INTERNATIONAL JOURNAL OF BUSINESS & ECONOMIC STUDIES

Volume: 7, Issue:2, Year 2025

E-ISSN: 2718-0247

Contact

International Journal of Business and Economic Studies

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INTERNATIONAL JOURNAL OF BUSINESS & ECONOMIC STUDIES

ULUSLARARASI İŞLETME VE EKONOMİ ÇALIŞMALARI DERGİSİ

Year: 2025 - Volume: 7 - Issue: 2

ISSN: 2718-0247

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International Journal of Business & Economic Studies
Year: 2025, Vol: 7, No: 2, pp.81-92
https://doi.org/10.54821/uiecd.1612885

Impact of Institutional Quality on Youth Unemployment in Nigeria: A Comparative Analysis of Male and Female Youths

Kurumsal Kalitenin Nijerya'daki Genç İşsizliği Üzerindeki Etkisi: Erkek ve Kadın Gençlerin Karşılaştırmalı Analizi

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Received : 03.01.2025
Revised : 30.04.2025
Accepted : 02.05.2025
Type of Article : Research

Keywords:
Institutional Quality, Youth Unemployment, Male Youth Unemployment, Female Youth Unemployment, Nigeria

Jel Codes:
C01, J02, J06

ABSTRACT

This paper investigates the influence of institutional quality on youth unemployment in Nigeria, focusing on gender differences among male and female youths, using annual data from 1991 to 2023. Institutional quality is measured through political rights and civil liberties, and the analysis employs the Autoregressive Distributed Lag (ARDL) model. The findings reveal that, in the long run, improved political rights are associated with a 0.93% increase in female youth unemployment, highlighting structural challenges that disproportionately affect women. Conversely, enhanced civil liberties contribute to a 0.56% reduction in female youth unemployment, underscoring their importance in fostering equitable employment opportunities. In the short run, better political rights correlate with a 0.39% decrease in female youth unemployment and a 0.25% reduction in overall youth unemployment. Results for male youths were not statistically significant in both the long- and short-run. These findings emphasise the critical role of institutional reforms and governance frameworks in addressing gender disparities and promoting labour market equity to combat youth unemployment effectively in Nigeria.

Anahtar Kelimeler:
Kurumsal Kalite, Genç İşsizliği, Erkek Genç İşsizliği, Kadın Genç İşsizliği, Nijerya

Jel Kodları:
C01, J02, J06

ÖZET

Bu çalışma, 1991-2023 yılları arasındaki verileri kullanarak, Nijerya'daki genç işsizliğinin üzerinde kurumsal kalitenin etkisini incelemekte ve erkek ve kadın gençler arasındaki cinsiyet farklılıklarına odaklanmaktadır. Kurumsal kalite, siyasi haklar ve medeni özgürlükler aracılığıyla ölçülmekte olup analizde Otoregresif Dağıtılmış Gecikme (ARDL) modeli kullanılmaktadır. Bulgular, uzun vadede iyileştirilmiş siyasi hakların kadın genç işsizliğinde %0,93'lik bir artışla ilişkili olduğunu ve kadınları orantısız bir şekilde etkileyen yapısal zorlukları ortaya koyduğunu göstermektedir. Öte yandan, gelişmiş medeni özgürlükler kadın genç işsizliğinde %0,56'lük bir azalmaya katkıda bulunarak eşit istihdam fırsatlarının teşvik edilmesindeki önemini vurgulamaktadır. Kısa vadede, daha güçlü siyasi haklar kadın genç işsizliğinde %0,39 ve genel genç işsizliğinde %0,25 oranında bir azalma ile ilişkilidir. Erkek gençler için elde edilen sonuçlar hem uzun hem de kısa vadede istatistiksel olarak anlamlı değildir. Bu bulgular, Nijerya'da genç işsizliğiyle etkili bir şekilde mücadele etmek için toplumsal cinsiyet eşitsizliğini azaltmada ve işgücü piyasasında eşitliği teşvik etmede kurumsal reformların ve yönetişim çerçevelerinin kritik rolünü vurgulamaktadır.

Suggested Citation: Azu, N. P., Okorie, V. T., Akadile, I. A., & Okafor, J. S. (2025). Impact of institutional quality on youth unemployment in Nigeria: A comparative analysis of male and female youths. *International Journal of Business and Economic Studies*, 7(2), 81-92, https://doi.org/10.54821/uiecd.1612885

1. INTRODUCTION

Youth unemployment has continued to persist as a major cause of poverty and discontent, transforming socioeconomic challenges in Nigeria and affecting poverty, discontent, and economic unrest (Anyanwu et al., 2021). Nigeria has a youthful population of over 60%, which leads to an increased population in the employment-seeking mode; thus, the economy struggles to provide. In addition, a lack of strong institutional support obstructs the proper performance of the labour market, economic growth, and governance and leads to unemployment among the youth (Kilishi et al., 2021). This implies that institutions such as regulatory agencies, governance structures, and laws affect investment, employment, and the implementation of labour laws, consequently defining the conditions in the labour market (Robinson & Acemoglu, 2012). Nonetheless, political instability, low regulatory quality, and corruption undermine these institutions in Nigeria, thereby intensifying the issue of youth unemployment in the country (Raifu et al., 2022; 2024).

The connection between labour market outcomes and institutional quality is well-documented internationally. North (1990) and recent studies by Kilishi et al. (2021) and Fakih et al. (2020) indicate that robust institutions foster an environment favourable to economic activity, thereby enhancing job creation and reducing unemployment. Institutions influence access to education, training, and employment opportunities with regard to the youth (Dietrich & Möller, 2016). Structural barriers imposed, such as inadequate institutions, constrain youth participation in labour in Nigeria (Azu et al., 2024, 2021). Commitment also becomes stunted along gender lines due to differences in gender, and this weakness is intensified by discriminatory practices and cultural norms (Asongu & Odhiambo, 2018; 2020; Efobi et al., 2018).

The gendered dimensions of youth unemployment in Nigeria should be brought to the limelight. Female adolescents are faced with extra socio-cultural challenges of restricted education, gender discrimination and limited labour market participation. On the other hand, male youths are faced with the issues of skill mismatches and under-employment (Efobi et al., 2018; ILO, 2016). Enacting laws that promote fair work practices, educational access, and gender equality can significantly mitigate these discrepancies (Raifu et al., 2024). Nonetheless, a significant gap remains in the research and policy frameworks regarding the differential impact of institutional quality on male and female youth unemployment in Nigeria.

Although there are various policies, youth unemployment in Nigeria remains worrisome at these levels. Therefore, we will investigate the effectiveness of the existing institutional frameworks (National Bureau of Statistics, 2023). Inadequate enforcement of labour regulations, corruption and ineffective governance hinder job creation and long-term employment opportunities (Abé-Ndjie et al., 2019). Existing policies are insufficient to tackle male and female youth's distinct needs in the light of disparate consequences of unemployment. These gender asymmetries highlight the importance of institutional changes embedding gender considerations into models of labour market dynamics (Asongu & Odhiambo, 2020; Efobi et al., 2018).

Despite studies by authors like Dietrich and Möller (2016) and Fakih et al. (2020) on the power of institutions to tackle unemployment, there has been little research on Nigeria, particularly in the context of gendered dimensions of youth unemployment. The inclination to approach youth unemployment as a single issue reduces the ability to develop targeted solutions because substantial differences exist regarding the problems faced by male and female youth in the labour market (Raifu et al., 2024; 2022). This separation demonstrates a gap that needs to be filled through a comparative study exploring the differential impact of institutional quality on youth unemployment for males and females.

This research aims to fill the gap in understanding the relationship between youth unemployment and institutional quality in Nigeria, with a specific focus on gender differences. By measuring the distinct effects of institutional quality—defined through political rights and civil liberties—on male and female youth unemployment, the study aims to provide policy-relevant insights into how institutional reforms can promote equitable and inclusive employment (Acemoglu & Robinson, 2012). This approach aligns with the broader goals of Sustainable Development Goal (SDG) 8, which advocates for decent work and inclusive economic growth, and SDG 5, which seeks gender equality and the empowerment of women and girls. Motivated by Nigeria's persistently high youth unemployment, the study explores the governance-labour nexus. It highlights the gendered nature of labour market exclusion, offering a framework for strengthening institutions to support sustainable and inclusive development.

This research spans 33 years, from 1991 to 2023, examining the dynamics of how institutional quality influences youth unemployment in Nigeria. The period was carefully selected to capture major political and economic transitions, including the Structural Adjustment Program era, the 1999 shift to democratic governance, and later reforms like globalisation and privatisation. The Autoregressive Distributed Lag (ARDL) technique was employed due to the mixed order of integration in the data. This study contributes significantly to the literature by offering a gender-disaggregated analysis—a dimension often neglected in Nigerian labour research (Fakih et al., 2020; Raifu et al., 2024). It uniquely measures institutional quality through political rights and civil liberties (Freedom House, 2023), revealing both short- and long-run asymmetries, especially in the case of female youth unemployment. Furthermore, integrating insights from human capital theory demonstrates how institutional weaknesses deepen gender disparities in education and labour market participation (Acemoglu & Robinson, 2012; Becker, 1964).

2. A TREND OF YOUTH UNEMPLOYMENT AND INSTITUTIONAL QUALITY IN NIGERIA

Figure 1 presents the trends in youth unemployment and institutional quality. As exhibited in the literature, there's a close relation between the quality of institutions and employment outcomes. According to Binuyo et al. (2024), weak institutions and governance challenges have been found to deepen unemployment and are prominent in developing countries. The prolongations of the periods of poor political rights (for instance, 1993–1997) are relevant to the findings of Robinson and Acemoglu (2012), who explain that in Brazil, often fragile institutions caused by military regimes lead to negative economic effects like high unemployment levels. Nigeria's autocratic and politically unstable period likely limited economic opportunities for the youth.

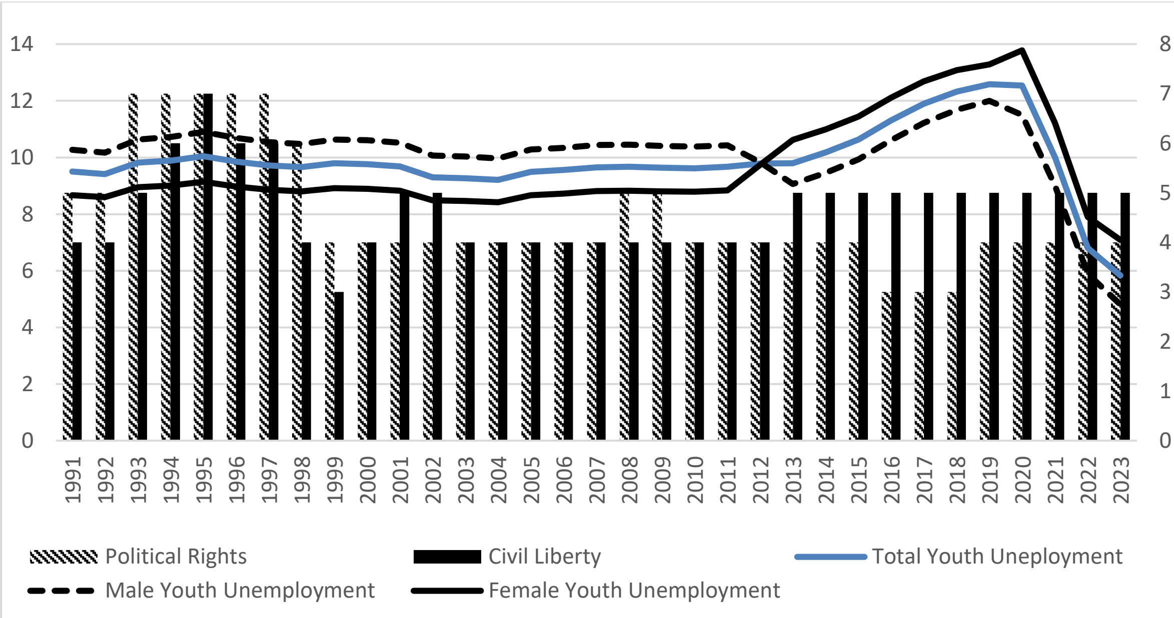

Figure 1. Institutional Quality and Youth Unemployment in Nigeria
Source: WDI and Freedom House

The gender disparity in unemployment corresponds with the findings of Anyanwu et al. (2021), Asongu and Odhiambo (2020), and Efobi et al. (2018), which indicate that female youth in Sub-Saharan Africa frequently encounter systemic barriers, such as restricted access to education and labour market participation, exacerbated by institutional inefficiencies. The increase in female unemployment relative to male unemployment in the late 2010s may indicate structural adjustments and changes in socioeconomic dynamics, as Azu et al. (2024) observed. The notable reduction in youth unemployment between 2021 and 2023 may be associated with post-pandemic economic recovery strategies and specific policy interventions, highlighting the critical role of governance in restoring employment following a crisis. The references underline the relationship between institutional quality, governance, and labour market outcomes in Nigeria, thereby corroborating the trends identified in the data.

3. LITERATURE REVIEW

The basis of this research is human capital theory (Becker, 1962; 1964). It also asserts that individuals' training, education and skills are great economic development and productivity determinants. The hypothesis is that investments in human capital improve employer credibility and earning potential because a skilled labour force has a higher capability of meeting labour market demands. The human capital theory applies to youth unemployment in Nigeria as quality education and skill acquisition are highly determinants of male and female youths' job prospects. A more general measure of institutional quality, for which the quality of educational systems and the availability of training programmes are but particular instances, is defined as effective governance, political rights and civil liberties are major determinants of human capital formation in an institutional context (Robinson & Asemoglu, 2012). Institutional quality, particularly the extent to which corruption and governance are ineffective, tends to worsen gender inequalities in that it reduces the access of women to education skill development and hence propels them to unemployment inequality. Therefore, the interaction between human capital and institutional quality must be analysed to understand why youth unemployment in Nigeria is highly persistent, with gender.

Research in this area takes a diverse approach—empirically presenting perspectives on the relationship between youth unemployment and institutional quality. Dietrich and Möller (2016) conclude that both were critical to analysing how important cyclical and institutional variables were in Europe's youth unemployment after the Great Recession. The analysis based on panel data shows that in addition to structural differences aggravating the situation, some variations exist among nations. The report highlights the necessity of combining institutional changes with macroeconomic stimulation to address youth unemployment effectively. Kawaguchi and Murao (2014) emphasise that youth unemployment in OECD countries has enduring negative effects, exacerbated by rigid labour market structures. These results indicate that addressing institutional deficiencies is crucial for mitigating chronic youth unemployment.

Based on a sample from sub-Saharan Africa (SSA), Kilisi et al. (2021) observe that market-friendly parties clearly cut down on unemployment rates for both genders. Their finding also suggests a gap between immediate impacts and underscores the need for policies which increase private investment and labour mobility. The result is similar to that of Raifu et al. (2024), who explored the relationship between Government expenditure and institutional quality in Nigeria. Furthermore, the long-term effects of expenditure on employment are also negative but may be attenuated by institutional quality insofar as institutional quality reduces the strength of the impact of expenditure on unemployment (Raifu et al., 2022). These studies suggest that to better deal with unemployment, there's room for strengthening institutional frameworks.

Institutions in research in Asia elucidate an influence on employment market trends. Within the context of the Fourth Industrial Revolution, institutional quality and human capital influence unemployment, according to Vicente (2023). The research shows that technical advances increase unemployment rates unless institutional quality and investments in human capital improve sufficiently. In Asian countries, Pham (2024) shows that the implementation of institutional improvements leads to more beneficial government investment into labour and argues for the need for efficient public expenditure and strong governance frameworks.

The research in African studies demonstrates that there is an interrelation between youth unemployment and governance indicators. Abé-Ndjié et al. (2019) highlight the importance of governance factors, such as political stability and corruption control, to reduce youth unemployment. These consequences are less pronounced in nations characterised by abundant natural resources and elevated levels of corruption. Binuyo et al. (2024) thus argue that better political stability and regulatory quality are required since they show that institutional quality increases unemployment in Sub-Saharan Africa. The findings add credence to Demeke's (2022) finding in the IGAD region that youth unemployment is correlated with political instability.

Fakih et al. (2020) show that gender is an essential determinant of youth employment in the MENA region. The results indicate that increasing gender equity in labour markets can lower total unemployment, but only with respect to men, leaving women worse off but unrelated to their labour market situation. The analysis by Sachs and Smolny (2015) of OECD countries indicates that labour market structures frequently protect older workers, adversely affecting younger entrants. Both studies emphasise the gendered dimensions of unemployment and the necessity for inclusive institutional reforms. Çetin et al. (2015) complement this by examining 15 EU countries and finding that unemployment significantly and negatively affects economic growth, with panel cointegration and Granger causality tests revealing a strong long-run, bi-directional relationship between unemployment and growth. Separately, Günaydin and Çetin (2015), in their study on Turkey, show that youth unemployment is significantly influenced by macroeconomic variables such as per capita income, inflation, trade openness, and FDI, with all showing long-run negative effects and strong causality relationships. These studies underscore the need for inclusive institutional reforms and macroeconomic stability to effectively address youth unemployment, especially through gender-sensitive and age-responsive policies.

The reviewed literature demonstrates a growing recognition of the complex interplay between institutional quality, macroeconomic factors, and youth unemployment across various regions. Studies highlight the significance of governance structures, labour market dynamics, and economic indicators in shaping employment outcomes. However, a notable gap persists in studies that specifically examine this connection through a gender-based comparative lens. While scholars such as Kilishi et al. (2021) and Raifu et al. (2024) have investigated institutional quality in relation to unemployment and government expenditure, many of these studies fail to address the unique challenges faced by male and female youths, particularly regarding access to employment, education, and labour market participation. Similarly, Fakih et al. (2020) and Abé-Ndjié et al. (2019) emphasise the role of institutional and governance factors in youth unemployment but do not offer gender-disaggregated analyses within the Nigerian context, where institutional, cultural, and economic factors may affect young men and women differently. In contrast, the present study distinguishes itself by adopting a gender-comparative approach, revealing how institutional quality—measured specifically through political rights and civil liberties—impacts male and female youth unemployment differently. Moving beyond broad governance indices and treating youth unemployment as a heterogeneous issue, this study addresses a critical gap in the literature. It provides a more nuanced foundation for designing equitable and gender-responsive policy interventions in Nigeria.

In summary, the extant literature underscores the multifaceted and regionally diverse nature of youth unemployment, with institutional quality and human capital emerging as central determinants—yet there remains a pressing need for more context-specific, gender-sensitive analyses that can inform targeted and inclusive policy responses.

4. METHODOLOGICAL NOTES

4.1. Model Specification and Data

The research follows the Ex Post Facto design, which is a fit to analyse the causal relationship between institutional quality and youth unemployment in Nigeria based on historical data. The 1991–2023 period was chosen for data availability and to capture key political and economic shifts in Nigeria, including the Structural Adjustment era, the 1999 democratic transition, and recent events like the COVID-19 pandemic. This 32-year span enables robust analysis of long- and short-run effects, aligning well with the chosen estimation method.

Table 1. Data Sources and Expected Signs of Coefficients

Variables	Expectation	Sources
Total Youth Unemployment (TYU_t)	Dependent	WDI
Male Youth Unemployment (MYU_t)	Dependent	WDI
Female Youth Unemployment (FYU_t)	Dependent	WDI
Political Right (PR_t)	Positive (+)	Freedom House
Civil Liberty (CL_t)	Positive (+)	Freedom House
Nominal GDP (GDP_t)	Negative (-)	WDI
Exchange Rate ($EXC_{i,t}$)	Negative (-)	WDI

Note: WDI-World Development Indicator

The research design allows for a robust investigation of the effects of institutional variables—political rights (PR) and civil liberty (CL)—on youth unemployment rates. The proposed model captures youth unemployment (TYU) as a function of institutional quality (INS), nominal GDP (GDP), and exchange rate (EXC). The study addresses gender-specific dynamics by disaggregating youth unemployment into male (MYU) and female (FYU) categories, offering a comparative analysis that accounts for socioeconomic disparities. The base model is as follows:

$$TYU_t = \beta_0 + \beta_1 INS_t + \beta_2 GDP_t + \beta_3 EXC_t + \varepsilon_t \tag{1}$$

Where TYU_t is the youth unemployment rate. To achieve the objectives of this research, youth can be substituted with Male Youth Unemployment (MYU_t) and Female Youth Unemployment (FYU_t). INS_t stand for a vector of institutional quality at time t (to be captured in 2 standpoints: political rights and civil liberty as per Freedom House data), $GDP_t$is the nominal GDP at time t and EXC_t is the exchange rate at time t. ε_t – stochastic error term assumed to be normally distributed, β_O is the constant, β_1 *to* β_3 represents the estimated parameters of the model. Equation 1 is expanded to include all the institutional quality variables and transformed into a natural logarithm as follows:

$$lnTYU_t = \beta_0 + \beta_1 lnPR_t + \beta_2 lnCL_t + \beta_3 lnGDP_t + \beta_4 lnEXC_t + \varepsilon_t \tag{2}$$

While other variables remain as previously described, PR_t represents political rights at time, t and CL_t is civil liberty at a time, t; both being proxies for institutional quality. Freedom House presents the institutional quality data in descending order from 7 (worse) to 1 (better), insinuating the lesser, the better. Therefore, the interpretation is reversed; a positive coefficient implies a negative effect and vice versa. All variables in Equation 2 are in logarithm, ensuring linearity and reducing heteroscedasticity, enhancing the reliability of the estimates.

4.2. Estimation Technique

As regards the use of time series data, the Autoregressive Distributed Lag (ARDL) model developed by Pesaran et al. (2001) and Pesaran and Shin (1999) has been popular because it provides an opportunity for the analysis of both short and long-run relationships. As a result, the model can accommodate different variables that are stationary at levels (I(0)), first differences (I(1)) or a combination of them, removing the requirement for pretesting the variables' stationarity (Yusuf & Mohd, 2020). However, the ARDL approach is specifically efficient for dynamic analysis, which simultaneously estimates long and short-run parameters (Toriolaa et al., 2021). For small sample sizes, this method is suitable and yields reliable results across all datasets (Lim & Grosheck, 2021). Through bounds testing, cointegration is established; the F statistic exceeds the upper critical bound, thereby establishing a long-run relationship. The error correction model (ECM) derived from ARDL shows the speed of adjustment to equilibrium by its negative and significant ECM coefficient (Banerjee et al., 1998). In empirical research, the ARDL is more straightforward to estimate and interpret using analytical tools such as Stata. Based on the methodology utilised for the analysis (ARDL), Equation 3 will be expressed as:

$$lnTYU_t = \beta_0 + \beta_1 lnTYU_{t-i} + \beta_2 lnPR_{t-i} + \beta_3 lnCL_{t-i} + \beta_4 lnGDP_{t-i} + \beta_5 lnEXC_{t-i} + \sum_{i=0}^{p} \beta_6 \Delta lnTYU_{t-i} + \sum_{i=0}^{p} \beta_7 \Delta lnPR_{t-i} + \sum_{i=0}^{p} \beta_8 \Delta lnCL_{t-i} + \sum_{i=0}^{p} \beta_9 \Delta lnGDP_{t-i} + \sum_{i=0}^{p} \beta_{10} \Delta lnEXC_{t-i} + ECM + \mu_t \quad (3)$$

Note that all the variables remain as previously described, but Δ stands for the difference (or change) in respective variables, and (-) is the lag sign. In satisfying the long-run relationship, the ARDL bound test requires a null hypothesis for no cointegration HO: $\beta_1 = \beta_2 = \beta_3 = \beta_4 = \beta_5 = 0$ for equation (3).

5. RESULTS AND DISCUSSION

The summary statistics presented in Table 2 Panel A provide essential insights into the characteristics of the variables. The dependent variables: total youth unemployment ($LTYU_t$), male youth unemployment($LMYU_t$) and female youth unemployment ($LFYU_t$) present mean values of 2.2810, 2.3020, and 2.2535, respectively, with moderate variations as reflected in their standard deviations. The independent variables, political rights (LPR_t) and civil liberties (LPR_t), present mean values of 1.4843 and 1.5261, respectively, with ranges from 1.0986 to 1.9459, suggesting a degree of stability in these governance indicators. Nominal gross domestic product ($LGDP_t$) and exchange rate ($LEXC_t$) display significant variability, with $LGDP_t$ averaging 26.0890 and $LEXC_t$ demonstrating a broad range from 2.2935 to 6.1366, indicative of Nigeria's unstable macroeconomic conditions.

Table 2. Descriptive and Correlation

Panel A Summary Statistics							
Variable	$LTYU_t$	$LMYU_t$	$LFYU_t$	LPR_t	LCL_t	$LGDP_t$	$LEXC_t$
Obs	33	33	33	33	33	33	33
Mean	2.2810	2.3020	2.2535	1.4843	1.5261	26.0890	4.6573
Std. Dev.	0.1435	0.1752	0.1629	0.2412	0.1715	0.7898	1.0717
Min	1.7649	1.5692	1.9590	1.0986	1.0986	24.6756	2.2935
Max	2.5327	2.4846	2.6234	1.9459	1.9459	27.0762	6.1366
Panel B Correlation Matrix							
Variables	$LTYU_t$	$LMYU_t$	$LFYU_t$	LPR_t	LCL_t	$LGDP_t$	$LEXC_t$
$LTYU_t$	1						
$LMYU_t$	0.8802	1					
$LFYU_t$	0.8296	0.4652	1				
LPR_t	-0.1511	0.1063	-0.4095	1			
LCL_t	0.1040	-0.0612	0.2643	0.3583	1		
$LGDP_t$	0.1261	-0.2175	0.4909	-0.4261	0.1743	1	
$LEXC_t$	0.0025	-0.3272	0.3916	-0.8125	-0.1051	0.6859	1

The correlation matrix in Table 2 Panel B illustrates the relationships among youth unemployment, governance, and various economic variables. The three dependent variables are highly correlated, showing a strong similarity and consistent trend across these demographics. The two variables of institutional quality show no evidence of a strong correlation between them; hence, they will be estimated in the same regression. Azu and Nwauko (2021) and Azu & Muhammad (2020) stressed that multicollinearity issues are evident when highly correlated variables are estimated in the same model.

5.1. Unit Root Tests and Cointegration

The findings from the Augmented Dickey-Fuller (ADF) unit root test shown in Table 3 demonstrate the stationarity properties of the variables analysed. The results show that total youth unemployment, male youth unemployment, female youth unemployment and civil liberty are integrated at level I(0) at various significant levels. In contrast, political rights, nominal GDP and exchange rate are stationary at first differences I(1) and at different significance levels. The results support the choice of the ARDL estimation technique.

Table 3. Augmented Dickey-Fuller (ADF) Unit Root Test

Variables	Level (t-statistics)	1st difference (t-statistics)	Remarks
$LTYU_t$	-4.358***	-4.338***	I(0)
$LMYU_t$	-5.528***	-3.764***	I(0)
$LFYU_t$	-2.659*	-3.753***	I(0)
LPR_t	-1.821	-4.399***	I(1)
LCL_t	-3.699***	-4.807***	I(0)
$LGDP_t$	-1.974	-3.255**	I(1)
$LEXC_t$	-1.294	-4.163***	I(1)
Critical Values	10%	5%	1%
Level	-2.623	-2.983	-3.709
Ist Difference	-2.624	-2.986	-3.716

Note: * indicates stationery at 10 %, ** means stationery at 5% and *** means stationery at 1%. Unit root test was based on Augmented Dickey-Fuller (ADF) Using Stata 14

The model was estimated in three variations: total youth unemployment (T), male youth unemployment (M), and female youth unemployment (F). The cointegration bounds test indicates a long-run relationship across all models, as the F-statistics surpass the 1% critical upper bounds: 6.697 (T), 5.855 (M), and 5.627 (F). Thus, the null hypothesis of the absence of a long-run relationship is rejected. Again, the error correction terms (ECM-1) are negative and significant at the 1% level, with adjustment speeds of 71.0% (T), 68.2% (M), and 55.8% (F), suggesting effective corrections towards equilibrium. The results in Table 4 indicate robust long-run dynamics, the absence of serial error correction and data instability occasioned by a structural break (Abdullahi et al., 2024) within the ARDL framework.

Table 4. Cointegration Bound Tests Result

F-statistic (T)	6.697	EC_{M-1}	-0.710***	(0.164)
F-statistic (M)	5.855	EC_{M-1}	-0.682***	(0.163)
F-statistic (F)	5.627	EC_{M-1}	-0.558***	(0.156)
F-Bounds Test	Significant level	10%	5%	1%
	Lower bound	2.45	2.86	3.74
	Upper bound	3.53	4.01	5.06

Note: the number in parenthesis represents t-statistics, *** signifies a 1% level of significance, F-statistics is determined with restricted constant and no trend; T- Total Youth Model, M-Male Youth Model and F-Female Youth Model

5.2. Short Run and Long Run Results

The regression results presented in Table 5 illustrate the long-term effects of institutional quality, as measured by political rights and civil liberties, on youth unemployment in Nigeria, explicitly emphasising male and female youth. Both political rights and civil liberty are interpreted in a reverse form due to the structure of the data. In the long term, political rights demonstrate negative coefficients of -0.385 for total youth unemployment, -0.267 for male youth unemployment, and -0.931 for female youth unemployment. However, only the outcome for female youth unemployment is statistically significant at the 10% level. This suggests that a 1% improvement in political rights increases female youth unemployment by 0.93%, all things being equal. This finding suggests that adverse political environments may compel female youths to engage in unconventional or informal employment as a survival strategy. Civil liberty exhibits a positive and statistically significant coefficient for both total and female youth unemployment. The coefficients of 0.287 and 0.563 are significant at the 5% and 1% levels, respectively. This indicates that improved civil liberties correlate with a decrease in total youth unemployment and female youth unemployment by 0.29% and 0.56%, respectively.

Table 5. Regression Result on the Short-run and Long-run Impact of Institutional Quality on Youth Unemployment in Nigeria

Variables	Youth	Male Youth	Female Youth
Long Run Results			
LPR_t	-0.385 (0.295)	-0.267 (0.315)	-0.931* (0.460)
LCL_t	0.287** (0.111)	-0.0126 (0.128)	0.563*** (0.159)
$LGDP_t$	0.0246 (0.040)	-0.00705 (0.042)	0.120* (0.064)
$LEXC_t$	-0.0762 (0.089)	-0.0955 (0.093)	-0.188 (0.141)
Error Correction Short Run Results			
ECT_{t-1}	-0.710***(0.202)	-0.682***(0.197)	-0.558**(0.195)
ΔLTY_{t-1}	1.287*** (0.317)	1.408*** (0.317)	0.737** (0.277)
ΔLPR_t	0.252** (0.114)	0.156 (0.127)	0.386***(0.131)
ΔLPR_{t-1}	0.144 (0.106)	0.0330 (0.118)	0.292** (0.116)
ΔLCL_t	-0.125 (0.117)	-0.0234 (0.108)	-0.128 (0.151)
ΔLCL_{t-1}	-0.0670 (0.100)	0.0161 (0.112)	-0.108 (0.110)
$\Delta LGDP_t$	-0.139 (0.115)	-0.127 (0.129)	-0.109 (0.122)
$\Delta LGDP_{t-1}$	-0.0422 (0.051)	0.0103 (0.052)	-0.0878 (0.065)
ΔEXC_t	-0.0448 (0.148)	-0.0911 (0.159)	0.0705 (0.165)
Constant	1.543** (0.576)	2.325*** (0.698)	0.307 (0.625)
Observations	33	33	33
R-squared	0.833	0.835	0.778

Note: Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

The results indicate a distinct pattern for political rights in the short run. Political rights demonstrate positive coefficients of 0.252, 0.156, and 0.386 for total, male, and female youth unemployment at the level. Only the total and female youth unemployment results are statistically significant at the 5% and 1% levels, respectively. The findings indicate that improved political rights result in a 0.25% decrease in total youth unemployment and a 0.39% decrease in female youth unemployment, all things being equal. The result at lag one is predominantly insignificant, except for female youth unemployment, which exhibits a coefficient of 0.292, significant at the 5% level. This indicates that an improved political right would lead to a 0.29% decrease in female unemployment in the short run. The statistically significant findings for female youths in both the long and short term highlight their increased sensitivity to variations in institutional quality, potentially arising from unequal opportunities or sociopolitical obstacles.

The short-run results for civil liberty are predominantly not statistically significant; however, the coefficients offer some insight into the underlying dynamics. At level, civil liberty exhibits coefficients of -0.125, -0.0234, and -0.128 for total, male, and female youth unemployment, respectively. At lag one, the coefficients are -0.0670 for total youth unemployment, 0.0161 for male youth unemployment, and -0.108 for female youth unemployment. While not statistically significant, the results suggest that the negative coefficients for total and female youth unemployment may indicate that civil liberty enhancements could lead to increased unemployment levels in the short run. The mixed results highlight the complexity of the relationship between institutional quality and youth unemployment, especially in the context of gender disparities, necessitating more nuanced policy interventions.

5.3. Post Diagnostic Test

The diagnostic test results in Table 6 validate the robustness and reliability of the regression models concerning total, male, and female youth unemployment. The R-squared values—0.883 for total youth, 0.835 for male youth, and 0.778 for female youth unemployment—demonstrate that the models account for a substantial portion of the variability in unemployment rates. Male youth unemployment exhibits the most extraordinary explanatory power, whereas the lower R-squared value for female youth indicates the potential influence of unexamined factors, warranting additional investigation.

The Breusch-Godfrey test indicates no serial correlation, with probabilities of 0.8050 for total youth, 0.2919 for male youth, and 0.9021 for female youth, all exceeding the 0.05 threshold. The Breusch-Pagan-Godfrey test indicates an absence of significant heteroscedasticity, as all models exhibit probabilities greater than 0.05. The CUSUM test verifies model stability, as cumulative residuals stay within established critical limits. The diagnostic results confirm the reliability of the models and underscore their utility in shaping gender-specific youth unemployment policies in Nigeria.

Table 6. Diagnostic Test

Statistics	Youth	Male Youth	Female Youth
R-Square	0.833	0.835	0.778
Serial Correlation	0.061 (0.8050)	1.111(0.2919)	0.015(0.9021)
Heteroscedasticity Test	16.30 (0.1010)	8.51 (0.1061)	16.38 (0.1100)

Note: Probabilities are in parentheses. Serial correlation is with the Breusch-Godfrey LM test; the Heteroscedasticity test is with the Breusch-Pagan test. All were done using Stata 14.

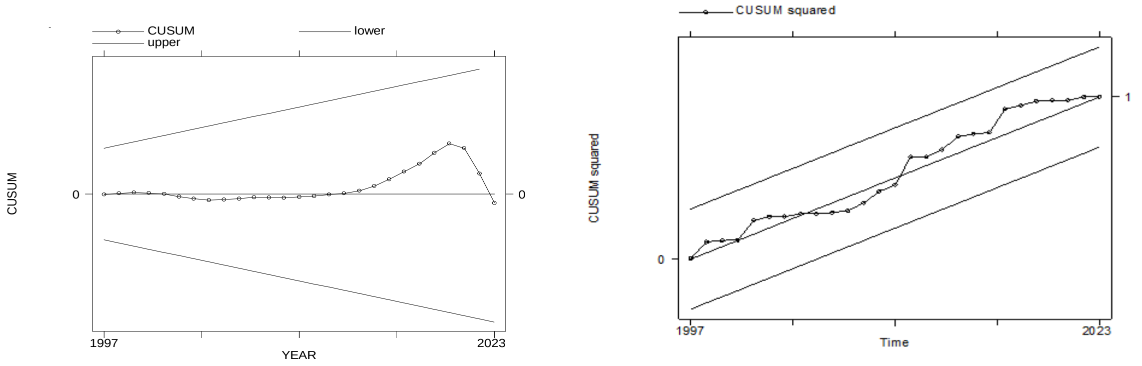

Figure 2. CUSUM and CUSUM Sqaured

5.4. Discussion of Findings

The regression findings provide crucial new information on how institutional quality, as determined by civil freedoms and political rights, affects youth unemployment in Nigeria, with an emphasis on gender dichotomy. Improved political rights show a strong negative correlation with female youth unemployment over the long run, indicating that political rights eventually lead to higher rates of female youth unemployment. This surprising result could reflect sociopolitical dynamics, where unfavourable political circumstances may lead to young women turning to informal or unstable work. Conversely, civil liberty has a positive and significant coefficient, reflecting that improved civil liberty reduces overall and female youth unemployment in Nigeria. These results align with research highlighting the vital impact of institutional quality—particularly political stability and governance—on unemployment trends, such as that conducted by Abé-Ndjié et al. (2019) and Binuyo et al. (2024). Additionally, the findings highlight the unique vulnerability of young women, supporting the claim made by Fakih et al. (2020) that gender differences influence unemployment outcomes in institutional settings.

Political rights have a short-term favourable impact on both overall and female youth unemployment, with notable decreases seen as political rights increase. The results show the direct advantages of political changes in establishing fair possibilities and are susceptible to female youth unemployment. Given the ongoing impact on female unemployment, the delayed effects further highlight the enduring nature of institutional factors. On the other hand, civil liberty coefficients are generally not significant in the short run. Still, the negative trends imply that improvements may ultimately lead to a rise in young unemployment in Nigeria. These contradictory findings support the complexity outlined by Kilishi et al. (2021), who contend that for institutional improvements to have noticeable impacts, time and complementing policies are needed. Therefore, the gender-specific results, which are complex, support policies that are specifically designed to address the particular obstacles that young women in Nigeria confront in the job market.

Human capital theory, which highlights the importance of education, skills, and institutional frameworks in improving productivity and employment outcomes, is consistent with the study's results. The findings highlight the critical role that institutional quality—determined by civil freedoms and political rights—plays in reducing youth unemployment in Nigeria, especially among young women. According to Fakih et al. (2020), although increased civil freedoms are associated with lower unemployment, restrictions on political rights and civil liberties worsen gender inequality by preventing equal access to chances for education, vocational training, and employment. The illogical long-term correlation between political rights and female unemployment implies that unfavourable institutional settings force young women into informal work, which reflects enduring gender inequality. These results are consistent with Robinson and Asemoglu (2012), who contend that poor institutional quality impedes human capital development and sustains structural inequality, particularly for underprivileged populations. Likewise, Vicente (2023) highlights how crucial strong institutional frameworks are to converting technology and economic breakthroughs into fulfilling jobs. Reducing unemployment, improving human capital, and advancing labour market justice in Nigeria need strengthening governance and tackling gender-specific issues.

6. CONCLUSIONS

With an emphasis on the gender-specific impacts of political rights and civil freedoms, the results of this study highlight the crucial role that institutional quality plays in resolving youth unemployment in Nigeria. Although a positive correlation exists between improving civil liberty and lower youth unemployment rates, the inverse association between enhanced political rights and higher rates of female youth unemployment highlights more serious institutional and structural issues. These findings demonstrate the ongoing gender disparities in educational opportunities, skill development, and employment prospects, especially for young women. The sensitivity of female youth unemployment to differences in institutional quality is further shown by the short- and long-term dynamics, underscoring the pressing need for fair institutional changes and inclusive governance to close these gaps.

It is suggested that governments focus on institutional changes that improve political stability, civil liberties, and governance quality while addressing gender-specific hurdles in light of these results. Policies aiming at lowering the structural and cultural barriers that disproportionately impact female youths should be combined with investments in human capital, such as high-quality education and focused skill development programs. Furthermore, encouraging women to participate in governance and decision-making procedures might aid in developing policies better suited to their particular difficulties. Collaborative efforts between government, private sectors, and civil society to design and implement gender-sensitive interventions will mitigate youth unemployment and foster more inclusive economic growth in Nigeria.

This study acknowledges key limitations, including the absence of methods that account for structural breaks, if any, which may affect the accuracy of its findings. Future research should apply Fourier-based ARDL models to capture smooth structural shifts over time. Expanding institutional indicators, incorporating regional-level data, and exploring panel analyses across countries are also recommended to strengthen the analysis and provide a deeper, more nuanced understanding of gendered youth unemployment dynamics.

AUTHORS' DECLARATION:

This paper complies with Research and Publication Ethics, has no conflict of interest to declare, and has received no financial support.

AUTHORS' CONTRIBUTIONS:

Conceptualisation, writing-original draft, editing – **ANP, OVT, AIA** and **OJS**, data collection, methodology, formal analysis – **ANP, OVT**, **OJS** Final Approval and Accountability – **ANP** and **AIA**.

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International Journal of Business & Economic Studies
Year: 2025, Vol: 7, No: 2, pp.93-112

https://doi.org/10.54821/uiecd.1649313

The Mediating Role of Ethical Leadership in the Effect of Psychological Climate on Work Engagement

Psikolojik İklimin İşe Adanmışlığa Etkisinde Etik Liderliğin Aracı Rolü

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Received : 01.03.2025
Revised : 14.06.2025
Accepted : 23.06.2025
Type of Article : Research

ABSTRACT

The purpose of this study is to explore the mediating role of ethical leadership in the relationship between psychological climate and work engagement. The study consists of survey data (n=442) collected from employees in iron and steel companies in Istanbul. Confirmatory factor analysis was conducted to examine the convergent validity of the construct measures. Structural equation modeling was used to estimate the fit of the hypothesized model to the data. The findings show that all psychological climate variables affect ethical leadership and ethical leadership also has a significant effect on work engagement dimensions. In addition, the study revealed that ethical leadership has a full mediating role in the effect of psychological climate on work engagement. Limitations of this study include its focus on a single sector and location, which limits the generalizability of the findings to other sectors and cultural contexts. This study contributes to the work engagement literature by highlighting the role of ethical leadership in shaping the psychological climate of an organization. It provides new perspectives on how leadership behavior affects employee engagement, particularly in the context of ethical decision-making and leadership practices. The findings provide practical recommendations for organizations seeking to increase employee engagement through strategies for leadership development and improving psychological climate.

Keywords:
Psychological Climate,
Ethical Leadership,
Work Engagement,
Mediating Role

Jel Codes:
M00, M1, M11

ÖZET

Bu çalışmanın amacı, psikolojik iklim ile işe adanmışlık arasındaki ilişkide etik liderliğin aracılık rolünü araştırmaktır. Çalışma, İstanbul'daki demir-çelik şirketlerindeki çalışanlardan toplanan anket verilerinden (n=442) oluşmaktadır. Yapısal ölçümlerin yakınsak geçerliliğini incelemek için doğrulayıcı faktör analizi yapılmıştır. Hipotezlenen modelin verilere uygunluğunu tahmin etmek için yapısal eşitlik modellemesi kullanılmıştır. Bulgular, tüm psikolojik iklim değişkenlerinin etik liderliği etkilediğini ve etik liderliğin de işe adanmışlık boyutları üzerinde anlamlı bir etkisi olduğunu göstermektedir. Ayrıca çalışma, etik liderliğin psikolojik iklimin işe adanmışlık üzerindeki etkisinde tam aracılık rolü üstlendiğini ortaya koymuştur. Bu çalışmanın sınırlılıkları arasında tek bir sektöre ve konuma odaklanması yer almaktadır; bu da bulguların diğer sektörlere ve kültürel bağlamlara genellenebilirliğini kısıtlamaktadır. Bu çalışma, etik liderliğin bir örgütün psikolojik iklimini şekillendirmedeki rolünü vurgulayarak işe adanmışlık literatürüne katkı sağlamaktadır. Özellikle etik karar alma ve liderlik uygulamaları bağlamında, liderlik davranışının çalışan katılımını nasıl etkilediğine dair yeni bakış açıları sunmaktadır. Bulgular, liderlik gelişimi ve psikolojik iklimin iyileştirilmesine yönelik stratejilerle çalışan katılımını artırmak isteyen kuruluşlar için pratik öneriler sunmaktadır.

Anahtar Kelimeler:
Psikolojik İklim,
Etik Liderlik,
İşe Adanmışlık,
Aracı Rol

Jel Kodları:
M00, M1, M11

Suggested Citation: Yazıcı, A. M., Özkan, A., & Yalçın, Y. (2025). The mediating role of ethical leadership in the effect of psychological climate on work engagement. *International Journal of Business and Economic Studies*, 7(2), 93-112, https://doi.org/10.54821/uiecd.1649313

1. INTRODUCTION

In today's business world, issues such as job involvement and ethical leadership are critical to the success of organizations. Job involvement refers to the level of commitment and motivation that employees feel towards their jobs (Pourtousi & Ghanizadeh, 2020). Psychological climate is the emotional, mental and behavioral characteristics of the environment perceived by individuals within an organization (Murtza & Rasheed, 2023). A good psychological climate increases employee motivation, provides job satisfaction, encourages collaboration and positively affects performance (Afota et al., 2023). The attitude and behavior of leaders have a great influence on the psychological climate of employees. Supportive, fair and motivating leadership styles generally create a positive psychological climate. Open and effective communication makes employees feel emotionally connected to their organization. Good communication helps to solve problems and build trust. Employees want to feel that things are managed fairly (Kawiana et al., 2021). The sense of justice plays an important role in the psychological climate of employees. Working in a trustworthy environment increases cooperation and supports motivation. Valuing employees' opinions and understanding their feelings positively affect the psychological climate. In a participatory environment, employees are more motivated and feel valued (Sharma & Kumra, 2020).

Effective management of stress has a significant impact on the psychological climate of employees. Working in a stressful environment reduces motivation and job satisfaction. Employees' respect for their achievements and receiving feedback positively affect the psychological climate, while appreciated employees are more motivated and motivated to do their jobs better (Wen et al., 2020). Employees' commitment to their work determines their overall psychological climate. Dedicated employees tend to create a more positive atmosphere (Sabokro et al., 2021). A sense of fairness increases employees' trust in each other and in their leaders. Fair practices support psychological trust and job satisfaction. Constructive feedback helps employees understand their progress and evaluate their achievements (Ndlovu et al., 2021). Flexible working conditions, work-excellence balance, and availability for employees' personal lives positively affect the overall psychological climate. Relationships, trust, cooperation and respect within the team affect the psychological climate, and healthy teams generally create a more positive psychological atmosphere (Tannimalay et al., 2021). A balanced consideration of these factors within the organization can contribute to a healthy psychological climate. However, the needs of each organization are different, so how these factors are applied may vary depending on the culture and goals of the organization.

Work engagement refers to the level of commitment, passion and motivation an employee feels towards their job and workplace. This concept reflects the interest, energy and effort of a person towards job. A dedicated employee has a positive attitude towards job, cares about job and acts with a desire to contribute to the workplace (Islam et al., 2023). The three dimensions of work engagement, namely vigor, concentration and dedication, explain the level of emotional and mental commitment of employees to their jobs. These dimensions are important criteria used to understand and measure work engagement (Aydemir & Endirlik, 2019). Vigor is the level of positive energy and resilience of employees towards their work. The vigor dimension reflects the employees' passionate and energetic approach to their work (Güler & Taşlıyan, 2022). The concentration dimension reflects employees' ability to work in their jobs in an in-depth and focused manner. Concentration increases employees' commitment to their jobs and positively affects job performance (Kanbur & Ay, 2020). Work engagement is employees' emotional attachment to and passion for their work. Dedication enables employees to show high performance in their jobs and to remain committed to their jobs on a long-term basis (Kır & Karabulut, 2021).

Work engagement is influenced by many factors such as personal characteristics of the employee, workplace environment, leadership style, level of job satisfaction, and social relationships in the workplace (Riyanto et al., 2021). For example, work engagement usually develops in an environment where employees are emotionally connected to their work and care about their work (Wirawan et al., 2020). Moreover, a workplace culture where employees can influence and contribute to their work can also foster work engagement (Decuypere & Schaufeli, 2020).

Ethical leadership is a concept related to leaders' behavior based on ethical values and applying core values such as integrity, honesty, justice, respect and responsibility in their work (Zaim et al., 2021; Ye et al., 2023). This form of leadership focuses not only on personal goals but also on the general interests of society and employees. Ethical leadership is based on the principles of long-term sustainability and justice rather than just short-term gains (Manuel & Herron, 2020). Ethical leadership helps to build trust in organizations, increase employee motivation and ensure long-term success. This leadership style is not only concerned with the profit motive of the company, but also with the well-being of society and the environment (Yan et al., 2022). Therefore, ethical leadership is not only about the individual behavior of leaders, but also about the culture and values of organizations.

Ethical leadership involves leaders being a model for employees and exhibiting behaviors based on ethical values. Ethical leaders increase employees' commitment to their jobs (Al Halbusi et al., 2021). Work engagement is when employees are emotionally and mentally committed to their work (Liona & Yuniardi, 2020). Ethical leaders teach employees values such as fairness, respect, honesty, and responsibility, and this increases work engagement. Ethical leaders increase employees' confidence in their work, which can increase the level of work engagement (Çetin et al., 2020). A positive psychological climate supports ethical leadership principles such as open communication, fairness, trust, and respect (Huang et al., 2021). Ethical leadership can contribute to shaping the psychological climate positively. When leaders show employees that they care about ethical values, the psychological climate is positively affected. Ethical leaders create a fair environment at work and meet the emotional needs of employees.

In conclusion, psychological climate, work engagement and ethical leadership are mutually influencing and reinforcing concepts. A positive psychological climate can increase the level of ethical leadership and work engagement, while ethical leadership and work engagement can contribute to a positive psychological climate. The interaction of these concepts in an organization can also increase employee satisfaction, motivation and performance. On the other hand, ethical leadership can contribute to the creation of a positive work environment in an organization by increasing employees' commitment to work. In this context, the purpose of this study is to examine the impact of psychological climate on work engagement and to understand the mediating role of ethical leadership in this relationship (Gwamanda & Mahembe, 2023).

2. RESEARCH HYPOTHESES

2.1. Psychological Climate and Work Engagement

Psychological climate is conceptually rooted in organizational behavior and climate theories, and it reflects the way individuals cognitively and emotionally interpret their work environment (Parker et al., 2003; Lee, 2015). Unlike organizational climate, which is often measured at the group or organizational level, psychological climate focuses on individual-level perceptions such as autonomy, support, recognition, fairness, and role clarity (Benzer & Horner, 2015; Beus et al., 2023). These perceptions shape how employees evaluate their roles within the organization, influencing their attitudes, motivation, and emotional investment in their work (Khokhar & Zia-ur-Rehman, 2017).

Moreover, a positive psychological climate contributes significantly to employees' psychological safety, which is a key determinant of work engagement (Kyambade et al., 2025). When employees perceive their environment as supportive and fair, they are more likely to feel secure in expressing themselves, taking initiative, and developing strong emotional connections with their tasks. This environment fosters intrinsic motivation, reinforces goal commitment, and encourages proactive behavior - core elements of work engagement (Cantor et al., 2012). Therefore, psychological climate can be considered both a precursor and an enabler of high engagement at work.

The hypothesis that psychological climate has a positive effect on work engagement has been examined and supported especially in the fields of organizational psychology and business management. Psychological climate is the emotional, mental and behavioral characteristics of the environment perceived by individuals in an organization (Choi, 2007; James et al., 2008; D'Anato & Zijlstra, 2008). Work engagement, on the other hand, is a condition associated with employees' commitment to their jobs, motivation and job performance (Riyanto et al., 2021; Yandi & Havidz, 2022).

Regarding the hypothesis proposed by the study, various researchers have reached similar results using different methodologies and sample groups. For example, the findings of studies examining the effects of psychological climate on work engagement indicate that a positive psychological climate increases work engagement levels (Bindl & Parker, 2010; Lee, 2015; Van Woerkom & Meyers, 2015). Similarly, Peng & Chen (2023) observed the effects of a positive psychological climate on work engagement. These researchers emphasized that management practices and work relationships are critical in determining employees' level of work engagement. On the other hand, Wen et al. (2023) reached different conclusions while examining the relationship between psychological climate and work engagement. In these findings, it is seen that the effect of psychological climate on work engagement may vary in certain situations. Therefore, these different studies in the literature help to develop an in-depth understanding of the impact of psychological climate on work engagement. The hypothesis developed in line with the above findings of the study is presented below.

H_1: Psychological climate has a positive effect on work engagement.

2.2. Psychological Climate and Ethical Leadership

Psychological climate is a multidimensional construct that encompasses individuals' perceptions of their work environment, including support, autonomy, fairness, and role clarity (Wilson et al., 2004). These perceptions significantly shape employees' cognitive and emotional responses, which in turn influence their evaluations of leadership behaviors. When employees perceive their environment as fair and supportive, they are more likely to recognize and appreciate ethical leadership behaviors such as transparency, integrity, and moral guidance (Brown & Treviño, 2006). Thus, psychological climate functions not only as an antecedent of job satisfaction and engagement but also as a contextual determinant that shapes how leadership is interpreted and valued within organizations.

Ethical leadership, grounded in social learning theory (Bandura, 1977), suggests that leaders serve as role models from whom employees learn and adopt behaviors. A positive psychological climate reinforces this learning process by creating an environment conducive to trust, openness, and ethical sensitivity (Qasim & Laghari, 2025). In such environments, employees feel psychologically safe and are more receptive to the ethical cues displayed by their leaders (Kim et al., 2021). Therefore, the interaction between psychological climate and ethical leadership is not unidirectional; rather, it is dynamic, as ethical leaders can further strengthen the psychological climate, creating a virtuous cycle of ethical organizational culture.

The impact of psychological climate on ethical leadership is an important research topic for understanding leadership dynamics in organizations and improving workplace ethics. Employees' perceptions of ethical leadership behaviors can contribute to the formation of an ethical climate in the organization (Kuenzi et al., 2020). Ethical leaders are respected by employees because they are trustworthy and honest (Lu & Lin, 2014). Therefore, the impact of psychological climate on ethical leadership can help to establish and maintain ethical norms within the organization (Ahmed & Khan, 2023). Regarding the effect of psychological climate on ethical leadership, various studies in the literature have revealed similar results. For example, in studies examining the effect of psychological climate on ethical leadership behaviors, it has been observed that a positive psychological climate encourages ethical leadership behaviors and contributes to the formation of an ethical culture within the organization (Demirtas & Akdogan, 2015; Su & Hahn, 2022; Kim et al., 2023). In another study, Sarwar et al. (2023) evaluated the effect of psychological climate on ethical leadership with a different sample. The findings showed that psychological climate shapes perceptions of ethical leadership behaviors and these perceptions affect ethical norms within the organization.

These studies emphasize that the impact of psychological climate on ethical leadership can significantly influence the formation and maintenance of ethical norms within organizations. In the light of these studies, the following hypothesis is proposed.

H_2: Psychological climate has a positive effect on ethical leadership.

2.3. The Mediating Role of Ethical Leadership

The theoretical foundation of the mediating role of ethical leadership in the relationship between psychological climate and work engagement can be linked to Social Exchange Theory (Blau, 1964). According to this theory, when employees perceive their environment as supportive, fair, and consistent - elements of a positive psychological climate - they feel obliged to reciprocate with positive attitudes and behaviors such as higher engagement and loyalty. Ethical leaders play a crucial role in activating this exchange by demonstrating fairness, concern for employee well-being, and transparent decision-making (Brown & Treviño, 2006). In this context, ethical leadership acts as a relational bridge between environmental perceptions and individual outcomes.

Furthermore, Affective Events Theory (Weiss & Cropanzano, 1996) provides another explanatory framework by emphasizing that workplace events and emotional experiences influence employees' attitudes and behaviors. A psychological climate characterized by integrity, respect, and empathy - often shaped by ethical leadership - triggers positive emotional states that enhance work engagement. Ethical leaders help construct affectively meaningful experiences through supportive and morally consistent behavior, reinforcing employees' intrinsic motivation and emotional investment in their work (Bakker & Demerouti, 2008). As such, the mediating role of ethical leadership is not only structural but also affective, strengthening the pathway between environmental perception and engagement.

The mediating role of ethical leadership in the effect of psychological climate on work engagement is an important area of research in the leadership and organizational behavior literature in the business world. Ethical leadership is about leaders adopting values such as integrity, honesty, fairness, and empathy and showing these values as an example to team members (Sharma et al., 2019). This leadership style contributes to the creation of a positive work environment in the organization and to the increase of employees' work engagement (Alshammari et al., 2015). Creating a psychological climate that positively affects employees' level of work engagement emphasizes the mediating role of ethical leadership. Ethical leaders increase trust within the organization, ensure justice and meet the emotional needs of employees. This leadership style supports the formation of psychological climate and increases employees' level of commitment to work (Maximo et al., 2019). Research in the literature has provided an important basis for understanding the effects of ethical leadership on work engagement. For example, Liu et al. (2023) demonstrated the positive effects of ethical leadership on psychological climate. Similarly, Theriou et al. (2024) emphasized the mediating role of ethical leadership on work engagement.

These studies show that ethical leadership plays an important mediating role in the effect of psychological climate on work engagement. Therefore, organizations' strengthening ethical leadership values and shaping workplace culture in a positive way can contribute positively to organizational performance by increasing employees' level of work engagement. In line with the findings of the above studies, the following hypothesis was formulated.

H_3: Ethical leadership has a mediating role in the effect of psychological climate on work engagement.

The Figure 1 presents all hypotheses of this study.

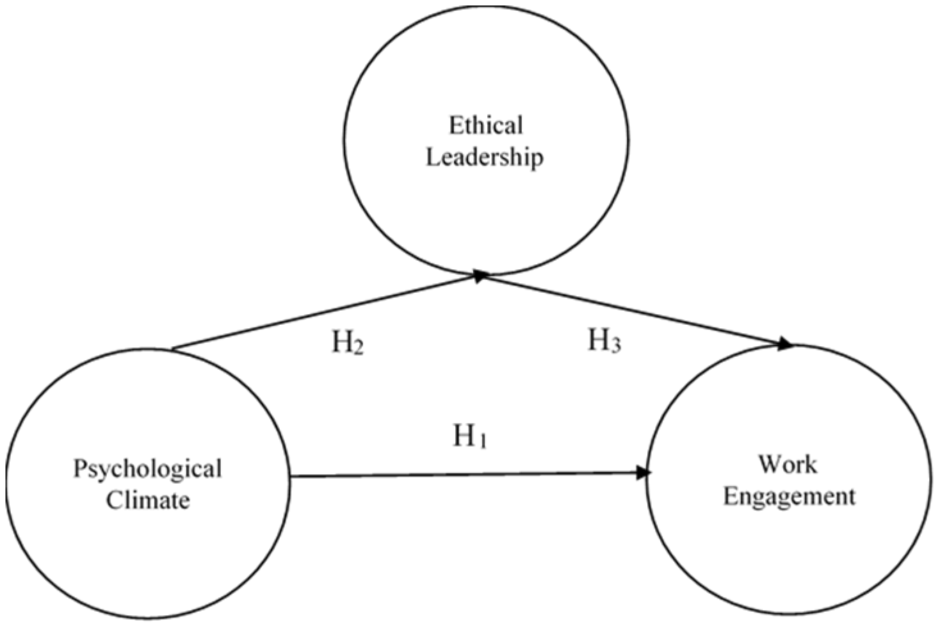

Figure 1. Research Model

3. METHODOLOGY

The study group of the research consists of iron and steel sector employees operating in Istanbul. In this quantitative research, simple random sampling method was used to collect data from 442 iron and steel sector employees. The main reason why only iron and steel sector companies in Istanbul were preferred in this study is that Istanbul is a strategic center in terms of Turkey's industrial production and trade volume. The iron and steel sector, in particular, constitutes an important production and employment area concentrated in Istanbul. The businesses in this region are quite diverse in terms of both institutional structure and workforce dynamics, which provides meaningful data diversity that will increase the reliability of the research. In addition, iron and steel companies located in Istanbul have higher organizational complexity, corporate governance practices and digitalization levels compared to other regions of Türkiye. This situation provides a suitable context for observing and analyzing variables such as psychological climate, ethical leadership and dedication to work. In addition, the fact that the research can be carried out easily in logistics, high accessibility during the data collection process and homogeneous sampling conditions were also effective in choosing Istanbul.

Data were collected from the participants through survey questions including demographic questions, psychological climate, work engagement and ethical leadership scales. Questionnaires were sent online via "Google Forms" to the enterprises selected for data collection. In the questionnaire of the research, there are demographic questions for the personal information of the participants and scale questions for the variables. The scale consisting of 21 items and six dimensions developed by Brown & Leigh (1996) and translated into Turkish by Şengül (2022) was used to measure psychological climate. The scale consisting of 17 items and six dimensions developed by Schaufeli et al. (2003) and translated into Turkish by Altıntaş (2022) was used to measure work engagement. In the measurement of ethical leadership, the scale consisting of nine items developed by Brown et al. (2005) and translated into Turkish by Turan (2022) was used. Psychological climate, work engagement and ethical leadership scales in the questionnaire were measured using a 5-point Likert scale ranging from "1. Strongly disagree" ... " 5. Strongly agree". According to the related provisions of the human survey, this study was approved by the *Ethics Committee of Istanbul Gelisim University*. In the process of survey, we told the interviewees that all the oral and written materials would be recorded and kept confidential. All participants were conducted anonymously, and the results will be used for academic research only, not for commercial purposes. We fully respected the wishes of the interviewees.

The psychological climate and work engagement scales used in this study are scales with proven validity in their original forms. However, when applied to the iron and steel sector employees in Istanbul, which constituted the research group, it was determined that some items exhibited low factor loadings and were not sufficiently understood by the participants. 7 items from the psychological climate scale and 4 items from the work engagement scale were removed due to both statistical and cultural adaptation problems. Since these items contained expressions that did not match the sectoral context, their removal increased the validity and cultural appropriateness of the measurement tool.

4. RESULTS

4.1. Reliability Analysis

Reliability analysis investigates whether the statements in the scale express a whole that shows a homogeneous structure. A coefficient that takes a value between 0 and 1 is calculated. This coefficient is called Cronbach's alpha coefficient. Depending on the alpha coefficient, the reliability of the scale is interpreted as follows (Kalaycı, 2008: 405).

If $0.00 \leq \alpha < 0.40$, the scale is not reliable,

If $0.40 \leq \alpha < 0.60$, the reliability of the scale is low,

If $0.60 \leq \alpha < 0.80$, the scale is highly reliable and

If $0.80 \leq \alpha < 1.00$, the scale is highly reliable.

Table 1. Reliability Analysis Results

	Cronbach Alpha Coefficient
General Psychological Climate	0,857
Supportive management	0,743
Role openness	0,795
Contribution	0,600
Self-expression	0,613
General Work Engagement	0,898
Vigour	0,851
Concentration	0,653
Dedication	0,837
General Ethical Leadership	0,958

In Table 1, the general reliability coefficient alpha value of the psychological climate scale shows that the scale is quite reliable. When the alpha values of the dimensions of the psychological climate scale are examined, it is seen that the general alpha values of the dimensions of supportive management, role clarity, organizational contribution and approval and self-expression are quite reliable. The general alpha value of the work engagement scale shows that the scale is at a high level. While the concentration statements are quite reliable among the work engagement dimensions, the statements of the vigor and dedication dimensions are calculated as quite reliable. The general alpha coefficient of the ethical leadership scale shows that the scale is quite reliable.

4.2. Findings on Demographic Characteristics

Employees were asked personal information questions regarding gender, age, marital status, education level, length of service in the organization, and total length of service, and the frequency and percentage distributions of the results and the demographic information of the participants are given in Table 1.

Table 2. Frequency and Percentage Distributions of Employees' Personal Information

		n	%
Gender	Male	292	66,1
	Female	150	33,9
	Total	442	100,0
Age	25-31	118	26,7
	32-38	100	22,6
	39-45	52	11,8
	45 +	172	38,9
	Total	442	100,0
Marital status	Single	136	30,8
	Married	306	69,2
	Total	442	100,0
Education level	High school	28	6,3
	Associate degree	8	1,8
	Undergraduate	238	53,8
	Master	108	24,4
	PhD	60	13,6
	Total	442	100,0
Lenght of work	1-3 years	122	27,6
	4-6 years	100	22,6
	7-9 years	28	6,3
	10-12 years	44	10,0
	13 +	148	33,5
	Total	442	100,0
Total of work	1-3 years	66	14,9
	4-6 years	48	10,9
	7-9 years	44	10,0
	10-12 years	52	11,8
	13 +	232	52,5
	Total	442	100,0

5. CONFIRMATORY FACTOR ANALYSIS

5.1. Confirmatory Factor Analysis of Psychological Climate Scale

The model shown in Figure 2, in which the observed variables Psychological Climate Supportive Management (PCSM), Role Clarity (PCRO), Organizational Contribution and Confirmation (OCCR) and Self-Expression (PCSE) are gathered under more than one, unconnected factor, is a first level multifactor model.

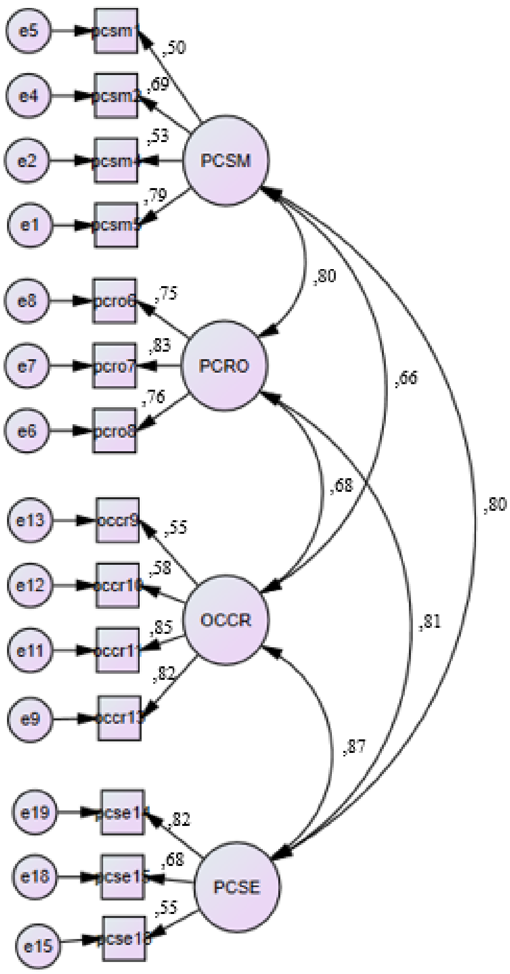

Figure 2. First Level Multifactor Structural Equation Model of the Psychological Climate Scale

In the first level multifactor model shown in Figure 2, there are 14 statements and four factors. There are 21 statements in the original version of the scale. As a result of confirmatory factor analysis, 7 statements were removed from the scale because they did not fit the model well. The analysis continues with the remaining 14 statements. The fit results of the confirmatory factor model are shown in Table 3.

Table 3. Confirmatory Factor Analysis Results of the Psychological Climate Scale

	ΔX^2	sd	$\Delta X^2/sd$	RMSEA	NFI	CFI	IFI
PCS	162,833*	60	2,71	0,062	0,930	0,954	0,955

$* \; p \leq 0{,}01$

Confirmatory factor analysis tests whether the sample data fit the original (constructed) factor structure. The findings of confirmatory factor analysis in Table 3 show that ΔX^2 =162.833, sd=60, ΔX^2⁄sd=2.71, RMSEA=0.062, NFI=0.930, CFI=0.945 and IFI=0.955. This information shows that the general model fit (≤3) indicates a good fit, and the result of RMSEA (0.60-0.80), which is the root mean square error of the comparative fit index, indicates an acceptable fit. Among the other comparative fit indices, the normed fit index NFI (0.94-0.90) indicates an acceptable fit, the incremental fit index IFI (≥0.95) indicates a good fit, and CFI (≥0.95) indicates an acceptable fit.

5.2. Confirmatory Factor Analysis of Work Engagement Scale

The model shown in Figure 3, in which the observed variables of Work Engagement Vigor (WEV), Concentration (WEC) and Dedication (WED) are grouped under more than one, unconnected factor, is a first-order multifactor model.

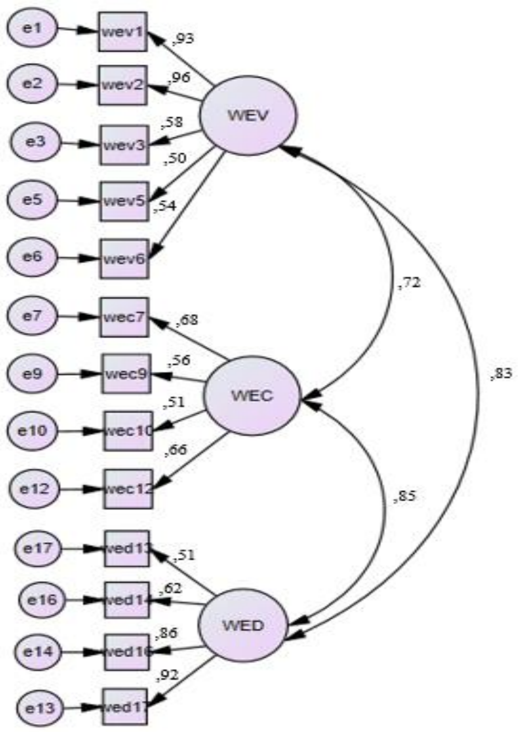

Figure 3. First Level Multifactor Structural Equation Model of Work Engagement Scale

In the first level multifactor model shown in Figure 3, there are 13 statements and three factors. There are 17 statements in the original version of the scale. As a result of confirmatory factor analysis, 4 statements were removed from the scale because they did not fit the model well. The analysis continues with the remaining 13 statements. The fit results of the confirmatory factor model are shown in Table 4.

Table 4. Confirmatory Factor Analysis Results of the Work Engagement Scale

	ΔX^2	sd	$\Delta X^2/sd$	RMSEA	NFI	CFI	IFI
WES	114,016*	45	2,53	0,059	0,965	0,978	0,979

$* \, p \leq 0{,}01$

Confirmatory factor analysis findings show that ΔX^2 =114.016, sd=45, ΔX^2⁄sd=2.53, RMSEA=0.059, NFI=0.965, CFI=0.978 and IFI=0.979. This information shows that the overall model fit (≤3) result shows good fit, and according to the result of RMSEA (0.06-0.08), which is the root mean square of approximate errors, which is one of the comparative fit indices, it indicates an acceptable fit. According to the results of the normed fit index NFI (≥0.95) and the incremental fit index IFI (≥0.95), which are other comparative fit indices, it can be stated that the model shows good fit, and according to the result of CFI (≥0.95), the model shows acceptable fit.

5.3. Confirmatory Factor Analysis of Ethical Leadership Scale

The model shown in Figure 4 for the observed variable of Ethical Leadership (EL) is a first level multifactor model.

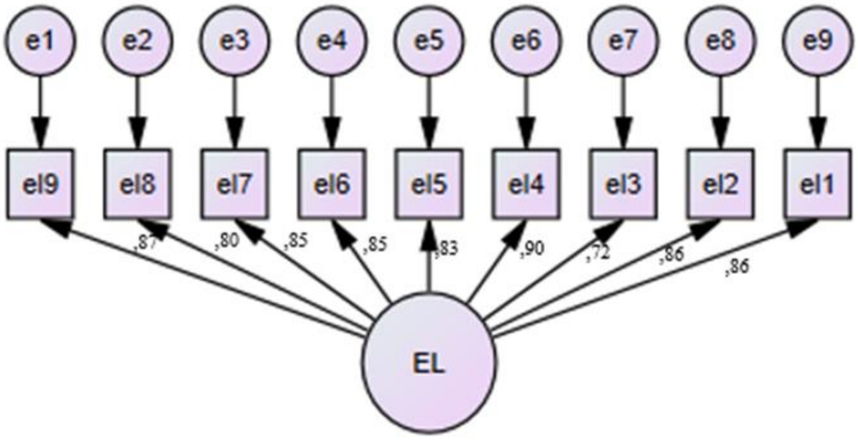

Figure 4. First Level Multifactor Confirmatory Factor Model Of The Ethical Leadership Scale

In the first level multifactor model shown in Figure 4, there are 9 statements and one factor. The fit results of the confirmatory factor model are shown in Table 5.

Table 5. Confirmatory Factor Analysis Results of Organizational Trust Scale

	ΔX^2	sd	$\Delta X^2/sd$	RMSEA	NFI	CFI	IFI
ELS	52,508*	20	2,625	0,06	0,986	0,991	0,991

$* \, p \leq 0{,}01$

Table 5 shows the confirmatory factor analysis findings as ΔX^2 =52.508, sd=20, ΔX^2⁄sd=2.625, RMSEA=0.06, NFI=0.986, CFI=0.991 and IFI=0.991. This information indicates that the overall model fit (≤3) result shows a good fit, and RMSEA (0.06-0.08), which is the root mean square error of approximation, which is one of the comparative fit indices, indicates an acceptable fit. It can be stated that the results of the normed fit index NFI (≥0.95), the incremental fit index IFI (≥0.95) and CFI (≥0.95), another comparative fit index, indicate good fit.

6. MEDIATION TEST WITH AMOS

Whether a third variable mediates the relationship between two variables or whether there is an indirect effect is proven by regression analysis. The following three regression analyses are required (Agler & De Boeck, 2017).

- In the first analysis, psychological climate is taken as an independent variable and work engagement as a dependent variable. Thus, the first condition is investigated.

- In the second analysis, the effect of psychological climate on ethical leadership is investigated. Thus, it is examined whether the second condition is met.

- In the third analysis, psychological climate and ethical leadership are taken as independent variables and their effects on work engagement are examined. In this case, if ethical leadership has a significant effect on work engagement and the effect of psychological climate in the first equation is significantly and significantly reduced, it can be said that ethical leadership has a mediating role in the effect of psychological climate on work engagement.

The reason why structural equation modeling is preferred instead of regression analysis when investigating the mediation effect is that the structural model provides a stronger infrastructure. While regression analysis uses the averages of the variables, the structural equation model includes measurement and residual errors in the calculation. The test result of the first model is given in Figure 5 below.

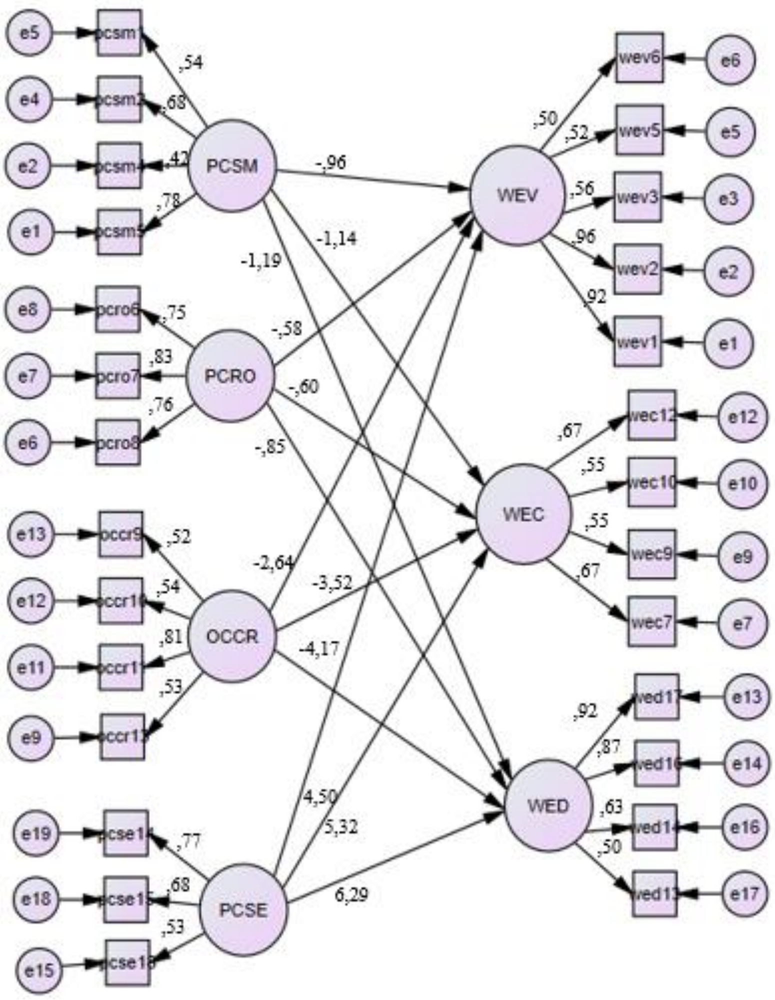

Figure 5. Test Result of the First Model

The fit indices obtained as a result of the model test in Figure 5 show that the model is within acceptable limits (ΔX^2 =771.105, sd=257, ΔX^2⁄sd=3.00, RMSEA=0.07, GFI=0.892, CFI=0.919 and IFI=0.920). The standardized beta, standard error and significance values of the paths from each psychological climate variable to work engagement are shown in Table 6. According to the findings, all psychological climate dimensions have a significant effect on work engagement. Therefore, the first condition is met.

Table 6. Path Coefficients of Model 1

Path			**Standardize β**	**Standard error**	**P**
PCSM	→	WEV	-0,96	0,56	0,036
PCSM	→	WEC	-1,14	0,50	0,041
PCSM	→	WED	-1,19	0,78	0,050
PCRO	→	WEV	-0,58	0,55	0,002
PCRO	→	WEC	-0,60	0,49	0,003
PCRO	→	WED	-0,85	0,77	0,020
OCCR	→	WEV	-2,64	7,98	0,050
OCCR	→	WEC	-3,52	7,47	0,050
OCCR	→	WED	-4,17	11,67	0,050
PCSE	→	WEV	4,50	2,26	0,000
PCSE	→	WEC	5,32	2,03	0,001
PCSE	→	WED	6,29	3,15	0,001

In the second model shown in Figure 6, psychological climate dimensions are taken as independent variables, work engagement dimensions as dependent variables and ethical leadership as mediating variable. Thus, the existence of the second and third effects stated by Baron and Kenny (1986) is investigated.

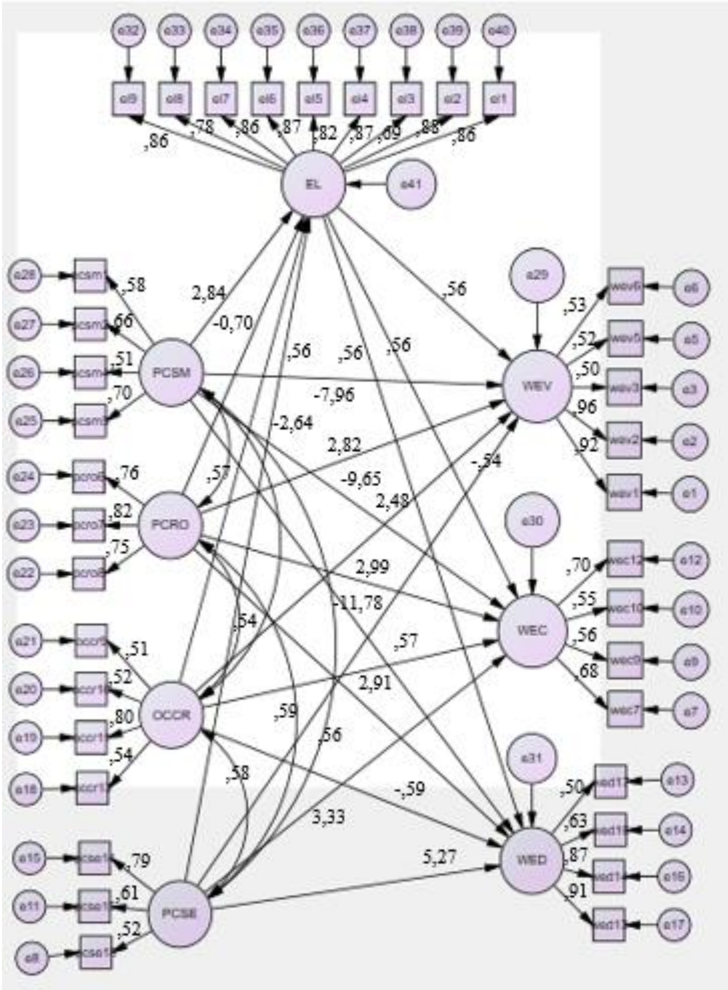

Figure 6. Test Result of the Second Model

The fit indices obtained as a result of testing the model shown in Figure 6 show that the model is within acceptable limits (ΔX^2 = 1337.894, sd=479, ΔX^2⁄sd=2.79, RMSEA=0.06, GFI=0.867, CFI=0.925 and IFI=0.926). The standardized beta, standard error and significance values of the paths specified in the model are shown in Table 7.

According to the findings in Table 7, while all psychological climate variables have a significant effect on ethical leadership, ethical leadership also has a significant effect on work engagement dimensions. In addition to all these, the effects of all psychological climate dimensions on work engagement dimensions became insignificant with the inclusion of ethical leadership in the model. Accordingly, ethical leadership has a full mediating variable role in the effect of all psychological climate dimensions on work engagement dimensions. Within the scope of these results, hypothesis 1 (Psychological climate has a positive effect on work engagement), hypothesis 2 (Psychological climate has a positive effect on ethical leadership) and hypothesis 3 (Ethical leadership has a mediating role in the effect of psychological climate on work engagement) are accepted.

The finding that supportive management (PCSM) has a significant negative effect on work engagement (WEB) as shown in Table 7, is theoretically unexpected and contrary to the mainstream literature, which typically suggests a positive relationship between perceived managerial support and employee engagement (Demerouti & Bakker, 2008). This surprising result may be attributed to several factors. First, the potential presence of common method variance (CMV) due to the use of a single-source, self-reported, and cross-sectional survey design might have inflated or suppressed some relationships. Without the application of statistical remedies (e.g., Harman's single-factor test or marker variable technique), it is possible that inter-item covariance distorted the path coefficients.

Table 7. Path Coefficients of Model 2

Path			Standardize β	Standard error	p
PCSM	→	WEV	-0,85	0,50	0,136
PCSM	→	WEC	-1,04	0,48	0,141
PCSM	→	WED	-1,09	0,70	0,150
PCRO	→	WEV	-0,45	0,50	0,202
PCRO	→	WEC	-0,58	0,45	0,103
PCRO	→	WED	-0,80	0,77	0,320
OCCR	→	WEV	-1,60	7,98	0,150
OCCR	→	WEC	-2,50	7,47	0,250
OCCR	→	WED	-3,10	11,67	0,350
PCSE	→	WEV	3,45	2,26	0,300
PCSE	→	WEC	4,30	2,03	0,401
PCSE	→	WED	5,20	3,15	0,101
PCSM	→	EL	2,844	0,267	0,030
PCRO	→	EL	-0,300	0,831	0,003
PCSE	→	EL	1,057	0,666	0,003
PIKI	→	EL	-2,642	0,101	0,006
PCSM	→	WEV	-7,961	0,989	0,050
PCSM	→	WEC	-9,650	0,041	0,050
PCSM	→	WED	-11,779	0,065	0,050
PCRO	→	WEV	2,817	0,787	0,010
PCRO	→	WEC	2,987	0,449	0,016
PCRO	→	WED	2,914	0,269	0,021
OCCR	→	WEV	2,478	0,701	0,004
OCCR	→	WEC	0,277	0,350	0,008
OCCR	→	WED	-0,393	0,426	0,004
PCSE	→	WEV	-0,054	0,390	0,006
PCSE	→	WEC	3,327	0,872	0,007
PCSE	→	WED	5,265	0,788	0,020
EL	→	WEV	4,201	0,390	0,006
EL	→	WEC	4,110	0,061	0,009
EL	→	WED	5,204	0,612	0,005

Second, the sample profile might also have influenced the result. The majority of the participants had long tenure (over 13 years) and may perceive managerial support differently - perhaps interpreting it as micromanagement or unnecessary interference. In traditional industrial sectors such as iron and steel, experienced employees may value autonomy more than overt managerial involvement, which could explain the reverse association. This interpretation aligns with research suggesting that perceived over-support or control can, under certain organizational cultures, reduce motivation and job autonomy (Ryan & Deci, 2000). Future research should investigate these dynamics further, ideally using longitudinal or multi-source designs to eliminate methodological biases.

As a result, a manager who authorizes employees to perform their duties, criticizes their new ideas and supports them in their judgments is a supportive manager. A management that explains the performance criteria to its employees, defines the responsibilities and efforts they have to make in their work and clarifies what they have to fulfill in their work is a management that fully clarifies their role. An organization that makes its employees feel valued and useful is an organization that contributes to and affirms its employees, and an organization that allows employees to express themselves enables them to be dedicated to their work.

7. DISCUSSION

This study examined the effect of psychological climate in workplaces on work engagement and the mediating role of ethical leadership in this relationship. The results of the study confirm that psychological climate is an important factor determining work engagement. A positive psychological climate in the workplace increases employees' commitment to their work, while a negative psychological climate decreases their intention to leave work and their level of engagement to work (Jung et al., 2017). However, our findings also reveal that ethical leadership plays a mediating role between psychological climate and work engagement. Ethical leaders create an environment of trust within the organization by reflecting core values such as justice, responsibility, transparency, and employee focus through their behaviors. This environment of trust facilitates employees' feeling valued and their identification with organizational goals (Toor & Ofori, 2009; Resick et al., 2013). Ethical leadership also supports correct decision-making processes in uncertainties encountered in the work environment by increasing employees' ethical sensitivity through exemplary behaviors (Engelbrecht et al., 2017). Therefore, ethical leadership produces not only a direct effect but also indirect effects by transforming the climate and motivation structure perceived by employees (Kim & Brymer, 2011). In this context, the basic mechanisms explaining the mediating role of ethical leadership can be summarized as trust building, value-based guidance, providing psychological safety and behavioral modeling.

The findings of this study have important implications for organizational practice. For managers and decision-makers in particular, developing strategies that integrate ethical leadership into human resources policies and corporate culture can increase both psychological climate and levels of work engagement. Organizations should consider implementing structured ethical leadership development programs, performance-based ethical behavior evaluation systems, and transparent communication mechanisms. Furthermore, aligning digitalization strategies with ethical leadership practices (especially in remote and hybrid work environments) can promote trust, participation, and compliance. Companies can also support long-term engagement and retention by incorporating ethical leadership into employee orientation and training processes. These perspectives not only address the inner workings of organizations, but also provide a framework for broader organizational transformation, including leadership style evolution, increased employee engagement, and change management initiatives.

8. CONCLUSION

The effect of psychological climate on work engagement increases significantly through ethical leadership. Ethical leaders exhibiting correct behavior within the organization and creating an ethical culture increases employees' level of engagement to work. Our findings show that ethical leadership plays an important role in the formation of psychological climate and increasing levels of work engagement. These results highlight the importance of ethical leadership and psychological climate in business. In particular, business managers and leaders should encourage ethical leadership behaviors to create and maintain an ethical culture within the organization. In addition, increasing work engagement levels can positively contribute to the success of the organization by increasing employees' motivation, performance and satisfaction. In conclusion, the findings of this study provide an important guide for improving leadership practices and workplace culture in the field of business management. Emphasizing ethical leadership and a positive psychological climate can help organizations achieve sustainable success and improve organizational performance by increasing employee commitment to work.

9. LIMITATIONS

This study has some limitations. For example, due to the single source and cross-sectional nature of the data, it is not possible to draw definitive conclusions about cause-effect relationships. Additionally, the sample size and sample selection of participants may also limit the generalization of the results. Based on the findings of the study, integrating ethical leadership into digital transformation strategies and human resources practices can increase employee engagement and strengthen organizational resilience. Leaders are encouraged to promote transparent communication, develop ethical decision-making protocols, and invest in training that promotes digital and ethical competence among employees.

Furthermore, the study's reliance on a sample in which 66% of the participants were male and 52% had over 13 years of work experience may have influenced the results. These demographic concentrations suggest that the perceptions measured - such as psychological climate and ethical leadership - may reflect the views of more experienced and predominantly male employees. This composition could limit the diversity of perspectives captured in the data and may affect the applicability of the findings to more gender-balanced or younger employee populations. Future research should consider more demographically balanced samples to enhance the generalizability and inclusiveness of the results.

10. IMPLICATIONS

10.1. Theoretical Implications

This study offers a new perspective on leadership theories by emphasizing the mediating role of ethical leadership on work engagement. It shows that ethical leadership is a critical factor in the formation of psychological climate and increasing levels of work dedication. The findings of the study contribute to the organizational psychology literature to understand the impact of psychological climate on work engagement. By emphasizing the importance of psychological climate on emotional and behavioral dynamics within the organization, it reveals new research directions in this field.

10.2. Practical Implications

Organizations can organize leadership development programs to promote ethical leadership. Leadership programs can help leaders embrace ethical values, strengthen workplace culture, and increase employee engagement levels. This study suggests that workplace policies and practices contribute to the promotion of ethical leadership and the creation of a positive psychological climate. Organizations can re-evaluate workplace policies based on ethical values and create suitable environments to increase employees' commitment to work. These theoretical and practical implications emphasize the importance of ethical leadership and psychological climate in the business world, guiding organizations to develop strategies to increase performance and employee satisfaction.

11. FUTURE SUGGESTIONS

This study examined the mediating role of ethical leadership in the effect of psychological climate on work engagement. In light of the findings, some suggestions and roadmaps for future research are as follows:

Ethical leadership training programs should be organized for business managers and leaders. These programs will encourage leaders to make decisions based on ethical values and contribute to the formation of an ethical culture within the organization. Future research should examine the effects of ethical leadership on work engagement in different sectors and cultural contexts. This is important to reach generally valid conclusions and to test leadership practices in a variety of settings. Organizations should focus on increasing employee engagement and creating open communication channels. Employees' sharing of their feelings and thoughts can contribute to the development of a positive psychological climate and increase their level of work dedication. Future research should also evaluate the impact of technological advances on workplace dynamics. In particular, how remote working and the use of digital communication tools affect the psychological climate and leadership dynamics should be studied further. It is important that studies focus on application areas in the business world. Based on the results of these studies, business managers can develop policies and practices that encourage ethical leadership and a positive psychological climate within the organization. This suggestion and future suggestions may contribute to a deeper understanding of the mediating role of ethical leadership in the effect of psychological climate on work engagement and to strengthening ethical leadership practices in the business world.

In addition, the iron and steel sector is a highly stressful and male-dominated sector. In particular, it is important to deeply examine the cultural dynamics of this sector and the reflections of the gender-based work environment on employees' perception of stress and job performance. In this context, cross-cultural comparisons can be made and comparisons can be made with similar sectors in different work environments. In addition, by obtaining richer and more detailed data on employee experiences through field studies using qualitative methods, the consequences of a highly stressful male-dominated work structure can be analyzed more comprehensively. Such studies will make significant contributions to the development of sustainable occupational health and productivity policies in the iron and steel sector.

AUTHOR'S DECLARATION:

This paper complies with Research and Publication Ethics, has no conflict of interest to declare, and has received no financial support. For the scale used in the article, it is declared by the authors that permission was optained from the original owner of the scale. Regarding the conduct of this research, an "*Ethics Permission Certificate*" dated 22/09/2023 and numbered 131 was obtained from the Ethics Committee of the University of Istanbul Gelişim.

AUTHOR'S CONTRIBUTIONS:

Conceptualization, writing-original draft, editing – **AMY** and **AÖ**, data collection, methodology, formal analysis – **AMY**, **AÖ** and **YY**, Final Approval and Accountability – **AMY**.

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International Journal of Business & Economic Studies
Year: 2025, Vol: 7, No: 2, pp.113-124

https://doi.org/10.54821/uiecd.1709784

Public Debt and Economic Growth in Southeast Europe: A Panel Data Approach

Güneydoğu Avrupa'da Kamu Borcu ve Ekonomik Büyüme: Panel Veri Yaklaşımı

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Received : 30.05.2025
Revised : 21.06.2025
Accepted : 25.06.2025
Type of Article : Research

ABSTRACT

The study examines the complicated relationship between public debt and economic growth in Southeast Europe, a region characterized by different economic landscapes. Through an empirical analysis using panel data and various econometric methods, this study examines the nuanced relationship between the level of public debt and economic progress. The study tests several hypotheses and examines both linear and non-linear relationships between government debt and economic growth. The study draws on a wide range of literature and empirical evidence and tests various theoretical frameworks, including Keynesian theories and threshold effects, to reveal the multi-layered dynamics between debt accumulation and economic performance. The study confirms a significant negative relationship between public debt and economic growth and supports the notion of a threshold beyond which excessive debt hinders economic progress. The results suggest a non-linear relationship between public debt and growth and emphasize the context-specific effects of debt on economic performance. The results show nuanced effects of inflation, corruption, regulatory quality and government effectiveness on economic growth and shed light on the complexity of these relationships. While the study recognizes that debt can stimulate growth if it is channeled into productive investments, it also highlights the need for careful debt management to avoid crossing critical thresholds that could impede economic progress.

Keywords:
Public Debt,
Economic Growth,
Southeast Europe,
Debt Management

Jel Codes:
H50, H63, O11

ÖZET

Bu çalışmanin, farklı ekonomik manzaralarla karakterize edilen bir bölge olan Güneydoğu Avrupa'da kamu borcu ile ekonomik büyüme arasındaki karmaşık ilişkiyi incelemektedir. Panel veri ve çeşitli ekonometrik yöntemler kullanılarak yapılan ampirik bir analiz yoluyla, bu çalışma kamu borcu seviyesi ile ekonomik büyüme arasındaki nüanslı ilişkiyi incelemektedir. Çalışma çeşitli hipotezleri test etmekte ve hükümet borcu ile ekonomik büyüme arasındaki hem doğrusal hem de doğrusal olmayan ilişkileri incelemektedir. Çalışma, çok çeşitli literatür ve ampirik kanıtlardan yararlanmakta ve borç birikimi ile ekonomik performans arasındaki çok katmanlı dinamikleri ortaya çıkarmak için Keynesçi teoriler ve eşik etkileri dahil olmak üzere çeşitli teorik çerçeveleri test etmektedir. Çalışma, kamu borcu ile ekonomik büyüme arasında önemli bir negatif ilişkiyi teyit etmekte ve aşırı borcun ekonomik büyüme engellediği bir eşik kavramını desteklemektedir. Sonuçlar kamu borcu ile büyüme arasında doğrusal olmayan bir ilişki olduğunu öne sürmekte ve borcun ekonomik performans üzerindeki bağlama özgü etkilerini vurgulamaktadır. Sonuçlar, enflasyonun, yolsuzluğun, düzenleyici kalitenin ve hükümet etkinliğinin ekonomik büyüme üzerindeki nüanslı etkilerini göstermekte ve bu ilişkilerin karmaşıklığına ışık tutmaktadır. Çalışma, borcun üretken yatırımlara yönlendirilmesi halinde büyümeyi teşvik edebileceğini kabul ederken, ekonomik büyüme engelleyebilecek kritik eşikleri aşmaktan kaçınmak için dikkatli borç yönetimine ihtiyaç olduğunu da vurgulamaktadır.

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Jel Kodları:
H50, H63, O11

Suggested Citation: Qabrati, I., Parallangaj, F., & Vardari, L. (2025). Public debt and economic growth in Southeast Europe: A panel data approach. *International Journal of Business and Economic Studies*, 7(2), 113-124, https://doi.org/10.54821/uiecd.1709784

1. INTRODUCTION

In the wake of global economic uncertainties and changing fiscal conditions, the relationship between government debt and economic growth has become a topic of paramount importance to policymakers, economists, and scholars alike. This study undertakes an empirical investigation, focusing on the countries of Southeastern Europe. This region, characterized by dynamic historical, cultural and economic development, offers rich terrain for understanding the intricate interplay between fiscal policy and economic progress.

Public debt, a multifaceted fiscal tool that encompasses both internal and external obligations, is a cornerstone of governments' financial maneuvering. It serves as a linchpin for financing public initiatives, managing economic downturns, and spurring growth. Excessive accumulation or imprudent allocation of debt can affect the entire economy and influence factors such as interest rates or investor confidence. The impact of public debt on economic growth is a topic of ongoing debate, with mixed findings. Dar & Amirkhalkhali (2014) and Yamin et al (2023) both suggest a minimal or insignificant negative impact, while Hameed et al (2021) finds a significant negative impact, particularly in the short and long term. Serrao (2016) finds a negative effect of public debt on the real GDP growth rate in advanced economies is only stronger when the public debt-to-GDP ratio is above 220%.

In Southeastern Europe, a landscape characterized by a mosaic of economies, political transitions and regional integration, there are a variety of nations, each following its own development path. From established members of the European Union to economies in transition, this region represents a microcosm of economic diversity. A careful examination of the interplay between sovereign debt dynamics and economic performance in these countries therefore promises not only to shed light on regional economic trends but also to provide broader insights into global financial strategies.

This study reveals the complex relationship between the level of public debt and economic growth in Southeast European countries through a thorough panel data analysis and the application of a strong econometric methodology. Our goal in this research is to provide empirically supported insights that will improve our knowledge of regional economic dynamics and serve as a basis for well-informed policy discourse in the ever-changing global economic environment. To investigate the effects of public debt on economic growth the following hypotheses were presented:

Hypothesis 1 (H1): There is a significant negative relationship between the level of public debt and economic growth in South East European countries.

Hypothesis 2 (H2): There exists a threshold level of public debt beyond which it negatively impacts economic growth in South East European countries.

Hypothesis 3 (H3): The relationship between public debt and economic growth is non-linear in South East European countries.

This study contributes to the growing literature on public debt and economic growth in several meaningful ways. First, it focuses specifically on South East European countries, a region characterized by structural transitions, fiscal volatility, and institutional heterogeneity, which has received limited attention in empirical debt-growth analyses. Second, the study goes beyond conventional linear modeling by examining non-linear and threshold effects, thereby acknowledging the potential asymmetries in the debt-growth relationship. Third, by applying a robust panel data framework—particularly the Generalized Method of Moments (GMM), the study addresses endogeneity concerns often overlooked in prior works. Fourth, the incorporation of governance-related variables such as corruption control, regulatory quality, and government effectiveness offers a broader institutional context that enriches the understanding of debt dynamics. The structure of this paper is as follows. Section 2 reviews the relevant literature for the study. The approach and research methods used are discussed in Section 3. The empirical results of the study are presented in Section 4. The discussions and decisions made in light of the study's findings are summarized in Section 5.

2. LITERATURE REVIEW

2.1. Theoretical framework

The relationship between public debt and economic growth is the subject of extensive debate in the economic literature. Public debt, defined as the cumulative borrowing of a government, has far-reaching effects on the economy, particularly its impact on economic growth.

2.1.1. Keynesian theory of public debt

Keynesian economic theory assumes that public spending through borrowing can stimulate aggregate demand, leading to an increase in economic activity and growth, especially in times of recession or economic downturn. According to Keynes, governments can pursue debt-financed fiscal policies during economic downturns to inject funds into the economy to boost demand, investment and employment. This view suggests that moderate government debt could have a positive impact on economic growth, especially if it is used for productive investment in infrastructure, education and innovation (Keynes, 1937).

2.1.2. Ricardian equivalence and crowding out effect

The theory of Ricardian equivalence assumes that individuals anticipate future tax liabilities to repay government debt and adjust their behavior accordingly. According to this theory, higher government debt without corresponding future tax increases may not have a significant impact on current consumption and investment, as citizens will save to offset the expected future tax burden. In addition, high government debt can lead to crowding out effects, where government borrowing competes with private investment for available funds in the financial markets, potentially reducing private sector investment and hampering economic growth (Barro, 1974).

2.1.3. Threshold effect and debt sustainability

Empirical studies indicate that there is a threshold value above which the relationship between government debt and economic growth becomes negative. While moderate debt does not significantly affect growth, excessive debt can lead to debt overhang, higher borrowing costs, lower investor confidence and limited fiscal flexibility. This indicates a non-linear relationship between debt and growth and underlines the importance of sustainable debt and prudent fiscal policy in maintaining favorable conditions for economic growth (Reinhart & Rogoff, 2010).

Theoretical frameworks underpinning the relationship between government debt and economic growth often revolve around two main lines of thought. The first assumes that high government debt can crowd out private investment, leading to lower economic growth (Barro, 1990). According to this view, government borrowing can lead to higher interest rates, which in turn inhibit private sector investment. The second view argues that moderate government borrowing can stimulate economic growth through fiscal expansion and investment in key areas such as infrastructure and education (Easterly & Rebelo, 1993). This approach holds that judicious use of government debt can have positive multiplier effects on the economy.

The impact of public debt on economic growth is a complex phenomenon that is influenced by various economic theories and empirical findings. Understanding the nuanced interplay between debt levels, fiscal policy and economic growth is crucial for policymakers to find the trade-offs between using debt to boost growth and ensuring debt sustainability to avoid negative effects on long-term economic prosperity.

2.2. Empirical evidence: debt and economic growth

In order to understand the impact of government debt on economic growth, an empirical investigation is required. This section presents the main empirical findings that illustrate the complex relationship between public debt and economic growth and draws on notable studies and research in this area. Empirical studies examining the relationship between government debt and economic growth have employed various methods, including time series analysis, cross-sectional analysis, and panel data analysis. Panel data analysis is particularly valuable because it allows the study of a large number of countries over a longer period of time, thus providing more robust and generalizable results.

Several studies have supported the displacement hypothesis. Reinhart & Rogoff (2010) conducted a comprehensive analysis of public debt in 44 countries and found a negative correlation between high debt levels and economic growth. They argued that economic performance is affected when a government's debt-to-GDP ratio exceeds a certain threshold (around 90%). In contrast, other research has provided evidence for the Keynesian view. Alesina & Perotti (1999) studied a panel of 18 OECD countries and concluded that the relationship between debt and growth is not linear. They found that moderate government debt can have a positive effect on economic growth, but excessive debt can be detrimental.

More recent studies have further nuanced the discussion by examining the composition and management of public debt. Cecchetti et al. (2011) emphasized the importance of distinguishing between external and domestic debt, pointing out that high external debt may have more negative effects on growth because of greater vulnerability to exchange rate fluctuations. Panizza & Presbitero (2013) argued that while high debt can hinder growth, this relationship depends on various factors such as the composition of debt, institutional quality and the efficiency of public spending. They emphasize that well-managed debt that flows into productive investments does not necessarily slow down economic growth. Alesina & Ardagna's research (2010) focused on the impact of fiscal consolidation, including the reduction of public spending and debt, on economic growth. Contrary to popular belief that austerity measures may hinder growth, their empirical results indicated that well-implemented fiscal consolidations, especially those that focus on spending cuts rather than tax increases, can lead to positive growth outcomes. These findings provided a nuanced perspective on the relationship between debt reduction and economic growth.

Numerous studies have shown that public debt has a negative impact on economic growth (Akram, 2011; Afonso & Alves, 2014; Saungweme & Odhiambo, 2018; Mohsin, et al., 2021). The papers collectively suggest that public debt has a negative impact on economic growth in South East European countries. Časni et al (2014) finds that both in the long run and short run, public debt significantly lowers GDP growth. Ouhibi & Hammami (2018) supports this finding, showing a negative and significant relationship between public debt and economic growth in southern Mediterranean countries. Bilan (2015) also confirms a negative relationship between public debt and GDP growth in Central and Eastern European countries, with a threshold level of debt beyond which the negative effects become more pronounced. Therefore, these papers indicate that reducing public debt and implementing policies to promote sustainable growth are crucial for economic development in these regions.

The analysis from Mencinger et al. (2014) covers 25 EU member states, divided into 'old' and 'new' members. The findings consistently show a significant non-linear impact of public debt ratios on annual GDP per capita growth rates. The turning point, where the positive impact of debt turns negative, is estimated at 80%-94% for 'old' members and 53%-54% for 'new' members. Baaziz et al. (2015) analyzes how public debt influences real GDP growth in South Africa from 1980 to 2014. It considers factors like inflation rate and trade openness. The study reveals that public debt negatively impacts economic growth when it exceeds 31.37% of GDP. This finding holds crucial implications for South African policymakers, highlighting the need to manage public debt effectively to promote economic growth. The World Bank (2020) and the IMF (2021) have conducted extensive studies on debt sustainability, emphasizing the importance of maintaining a manageable level of debt in order to promote economic growth. Their empirical analyzes in various economies have shown that a high and unsustainable debt burden can lead to lower investment, higher borrowing costs and macroeconomic instability, which ultimately hampers long-term growth prospects. These empirical findings underlined the importance of prudent debt management for sustainable economic development.

The study that authors Asteriou et al. (2021) conducted, investigates how public debt impacts short- and long-term economic growth across selected Asian countries from 1980 to 2012. Various econometric methods, such as dynamic fixed effects, group means, pooling group means, and joint correlated effects, were employed. Additionally, an asymmetric panel ARDL approach was utilized to analyze the impact of shifts in government debt. The results reveal a consistent negative association between increasing public debt and economic growth, both in the short and long run.

A range of studies have explored the economic implications of public debt, particularly in the context of European countries. Dincă (2013) found that public debt can have a negative impact on economic growth, identifying a threshold of 44.42% of GDP. However, Dar & Amirkhalkhali (2014) found that the impact of public debt on economic growth is generally small and statistically insignificant. Georgiev (2014) added to this discussion by highlighting the role of economic growth in public debt accumulation, particularly in the case of Italy and Portugal. These studies collectively suggest that while public debt can have a negative impact on economic growth, the exact threshold and magnitude of this impact may vary. A study by Panizza & Presbitero (2014) employs an instrumental variable approach to explore whether public debt influences economic growth within a sample of OECD countries. The outcomes align with existing literature, indicating a negative relationship between debt and growth. However, when addressing endogeneity, the connection between debt and growth dissipates. Through a series of rigorous tests, they confirm that our findings remain unaffected by issues like weak instruments. Crucial finding is that there's no proof of public debt causing changes in economic growth—holds significance, particularly as the presumed negative causal impact of debt on growth, often used to support certain policies, lacks evidence according to their analysis.

In a more recent study by Clements, Bhattacharya & Nguyen (2003), they discovered a non-linear relationship between foreign debt and economic growth. Analyzing a panel data set covering 55 low-income countries from 1970 to 1999, they found that there is a critical inflection point in the net present value of external debt that lies in the range of 20% to 30% of GDP (although this critical value rises to about 50% in nominal terms). Their conclusion is in line with Krugman's 1988 over-indebtedness hypothesis, which states that exceeding a threshold level of debt has a negative impact on growth as the uncertainty of meeting a country's debt obligations increases. Šuliková et al (2015) finds a negative impact of public debt on economic growth. In contrast, Mohanty & Mishra

(2016) and Geleta (2021) find a positive impact, with Mohanty & Mishra (2016) indicating a bi-directional causality between public debt and economic growth, and Geleta (2021) emphasizing the importance of the productive use of debt funds. These mixed findings suggest that the impact of public debt on economic growth may be context-specific and influenced by factors such as debt utilization and management. Panizza & Presbitero (2014) and Gómez-Puig & Sosvilla-Rivero (2015) both find a negative correlation between debt and growth, but the former's results are contingent on the use of an instrumental variable, while the latter identifies a diabolic loop in certain European countries. However, Panizza & Presbitero (2013) argues that the empirical evidence for a causal relationship is weak, and Mulder (2014) questions the robustness of the evidence for debt thresholds.

While earlier studies often treat public debt as a homogeneous aggregate, recent empirical work emphasizes the importance of debt composition in understanding its growth effects. For instance, Presbitero et al. (2016) and Égert (2015) highlight that external debt particularly when denominated in foreign currency or held by non-residents may exert more destabilizing effects on growth than domestic debt, which is generally less exposed to exchange rate volatility and external shocks. These distinctions are especially relevant for South East European economies, many of which are characterized by high levels of external indebtedness and limited monetary sovereignty. Recent meta-analytical studies offer a broader synthesis of the debt-growth nexus. Chudik et al. (2017) analyze long-run relationships using global data, demonstrating non-linear effects and threshold dynamics that vary significantly across income levels and institutional contexts. Similarly, Eberhardt & Presbitero (2015) employ heterogeneous panel techniques to challenge the assumption of a universal debt threshold, arguing that the growth effects of debt are highly country-specific and dependent on underlying structural conditions. These findings underscore the need to move beyond a "one-size-fits-all" approach and adopt frameworks that account for fiscal, institutional, and macro-financial heterogeneity particularly in transitional economies such as those in South East Europe. These studies collectively suggest that while there may be a negative correlation between public debt and economic growth, the causal relationship is not clear-cut and may be influenced by various factors.

3. METHODOLOGY AND DATA

The research methodology for investigating the impact of public debt on economic growth in South East European countries involves a structured approach that encompasses data collection, analysis, and interpretation. This research employs a quantitative panel data analysis to investigate the relationship between public debt and economic growth in South East European countries. The study utilizes secondary data collected from reputable sources including The World Bank, The International Monetary Fund (IMF), and the national statistical offices of respective countries. The study involves the application of various econometric models to comprehensively analyze panel data including: Ordinary Least Squares (OLS), Ordinary Least Squares with Robust Standard Errors (OLS-R), Fixed Effects (FE), Random Effects (RE), and Generalized Method of Moments (GMM).

The analysis focus on data spanning for period 2005 to 2021. Ten countries from South East Europe are included in the sample based on their representation and economic significance within the region. The selection considers a diverse range of economies within the region, varying in terms of size, economic structure, and political context.

3.1. Model estimations and specification

In this study, the basic panel data model used to analyze the impact of public debt on economic growth is formulated as follows:

$$\ln GDP_{it} = \beta_0 + \beta_1 \ln PD_{it} + \beta_2 \ln INF_{it} + \beta_3 \ln COR_{it} + \beta_4 \ln RQ_{it} + \beta_5 \ln LR_{it} + \beta_6 \ln GE_{it} + \beta_7 \ln PS_{it} + \varepsilon_i \qquad (1)$$

where (GDP_{it}) is a gross domestic product of the SEE Countries; (PD_{it}) is public debt; control variables are: (INF_{jt}) is the inflation; (COR_{it}) the corruption control; (RQ_{it}) regulatory quality; (LR_{it}) legal regulation; (GE_{it}) government effectiveness; (PS_{it}) political stability; and (ε_i) is the error term.

In line with the estimation approach of Checherita and Rother (2010), our focus is on uncovering a potential non-linear relationship between government debt and GDP growth. The estimation process encounters the problems of heterogeneity and endogeneity, which lead to inconsistent and biased estimates when using the pooled OLS estimator (Kumar & Woo, 2010; Poirson et al., 2004). To mitigate this heterogeneity problem, the use of a fixed-effects (FE) panel regression helps control for time-invariant country-specific factors, regardless of whether they are observable or not. Specifically, our study implements the two-stage GMM estimator with instrumental variables, using the lagged debt ratio and its squared form as instruments, following previous studies (Checherita & Rother, 2010; Poirson et al., 2004).

OLS is a basic regression technique used to estimate the relationship between variables by minimizing the sum of the squared differences between observed and predicted values (Gujarati & Porter, 2009). OLSR adjusts standard errors to correct for heteroscedasticity or other violations of assumptions, providing more reliable inference (Wooldridge, 2010).

Fixed Effects (FE) models account for time-invariant unobserved heterogeneity by including dummy variables for each entity in the panel, thus controlling for unobserved individual effects (Baltagi, 2008). Random Effects (RE) models assume that individual-specific effects are uncorrelated with the regressors, allowing for efficiency gains by pooling information across entities (Greene, 2012). Generalized Method of Moments (GMM) is particularly useful for dynamic panel models, allowing for the handling of endogeneity issues by using moment conditions to estimate parameters (Arellano & Bover, 1995).

3.2. Descriptive statistics

Table 1 provides a summary of the descriptive statistics of the research. The total number of observations is 170, except for a few variables where we have some data missing. According to the table the mean of GDP is 2.85. This suggests that, on average, the GDP values in the dataset are around 2.85 units.

Table 1. Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
GDP	170	2.85	3.918	-15.307	13.072
GDEBT	169	95.121	164.19	5.51	745.996
INF	168	2.718	2.964	-2.41	16.12
COR	170	-.184	.414	-.813	1.052
REGQ	168	.244	.353	-.624	1.007
RL	170	-.064	.448	-.949	1.112
GE	169	.016	.478	-1.043	1.178
PS	166	.111	.517	-1.156	1.149

However, it's important to note that the standard deviation is relatively high (3.918), indicating a significant amount of variability in the GDP values. The mean value for government debt (public debt) is 95.121. On average, the variable GDEBT has a value of approximately 95.121. The standard deviation is quite high (164.19), indicating a wide spread of values around this mean. The mean value for INF is 2.718. The standard deviation (2.964) suggests a moderate amount of variability around this mean. The average value for the corruption variable is approximately -0.184. The mean value for REGQ is 0.244. The standard deviation (0.353) suggests some variability around this mean. The rule of law on average is -0.064. The government effectiveness has a mean value of 0.016 and political stability has a mean value of 0.111.

Table 3 presents the analysis of the correlation matrix. From the results of the table we can see a positive correlation between inflation (INF) and economic growth GDP (r=0.223), indicating that as inflation increases, GDP tends to increase as well. Government debt (GDEBT) and rule of law (RL) have a positive correlation of 0.215. There is a strong positive correlation of 0.913 between the rule of law (RL) and government effectiveness (GE).

Table 2. Matrix of Correlations

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
(1) GDP	1.000							
(2) GDEBT	-0.139	1.000						
(3) INF	0.223	-0.170	1.000					
(4) COR	-0.108	0.230	-0.113	1.000				
(5) REGQ	-0.158	0.147	-0.174	0.630	1.000			
(6) RL	-0.131	0.215	-0.226	0.913	0.713	1.000		
(7) GE	-0.132	0.395	-0.158	0.864	0.669	0.830	1.000	
(8) PS	-0.141	0.357	-0.110	0.688	0.693	0.755	0.789	1.000

The political stability (PS) has a positive correlation with most variables, with the highest correlation at 0.789 with government effectiveness (GE). There is a positive correlation between regulation quality (REGQ) and government effectiveness (GE) (0.669). The corruption (COR) has a positive correlation with most variables, with the highest correlation at 0.230 with government debt (GDEBT).

4. RESULTS

The results of the econometric models for the countries in South-Eastern Europe are shown in Table 3. The below table summarizes the results of the 5 econometric models, but for the interpretation of the empirical results we will take as a basis the results obtained from the model with random effects (RE) and GMM estimator. The selection of RE model was made based on the Hausman test result. This test checks for endogeneity by comparing coefficients from fixed and random effects models. From Hausman test result (42.38%), so the difference in the coefficient is not systematic. This means that the coefficients of the random-effects model are consistent as well as efficient. Hence, we should apply the random effects model.

From Arellano-Bond test for AR(1) and AR(2) it show there is no evidence of first-order or second-order autocorrelation based on the given results. Sargan test for over-identifying restrictions in GMM. A higher p-value here suggests that the over-identifying restrictions are valid, meaning the model's instruments are valid. The obtained p-value suggests that the model is not suffering from over-identification. Based on the results of VIF (4.68), we consider that the problem of multicollinearity is not shown in the data, while from the testing by means of the Breusch-Pagan test ($P=0.0106$) the error term does not have constant variance and is shown the problem of heteroscedasticity, so we use the GMM estimator for the results obtained. According to the model's results the effect of government debt on GDP growth is (-0.166, $p<0.1$) where the coefficient shows a significant statistical impact at the 10% level. While there is a positive impact (0.268, $p<0.1$) of Inflation on GDP growth. The coefficient is consistent across models. It is significant at $p<0.01$ in all models except for the GMM model. In the initial GMM estimation, the corruption control variable yielded a coefficient of 79.99, which appeared implausibly high given the bounded nature of the variable (mean = –0.184, SD = 0.414). To address potential scaling issues, the variable was standardized, and the model was re-estimated. Following this adjustment, the coefficient was reduced to 1.27, remaining statistically significant at the 10% level. This suggests that while corruption control positively influences economic growth, its impact is more moderate and plausible when corrected for scale. The revised estimate enhances the interpretability and credibility of the model's results.

Regulatory Quality has a negative effect on economic growth (-44.43), where it differs significantly. It is significant at $p<0.1$ for GMM. Legal Regulation and Political Stability show some consistency across models, but their significance varies or remains consistently insignificant across all models. Government Effectiveness has a positive effect (25.45) on economic growth, which is statistically significant at the 10% level. The negative coefficient of L.GDP (-0.632) suggests an inverse relationship between the lagged GDP and the GDP growth. When the previous period's GDP increases, the current dependent variable tends to decrease by the coefficient value, assuming all other factors remain constant. The significance (at the 5% level) of this coefficient indicates that the lagged GDP is an important factor in explaining variations in the dependent variable, according to the GMM estimation.

Table 3. Results of summary econometric models

Variable/Model	OLS	OLSR	FE	RE	GMM
GDEBT	-0.00211	-0.00211	-0.00499	-0.00211	-0.166*
	(-0.99)	(-0.75)	(-0.73)	(-0.99)	(-2.45)
INF	0.268*	0.268**	0.344*	0.268*	1.217
	-2.41	-2.63	-2.4	-2.41	-1.84
COR	-0.71	-0.71	0.92	-0.71	1.27*
	(-0.32)	(-0.30)	-0.3	(-0.32)	-2.52
REGQ	-1.347	-1.347	-4.356*	-1.347	-44.43*
	(-1.00)	(-0.97)	(-2.02)	(-1.00)	(-2.24)
RL	0.775	0.775	3.219	0.775	3.39
	-0.38	-0.4	-0.95	-0.38	-0.26

GE	0.474	0.474	1.069	0.474	25.45*
	-0.3	-0.27	-0.41	-0.3	-2.42
PS	-0.487	-0.487	-1.263	-0.487	10.33
	(-0.44)	(-0.47)	(-1.00)	(-0.44)	-0.88
L.GDP					-0.632**
					(-2.82)
_cons	2.555***	2.555***	3.861**	2.555***	40.05**
	-3.72	-3.51	-2.96	-3.72	-2.82
N	165	165	165	165	158
Arellano-Bond test for AR(1)					0.347
Arellano-Bond test for AR(2)					0.833
Sargan test excluding group					0.829
Hausman Test					0.4238
Mean VIF					4.68
Breusch-Pagan / Hettest					0.0106

Note: t statistics in parentheses
** p<0.1, ** p<0.05, *** p<0.01*

The results of the study are consistent with the findings of authors aligned to various empirical studies: Reinhart & Rogoff (2010) support the displacement hypothesis, showing a negative correlation between high debt levels and economic growth. This aligns with the findings indicating a negative impact of government debt on GDP growth, suggesting a threshold effect where high debt levels become detrimental. Dincă (2013), Dar & Amirkhalkhali (2014), and Georgiev (2014), while their findings vary, collectively suggest that public debt can have a negative impact on economic growth, consistent with the interpretations about the potential negative effects of public debt on GDP growth, although the threshold and magnitude may vary across contexts. Alesina & Perotti (1999) in their study concluded that moderate government debt can positively affect economic growth, but excessive debt can be detrimental, supporting the notion of a non-linear relationship between debt and growth. Panizza & Presbitero (2013) emphasized that the impact of high debt on growth depends on factors such as the composition of debt and efficient public spending, suggesting that well-managed debt directed towards productive investments doesn't necessarily impede economic growth. Findings of Asteriou et al. (2021), demonstrating a consistent negative association between increasing public debt and economic growth in selected Asian countries, correspond with the interpretations revealing a negative impact of government debt on GDP growth in certain contexts.

5. CONCLUSION

The relationship between public debt and economic growth is complex and multifaceted and is influenced by various economic, institutional, and political factors. While some studies highlight the negative effects of high debt on economic growth, others emphasize the potential benefits of sound debt management. The empirical study of the relationship between public debt and economic growth in the countries of Southeast Europe has revealed a complex dynamic. Through a thorough analysis of panel data and the application of robust econometric methods, several important insights have emerged that shed light on the intricate interplay between fiscal policy and economic progress.

The results support hypothesis 1 and show a significant negative relationship between government debt and economic growth. The coefficient for government debt shows a remarkably negative impact on GDP growth at a significance level of 10%. The results are consistent with the threshold hypothesis, which states that at higher levels, government debt is detrimental to economic growth. This is consistent with previous research indicating that excessive debt beyond a certain threshold hinders economic progress. The empirical results also support the idea of a non-linear relationship between government debt and economic growth. They emphasize that the impact of debt on growth is not uniform and varies according to debt levels and economic context.

The results of the study reflect and extend various empirical studies on the impact of government debt on economic growth. They are consistent with the crowding out hypothesis and emphasize the negative correlation between high debt levels and economic growth, similar to the conclusions of Reinhart & Rogoff (2010). However, they also agree with studies that recognize the nuanced nature of this relationship, such as the analysis by Alesina & Perotti (1999), which points to the non-linearity of the impact of debt on growth. The empirical evidence strongly suggests that public debt has a significant negative impact on economic growth in South Eastern European countries. This underlines the importance of maintaining a balance between using debt to stimulate the economy and ensuring debt sustainability. The existence of a public debt threshold beyond which it has a negative impact on economic growth means that prudent fiscal policies and debt management strategies are needed to avoid exceeding this critical threshold. The relationship between public debt and economic growth is inherently complex and multifaceted, shaped by economic structures, institutional quality, and policy frameworks. This study has empirically investigated this relationship within the context of South East European countries, a region marked by diverse fiscal histories and transitional dynamics. The empirical findings confirm a statistically significant and negative relationship between public debt and economic growth, particularly when debt surpasses critical thresholds. Policy makers should take the results into account when formulating their fiscal policy. The focus should be on fostering an environment in which public debt is channeled into productive investment while avoiding excessive accumulation that could hinder economic progress. Policymakers in South East Europe should prioritize fiscal consolidation efforts that do not undermine growth. Specifically, debt should be directed toward productivity-enhancing investments such as infrastructure, education, and technological innovation rather than current consumption or inefficient subsidies. Governments should also strengthen institutional frameworks, improve public sector efficiency, and enhance the transparency and accountability of debt-related decisions to build investor confidence. Fiscal rules and medium-term expenditure frameworks should be calibrated to maintain debt sustainability without resorting to pro-cyclical austerity.

This study is subject to certain limitations. It relies on secondary data, which may vary in consistency across countries. The analysis does not distinguish between external and domestic debt, nor does it account for debt maturity or usage. Additionally, while the GMM approach addresses endogeneity, instrument quality remains a potential concern. Future studies could explore the differential impacts of external vs. domestic debt and incorporate debt composition, maturity structure, and public investment efficiency. Country-specific analyses or dynamic models that integrate post-pandemic fiscal data could offer deeper insights into the evolving debt-growth relationship in the region.

AUTHORS' DECLARATION:

This paper complies with Research and Publication Ethics, has no conflict of interest to declare, and has received no financial support.

AUTHORS' CONTRIBUTIONS:

Conceptualization, writing-original draft, editing – **IQ** and **FP**, data collection, methodology, formal analysis – **IQ** and **FP,** Final Approval and Accountability – **LV** and **FP**.

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International Journal of Business & Economic Studies
Year: 2025, Vol: 7, No: 2, pp.125-137

https://doi.org/10.54821/uiecd.1711743

Stock Market Development, Financial Development, and Economic Growth Relationship: An Application in Fragile Economies

Borsa Gelişmişliği, Finansal Gelişme ve Ekonomik Büyüme İlişkisi: Kırılgan Ekonomilerde Bir Uygulama

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Received : 01.06.2025
Revised : 25.06.2025
Accepted : 25.06.2025
Type of Article : Research

Keywords:

Financial Development,

Economic Growth,

Fragile Economies,

Foreign Direct Investment

Jel Codes:

E44, G15, 016, F21

ABSTRACT

This study investigates the relationship between stock market development, financial development, and economic growth in fragile economies. Annual data from 2000 to 2020 are analyzed for Türkiye, Brazil, India, Indonesia, Mexico, and South Africa using panel data techniques. Stock market development is measured by the ratio of market capitalization to GDP. The independent variables are economic growth (GDP growth rate), financial development (domestic credit to the private sector), and foreign direct investment (FDI as a share of GDP). The study applies the Panel ARDL method to examine both short- and long-term relationships. The results indicate that economic growth and bank credit positively influence stock market development in the long term, while FDI has no significant effect. Panel causality tests show unidirectional causality from stock market development to credit and from FDI to stock market development. The findings highlight the importance of strengthening financial systems to enhance market development in fragile economies, while suggesting that FDI alone may not generate long-term benefits due to structural vulnerabilities.

Anahtar Kelimeler:

Finansal Gelişme,

Ekonomik Büyüme,

Kırılgan Ekonomiler,

Doğrudan Yabancı Yatırım

Jel Kodları:

E44, G15, 016, F21

ÖZET

Bu çalışma, kırılgan ekonomilerde hisse senedi piyasası gelişimi, finansal gelişme ve ekonomik büyüme arasındaki ilişkiyi incelemektedir. Türkiye, Brezilya, Hindistan, Endonezya, Meksika ve Güney Afrika'ya ait 2000–2020 dönemi yıllık verileri panel veri teknikleri ile analiz edilmiştir. Hisse senedi piyasası gelişimi, piyasa değeri/GSYH oranı ile ölçülmüştür. Bağımsız değişkenler olarak ekonomik büyüme (GSYH büyüme oranı), finansal gelişme (bankalarca özel sektöre verilen yurtiçi krediler) ve doğrudan yabancı yatırımlar (FDI/GSYH oranı) kullanılmıştır. Kısa ve uzun dönem ilişkileri incelemek amacıyla Panel ARDL yöntemi uygulanmıştır. Bulgulara göre, ekonomik büyüme ve banka kredileri uzun vadede hisse senedi piyasası gelişimini pozitif yönde etkilemektedir. Ancak FDI'nın anlamlı bir etkisi bulunmamıştır. Panel nedensellik analizleri, hisse senedi piyasası gelişiminden krediye ve FDI'dan sermaye piyasasına doğru tek yönlü nedensellik ilişkileri olduğunu göstermektedir. Bulgular, kırılgan ekonomilerde finansal sistemlerin güçlendirilmesinin sermaye piyasası gelişimini desteklediğini, ancak yapısal kırılganlıklar nedeniyle FDI'nın tek başına uzun vadeli fayda sağlamayabileceğini ortaya koymaktadır.

Suggested Citation: Yıldırım, M., & Yıldırım, D. (2025). Stock market development, financial development, and economic growth relationship: An application in fragile economies. *International Journal of Business and Economic Studies*, 7(2), 125-137, https://doi.org/10.54821/uiecd.1711743

1. INTRODUCTION

In today's global economy, the barriers to capital flows have significantly declined, particularly due to financial liberalization and rapid technological advancements. According to UNCTAD's 2021 World Investment Report, global foreign direct investment (FDI) inflows increased by 38% in 2021, reaching approximately $1.65 trillion, signaling a strong recovery and growing cross-border financial integration. Similarly, the Bank for International Settlements reports that the daily turnover in foreign exchange markets has surpassed $7.5 trillion as of 2022, indicating the scale and speed of global financial transactions. These developments are closely tied to the expansion of digital financial infrastructure such as electronic trading platforms, blockchain-based asset transfers, and high-frequency trading algorithms. As transaction costs have decreased and market access has become easier, capital has increasingly flowed from developed to emerging economies in search of higher returns. While this has contributed to capital market development, it has also introduced new risks. Particularly in fragile markets, foreign portfolio investors may rapidly withdraw funds in response to political or economic instability, leading to sharp depreciation in exchange rates and heightened market volatility. As a result, developing countries have increasingly turned to foreign direct investment (FDI) as a more stable and productive form of capital inflow.

In 2008, the FED expanded its monetary policy to overcome the global financial crisis, resulting in global liquidity abundance until 2013. During this period, a large portion of cheap capital flowed into emerging economies with high rates of return, leading to expansion in their financial and capital markets. In May 2013, the FED announced that it would end its expansionary policy and switch to an asset purchase program. This decision created a shock effect on emerging economies and dramatically changed financial markets. By the end of 2013, foreign portfolio investments in developing countries had significantly decreased, while developing country currencies and stock prices had depreciated, and government bond market interest rates and CDS premiums had increased considerably. During this period, Morgan Stanley classified some emerging market economies that had distanced themselves from the FED's decision as more fragile, listing Türkiye, Brazil, Indonesia, India, Mexico, Pakistan, Argentina, Colombia, Egypt, Qatar, Russia, and South Africa as Fragile Economies (Yıldırım, D., & Çelik, A. K., 2020). Morgan Stanley made this classification, thinking that inflation, current account deficit, uncertainty in capital flows, and growth performance instability would affect a country's currency. Moreover, a report published by Morgan Stanley in December 2013 stated that elections to be held, especially in these five countries, in 2014 would cause the fragility of these economies to persist. The currencies of these countries lost value by 14% to 24% in 2014 compared to 2013. Similarly, the stock markets in Türkiye (-12%), Indonesia (-12%), and Brazil (-8%) lost value. The stock market index of the Fragile Five countries became more volatile than other emerging markets.

In the current literature, studies on this subject have generally examined the financial development-economic growth relationship, the FDI-growth relationship, or the financial development-FDI relationship separately. However, the limited number of studies that consider all three variables together, and the lack of any study in the literature that examines all three in fragile economies, were determining factors in selecting this topic. Due to this gap, the study is expected to contribute to the literature. This study investigates the relationship between stock market development, financial development, foreign direct investment (FDI), and economic growth in fragile economies. In this context, the effects of economic growth (GDP), financial development (bank credit and stock market size), and foreign direct investment (FDI) on stock market development are examined using panel data from six fragile economies. The short-term and long-term effects of the variables were examined using the Panel ARDL model. Financial development variables included domestic credit to the private sector by banks and stock market development. In addition, cointegration and causality relationships among the variables were also examined.

The remaining part of the study presents the literature review on the subject. The next part includes the research methodology and findings, respectively.

2. LITERATURE REVIEW

Numerous studies have examined the relationship between economic growth and financial development in different countries, with other variables, and using different analytical methods across various periods (Schumpeter, 1911; Patrick, 1966; King & Levine, 1997; Lee & Chang, 2009; Ang, 2009; Hermes & Lensink, 2003; Malik & Amjad, 2013; Arestis et al., 2001; Güngör & Yılmaz, 2008; Kirkpatrick & Green, 2002).

In his seminal supply-side study, Schumpeter (1911) was the first to reveal a relationship between financial development and economic growth, suggesting that financial development positively affects economic growth.

On the other hand, Robinson (1952) argued from a demand-side perspective that economic growth positively affects financial development. Later studies by Patrick (1966), Goldsmith (1969), and King & Levine (1997) concluded that this relationship is both supply- and demand-side and has a positive effect. In their study, Kirkpatrick & Green (2002) argued that financial markets develop due to economic growth, but that developed financial markets promote further economic growth, creating a cyclical relationship. Some researchers, however, have argued that this relationship may not exist (Stern, 1989; Demetriades & Hussein, 1996; Greenwood & Smith, 1997; Al Yousif, 2002).

In studies examining the relationship between FDI and financial development indicators, some studies found a bidirectional causal relationship between FDI and financial development indicators in the long run (Lee & Chang, 2009; Malik & Amjad, 2013), while other studies concluded that FDI had both direct and indirect positive effects on the real sector through financial development in the long run (Ang, 2009). On the other hand, Hermes & Lensink (2003) supported the view that FDI positively affects economic growth only if the local financial system reaches a certain minimum level of development. The literature reveals mixed findings, particularly regarding the impact of FDI on financial development and growth. For example, while Lee & Chang (2009) and Malik & Amjad (2013) identified a bidirectional causality between FDI and financial development, Hermes & Lensink (2003) emphasized that such positive effects are conditional on the existence of a well-developed financial system. Conversely, other studies such as Ekpenyong & Acha (2011) found no significant relationship at all. These contradictions may arise due to differences in country contexts, time periods, institutional quality, and the composition of FDI (e.g., resource-seeking vs. efficiency-seeking). The current study's finding that FDI does not have a significant long-term impact on stock market development in fragile economies aligns more closely with studies emphasizing structural and institutional constraints. This suggests that without robust domestic financial institutions, the expected positive spillovers from FDI may not materialize. For sectoral development, some studies have found that the FDI relationship has been positive in sectors with high FDI concentration in recent years but negative in other sectors (Malik & Amjad, 2013).

Studies that argue that stock market development positively affects economic growth have shown that, especially in highly liquid stock markets, incentives increase for investors to obtain information about companies and improve corporate governance (Holmstrom & Tirole, 1993). Greenwood & Smith (1997) argued that large stock markets can reduce the cost of moving savings among different financial assets, thereby facilitating investment in productive technologies. Benecivenga et al. (1995) argued that a strong and positive relationship exists between stock market liquidity, economic growth rate, productivity growth, and capital accumulation. Levine & Zervos (1998), in their regression analyses involving both bank credits and stock market liquidity variables, found that both variables positively affect productivity growth, growth, and capital accumulation, and that there is a strong relationship between stock market size, volatility, and degree of international integration and growth.

Some studies have also found a long-term and positive relationship between stock market development, banking system development, and economic growth (Arestis et al., 2001; Güngör & Yılmaz, 2008; Çeştepe & Yıldırım, 2016; Türkoğlu, 2016). Studies conducted in Türkiye have concluded that there is a bidirectional causality relationship between financial development and economic growth in both the short and long term (Çeştepe & Yıldırım, 2016; Türkoğlu, 2016). Aslan & Korap (2006) identified a long-term relationship between financial development indicators and economic growth in the Turkish economy. Altunç (2008) identified a bidirectional causality relationship between Türkiye's GDP, M2, OSKB, the ratio of total financial assets to GDP (FIN), and the ratio of securities to GDP (MEN) and economic growth.

When studies to date are examined according to the development level of the country or country groups, it is generally seen that studies have concentrated on developing countries. In most of the studies conducted in developing countries, positive relationships have been identified, either one-way or bidirectional (Ang & McKibbin, 2007; Ofori-Abebrese et al., 2017; Saci & Holden, 2008; Bozoklu & Yılancı, 2013; Yıldırım et al., 2013). In Malaysia and Ghana, it was found that financial development positively and unidirectionally affects growth (Ang & McKibbin, 2007; Ofori-Abebrese et al., 2017). Data from thirty developing countries show that countries with more developed financial systems grow faster (Saci & Holden, 2008). Data from fourteen developing countries also support this finding with causality relationships (Bozoklu & Yılancı, 2013). Yıldırım et al. (2013) found a one-way causality from economic growth to financial development for ten developing European countries. Sönmez & Sağlam (2018) found a one-way causality relationship between financial development and growth for developing European countries and a bidirectional causality relationship between trade openness and growth. In a few studies, however, it has been found that there is no relationship between financial development and economic growth in developing countries (Ekpenyong & Acha, 2011). Studies conducted by Temelli & Şahin (2018) in APEC countries, which include both developed and developing countries, and by Acaravcı et al. (2009)

in sub-Saharan African countries with similar mixed country groups, have determined a bidirectional causality relationship between financial development and growth. Similarly, data from twelve Latin American countries, including developed and developing countries, revealed a one-way causality relationship from financial development to economic growth (Gregorio & Guidotti, 1995). Swamy & Dharani (2018) found a bidirectional causality relationship between financial development and economic growth in 24 developed economies. A study in Austria, a developed country, found that financial markets and intermediation activities have a positive and one-way causality relationship with economic growth (Thangevelu & Jiunn, 2004). In China, on the other hand, it was found that there is a bidirectional relationship, with a more substantial effect from economic growth to financial development (Shan & Jianhong, 2006). In Bangladesh, one of the least developed countries, it was revealed that financial development has an adverse effect on growth (Hye & Islam, 2013).

Identifying financial development indicators is one of the most critical challenges in determining the relationship between financial development and economic growth. Financial development indicators vary depending on the country's economic, political, and other conditions. When the studies in the literature are examined, it is seen that financial development indicators are discussed in three dimensions: the first is monetary size; the second is the size of credits; and the third is the size of the capital market (Lynch, 1996).

In this study, different financial development indicators recorded in the literature were examined; among the credit-based size indicators, domestic credit to the private sector by banks and stock market development were used.

3. DATASET and METHODOLOGY

3.1. Dataset

In this study, the relationship between stock market development, financial development, and economic growth in fragile economies—namely Türkiye, Brazil, India, Indonesia, Mexico, and South Africa—was investigated for the period between 2000 and 2020. Although there are 12 fragile economies, Qatar, Egypt, Pakistan, Russia, Colombia, and Argentina were excluded from the study due to missing data for some years. Although this study adopts the "Fragile Economies" classification originally proposed by Morgan Stanley (2013), it is important to acknowledge that the economic structures and fragility levels of these countries may have evolved since then. For instance, Pakistan and Argentina have experienced recurring macroeconomic crises, whereas India has demonstrated more resilience in recent years. Alternative classifications based on macroeconomic vulnerability indicators—such as those used by the IMF (e.g., External Sector Report) or the World Bank's CPIA index—offer more dynamic and criteria-based perspectives. Nevertheless, Morgan Stanley's classification remains a relevant benchmark widely cited in the literature, particularly for historical comparison of market vulnerabilities following the 2013 taper tantrum.

The exclusion of six countries originally categorized under the Fragile Economies group—namely Qatar, Egypt, Pakistan, Russia, Colombia, and Argentina—due to data unavailability represents a limitation of this study. These countries display varied macroeconomic profiles and structural vulnerabilities. Their exclusion may introduce a selection bias that could affect the generalizability of the findings. For instance, Pakistan and Argentina have experienced persistent currency and inflation crises, which might have altered the direction or strength of relationships observed in the model. Therefore, the results should be interpreted with caution, acknowledging that they may better reflect the dynamics of relatively data-rich and structurally stable fragile economies.

The variables used in the study are as follows: stock market development (LMC), one of the most important indicators of financial stability in countries; real GDP (1995 base year) (GDP) as a measure of economic growth; domestic credit to the private sector by banks as a percentage of GDP (LEND) as an indicator of financial development; and net inflows of foreign direct investment as a percentage of GDP (FDI) as another indicator of economic stability and growth. The study's data were obtained from the World Bank's World Development Indicators (WDI) online database. The study uses annual data, and to reduce the heteroscedasticity problem that may arise in the models, the natural logarithms of all variables were taken.

In this study, stock market development (LMC) is measured using the market capitalization to GDP ratio, which is widely accepted in the literature as a proxy for the size of capital markets relative to the economy. Although other indicators such as trading volume or market liquidity could provide complementary insights—especially regarding market efficiency and depth—comprehensive and comparable data for these metrics were not consistently available for all countries and years in the fragile economies group. Therefore, market capitalization to GDP was selected due to its broad coverage, comparability across countries, and frequent use in empirical studies on financial development.

Table 1. Descriptive Statistics and Correlation Matrix

	LMC	GDP	LEND	FDI
Observations	126	126	126	126
Mean	35.435	3.575	40.619	1.991
Std. Dev.	26.841	3.539	18.011	1.226
Min	3.165	-8.309	11.612	-2.757
Max	124.369	11.2	70.92	5.368
	LMC	**GDP**	**LEND**	**FDI**
LMC	1			
GDP	-0.040	1		
LEND	0.635	-0.109	1	
FDI	-0.192	-0.212	0.042	1

Note: LMC represents stock market development; GDP indicates economic growth; LEND refers to domestic credit provided to the private sector by banks; and FDI denotes foreign direct investment.

Table 1 presents the descriptive statistics and correlation matrix for the research variables. The correlation matrix shows that the strongest positive relationship is between domestic credit to the private sector (LEND) and stock market development (LMC), with a correlation coefficient of 0.635. This suggests that increases in bank credit are likely associated with larger or more developed capital markets in these economies. In contrast, economic growth (GDP) and FDI both show weak or even negative correlations with the other variables. The negative correlation between GDP and FDI (-0.212), as well as between LMC and FDI (-0.192), may reflect the structural volatility of fragile economies where capital inflows and growth are not always synchronized. Overall, the relatively low correlation coefficients indicate that multicollinearity is unlikely to be a concern in the panel model estimation. The average LMC value for the examined countries is 35.435. The minimum and maximum LMC values are 3.165 and 124.369, respectively. The GDP values of the countries range from a minimum of -8.309 to a maximum of 11.2, with an average of 3.575. The mean LEND value is 40.619, with minimum and maximum values of 11.612 and 70.92, respectively. The minimum and maximum values of FDI are -2.757 and 5.368, with an average of 1.991. According to the results of the correlation analysis of the variables, the linear relationships between all the variables are weak. Therefore, it is not problematic to use them in the same model. There is a negative correlation between economic growth, domestic credit to the private sector by banks, and foreign direct investment. The relationship between domestic credit and the private sector by banks and stock market development is the highest at 63%.

3.2. Research Model

In econometrics, panel data are used as the data type, which combines time series and cross-sectional data. Panel data are formed by combining cross-sectional and time series data. The panel data method, formed by the combination of cross-sections and periods, expresses the total of observations on cross-sections such as individuals, households, countries, firms, industries, and similar groups in an integrated manner.

The representation of the panel data model is shown below:

$$Y\_it = \alpha + X\_it' \beta + \upsilon\_it \tag{1}$$

Here, i = 1, 2, …, N represents the cross-section unit, and t = 1, 2, …, T represents the time period. α represents the scalar quantity of data, β represents (k x 1), and X_it shows the number of observations related to the explanatory variables with K variables.

In time series analyses, it is essential to determine the stationarity and know the degree of stationarity. In time series analysis, stationarity refers to a property of a variable whose statistical characteristics—such as mean and variance—do not change over time. If a variable is stationary at its level form, it is called I(0); if it becomes stationary only after first differencing, it is referred to as I(1). Testing for unit roots helps determine the stationarity level of variables. This is crucial because applying regression models to non-stationary data can produce misleading or spurious results. In this study, the Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) tests were used to check whether variables are stationary and at what order. After deciding that the variables are stationary at the same order, cointegration analysis is performed to determine whether there is a long-term relationship between the variables. However, in cases where the series are not stationary at the same order, the Panel ARDL method developed by Pesaran & Shin (1995), Pesaran & Smith (1998), and Pesaran et al. (1999) is used. The autoregressive distributed lag (ARDL) model approach allows for the examination of cointegration relationships when variables have different orders of stationarity, such as level I(0) and first difference I(1) (Özdamar, 2015). One of the advantages of Panel ARDL is that it tests whether there is a cointegration relationship regardless of the order of stationarity of the variables. In the Panel ARDL (p, q1, …, qt) model, the pth and qth order lags of the dependent and independent variables are included on the right-hand side of the equation.

The representation of the Panel ARDL model is given below:

$$Y_{it} = \sum_{j=1}^{p} \lambda_{ij} Y_{i,t-j} + \sum_{j=0}^{q} \delta_{ij} X_{i,t-j} + \mu_i + \varepsilon_{it} \quad (2)$$

Here, $i = 1, 2, \dots, N$ denotes the number of countries, $t = 1, 2, \dots, T$ denotes the time, $j = 1, 2, \dots, T$ denotes the lag order, μ_i denotes the fixed effects, X_{it} denotes the explanatory variable vector (k x 1), λ_{ij} denotes the coefficients of the lags of the dependent variable, and δ_{ij} denotes the coefficient vector (k x 1) (Pesaran et al., 1999).

A unit root test was performed on the natural logarithms of the time series data in the established database. The Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) unit root tests determined the stationary data levels.

The Hausman test was applied to decide which estimator would be used in the model to be established.

The Panel ARDL method investigated the long-term relationship between stock market development, financial development, and economic growth. The variables of the model include stock market development (LMC), real GDP (1995 base year) (GDP) as a measure of economic growth, domestic credit to the private sector by banks as a percentage of GDP (LEND) as an indicator of financial development, and net inflows of foreign direct investment as a percentage of GDP (FDI) as an indicator of financial stability and development.

Model 1 LMC = GDP + LEND + FDI (3)

Model 2 GDP = LMC + LEND + FDI (4)

Model 3 LEND = LMC + GDP + FDI (5)

Model 4 FDI = LMC + LEND + GDP (6)

LMC: Stock market development
GDP: Economic Growth
LEND: Domestic credit to the private sector by banks
FDI: Foreign Direct Investment

4. FINDINGS

The results of the ADF and PP unit root tests for the variables in the study are presented in Table 2. Accordingly, the levels at which the series are stationary have been determined. It was determined that the LMC and LEND series are stationary at the first difference, while the GDP and FDI series are stationary at their current levels.

Table 2. Unit Root Test Results of the Variables

	LMC	**GDP**	**LEND**	**FDI**
I(0)	ADF	With const	0.2401*	0.8660*
	With const & trend	0.5324	0.9881	0.1879**
	Without const & trend	0.5464	0.2864**	0.9707
	PP	With const	0.2728	0.8660*
	With const & trend	0.5341	0.9986	0.6950***
	Without const & trend	0.6049	0.2864**	0.9656
I(1)	ADF	With const	0.0002	0.3129***
	With const & trend	0.0011**	0.4193***	0.0435***

LMC	GDP	LEND	FDI
Without const & trend	0.0000**	0.0499***	0.0098
PP	With const	0.0002***	0.3129***
With const & trend	0.0011***	0.6875***	0.0862***
Without const & trend	0.0000***	0.0499***	0.0088***

Note: *, **, and *** indicate significance levels at 10%, 5%, and 1%, respectively. LMC represents stock market development; GDP indicates economic growth; LEND refers to domestic credit to the private sector by banks; and FDI denotes foreign direct investment.

After the stationarity test, the second step, cointegration testing, was performed using the Pedroni cointegration test to examine the long-term relationship between these series.

Table 3. Pedroni Cointegration Test

Test Statistic	Panel (Within Dimension)	Group (Between Dimension)
v	1.453*	.
rho	0.118	0.958
t	-0.232	0.480
adf	3.513***	4.702***

Note: **, *, and *** indicate significance levels at 10%, 5%, and 1%, respectively. The Pedroni Cointegration Test reports both Panel (within-dimension) and Group (between-dimension) statistics. The test statistics include the panel v-statistic (v), panel rho-statistic (rho), panel t-statistic (t), and panel Augmented Dickey-Fuller statistic (adf).

When the cointegration test results were examined, the null hypothesis of no cointegration was rejected. The cointegration test results among the series, which were found to have different levels of stationarity, are significant. The result indicates that there is a long-term relationship among the variables.

Table 4. Specification Test (Hausman, 1978)

Coefficient	Chi-square test value	1.103
P-value		0.776

According to the result of the Hausman test, the probability value is higher than the critical value. Therefore, the null hypothesis is accepted, and it was decided that the Pool Mean Group (PMG) estimator is appropriate for the model. The GDP coefficient has an adverse short-term effect on LMC (p<0.01). The LEND coefficient has a positive short-term impact on LMC (p<0.05). The error correction coefficient of the model shows that the model is working correctly (p<0.01). Approximately 45% of the deviations occurring in the short term are corrected in the following period, and the long-term equilibrium is reached. In the long term, the GDP and LEND coefficients positively affect LMC (p<0.01; p<0.05).

Table 5. Panel ARDL Estimations (Dependent Variable: LMC)

Short-term				
Coefficient	**Std. Error**	**z**	**P>z**	**95% Confidence Interval**
GDP	-3.207879	1.096984	-2.92	0.003
LEND	0.409203	0.158505	2.58	0.010
FDI	0.197670	2.066825	0.10	0.924
Long-term				
Coefficient	**Std. Error**	**z**	**P>z**	**95% Confidence Interval**
Error Correction Term	-0.445272	0.133043	-3.35	0.001
ΔGDP	0.788979	0.307200	2.57	0.010
ΔLEND	1.788343	0.611986	2.92	0.003
ΔFDI	0.376977	1.602654	0.24	0.814
Constant	13.485900	5.013759	2.69	0.007

Note: Table 5 reports the Panel ARDL estimations with LMC (stock market development) as the dependent variable. GDP indicates economic growth; LEND refers to domestic credit to the private sector by banks; and FDI denotes foreign direct investment. The error correction term captures the speed at which deviations from the long-term equilibrium are corrected. The model's log-likelihood value is -402.00. *, **, and *** indicate significance levels at 10%, 5%, and 1%, respectively.

The LEND coefficient has an adverse short-term effect on GDP (p<0.01). The error correction coefficient shows that the model functions correctly (p<0.01). Approximately 53% of the deviations occurring in the short term are corrected in the following period, reaching the long-term equilibrium. In the long term, none of the variables' coefficients statistically affect GDP (p>0.05).

Table 6. Panel ARDL Estimations (Dependent Variable: GDP)

Coefficient	Std. Error	z	P>z	95% Confidence Interval
Short-term				
LMC	0.050412	0.047866	1.05	0.292
LEND	-0.129749	0.033702	-3.85	0.000
FDI	-0.209185	0.485756	-0.43	0.667
Long-term				
Coefficient	**Std. Error**	**z**	**P>z**	**95% Confidence Interval**
Error Correction Term	-0.530675	0.184703	-2.87	0.004
ΔLMC	-0.033793	0.030651	-1.10	0.270
ΔLEND	0.151288	0.173121	0.87	0.382
ΔFDI	-0.156322	0.429113	-0.36	0.716
Constant	3.243289	1.275973	2.54	0.011

Note: Table 6 presents the Panel ARDL estimations with GDP (economic growth) as the dependent variable. LMC represents stock market development; LEND refers to domestic credit to the private sector by banks; and FDI denotes foreign direct investment. The error correction term indicates the speed of adjustment back to the long-term equilibrium. *, **, and *** indicate significance levels at 10%, 5%, and 1%, respectively.

The LMC coefficient has a positive short-term effect on LEND (p<0.10). The error correction coefficient shows that the model functions correctly (p<0.05). Approximately 1.5% of the deviations occurring in the short term are corrected in the following period, reaching the long-term equilibrium. In the long term, only the GDP coefficient positively affects LEND (p<0.05).

Table 7. Panel ARDL Estimations (Dependent Variable: LEND)

Coefficient	Std. Error	z	P>z	95% Confidence Interval
Short-term				
LMC	3.797242	2.286049	1.66	0.097
GDP	12.12109	10.74527	1.13	0.259
FDI	-18.93197	18.77231	-1.01	0.313
Long-term				
Coefficient	**Std. Error**	**z**	**P>z**	**95% Confidence Interval**
Error Correction Term	-0.014932	0.007155	-2.09	0.037
ΔGDP	-0.173293	0.091654	-1.89	0.059
ΔLMC	0.026569	0.040186	0.66	0.509
ΔFDI	0.523119	0.345485	1.51	0.130
Constant	-0.326650	0.510429	-0.64	0.522

Note: Table 7 reports the Panel ARDL estimations with LEND (domestic credit to the private sector by banks) as the dependent variable. LMC represents stock market development; GDP indicates economic growth; and FDI denotes foreign direct investment. The error correction term shows the speed of adjustment back to the long-run equilibrium. *, *, and *** indicate significance levels at 10%, 5%, and 1%, respectively.

In the model, all the independent variables (LMC, GDP, and LEND) have a positive short-term effect on FDI (p<0.01; p<0.10; p<0.05). The error correction coefficient shows that the model functions correctly (p<0.01). Approximately 58% of the deviations occurring in the short term are corrected in the following period, reaching the long-term equilibrium. In the long term, none of the variables' coefficients statistically affect FDI (p>0.05).

Table 8. Panel ARDL Estimations (Dependent Variable: FDI)

Short-term				
Coefficient	**Std. Error**	**z**	**P>z**	**95% Confidence Interval**
LMC	0.027189	0.006378	4.26	0.000
GDP	0.081681	0.046023	1.77	0.076
LEND	0.019138	0.009704	1.97	0.049
Long-term				
Coefficient	**Std. Error**	**z**	**P>z**	**95% Confidence Interval**
Error Correction Term	-0.581771	0.062899	-9.25	0.000
ΔLMC	0.006638	0.027926	0.24	0.812
ΔGDP	-0.040050	0.035505	-1.13	0.259
ΔLEND	0.002731	0.051346	0.05	0.958
Constant	0.111323	0.394323	0.28	0.778

Note: Table 8 presents the Panel ARDL estimations with FDI (foreign direct investment) as the dependent variable. LMC represents stock market development; GDP indicates economic growth; and LEND refers to domestic credit to the private sector by banks. The error correction term captures the speed of adjustment back to the long-term equilibrium. *, **, and *** indicate significance levels at 10%, 5%, and 1%, respectively.

Table 9. Panel ARDL Estimations (Country-Level Results with Dependent Variable: LMC)

Country	GDP	LEND	FDI
Brazil	1.041	3.218**	-2.064
	(1.064)	(1.320)	(3.369)
India	1.554	3.096*	1.029
	(1.476)	(1.641)	(5.560)
Indonesia	0.837	0.151	-0.426
	(0.620)	(0.476)	(0.668)
Mexico	0.0894	0.379	1.363***
	(0.139)	(0.281)	(0.345)
South Africa	-0.295	0.766	-4.641*
	(1.683)	(0.968)	(2.717)
Türkiye	1.507*	3.120***	7.001
	(0.873)	(1.039)	(5.902)
Panel	3.208***	0.409***	0.198
	(1.097)	(0.159)	(2.067)

Note: Table 9 reports country-level Panel ARDL estimations with LMC (stock market development) as the dependent variable. GDP indicates economic growth; LEND refers to domestic credit to the private sector by banks; and FDI denotes foreign direct investment. The values in parentheses are robust standard errors. *, **, and *** indicate significance levels at 10%, 5%, and 1%, respectively.

According to the country-level estimations, the effect of GDP on LMC is positive in 5 out of 6 countries and negative in one country. Only in Türkiye, the GDP coefficient of 1.507 is statistically significant ($p<0.10$). It is estimated that a 1% increase in GDP could increase LMC by 1.5% in Türkiye. The estimated coefficients for Brazil, India, Indonesia, Mexico, and South Africa are not statistically significant ($p>0.05$).

The effect of LEND on LMC is positive for all countries. The countries where these coefficients are statistically significant are Brazil (3.218, $p<0.05$), India (3.096, $p<0.05$), and Türkiye (3.120, $p<0.01$). A 1% increase in LEND could increase LMC by 3.2% in Brazil, 3.0% in India, and 3.1% in Türkiye.

The effect of FDI on LMC is negative and positive in three countries. The countries where FDI is statistically significant are Mexico (1.363, $p<0.01$) and South Africa (-4.641, $p<0.10$). An estimated 1% increase in FDI could increase LMC by 1.4% in Mexico and decrease it by 4.6% in South Africa.

Table 10. Causality Test Results

Panel	LMC	GDP	LEND	FDI
LMC	-	0.0504	3.797	0.0272***
		(1.05)	(1.66)	(4.26)
GDP	-3.208	-	12.12	0.0817
	(-2.92)		(1.13)	(1.77)
LEND	0.409**	-0.130***	-	0.0191*
	(2.58)	(-3.85)		(1.97)
FDI	0.198	-0.209	-18.93	-
	(0.10)	(-0.43)	(-1.01)	
ECT	-0.023*	-0.531**	-0.0149*	-0.582***
	(-2.12)	(-2.87)	(-2.09)	(-9.25)

Note: Table 10 presents the causality test results for the Panel ARDL estimations. LMC represents stock market development; GDP indicates economic growth; LEND refers to domestic credit to the private sector by banks; and FDI denotes foreign direct investment. ECT stands for the error correction term, which shows the speed of adjustment toward the long-run equilibrium. The values in parentheses are the z-statistics. *, **, and *** indicate significance levels at 10%, 5%, and 1%, respectively.

The panel causality test results show a one-way and statistically significant causal relationship between LMC and LEND ($p<0.05$). A one-way and statistically significant causal relationship exists between GDP and LEND ($p<0.01$). Moreover, a one-way and statistically significant causal relationship exists between FDI, LMC, and LEND ($p<0.01$; $p<0.10$).

5. CONCLUSION

In recent years, significant developments have occurred in the world economy. The removal of barriers to capital flows and the impact of technological developments have increased transaction volumes in markets. This situation has led to the growing importance of capital markets. It has made it an important discussion topic to understand the factors affecting stock market development and how they affect it. This study examined the effects of foreign direct investment, financial development, and economic growth on stock market development in six countries classified as fragile economies.

The variation in country-level results highlights the importance of domestic economic and institutional contexts. Türkiye’s statistically significant positive coefficients for both GDP and LEND suggest that its relatively more developed banking system and deeper capital markets may facilitate the effective transmission of macroeconomic growth and credit into stock market development. In contrast, the divergent effects of FDI—positive in Mexico and negative in South Africa—may stem from structural differences. Mexico’s relatively open market policies and stable investment climate could attract efficiency-seeking FDI that integrates with financial markets. Meanwhile, in South Africa, high political uncertainty and capital control risks may cause FDI to take non-productive or speculative forms, thereby undermining stock market stability. These patterns suggest that generalizing across fragile economies without accounting for national differences may obscure meaningful dynamics.

It was found that the GDP and LEND variables positively affect stock market development in fragile economies. The finding that GDP has a negative short-term effect on stock market development (LMC), despite its positive long-term impact, may reflect lagged transmission mechanisms in fragile economies. Economic growth may initially trigger uncertainties, policy changes, or inflationary pressures, which can temporarily unsettle capital markets. Moreover, fragile economies often face structural rigidities that delay the translation of macroeconomic growth into financial sector improvements. Regarding FDI, its insignificant long-term effect on LMC suggests that foreign capital inflows are not always effectively absorbed due to institutional weaknesses, underdeveloped financial markets, or policy instability. FDI may be concentrated in non-listed sectors or directed toward short-term speculative ventures rather than fostering deep capital market integration. Unlike a few previous studies that argued no such relationship (Stern, 1989; Al Yousif, 2002), most found a positive effect (Schumpeter, 1911; Robinson, 1952; Kirkpatrick & Green, 2002; Levine & Zervos, 1998). The FDI variable was found to have no significant effect. Since previous studies did not focus on fragile economies, different conclusions were reached; due to fragility, FDI was not found to have a substantial impact.

Panel causality tests revealed the presence of one-way causal relationships. A one-way causal relationship exists between LMC, GDP, FDI, and LEND. Unlike the one-way causality relationship from LMC to GDP found in a previous study examining fragile economies, no such relationship was found in this study. However, consistent with previous studies, a one-way causal relationship from LMC to LEND was identified (Arestis et al., 2001; Güngör & Yılmaz, 2008). In some studies, no such relationship was found (Ekpenyong & Acha, 2011).

Moreover, a one-way causal relationship between FDI and LMC and LEND was identified. However, this study found only one-way causality, contrary to the bidirectional causal relationship found in previous studies (Lee & Chang, 2009; Malik & Amjad, 2013). In conclusion, due to the fragile nature of the countries examined in this study and their lack of a robust financial system, the effective use of FDI in the long term is problematic unless a sustainable system is established.

Based on the empirical findings, fragile economies should adopt structural policies that strengthen their domestic financial systems to improve the long-term effectiveness of capital inflows. These may include promoting regulatory transparency, strengthening investor protection laws, enhancing banking sector oversight, and incentivizing the listing of domestic firms to deepen capital markets. To make FDI more productive, governments should target efficiency-seeking investments rather than speculative or extractive flows, through sector-specific incentives and long-term stability agreements. Moreover, improving macroeconomic stability, policy credibility, and digital financial infrastructure would reduce short-term volatility and increase the absorptive capacity of the financial system. International cooperation, such as technical assistance from development banks, may also support institutional reform efforts.

Future research could benefit from the inclusion of micro-level firm data or investor behavior metrics to analyze transmission mechanisms in more depth. In addition, integrating structural macroeconomic models or simulation-based policy tools may allow for scenario testing on the effects of institutional reforms and financial shocks. Comparative studies across broader country groups could also illuminate the heterogeneity of financial development pathways among fragile economies.

AUTHORS' DECLARATION:

There is no need to obtain ethical permission for the current study as per the legislation.

AUTHORS' CONTRIBUTIONS:

Conceptualization, writing-original draft, editing – **MY** and **DY**, data collection, methodology, formal analysis – **DY** and **MY**, Final Approval and Accountability – **DY** and **MY**.

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International Journal of Business & Economic Studies
Year: 2025, Vol: 7, No: 2, pp.138-159
https://doi.org/10.54821/uiecd.1635584

A Study on the Factors Enabling Employee Fraud

Çalışan Hilelerine İmkân Yaratan Unsurlar Üzerine Bir Araştırma

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Received : 07.02.2025
Revised : 22.06.2025
Accepted : 24.06.2025
Type of Article : Research

Keywords:
Wage Satisfaction,
Excessive Workload,
Mobbing,
Fraud Diamond
Jel Codes:
M40, M41, M42, M49

ABSTRACT

The purpose of the study is to reveal the impact of wage satisfaction, excessive workload, and mobbing on the fraud triangle (opportunity, pressure, rationalization). The Research is executed on 270 manufacturer firms in Marmara Region with 270 employees. 161 employees out of 270 have joined the study. The survey data is analyzed by applying correlation and regression in the SPSS 22.0 interface programme. Additionally, these variables which are wage satisfaction, excessive workload and mobbing are tested wheather they demographically differentiate. When evaluated in terms of demographic variables, it has been observed that men have a higher wage satisfaction compared to women, that graduates with a postgraduate degree have significantly higher wage satisfaction than other education groups, and that within the organizational role variable, wage satisfaction decreases from managers to blue-collar workers. Additionally, it has been noted that job workload and experiences of mobbing are associated with lower wage satisfaction, while age and professional experience variables do not show significant differences according to the research variables.

Anahtar Kelimeler:
Ücret Tatmini,
Aşırı İş Yükü,
Mobbing,
Hile Karosu
Jel Kodları:
M40, M41, M42, M49

ÖZET

Çalışmanın amacı, ücret tatmini, aşırı iş yükü ve mobbing faktörlerinin hile karosu (fırsat, baskı, haklı gösterme ve yetkinlik) unsurları üzerinde bir etkisinin olup olmadığı değerlendirilmeye çalışılmıştır. Çalışma; Marmara Bölgesinde üretim faaliyeti gösteren ve 270 çalışanı mevcut olan bir işletmede uygulanmıştır. Evrenin tümüne ulaşılmaya çalışılmış olup anket sorularına 161 çalışan katılım sağlamıştır. Elde edilen anket verileri SPSS 22.0 programında analize tabi tutulmuş olup korelasyon ve regresyon analizi uygulanmıştır. Bununla birlikte ücret tatmini, aşırı iş yükü ve mobbing faktörlerinin hile karosu unsurlarının da demografik özelliklere göre farklılık gösterip göstermediği de tespit edilmeye çalışılmıştır. Analiz sonuçlarına göre; ücret tatmini, aşırı iş yükü ve mobbing faktörleri ile hile karosu unsurları arasında istatistiksel açıdan anlamlı ve pozitif yönde bir etkisi olduğu görülmüştür. Demografik değişkenler kapsamında değerlendirildiğinde ise erkeklerin kadınlara oranla daha yüksek bir ücret tatminine sahip oldukları, lisansüstü mezunlarının ücret tatmininin diğer eğitim gruplarına göre anlamlı olarak daha yüksek olduğu, kurum içi görev değişkeninde yöneticilerden mavi yakalılara doğru ücret tatmini daha yüksek, iş yükü ve mobbinge uğrama durumlara daha düşük olduğu gözlemlenmiş olup, yaş ve mesleki tecrübe değişkenleri araştırma değişkenlerine göre anlamlı olarak farklılaşmadığı tespit edilmiştir.

Suggested Citation: Yaylalı, İ. (2025). A study on the factors enabling employee fraud. *International Journal of Business and Economic Studies*, 7(2), 138-159, https://doi.org/10.54821/uiecd.1635584

1. INTRODUCTION

Balancing the spread of social and personal rights is important for ensuring the mandatory performance from the labor force in Professional business life. Businesses need an effective workforce to keep their performance steady and achieve their preplanned objectives. The capability of enterprises to adapt to modifying conditions, as well as keeping up with competitive environments to sustain their existence depends on the efficiency which is exhibited by employees. As a result, various methods are integrated by businesses to improve employee performance. For instance, a fair and optimally distributed wage mechanism, promotion-based organizational cultures, performance-focused reward systems, and motivational approaches can amend employees' sense of loyalty and commitment. On the other side, adverse forces such as mobbing, coercion, and unfair behaviors can reduce motivational activities, thereof making it improbable to assess performance, productivity, and organizational loyalty.

The assurance of competitiveness across sectors can be performed if businesses have sense to employees' expectations and needs. The Application of psychological pressure on employees by maintaining higher performance leads to inefficient work processes. Convenient working conditions and an optimally allocated wage system can contribute to achieving the needed value and moral based organizational culture. Otherwise, the reduction of performance by experiencing negative events like internal corruption is inevitable.

As the globe experiences intense economic growth, wage terms remain a critical factor that needs to be balanced in both developed and developing nations. In addition, overloading, burnout events and mobbing which are tried on employees can be evaluated as the major challenges from the point of organizational psychology. Businesses which are being operated in a harsh competitive ecosystem driven by globalization and technological improvements primarily aim to provide consistency and attain success in their daily operations. However, reaching these goals directly depends on employee needs and expectations. Another key criterion to enhance workforce performance is to employ skilled and highly qualified people.

From this point of view, the human factor can be assessed as a crucial element to succeed in both the private and public industries. Businesses can take significant steps to underscore their need for human-related resources, with the primary aim of ensuring workplace coordination, enhancing employee motivation, and prolonging success (Örücü, Dogan, & Hasırcı, 2023). Another critical component can be counted as preventing potential fraudulent acts for the minimization of financial losses.

Businesses have been cyclically operating their business activities in a competitive environment to ensure their sustainable development as mentioned above. In this competition, the wage part provided to employees is just fundamental. However, wages can be considered as critical components in a professional business career that can affect entirely the relevant dynamics. Due to the insufficient economic conditions, the amount that employees received in swap for their efforts plays a significant role in job appreciation and performance improvement (Güven, Bakan, & Yeşil, 2005). An effective wage balance can be perceived as a critical tool to increase labor supply (Pazarlıoğlu & Çevik, 2007).

In current dynamic international business conditions, escalating employee demands have pushed the motivations of businesses to explore novel strategies for retaining their labor force. As a result, the identification of factors that can amend the loyalty of employees and the implementation of necessary innovations have become indispensable. Securing talented and qualified employees necessitates not only fairly allocated wages but also ensuring that employee's sense like an integrative part of the organization (Aksu & Özmen, 2022). Excessive workload, unfair wage distribution, along with mobbing in the workplace can result in conflicts in both public, personal, and business life, that can negatively affect a person's health conditions and well-being. These aspects can lead to emotional distress, diminished job performance, and increased burnout (Bowen, Govender, Edwards, & Cattell, 2018; Hammer, Saksvik, Nytrø, Torvatn, & Bayazit, 2004; Choi, Cundiff, Kim, & Akhatib, 2018). Furthermore, if wages match the expectations of employees, fraudulent cases become inevitable, and employees may tend to harm the organization to offset their deprivations.

From the perspective of businesses to sustain their continuity, remain competitive, and implement strong market resilience, they should effectively and efficiently employ their available assets and resources. Whether business-based or employee-oriented, all human resources management systems need wage balance, workload diversification, and mobbing audits to ensure optimal efficiency. When inequalities unfold among employees, negative and opposite consequences can arise. If employees feel an excessive workload-like condition and are oppressed by their managers, they may look for relief by harming organizational assets. Likewise, the frustrations in wage expectation can urge employees towards fraudulent activities, persuading themselves that they are no longer taking what they deserve. Considering this mentioned statement of proof, the objective of this study is to evaluate how wage satisfaction, excessive workload, and mobbing factors affect the fraud diamond (pressure, opportunity, rationalization, and capability) elements (Wolfe & Hermanson, 2004). While many studies have been introduced due to wage satisfaction, excessive workload, and mobbing, a deep-seeked literature review revealed that it is not observed any kind of research investigating their relationship with the fraud diamond. Becuase of the lack of such type of studies, this type of research has been designed. To fill this breach and add value to the literature, this study primarily focuses on evaluating whether wage satisfaction, excessive workload, and mobbing factors influence the fraud diamond, which has become a significant concern for businesses.

2. FRAUD, FRAUD DIAMOND, and EMPLOYEE FRAUD

The concept of fraud is a significant problem that intimidates the continuity of businesses. Relative to the scandals that have emerged in recent time, fraud has become a major risk factor for both large and small-scale enterprises (Doğan & Kayakıran, 2017).

Even if business managers take various precautions against fraudulent activities, they are regularly at risk of encountering fraud or fraudulent behaviours or transactions. Therefore, fraud remains a persistent topic on the agenda of enterprises (Bircan, 2024).

According to the Turkish Language Association, fraud is defined as “a scheme, trick, or deception designed to mislead or deceive someone” (TDK, 2024). Another definition describes fraud as illegal activities that violate trust, such as embezzlement, misuse of resources, and abuse of authority (Çiftçi & Akbulut, 2023).

The fraud diamond theory, which was developed by Cressey in 1953, consists of three elements as pressure, opportunity, and rationalization. In 2004, Wolfe and Hermanson improved this model by adding a fourth element, capability, that is leading to the development of the "Fraud Diamond" theory (Kesuma & Fachruzzaman, 2024). According to the Fraud Diamond model, for fraud or fraudulent activities to occur, four key elements which are rowed as pressure, opportunity, rationalization, and capability must be present simultaneously (Kıymaz Kıvraklar & Ersoy Can, 2023). The Fraud Diamond is visualized in the Figure 1.

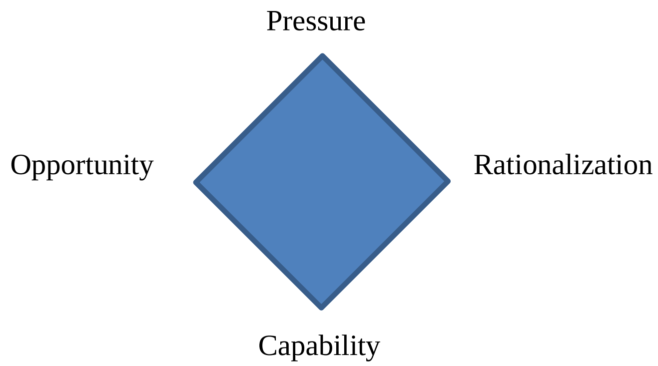

Figure 1. Fraud Diamond

Source: (Wolfe & Hermanson, 2004)

The pressure element emerges from financial and non-financial reasons that drive individuals to commit fraudulent activities. These pressures are classified into financial and job-related ones, as well as pressures resulting from harmful habits (Sujeewa et al., 2020). Examples of pressure factors include wage dissatisfaction, the desire for a luxurious lifestyle, job dissatisfaction, personal debts, and the need to earn money (Çelikdemir, 2020).

The opportunity element refers to the absence of control systems in a business which causes the deficiency to integrate the principle of segregation of duties in process management, and management’s ability to dominate controls. These factors create an environment which leads to fraud (Bayraklı, Erkan, & Elitaş, 2012). A lack of restrictions for accessing assets, non-transparent policies, and the inefficiencies to enforce apparent rules play a part in the opportunity factor (Huang et al., 2017). Employees who perceive that there is no effective internal control system in place may easily misappropriate company assets (Bozkurt, 2000).

The rationalization element consists of efforts to justify fraudulent activities (Bozkurt, 2000). In other words, business managers are often motivated to present financial results positively, because favorable financial outputs enhance bonuses and salaries. Employees, on the other hand, may subdue to fraud relative to financial challenges or their personal needs. These pressures typically stem from monetary and personal factors (Bulca & Yeşil, 2014).

The competence item is defined as the skills inherent in a human or gained over time (Kazan, 2021). Competence shows an individual's capability to leverage his or her position. However, in many events, individuals could arbitrarily violate organizational principles and rules (Fuad et al., 2020).

Among varied types of fraud, employee fraud is the most common one that is observed. So, controlling and punishing this behaviour is essential. However, because of its covert nature, identification and prevention of such frauds can be both costly and time-consuming (Kıymaz Kıvraklar & Ersoy Can, 2023).

Employee fraud involves the misuse of organizational assets and resources to acquire unfair financial benefits. In these cases, the employer is the loser of the fraudulent actions that are carried out by employees (Hacıhasanoğlu & Karaca, 2015). Employee fraud is commonly utilized deliberately and intentionally (Mengi, 2013). It is one of the most widespread forms of fraud, often taking the form of:

- Cash theft
- Check and promissory note theft
- Bribery
- Inventory manipulation
- Inflated price quotations
- Payments for non-existent work
- Duplicate payments
- Failure to record sales
- Underreporting sales
- Ghost check issuance
- Manipulating bank records
- Receiving kickbacks from suppliers
- Fraudulent invoicing
- Inflating overtime hours
- Theft of office supplies and fixed assets (ACFE, 2022).

To prevent these kinds of potential employee frauds, business management teams must implement effective control systems, assure wage equity, mitigate pressure/stress factors, and utilize efficient hiring processes (Manning, 2005). In this context, business outcomes, competitiveness, and economic benefits are both closely related to employee performance. Employee pleasure plays a crucial role for providing performance. In other words, employees' ability to demonstrate essential performance in their efforts depends on the level of satisfaction they receive from their job place (Nergiz & Yılmaz, 2016). Fundamentally, employees who are satisfied and whose opinions are taken in consideration are more likely to be motivated through a performance-based reward system (Özer, 2013). Inversely, wage imbalance, excessive workload, pressure, and duties overpacing employees' capabilities produce a business environment conducive to fraud acts (Abbasi & Janjua, 2016).

3. LITERATURE REVIEW

Fraud has recently become an important issue, causing significant revenue losses for organizations. Particularly in the accounting field, not only the scale but also the frequency of fraud cases has shown a substantial rise. This critical problem has been also taking attention from the academic studies. In both national and global literature, various studies emerge on fraud, employee fraud, wage satisfaction, excessive workload, and mobbing. Unfortunately, research that related to the factors of wage satisfaction, excessive workload, and mobbing with the fraud diamond elements of pressure, opportunity, rationalization, and competence are quite limited. As a result, academic studies which have been pointing out employee fraud and these factors from different perspectives are introduced with following orders.

Yüceyılmaz et al. (2024) examined the interaction between mobbing concept and job satisfaction among 410 municipal employees in Aydın region. The results demonstrated those low levels of mobbing perception and high-level job pleasure were observed in the management. Male employees were found to sense more threatened, contracted employees experienced more harassment, and postgraduate degree holders perceived higher levels of mobbing. Kaçmaz & Çiçek (2024) investigated the effect of mental workload on work-life quality and psychological resilience between 204 call center assistants in the Erzurum province. This study showed that mental workload significantly and negatively affected work-life quality. Açıkel & Esen (2023) examined the impacts of the Covid-19 pandemic on the perceptions of academic staff for workload and burnout. The study showed a rise in both workload perception and burnout during and after the Covid-19 pandemic. Özkaraca & Köse (2023) explored how the level of mobbing experiences influences job satisfaction among 63 health officers, 132 midwives, and 271 nurses at Muğla Education and Research Hospital. The findings presented with low levels of mobbing experience had resulted in high levels of job satisfaction. Eskibina (2023) investigated the relationship between mobbing perceptions and burnout levels among 252 auxiliary judicial staff in Balıkesir courthouse. Significant differences had emerged based on the factors of gender, age, position, unit affiliation, and seniority level in terms of mobbing and burnout perceptions. Yaman & Aytaç (2022) worked on the impacts of positive psychological capital and workload perception at organizational citizenship behavior and counterproductive work behaviors among administrative personnel in a state university of Turkey. The findings showed a positive and meaningful relationship between positive psychological capital and organizational citizenship behaviors, and a negative and meaningful interaction with counter productive work behaviors. Ön & Yanık (2023) explored the interactions between perceptions of excessive workload, turnover idea, and demographic characteristics among 103 employees at a retail chain in the Trabzon part of Turkey. They revealed a significant negative relationship between turnover intention and working years of service, while no significant relationship was determined with gender, age, marital status, education level, and income. Excessive workload was observed to positively and significantly affect turnover intention. Çiftçi (2022) examined the mediating role of job stress in the interaction between excessive workload and turnover intention among 223 employees who are working at chain markets in Ordu and Fatsa. The study revealed a partial mediating effect of job distress in the relation between excessive workload and turnover intention. Örücü et al. (2021) examined the moderating role of education level by searching for the relationship between wage and life satisfactions among 128 workers in the production sector in Balıkesir. The study concluded that the impact of wage satisfaction on life satisfaction was catalyzed by the educational level of the employees. Seçkin & Çoban (2017) explored the interaction between wage level and life quality among 197 blue-collar workers in Aksaray, Turkey. The study results showed a positive interaction between wage satisfaction and life satisfaction, with the job preservation intention of mediating this relationship. Ulucan Özkul & Özdemir (2013) studied the role of human resources managers for preventing employee fraud in corporate enterprises through qualitative research methods. The findings revealed that HR managers are responsible for the negative consequences of employee fraud in line with their authority within the business. Yanık & Yılmaz (2021) explored the perception of fraud among 509 accounting students at Recep Tayyip Erdoğan University. The study results illustrated that accounting students had a high level of fraud perceptions. Tahmaz et al. (2019) investigated the factors which are affecting employee fraud in the financial services sector, by focusing on group dynamics, manager behaviours, motivation, and group structure. The study results showed that group dynamics were playing a significant role in leading employees to commit fraud, with a 50.41% impact rate. Kıymaz Kıvraklar & Ersoy Can (2023) explored the relationship between fraud diamond elements and red flags which are associated with employee fraud. The research findings highlighted that red flags are related to the fraud diamond items. Aslanzade (2017) explored fraud profiles in enterprises from 2012 to 2016 by using ACFE reports and defined the differences between the characteristics and behaviors of employees who are committing fraud. Özdemir (2023) made a case study analysis on inventory theft in the context of asset misuse, as well as exploring opportunities for fraud and preventive measures. The findings showed weak internal audits, inconvenient control of warehouse bottlenecks, lack of following segregation of duties, failures in detailed background detections during hiring process, inadequate employee observation, and miscalculations of wastages in production. Purnamasari & Oktaroza (2015) studied on the misuse of sources in state-owned companies in Indonesia, through analyzing factors that are causing to asset misappropriation. The study results revealed that there are significant effects of pressure, opportunity, rationalization, and competence on abuse of organizational assets. Küçük (2021) explored frauds in accounting field in Gaziantep banks which led to legal issues, by focusing on personal intentions and motivations for committing fraud rather than organizational reasons. The study findings revealed that most of the frauds in banks stemmed from individual motivations. Kurt & Dedeoğlu (2025) investigated the effects of pressure, opportunity, rationalization, skill, and arrogance on the fraud tendency of independent auditors from the point of the fraud pentagon. Their study revealed that while pressure and opportunity had any effect on fraud tendency, rationalization, skill, and arrogance had a significant impact. Koomson et al. (2020) explored the pervasiveness of asset misuse in organizations and the factors which are leading employees to enact fraud. The study results revealed that employees were more likely to misappropriate assets which depends on the level of pressure and rationalization they confronted.

According to the literature, there is strong evidence that research studies have commonly focused on the perception of excessive workload and turnover intention, the relationship between excessive workload and burnout, mobbing perception and job satisfaction, the impact of wage satisfaction on life satisfaction, and the relationship between wage satisfaction and turnover intention. In the context of fraud and employee fraud, the fraud diamond, detection and prevention of fraud, fraud perceptions among professionals, the responsibilities of independent auditors in fraud detection, asset misusage, and factors affecting employee fraud have been mostly examined. However, it has been observed that there seems to be any kind of study which addresses the influence of job satisfaction, excessive workload, and mobbing factors on the fraud diamond. The lack of such study in the literature proves that the necessity of this type of research. Conclusively, this study is expected to contribute to the literature with its both conceptual and applicative scope.

4. RESEARCH

This part of the study involves the goal of research, methodology, validity analyses, and findings.

4.1. Purpose of Research

The objective of this research is to define whether there is an impact of wage satisfaction, excessive workload, and mobbing elements on the fraud diamond.

4.2. Research Methodology and Data Collection

Fraud that emerges in businesses is not only due to the weaknesses in auditing systems but also arises from employees' expectations which are not met. Hence, to prevent fraud, which becomes a serious problem for businesses, it is mostly inevitable to diminish fraud to minimized levels when factors like developing employees' perception of belonging, meeting their wishes, and providing equality are present. To assess the effect of wage satisfaction, excessive workload, and mobbing factors on the fraud diamond, the study is conducted at an enterprise in the Marmara field with 270 employees who have been taking roles in production activities.

Within the subject of the research, blue-collar, white-collar, and managerial personnels in the production company were reached via the human resources department. The related survey design was made, and forms were sent to the employees' email addresses. All ethical permissions were provided for the survey that was used in the research, and employees were also asked to answer through Google Forms. The design of the survey form was based on past research studies in the literature. The survey is composed of two parts. In the first one, the demographic characteristics of the employees were underscored by 7 questions which are related to demographics. In the second one, a total of 46 questions were presented regarding wage satisfaction, excessive workload, mobbing, opportunity, pressure, rationalization, and competence. For each of the 7 variables, distinct questions were set, as 4 questions for “wage satisfaction,” 11 for “excessive workload,” 7 for “mobbing,” 6 for “opportunity,” 8 for “pressure,” 4 for “rationalization,” and 6 for “competence.” A 5-point Likert scale was carried out for the statements, and a 3-point Likert scale was applied for the mobbing factor.

In order to assess the effect of wage satisfaction, excessive workload, and mobbing factors on the fraud diamond, surveys designed by “Güven et al. (2005),” “Leymann (1990),” “Yücekaya & İmamoğlu (2020),” “Çuhadar & Gencer (2016),” “Sahla & Ardianto (2023),” “Muhsin & Nurkhin (2018),” and “Utami & Purnamasari (2021)” were used.

4.3. Ethical Approval of Research

The research was utilized with ethical approval that is obtained from the Ethical Principles and Ethics Committee of Istanbul Medipol University on 11.09.2024, with the decision number E.70340.

5. FINDINGS

This study results showed the effects of wage satisfaction, excessive workload, and mobbing variables on the items of the fraud diamond which includes opportunity, pressure, rationalization, and competence. After conducting a validity (Cronbach's Alpha) analysis for the scales that have been used, the means of the remaining elements for each of the factors were calculated to define the variables. The relationships between the variables were tested by the usage of correlational analyses. The impacts of the independent variables (wage satisfaction, excessive workload, and mobbing) on the dependent variables (opportunity, pressure, rationalization, and competence) were analyzed by taking four different models into account, one for each dependent variable. Whether the categorical demographic parameters significantly diverged with the relation to the research variables (wage satisfaction, excessive workload, mobbing) and the dependent ones (opportunity, pressure, rationalization, and competence) were tested. After the analysis, the test findings were interpreted.

5.1. Validity Analyses of Data Collection Tools

The scales, that are used for wage satisfaction, excessive workload, and mobbing, consisted of 4, 11, and 7 questions, respectively. In addition, the scales related to opportunity, pressure, rationalization, and competence, which were defined as factors enabling employee fraud, made up with 6, 8, 4, and 6 questions, respectively. Later, the scales were calculated by using Cronbach's Alpha, and the variables were identified via the examination of whether phasing out an element would increase the Cronbach's Alpha value. If the removal of an item did not ascend the Cronbach's Alpha value as well as this value was above 0.7, the averages of the remaining ones were used to define the variables (Akgül & Çevik, 2003).

After analyzing the data provided from 161 participants, the scales for excessive workload, mobbing, rationalization, and competence were distilled by removing one item from each of the scales, and the averages of the remaining items were computed to identify the variables. The final validity values for the statements related to wage satisfaction, excessive workload, mobbing, opportunity, pressure, rationalization, and competence are shown in Table 1.

Table 1. Reliability Analyses of Factors Enabling Employee Fraud

Scale	Cronbach's Alpha	Statement Quantity
Wage Satisfaction	0,75	4
Excessive Workload (or Overloading)	0,93	11
Mobbing (or Workplace Bullying)	0,89	7
Opportunity	0,90	6
Pressure	0,86	8
Rationalization	0,71	4
Competence (or Skill Set)	0,84	6

5.2. Hypotheses and Research Model After Validity Analysis

In this study, the examination of the effects of wage satisfaction, excessive workload, and mobbing on opportunity, pressure, rationalization, and competence is made through a research model which is designed based on the variables derived after the validity analysis. The exploration was done on whether wage satisfaction, excessive workload, and mobbing significantly varied between opportunity, pressure, rationalization, and competence. The error rate was evaluated as 5% (95% confidence). The research hypotheses are presented as follows:

H_1: Wage satisfaction has a significant effect on the opportunity factor.

H_2: Excessive workload has a significant effect on the opportunity factor.

H_3: Mobbing has a significant effect on the opportunity factor.

H_4: Wage satisfaction has a significant effect on the pressure factor.

H_5: Excessive workload has a significant effect on the pressure factor.

H_6: Mobbing has a significant effect on the pressure factor.

H_7: Wage satisfaction has a significant effect on the rationalization *factor.*

H_8: Excessive workload (or Overloading) has a significant effect on the rationalization *factor.*

H_9: Mobbing has a significant effect on the rationalization *factor.*

H_{10}: Wage satisfaction has a significant effect on the competence factor.

H_{11}: Excessive workload has a significant effect on the competence factor.

H_{12}: Mobbing has a significant effect on the competence factor.

The research model has been framed in Figure 2 as shown below, in accordance with the research hypotheses.

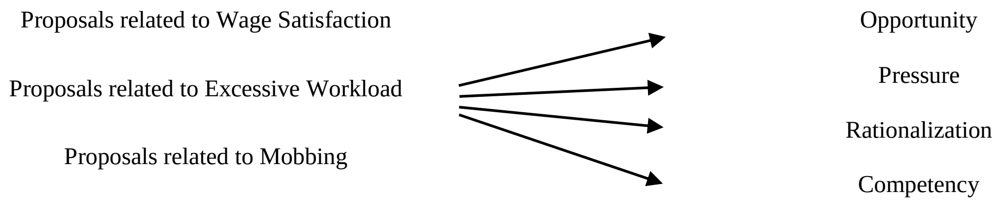

Figure 2. Research Model of Factors Affecting Elements Enabling Employee Fraud

5.3. Relationships Between Variables: Correlation Analysis

The correlation table which is shown below presents the relationships between the research variables, named as wage satisfaction, excessive workload, and mobbing, as well as the factors enabling employee fraud: opportunity, pressure, rationalization, and capability. Additionally, skewness and kurtosis values are obtained. If the skewness and kurtosis values are spanned by the range of -2 to +2, the variables can be evaluated as normally distributed (George & Mallery, 2010). Since the variables show a normal distribution, the Spearman correlation coefficient can be used.

Table 2. Correlational Interaction Between Variables

	Wage Satisfaction	Excessive Workload	Mobbing	Opportunity	Pressure (Imposition)	Rationalization	Competence
Wage Satisfaction	-						
Excessive Workload	-0,589	-					
Mobbing	-0,567	0,720	-				
Opportunity	-0,554	0,654	0,690	-			
Pressure (Imposition)	-0,653	0,677	0,621	0,516	-		
Rationalization	-0,385	0,417	0,297	0,282	0,344	-	
Competence	-0,521	0,573	0,509	0,649	0,453	0,445	-
Skewness	0,345	-0,035	0,234	-0,098	-0,526	-0,240	0,139
Kurtosis	-0,895	-0,473	-0,689	-0,136	0,302	-0,179	0,115

N= 161, *p<0,05, **p<0,01

As observed in table 2, there is a correlation between the variables of wage satisfaction, excessive workload, and mobbing with the opportunity, pressure, rationalization, and competence variables from moderate to strong. The level of the correlation coefficient expresses the strength and direction of the relationship between two variables. A correlation coefficient between 0 and 0.20 (or -0.20 to 0) indicates a very weak relationship, between 0.21 and 0.40 (or -0.40 to -0.21) indicates a weak relationship, between 0.41 and 0.60 (or -0.60 to -0.41) indicates a moderate relationship, and between 0.61 and 0.80 (or -0.80 to -0.61) indicates a strong relationship. Additionally, metrics between 0.81 and 1.00 (or -1.00 to -0.81) indicate a very powerful relationship between the variables (Cohen, 1988).

The relationship between wage satisfaction and the opportunity, pressure, rationalization, and competence variables is negative and moderate. Therefore, this offers that if wage satisfaction rises, the values of opportunity, pressure, rationalization, and competence decline. In other words, if wage satisfaction increases, the emergence of factors which enable employee fraud reduces. Oppositely, in case of excessive workload and mobbing factors, the relationship of them with opportunity, pressure, rationalization, and competence is positive and moderate. Therefore, since workload and mobbing rise, the factors enabling employee fraud, such as opportunity, pressure, rationalization, and competence, also escalate.

5.4. Hypothesis Tests: Regression Analyses

The analyses are made by the investigation of the impact of wage satisfaction, excessive workload, and mobbing variables on the factors which are enabling employee fraud, nominated as opportunity, pressure, rationalization, and competence. In addition to these, the findings of the multiple linear regression models implemented with detailed information in separate sections for each dependent variable.

5.5. Factors Affecting the Opportunity Factor Among the Elements Enabling Employee Fraud

The findings of the multiple linear regression model which is established to examine the effect of wage satisfaction, excessive workload, and mobbing variables on the opportunity factor enabling employee fraud, are visualized in Table 3.

Table 3. The Effect of Wage Satisfaction, Excessive Workload, and Mobbing on the Opportunity Factor

	Opportunity	
	Beta	Sig.
Excessive Workload	0,279	0,002
Wage Satisfaction	-0,198	0,015
Mobbing	0,618	0,000
Adjusted R2	0,536	
N	161	
F	62,680	
Sig	,000	
S.E.	0,7168	

When table 3 is deeply analyzed, it has been observed that all three variables which are defined as wage satisfaction, excessive workload, and mobbing have a significant impact on the opportunity factor ($p<0.05$). While wage satisfaction has a negative effect, the other two variables have a positive effect. From the point of the R^2 value, it can be observed that the three independent variables can be explained by 53.6% of the opportunity factor. As a result, this percentage ratio could be considered quite fine. Additionally, while examining the standardized beta coefficients, the variables with the highest impact on the opportunity factor are defined as mobbing, excessive workload, and wage satisfaction, by numbers. In this case, it can be perceived that as wage satisfaction increases, the prospect of employees engaging in fraud decreases. Furthermore, if workload and mobbing factors rise, the likelihood of an employee's propensity to commit fraud acts increases when the opportunity factor is influential.

5.6. Factors Influencing the Pressure Factor Among Elements Contributing to Employee Fraud

The results of the multiple linear regression model established to assess the effect of wage satisfaction, excessive workload, and mobbing variables on the pressure factor are presented in Table 4.

Table 4. The Effect of Wage Satisfaction, Excessive Workload, and Mobbing on the Pressure Factor

	Pressure	
	Beta	Sig.
Excessive Workload	0,288	0,000
Wage Satisfaction	-0,324	0,000
Mobbing	0,210	0,026
Adjusted R2	0,562	
N	161	
F	69,56	
Sig	0,000	
S.E.	0,5494	

If table 4 is considered, it could be extracted that all the variables which are defined as wage satisfaction, excessive workload, and mobbing have a significant impact on the pressure factor ($p<0.05$). Even if the other two variables have a positive effect, wage satisfaction has negative. Searching for the R2 value, it can be perceived that these three independent variables explain 56.2% of the pressure factor, which is a higher and significant explanation rate. When the standardized beta coefficients are explored, it reveals that the variables with the highest effect on the pressure factor are identified as wage satisfaction, excessive workload, and mobbing, respectively. Within this context, as wage satisfaction rises, the probability of engaging in fraudulent behavior diminishes when the pressure factor is taken on effect. On the other side, as workload and mobbing increase, the likelihood of fraudulent behavior escalates when the pressure factor is effective. The results for the relevant hypotheses are shown in Table 14.

5.7. Factors Affecting the Rationalization Factor Among the Elements Enabling Employee Fraud

The results of the multiple linear regression model that was established to explore the effects of wage satisfaction, excessive workload, and mobbing on the rationalization factor, are visualized in Table 5.

Table 5. The Effect of Wage Satisfaction, Excessive Workload, and Mobbing on the Rationalization Factor

	Rationalization		
	Beta		Sig.
Excessive Workload	0,256		0,001
Wage Satisfaction	-0,207		0,016
Mobbing	-0,094		0,486
Adjusted R2		0,193	
N		161	
F		20,21	
Sig		0,000	
S.E.		0,786	

*The values in the table are the results obtained after excluding the mobbing variable, which had no significant effect in the model.

When table 5 is reviewed, it can be observed that the wage satisfaction and excessive workload variables have a significant effect ($p<0.05$) on the rationalization item, which can be considered as one of the factors that stimulate employee fraud. However, the mobbing factor does not have a significant effect ($p>0.05$). While wage satisfaction has a negative impact, excessive workload has positive. From the point of R2 value, it can be perceived that the variables of wage satisfaction and excessive workload, which have a significant effect on the rationalization element, explain 20.21% of it. While this ratio is not much higher, it is still a crucial explanatory rate. When examining the standardized beta coefficients, it is also examined that excessive workload has a higher effect on the rationalization element in comparison with wage satisfaction. In this case, it can be considered that as wage satisfaction increases, the prospect of engaging in fraud decreases. As the workload rises, the effect of the mobbing factor on the rationalization element also rises, which leads to a higher likelihood of attempting to fraud. The findings for the related hypotheses are presented in Table 14.

5.8. Factors Affecting the Competence Element among the Factors Enabling Employee Fraud

The findings of the multiple linear regression model which is established to analyze the effect of wage satisfaction, excessive workload, and mobbing variables on the competence element, are presented in Table 6.

Table 6. The Effect of Wage Satisfaction, Excessive Workload, and Mobbing on the Competence Element

	Competence		
	Beta		Sig.
Excessive Workload	0,380		0,000
Wage Satisfaction	-0,288		0,000
Mobbing	0,168		0,182
Adjusted R2		0,380	
N		161	
F		48,370	
Sig		,000	
S.E.		0,733	

*The table values are those extracted after excepting the mobbing variable, which does not have a significant effect in the model.

If table 6 is considered, it could be observed that the variables of wage satisfaction and excessive workload have a significant effect ($p<0.05$) on the competency factor, while the mobbing factor does not have a significant effect on competency ($p>0.05$). While wage satisfaction has a negative effect, excessive workload is positive. R^2 value shows that there is evidence that the wage satisfaction and excessive workload variables explain 38% of the competency variable. This is a relatively high and significant explanatory rate. Additionally, when examining the standardized beta coefficients, it is observed that excessive workload has a higher impact on competency than wage satisfaction. Thus, it can be said that if wage satisfaction rises, the likelihood of engaging in fraudulent behavior could decrease. Furthermore, as the workload increases, the impact of competency on employees also increases, leading to a higher likelihood of engaging in fraudulent behavior. The results related to the hypotheses are shown in Table 14.

5.9. Demographic Characteristics

Frequency and percentage values of the demographic variables such as gender, marital status, age, educational background, tenure within the organization, experience within the organization, and professional experience are shown in Table 7.

Table 7. Demographic Characteristics of the Participants

Gender	Frequency (n=161)	Percentage
Male	78	48,45%
Female	83	51,55%
Marital Status	Frequency (n=161)	Percentage
Single	77	47,83%
Married	84	52,17%
Age	Frequency (n=161)	Percentage
18-25	31	19,25%
26-35	48	29,81%
36-45	55	34,16%
46 and above	27	16,77%
Education Level	Frequency (n=161)	Percentage
High School	25	15,53%
Vocational	24	14,91%
Undergraduate	80	49,69%
Graduate	32	19,88%
Organizational Status	Frequency (n=161)	Percentage
White Collar	94	58,39%
Blue Collar	30	18,63%
Manager	37	22,98%
Organizational Experience	Frequency (n=161)	Percentage
1 Year or Less	35	21,74%
1-5 Years Range	50	31,06%
6-10 Years Range	34	21,12%
11 Years or above	42	26,09%
Professional Experience	Frequency (n=161)	Percentage
1-5 Years Range	53	32,92%
6-10 Years Range	23	14,29%
11-15 Years Range	24	14,91%
16-20 Years Range	28	17,39%
21 Years or above	33	20,50%

If table 7 is analyzed, it can be observed that the ratio of female to male participants is convergent and close to each other. In the age groups, approximately 34% of the participants are in the 36-45 age range. Regarding marital status, 52% of the participants are married. About 49% of the participants hold an undergraduate degree. In terms of their role within the organization, 58% work as white-collar employees. The most common tenure for participants in the organization and their professional experience is in the 1-5 years range. It is also noted that all demographic variable groups have enough observations, and the proportion of observations within each group is at least about 15%.

5.9.1. Relationship Between Gender, Marital Status, and Research Variables

The relationship between variables such as wage satisfaction, workload, and mobbing with opportunity, pressure, rationalization, and competence factors contributing to employee fraud were tested for significant differences based on gender and marital status groups. For normally distributed variables within the two-group gender and marital status variables, a t-test was used, while the Mann-Whitney U test was applied to variables that did not follow a normal distribution. The results of the analysis are presented in Table 8.

Table 8. Relationship Between Gender, Marital Status, and Research Variables

	Observation Amount (n)		Average (Mean)		Std Deviation		t or Mann Whitney U	
Gender	**Male**	**Female**	**Male**	**Female**	**Male**	**Female**	**Test**	**p**
Wage Satisfaction	78	83	3,135	2,786	0,882	0,895	2,489	0,014
Excessive Workload	78	83	2,745	2,896	0,984	0,999	-0,969	0,334
Mobbing	78	83	2,073	2,175	0,677	0,699	2941,000*	0,314
Opportunity	78	83	2,759	2,878	0,999	1,104	-0,718	0,474
Pressure	78	83	3,454	3,542	0,843	0,822	-0,675	0,501
Rationalization	78	83	3,449	3,663	0,881	0,862	2732,500*	0,084
Competence	78	83	2,979	3,019	0,864	0,984	-0,273	0,785
Marital Status	**Single**	**Married**	**Single**	**Married**	**Single**	**Married**	**Test**	**p**
Wage Satisfaction	77	84	2,958	2,952	0,866	0,940	0,038	0,970
Excessive Workload	77	84	2,983	2,676	0,997	0,969	3812,000*	0,050
Mobbing	77	84	2,203	2,054	0,705	0,668	3656,000*	0,150
Opportunity	77	84	2,952	2,698	1,039	1,057	1,537	0,126
Pressure	77	84	3,477	3,519	0,870	0,798	-0,319	0,750
Rationalization	77	84	3,615	3,508	0,902	0,853	3557,500*	0,269
Competence	77	84	2,982	3,017	1,029	0,824	3310,500*	0,796

The test results indicated that only the average wage satisfaction differs significantly among gender groups ($p<0.05$), and nonsignificant differences were found for any other variable between gender or marital status groups ($p>0.05$). Regarding wage satisfaction, it was observed that male participants have a significantly higher average wage satisfaction compared to female ones.

Table 9. Relationship Between Age and Research Variables

Group Variable		Statistical Values			Anova (F Test)	
Age		N	Ort.	Ss	F	Sig.
Wage Satisfaction	18-25	31	2,839	0,682	1,081	0,359
	26-35	48	3,068	0,761		
	36-45	55	2,805	0,946		
	46 and above	27	3,194	1,194		
Excessive Workload	18-25	31	2,997	0,903	1,581	0,196
	26-35	48	2,669	0,846		
	36-45	55	2,847	1,023		
	46 and above	27	2,848	1,248		
Mobbing	18-25	31	2,242	0,672	2,970	0,054
	26-35	48	2,017	0,633		
	36-45	55	2,212	0,700		
	46 and above	27	2,006	0,763		
Opportunity	18-25	31	3,048	0,782	1,258	0,291
	26-35	48	2,469	0,964		
	36-45	55	3,009	1,116		
	46 and above	27	2,796	1,216		
Pressure	18-25	31	3,391	0,797	0,718	0,543
	26-35	48	3,339	0,703		
	36-45	55	3,730	0,835		
	46 and above	27	3,440	0,997		
Rationalization	18-25	31	3,699	0,706	2,283	0,081
	26-35	48	3,375	0,830		
	36-45	55	3,618	0,894		
	46 and above	27	3,605	1,066		
Competence	18-25	31	2,955	0,700	2,084	0,105
	26-35	48	2,788	0,900		
	36-45	55	3,051	0,993		
	46 and above	27	3,326	0,993		

*The test results indicate that none of the research variables show a statistically significant difference across age groups ($p>0.05$).

5.9.2. The Relationship Between Age and Research Variables

The interaction between wage satisfaction, excessive workload, mobbing, and the factors enabling employee fraud, namely opportunity, pressure, rationalization, and competence, with age groups were tested to define significant differences that exist. For variables with normally distributed data across more than two age groups, an ANOVA (F) test was used, while for variables without normal distribution, the Kruskal-Walli's test was applied. The test results are visualized in Table 9.

5.9.3. Relationship Between Education and Research Variables

The significance of divergents in wage satisfaction, excessive workload, and mobbing, as well as the opportunity, pressure, rationalization, and competence variables that enable employee fraud, across different education groups were tested. For variables that were normally distributed across more than two education groups, ANOVA (F) test was used, while the Kruskal-Walli's test was applied to variables that did not follow a normal distribution. The analysis results are presented in Table 10.

Table 10. Relationship Between Education and Research Variables

Group Variable		**Statistical Values**			**Anova (F Test)**	
Education		**N**	**Ort.**	**Ss**	**F**	**Sig.**
Wage Satisfaction	High School	28	3,036	0,954	4,365	0,006
	Vocational	21	2,524	0,774		
	Undergraduate	80	2,875	0,854		
	Graduate	32	3,367	0,918		
Excessive Overload	High School	28	2,621	0,888	2,823	0,051
	Vocational	21	3,352	0,895		
	Undergraduate	80	2,826	1,058		
	Graduate	32	2,644	0,871		
Mobbing	High School	28	1,947	0,669	2,303	0,079
	Vocational	21	2,413	0,640		
	Undergraduate	80	2,161	0,686		
	Graduate	32	2,005	0,697		
Opportunity	High School	28	2,601	0,922	1,644	0,182
	Vocational	21	3,095	1,186		
	Undergraduate	80	2,917	1,052		
	Graduate	32	2,588	1,038		
Pressure	High School	28	3,346	0,761	7,384	0,000
	Vocational	21	4,175	0,687		
	Undergraduate	80	3,509	0,827		
	Graduate	32	3,174	0,752		
Rationalization	High School	28	3,786	0,703	6,595	0,000
	Vocational	21	3,651	0,865		
	Undergraduate	80	3,687	0,836		
	Graduate	32	2,979	0,904		
Competence	High School	28	2,936	0,704	2,334	0,076
	Vocational	21	3,057	0,994		
	Undergraduate	80	3,148	0,972		
	Graduate	32	2,650	0,865		

If table 10 is examined, it can be observed that wage satisfaction, as well as the pressure and rationalization factors both of which facilitate employee fraud significantly differ across education groups ($p<0.05$). However, there are no significant differences were found for the other variables ($p>0.05$). Analyzing the post-hoc Tukey test results, it can be perceived that postgraduate degree holders have significantly higher wage satisfaction compared to other groups, especially with the associate degree holders. Regarding the pressure and rationalization factors, which contribute to employee fraud, postgraduate degree holders exhibit lower tendencies toward fraudulent behavior compared to other education groups.

Table 11. Relationship Between Internal Organizational Roles and Research Variables

Group Variables		**Statistical Values**			**Anova (F Test)**	
Organizational Role		**N**	**Ort.**	**Ss**	**F**	**Sig.**
Wage Satisfaction	Blue Collar	30	2,675	0,891	11,488	0,000
	White Collar	94	2,816	0,847		
	Manager	37	3,534	0,817		
Excessive Workload	Blue Collar	30	3,360	1,056	11,453	0,000
	White Collar	94	2,867	0,960		
	Manager	37	2,276	0,732		
Mobbing	Blue Collar	30	2,439	0,685	15,853	0,000
	White Collar	94	2,218	0,622		
	Manager	37	1,635	0,611		
Opportunity	Blue Collar	30	3,233	1,079	8,714	0,000
	White Collar	94	2,909	1,057		
	Manager	37	2,257	0,782		
Pressure	Blue Collar	30	3,868	0,776	13,698	0,000
	White Collar	94	3,602	0,785		
	Manager	37	2,948	0,729		
Rationalization	Blue Collar	30	4,023	0,787	11,369	0,000
	White Collar	94	3,603	0,790		
	Manager	37	3,072	0,931		
Competence	Blue Collar	30	3,360	1,144	5,540	0,005
	White Collar	94	3,030	0,892		
	Manager	37	2,632	0,668		

When table 11 is considered, it can could be observed that all variables significantly differ between each other according to internal organizational role groups ($p<0.05$). The results of the Tukey post-hoc test indicate that, from managers to employees, wage satisfaction is higher, while excessive workload and exposure to mobbing are lower. Relative to the elements enabling employee fraud, it was also observed that as one moves from managers to blue-collar workers, the likelihood of engaging in fraud increases when the factors of opportunity, pressure, rationalization, and competence emerge.

5.9.4. Relationship Between Tenure in the Organization and Research Variables

The examination is completed to reveal whether wage satisfaction, excessive workload, and mobbing as well as the fraud-enabling factors of opportunity, pressure, rationalization, and competence significantly differ regarding tenure groups in the organization. For variables with a normal distribution among tenure groups with more than two categories, ANOVA (F) test was applied, while the Kruskal-Walli’s test was used for variables without a normal distribution. The analysis results are visualized in Table 12.

Table 12. Relationship Between Tenure in the Organization and Research Variables

Group Variable		Statistical Values			Anova (F Test)	
Tenure in the Organization		N	Ort.	Ss	F	Sig.
Wage Satisfaction	1 year or less	35	2,914	0,707	3,103	0,051
	1-5 years range	50	3,020	0,759		
	6-10 years range	34	2,559	1,130		
	11 years or above	42	3,232	0,913		
Excessive Overload	1 year or less	35	2,691	0,821	2,505	0,061
	1-5 years range	50	2,760	0,909		
	6-10 years range	34	3,226	1,173		
	11 years or above	42	2,681	1,004		
Mobbing	1 year or less	35	2,086	0,626	1,040	0,377
	1-5 years range	50	2,104	0,627		
	6-10 years range	34	2,304	0,749		
	11 years or above	42	2,040	0,751		
Opportunity	1 year or less	35	2,733	0,839	2,217	0,086
	1-5 years range	50	2,760	1,039		
	6-10 years range	34	3,269	1,268		
	11 years or above	42	2,599	0,962		

Pressure	1 year or less	35	3,267	0,696	4,031	0,009
	1-5 years range	50	3,464	0,819		
	6-10 years range	34	3,906	0,806		
	11 years or above	42	3,412	0,878		
Rationalization	1 year or less	35	3,696	0,668	2,471	0,063
	1-5 years range	50	3,353	0,912		
	6-10 years range	34	3,852	0,975		
	11 years or above	42	3,453	0,843		
Competence	1 year or less	35	2,771	0,788	2,568	0,056
	1-5 years range	50	2,960	0,894		
	6-10 years range	34	3,359	1,206		
	11 years or above	42	2,948	0,737		

While examining Table 12, it is observed that the pressure factor, one of the elements enabling employee fraud, significantly differs across the groups based on tenure at the organization ($p<0.05$). No significant difference is found in other variables ($p>0.05$). The results of the post-hoc Tukey test show that the highest-pressure factor is observed among employees with 6-10 years of tenure at the organization.

5.9.5. The Relationship Between Professional Experience and Research Variables

The analyses are made to understand whether the variables of wage satisfaction, excessive workload, and mobbing, along with the elements enabling employee fraud opportunity, pressure, rationalization, and competence significantly differ across professional experience groups. For variables that follow a normal distribution, an ANOVA (F) test was used for groups with more than two categories, and the Kruskal-Walli's test was applied for variables that do not follow the normal distribution. The analysis results are presented in Table 13.

Tablo 13. Relationship between Professional Experience and Research Variables

Group Variable		**Statistical Values**			**Anova (F Test)**	
Professional Experience		**N**	**Ort.**	**Ss**	**F**	**Sig.**
Wage Satisfaction	1-5 years range	53	2,948	0,680	1,986	0,099
	6-10 years range	23	3,054	0,815		
	11-15 years range	24	2,760	0,839		
	16-20 years range	28	2,688	1,066		
	21 years and above	33	3,265	1,097		
Excessive Overload	1-5 years range	53	2,730	0,898	1,396	0,238
	6-10 years range	23	2,804	0,881		
	11-15 years range	24	2,996	0,838		
	16-20 years range	28	3,129	1,178		
	21 years and above	33	2,600	1,107		
Mobbing	1-5 years range	53	2,057	0,623	1,460	0,217
	6-10 years range	23	2,203	0,696		
	11-15 years range	24	2,230	0,676		
	16-20 years range	28	2,315	0,725		
	21 years and above	33	1,945	0,738		
Opportunity	1-5 years range	53	2,666	0,925	2,321	0,059
	6-10 years range	23	2,761	0,959		
	11-15 years range	24	2,876	1,018		
	16-20 years range	28	3,333	1,249		
	21 years and above	33	2,631	1,069		
Pressure	1-5 years range	53	3,403	0,706	1,350	0,254
	6-10 years range	23	3,360	0,715		
	11-15 years range	24	3,793	0,770		
	16-20 years range	28	3,635	1,031		
	21 years and above	33	3,430	0,920		
Rationalization	1-5 years range	53	3,585	0,794	0,169	0,954
	6-10 years range	23	3,593	0,765		
	11-15 years range	24	3,431	0,813		
	16-20 years range	28	3,607	1,089		
	21 years and above	33	3,546	0,954		

	1-5 years range	53	2,943	0,791		
	6-10 years range	23	2,696	0,910		
Competence	11-15 years range	24	2,842	0,867	2,044	0,091
	16-20 years range	28	3,350	1,234		
	21 years and above	33	3,121	0,809		

There is no significant difference for any research variable based on professional experience groups (p>0.05).

Table 14. Results of the Research Hypotheses

Hypotheses	Research Hypothesis
H_1: Wage Satisfaction has a significant effect on the Opportunity factor.	Validated
H_2: Excessive Workload has a significant effect on the Opportunity factor.	Validated
H_3: Mobbing has a significant effect on the Opportunity factor.	Validated
H_4: Wage Satisfaction has a significant effect on the Pressure factor.	Validated
H_5: Excessive Workload has a significant effect on the Pressure factor.	Validated
H_6: Mobbing has a significant effect on the Pressure factor.	Validated
H_7: Wage Satisfaction has a significant effect on the Rationalization n factor.	Validated
H_8: Excessive Workload has a significant effect on the Rationalization factor.	Validated
H_9: Mobbing has a significant effect on the Rationalization factor.	Invalidated
H_{10}: Wage Satisfaction has a significant effect on the Competency factor.	Validated
H_{11}: Excessive Workload has a significant effect on the Competency factor.	Validated
H_{12}: Mobbing has a significant effect on the Competency factor.	Invalidated

Wage satisfaction has a significant effect on the opportunity factor.

H_1: Multiple linear regression analysis revealed a statistically significant negative effect of wage satisfaction on the opportunity factor ($\beta = -0.198$, $p = 0.015$). This indicates that as employees' satisfaction with their salaries increases, the perception of opportunities to commit fraud decreases. The test model used an adjusted R^2 of 0.536, suggesting that wage satisfaction, excessive workload, and mobbing together explain 53.6% of the variance in opportunity. This implies that inadequate compensation may lead employees to perceive and potentially exploit gaps in the control systems.

Excessive workload has a significant effect on the opportunity factor

H_2: The regression analysis showed that excessive workload significantly and positively affects the opportunity element of the fraud diamond ($\beta = 0.279$, $p = 0.002$). As employees face greater workloads, they may identify weaknesses in internal processes, thereby increasing the likelihood of perceiving fraud opportunities. This relationship, tested within the same model as H1 and H3, confirms that workload stress is a critical enabling factor for fraudulent behavior.

Mobbing has a significant effect on the opportunity factor

H_3: According to the regression results, mobbing exhibited a strong positive and statistically significant effect on the opportunity dimension ($\beta = 0.618$, $p < 0.001$). Among the three predictors, mobbing had the largest standardized beta coefficient. This suggests that employees experiencing psychological harassment or social exclusion at work may become more inclined to identify and exploit fraud opportunities, potentially as a form of retaliation or disengagement.

Wage satisfaction has a significant effect on the pressure factor

H_4: The effect of wage satisfaction on the pressure component of the fraud diamond was negative and statistically significant ($\beta = -0.324$, $p < 0.001$), based on multiple linear regression. An adjusted R^2 of 0.562 indicates a high explanatory power of the model. This finding implies that higher wage satisfaction reduces the financial or psychological pressure that may otherwise motivate fraudulent actions.

Excessive workload has a significant effect on the pressure factor

H_5: Regression findings showed a significant positive relationship between excessive workload and pressure ($\beta = 0.288$, $p < 0.001$). High workloads may lead to stress, burnout, and performance anxiety, which collectively increase perceived pressure. This supports the fraud diamond theory's claim that workplace stress is a primary precursor to fraud.

Mobbing has a significant effect on the pressure factor

H_6: Mobbing was found to significantly increase the perception of pressure among employees (β = 0.210, *p* = 0.026). Although its effect size was smaller than the other two predictors, it was still statistically significant. The results underscore that psychological victimization can create emotional and professional pressure that aligns with conditions conducive to fraud.

Wage satisfaction has a significant effect on the rationalization factor

H_7: The regression analysis identified a significant negative effect of wage satisfaction on rationalization (β = -0.207, *p* = 0.016). As employees feel more fairly compensated, they are less likely to morally justify committing fraud. Although the adjusted R^2 of the model (0.193) was modest, the significance of the finding supports the idea that ethical rationalization declines as compensation improves.

Excessive workload has a significant effect on the rationalization factor

H_8: A significant positive effect was observed between excessive workload and rationalization (β = 0.256, *p* = 0.001), indicating that employees under high stress may be more inclined to justify fraudulent acts as a coping mechanism. This aligns with existing psychological theories suggesting that overburdened employees are more likely to morally disengage.

Mobbing has a significant effect on the rationalization factor

H_9: Contrary to expectations, the effect of mobbing on rationalization was statistically insignificant (β = -0.094, *p* = 0.486). This suggests that, while mobbing impacts other components of fraud motivation, it does not significantly influence the cognitive process of justifying fraud. This may indicate that emotional distress alone is insufficient to morally rationalize unethical behavior.

Wage satisfaction has a significant effect on the competence factor

H_{10}: Regression results indicated that wage satisfaction negatively and significantly affects the competence factor (β = -0.288, *p* < 0.001). The adjusted R^2 of the model was 0.380. This result implies that as satisfaction with pay increases, employees are less likely to misuse their skills or authority for fraudulent purposes.

Excessive workload has a significant effect on the competence factor

H_{11}: Excessive workload demonstrated a strong positive effect on the competence factor (β = 0.380, *p* < 0.001), indicating that increased workload might drive employees to misuse their capabilities. Among the predictors in this model, excessive workload had the highest influence on competence, suggesting a critical pathway from stress to misuse of skill and access.

Mobbing has a significant effect on the competence factor

H_{12}: The analysis showed that mobbing did not have a statistically significant effect on competence (β = 0.168, *p* = 0.182). This means that while mobbing can increase perceptions of pressure and opportunity, it does not necessarily lead employees to misuse their skills or authority for fraudulent actions. The emotional toll of mobbing may limit, rather than amplify, active misuse of competence.

6.CONCLUSION

The business environment is holding greater importance for the employees. While employees have financial expectations, they also care that having their ideas and opinions are considered during their time at work. These behaviors contribute to increasing motivation and wage appreciation, thereby improvement of performance in a positive path. The role of management in the implementation for performance enhancing methodologies is crucial. Negative behaviors, which are exhibited by managers toward employees, can lead to a reduction and loss of motivation and trust. In this context, it is important for managements to define factors which are affecting wage inequality for taking necessary measures.

Success, productivity, and continuity are each of them related to the performance of employees. The key factors ensuring the continuation of this interaction are the existence of fair wages, justice, and a suitable work environment. So, the higher wage satisfaction means the greater the organization's earnings. Since the individuals' expectations and needs are met in their wage times, motivation increases, stress decreases, and the necessary performance is achieved. As a result, these factors contribute to establishing an environment which supports wage satisfaction and, in turn, the sustainability of the organization because employees form the foundation of the organizations. In this context, fair wages are essential remarks to enhance socio-economic performance.

Mobbing in the labor place is seen as an important issue worldwide. In developed countries, the number of individuals who are incurred to mobbing has increased and has been causing serious harm. The risk of mobbing exists in every business. Mobbing not only influences employees but also causes significant harm to organizations. Most importantly, there is a risk of losing existing, talented, and experienced employees. In conclusion, if absenteeism and costs increase, the productivity rate decreases, and the organization's continuity is damaged and threatened. Moreover, mobbing within the workplace not only affects the victim but also the other employees, which could lead to reduce motivation and performance, as well as, most importantly, the loss of a sense of organizational commitment. Therefore, it is essential to determine the negative factors that affect the retention of high-quality employees and their intention to quit and evaluate the necessary conditions.

The objective of the study was to identify whether factors such as wage satisfaction, excessive workload, and mobbing have a significant effect on factors contributing to employee deceptiveness, including opportunity, pressure, rationalization, and competence.

The findings of the study showed that wage satisfaction has a negative effect on the opportunity factor, while excessive workload and mobbing have a positive effect. As wage satisfaction increases, the likelihood of an employee’s tendency to dishonest behavior decreases. However, as workload and mobbing factors rise, the likelihood of dishonest behavior also increases when the opportunity factor arises. It was found that these three independent variables explained 53.6% of the opportunity variable. The variables with the highest impact on the opportunity variable were found to be mobbing, excessive workload, and wage satisfaction, respectively.

In terms of the pressure factor, wage satisfaction had a negative effect, while the other two factors had a positive effect. As wage satisfaction increases, the likelihood of dishonest behavior decreases. However, as workload and mobbing factors increase, dishonest behavior also increases when the pressure factor is present. Wage satisfaction, excessive workload, and mobbing are independent variables explained 56.2% of the pressure variable. The variables with the highest impact on the pressure factor were wage satisfaction, excessive workload, and mobbing.

Wage satisfaction and excessive workload had a significant effect on the rationalization factor, but mobbing did not have a significant effect. Wage satisfaction had a negative effect, while excessive workload had a positive effect. These two variables explained 20.21% of the rationalization variable. Excessive workload had a higher impact on the factor of rationalization than wage satisfaction. As wage satisfaction rises, deceptive behavior decreases, but as workload increases, the likelihood of employees resorting to a rationalization for deceptive behavior also increases.

Moreover, wage satisfaction and excessive workload had a significant effect on the competence factor, while mobbing did not have a significant effect. Wage satisfaction had a negative effect, while excessive workload was positive. Wage satisfaction and excessive workload are explained by 38% of the competence variable. Excessive workload had a greater impact on the competence factor than wage satisfaction. As wage satisfaction increases, dishonest behavior decreases, but as the workload increases, the likelihood of employees engaging in dishonest behavior through competence also increases.

While examining demographic variables, it was found that male participants had significantly higher wage satisfaction compared to female ones. Age and professional experience variables did not diverge significantly in relation to the research variables. Postgraduate employees had significantly higher wage satisfaction than other educational groups. In the internal job role variable, wage satisfaction was higher for managers in comparison with the blue-collar workers, and the cases of excessive workload and mobbing were lower for managers. As an opportunity, pressure, rationalization, and competence factors emerged from managers to blue-collar workers, the likelihood of dishonest behavior rose. In terms of length of service in the organization, the highest pressure was found among those with 6-10 years of experience.

With this study, it is observed that the recommendations in the model will be beneficial for businesses for the prevention of deceptive actions, which has become a serious phobia for businesses and causes a 5% annual revenue loss. It has emerged that businesses need to be more vigilant and fastidious in executing their activities. This study was conducted in a production company in the Marmara Region, and future studies could expand the sample size, include different sectors, or compare research samples from corporate and family businesses, which can further contribute to the literature.

AUTHORS' DECLARATION:

This paper complies with Research and Publication Ethics, has no conflict of interest to declare, and has received no financial support. For the scale used in the article, it is declared by the authors that permission was optained from the original owner of the scale. Regarding the conduct of this research, an "*Ethics Permission Certificate*" dated 11/09/2024 and numbered E.70340 was obtained from the Ethics Committee of the University of İstanbul Medipol

AUTHORS' CONTRIBUTIONS:

The entire research is written by the author.

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