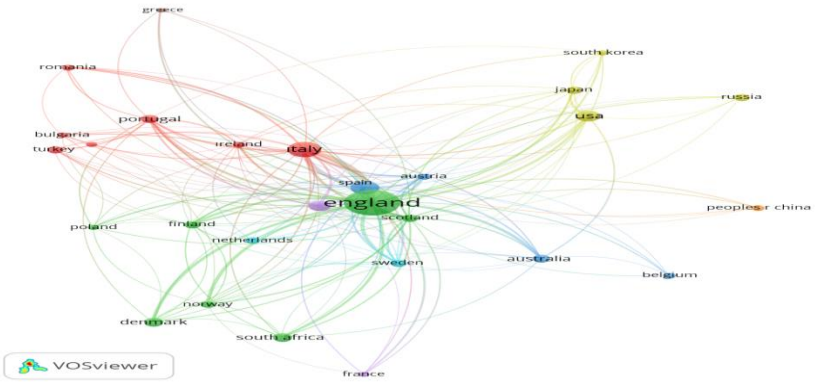
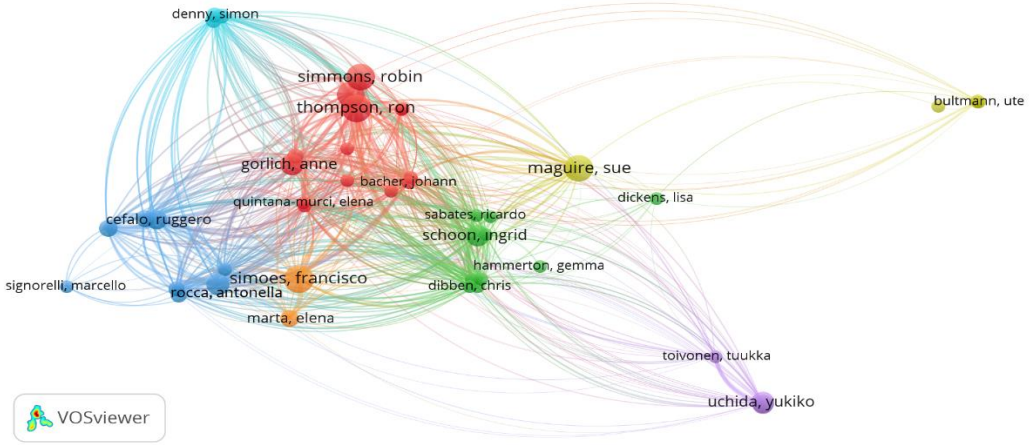


Table 8. Bibliographic Matching Author Clustering Table

CLUSTER 1	Bacher, Johann	CLUSTER 2	Bynner, John	CLUSTER 3	Caroleo, Floro Ernesto
	Beck, Vanessa		Dibben, Chris		Cefalo, Ruggero
	Finlay, Ian		Dickens, Lisa		Kazepov, Yuri
	Furlong, Andy		Dorsett, Richard		Mazzocchi, Paolo
	Gorlich, Anne		Everington, Dawn		Quintano, Claudio
	Holte, Bjorn Hallstein		Feng, Zhiqiang		Rocca, Antonella
	Katznelson, Noemi		Hammerton, Gemma		Scandurra, Rosario
	Quintana-Murci, Elena		Ralston, Kevin		Signorelli, Marcello
	Russell, Lisa		Sabates, Ricardo	CLUSTER 5	CLUSTER6
	Salva-Mut, Francesca		Schoon, Ingrid	Norasakkunkit, Vinai	Denny, Simon
	Sheridan, Marion	CLUSTER 4	Bultmann, Ute	Toivonen, Tuukka	Hazenberg, Richard
	Simmons, Robin		Maguire, Sue	Uchida, Yukiko	Seddon, Fred
	Tamesberger, Dennis		Reijneveld, Sijmen A.	CL.7	
	Thompson, Ron		Veldman, Karin	Marta, Elena	
			Viner, Russell M.	Simoes, Francisco	

Figure 5. Mapping Based on Bibliographic Matching



The central cluster shown in the figure is called cluster 1 in red. The authors in this cluster appear as a cluster of researchers who do research in the field of NEET and are related to each other. In Table 8, all authors belonging to the seven clusters are visualized by sorting as obtained from the VOSviewer script. At the same time, it can be said that the researchers in this cluster, which has high network power, are researchers who keep the concept of NEET on the agenda intensively in terms of both the number of publications and the number of citations. However, Cluster 1 shown in red, Cluster 2 shown in green, and Cluster 3 shown in blue have a very high scientific interaction with each other and are just as effective as Cluster 1. So much so that 7 of the top ten researchers with a scientific impact network are in Cluster 3. Therefore, according to the bibliographic matching analysis, we can state that these three clusters constitute the NEET center.

It has already been noted that bibliographic matching analysis is used to highlight the number of common references to an article. The bibliographic matching analysis proposed by Kessler (1963) groups articles according to the citations shared by the two articles. This analysis is one of the most advantageous techniques for grouping articles by research focus (Jarneving, 2017, Sipahi and Genç, 2022). Research focuses can be clearly seen in the clusters formed in the figure above. In this sense, Thompson, Simmons and Gorlich in cluster 1 in red, Schoon in cluster in green, Cefalo and Rocca in cluster 3 in blue, Maguire in cluster 4 in yellow, cluster 5 in purple. Uchida in 13, Denny in light blue cluster 6 and Simoes in orange cluster 7 are the centers of research.

Table 9. Authors by Analysis Based on Bibliographic Matching

	Author	Doc	Cit	TLS*		Author	Doc	Cit	TLS		Author	Doc	Cit	TLS
1	Cefalo, R.	5	56	1577	16	Seddon, F.	3	40	810	31	Marta, E.	4	43	310
2	Kazepov, Y.	4	56	1543	17	Simoes, F.	10	87	800	32	Bynner, J.	2	64	308
3	Thompson, R.	10	219	1527	18	Caroleo, F. E.	2	32	739	33	Sabates, R.	2	82	261
4	Rocca, A.	6	60	1430	19	Gorlich, A.	6	61	715	34	Toivonen, T.	2	65	251
5	Scandurra, R.	4	45	1396	20	Bacher, J.	2	52	687	35	Finlay, I.	2	45	185
6	Simmons, R.	9	153	1101	21	Tamesberger, D.	2	52	687	36	Sheridan, M.	2	45	185
7	Russell, L.	8	141	1076	22	Schoon, I.	6	227	579	37	Furlong, A.	2	205	184
8	Mazzocchi, P.	3	49	908	23	Maguire, S.	9	132	559	38	Bultmann, U.	2	80	183
9	Quintano, C.	3	49	908	24	Uchida, Y.	6	119	503	39	Reijneveld, S. A.	2	80	183
10	Dibben, C.	2	43	856	25	Norasakkunkit, V.	5	106	499	40	Veldman, K.	2	80	183
11	Everington, D.	2	43	856	26	Katznelson, N.	3	34	475	41	Dorsett, R.	2	30	88
12	Feng, Z.	2	43	856	27	Holte, B. H.	2	38	442	42	Signorelli, M.	2	51	54
13	Ralston, K.	2	43	856	28	Quintana-Murci, E.	2	35	373	43	Dickens, L.	2	32	24
14	Denny, S.	3	40	810	29	Salva-Mut, F.	2	35	373	44	Hammerton, G.	2	32	9
15	Hazenberg, R.	3	40	810	30	Beck, V.	2	30	336	45	Viner, Russell M.	2	179	5

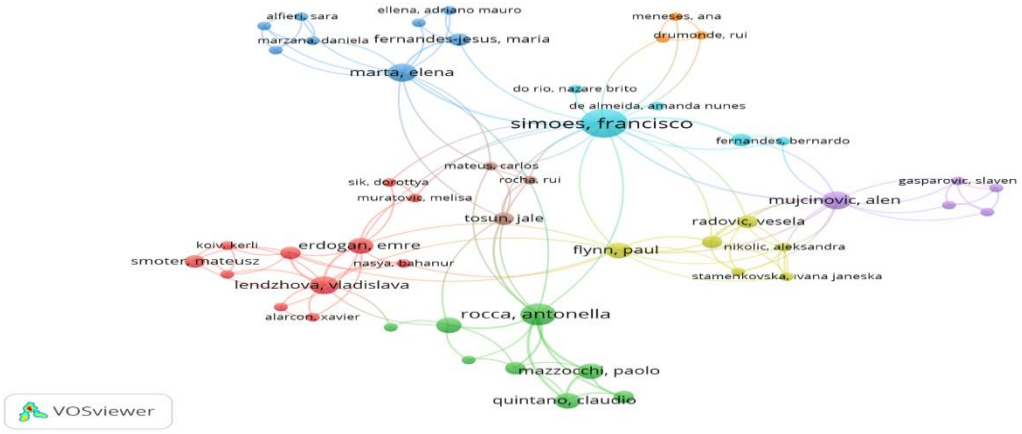
*TLS: Total Link Strength

The colors in table nine represent the clusters in table eight. It shows the number of citations that researchers have received according to the number of documents they have published. The studies published by these studies are ranked from highest to lowest according to TLS data showing the level of bibliographic match with each other. The studies with the highest total network power were realized in the studies of the researchers in the blue and red clusters, as can be seen from the table. In other words, these two cluster researchers direct the concept of NEET, and new studies are guided by the studies in these clusters.

Co-Authority Analysis: Researchers working together in the NEET literature and citation analysis criteria of their studies were made as a minimum of two authors and a minimum of one citation. To explain the reason for this, the criteria to be investigated are kept at minimum values because it is an analysis to understand whether researchers on NEET are a worthwhile subject to work with. For a study to be a co-authored study, the first threshold is for an author to have made 1 study with at least two co-authors. This criterion demonstrates the authors' willingness to collaborate on NEET at least once. In addition, it is expected that the publication will have received at least one citation, since the citation status is the indicator of the effectiveness of the study. Considering that the historical process of the NEET field is also very new, mapping

with minimum values will be a more efficient analysis. The mapping obtained from the VOSviewer software according to these threshold values is shown in Figure 6.

Figure 6. Co-Authority Analysis and Mapping



A total of 422 studies published by 875 authors, according to the threshold values, 734 authors collaborated even if at least one publication. However, among 734 authors who passed the critical threshold in Figure 6, 49 matches with the strongest network communication were gathered in 8 clusters. Authors matching in these eight clusters have the most effective networking power in co-authoring with each other among all authors. Lendzova, Erdoğan, Simoes, Flynn, Rocca, Mujcinovic, and Marta are both the center of their clusters and the strongest network power, while also being a communication bridge between clusters.

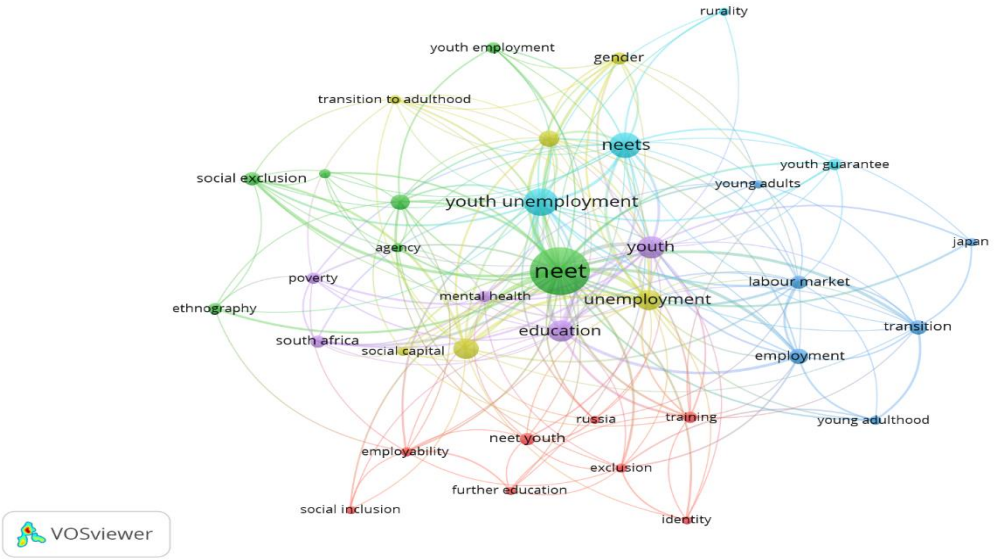
Co-occurrances Analysis and Keyword Mapping**:** In the co-occurrances analysis, the keywords used in the studies are examined. In this analysis, a network map was created showing the cooperation between the keywords used in NEET-oriented studies. For 1126 keywords, the minimum number of occurrences is set to 5, and 36 keywords meet the threshold value according to these criteria.

Table 10. Keyword Clustering

CLUSTER 1	Employability(7)(15) Exclusion(7)(17) Further Education(5)(7) Identy(5)(9) Neet Youth(11)(11) Russia(5)(10) Social Inclusion(5)(5) Training(9)(21)	CLUSTER 2	Agency(6)(8) Early School Leaving(6)(8) Etnography(9)(10) Neet (163)(203) Social Exclusion(14)(24) Youth Employment (56)(79) Youth Transitions(18)(26)
CLUSTER 3	Employment(18)(40) Japan(5)(10) Labour Market(14)(28) Transition(15)(26) Young Adulthood Young People(30)(48)	CLUSTER 4	Gender(11)(24) School-to-work-transit(19)(36) Social Capital(6)(12) Transition to Adulthood(7)(13) Unemployment(30)(67) Young Adults(5)(11)
CLUSTER 5	Education(32)(63) Mental Health(9)(19) Poverty(9)(17) South Africa(11)(19) Youth(35)(66)	CLUSTER 6	Neets (47)(55) Rurality(5)(5) Youth Guarantee(10)(13) Youth Unemployment(9)(10)

As a usual result, the keyword “neet” appears to be the most frequently used concept, with 163 matches. The terms “youth unemployment” (56), “neets”(47), “youth”(35) and “education”(32) are seen as the other keywords that match the most. The table below shows all of these keywords, how many times they are matched, and the total link strength these keywords create in the network. As can be seen in Table 10, the keywords that match the most are classified in 6 clusters. The first parenthesis next to the keywords shows the frequency of matches for the keywords, and the second parenthesis shows the total link strength of the keywords. As the minimum number of occurrences, which is an important determining criterion in determining the analysis, decreases, the match positions of these keywords also increase. However, the network map of the analysis made according to the number of 5, which is the threshold criterion, is shown in figure 7.

Figure 8. Keyword Cloud



In this mapping, which emerged from VOSviewer's co-occurrance and keywords matching, the communication networks between 6 clusters formed by 36 keywords in total are seen in the figure. The keyword "neet" is in the center of the map and other keywords are seen as the most matching concept. "youth unemployment", "neets", "youth"education", "unemployment", "young people" are the other terms with the highest number of matches seen on the map. They are the most common concepts with other keywords to explain the literature or to establish connections between concepts.

5. Conclusion

Although the concept of NEET is a very new concept, when the literature is examined, it is certain that it is an important problem and issue that should be addressed in a way that includes other social sciences related to economics. For this reason, it is extremely important for policy makers to design and implement solution models in accordance with the findings of the researchers. Especially today, rapidly developing technology and processes such as 'Digital Transformation' and 'Fourth Industrial Revolution', which are now loudly spoken, make the problem of how to integrate young people in NEET into labor markets. (Colak and Koç, 2023a).

Although the concept is still new in its historical process, it cannot be ignored that an important workforce and population problem needs to be investigated in every aspect for policy makers. Although the researches emerging at this stage contribute to the concept of NEET, the field has not reached the saturation point in research.

This situation supports the conclusion we reached by the determinations reached in the bibliometric research conducted by Simoes et al. According to Simoes et al. (2022), although the NEET field, which is in its infancy, is in demand by researchers in the literature, it is obvious that there are many dimensions that need to be written and discussed. The concept of NEET, which connects with themes such as employment, education, health and psychology, has been at the center of scientific research as a niche concept in this sense (Simoes et al., 2022).

It is clear that the field of study of NEET is a partially new concept in academia and since the publications on this subject date back to the 2000s, the field needs more study based on a 20-year history of literature. It is clear that the contribution of researchers to this field will also be a reference for policy makers who have a serious NEET problem in their region. Since the field of study draws a multidisciplinary image, it is necessary not to ignore the advantages of collaborating with researchers from different fields.

The citation analyzes and mappings show that as new studies on the concept of NEET are published, the subject will deepen and the influence network will increase. However, in order for this to happen, new researchers on the subject should also make scientific contributions. The fact that the concept represents young people between the ages of 15-24 and is a concept that is constantly changing due to generational transitions will naturally lead to continuous differences, new problems, new understandings and search for solutions on the timeline of NEETs. Therefore, it is important to make new researches by associating all kinds of scientific themes and fields with the NEET people. It can be expected that a new bibliometric analysis to be carried out after the studies to be carried out in this way will reveal a more in-depth NEET concept.

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