EKONOMIA I PRAWO. ECONOMICS AND LAW
Volume 24, Issue 3, 2025
p-ISSN 1898-2255, e-ISSN 2392-1625
www.apcz.umk.pl/EiP

Original article
received 21.02.2025; accepted 31.08.2025; published 30.09.2025
doi: 10.12775/ EiP.2025.14

The impact of the insurance market on economic growth: evidence from Türkiye

MUHAMMED VEYSEL KAYA

Department of Finance and Banking, Faculty of Financial Sciences, Ankara Hacı Bayram Veli University, Ankara, Türkiye
mveyselkaya@yahoo.com
ORCID: 0000-0001-9322-1694

MUHARREM UMUT

Department of Insurance, Faculty of Financial Sciences, Ankara Hacı Bayram Veli University, Ankara, Türkiye
muharrem.umut@gmail.com
ORCID: 0000-0002-9213-1440

ENES AKKURT

corresponding author
Department of Insurance, Institute of Graduate Programs, Ankara Hacı Bayram Veli University, Ankara, Türkiye
eakkurt24@gmail.com
ORCID: 0000-0002-7770-7704

Abstract

Motivation: The insufficient academic studies in the field of insurance in Türkiye and the lack of studies in the literature aimed at identifying the relationship between the financial market and the economic market have motivated this study.
Aim: One of Türkiye's emerging financial markets is the insurance market. This study aims to determine the direction of the relationship between the growth of Türkiye's emerging insurance market and economic growth.

Results: The analyses have revealed that there is either a unidirectional causal relationship between the variables used and economic growth or, in some cases, no causal relationship at all. Particularly, the results indicate a unidirectional causality and both short-term and long-term relationships between GDP and the variables of total premium production, claim payments, and market share. However, no causal relationship was found between the GDP variable and operating expenses, with only a long-term relationship with economic growth detected, and no short-term relationship identified. The research provides valuable insights for future research plans by revealing the interaction between the insurance sector in Türkiye and economic growth.

Keywords: insurance market growth; emerging financial markets; GDP; granger causality test; ARDL bounds test
JEL: A10; C32; G22; O4

1. Introduction

The onset of the COVID-19 pandemic in 2019 triggered a global economic downturn. Although the world economy contracted by 3.2% in 2022, projections for 2023 suggest a modest recovery with an estimated growth of 2.6% (OECD, 2023). Nevertheless, the prolonged effects of the pandemic, coupled with the Russia-Ukraine conflict and prevailing geopolitical uncertainties, have continued to constrain economic performance (IMF, 2024). Rising inflationary pressures, disruptions in global supply chains, and surging commodity prices have further exacerbated these challenges.

Financial markets constitute one of the primary engines of economic growth. Within this structure–comprising the banking, insurance, and capital markets–the insurance sector holds a particularly strategic position, accounting for approximately 5% of financial market activity following banking (TSB, 2022). Functioning as a risk transfer mechanism, insurance plays an indispensable role in maintaining economic continuity by enabling individuals and institutions to mitigate potential losses (Yang, 2024; Mili et al., 2024).

In recent years, the insurance industry has undergone a substantial transformation through digitalization and innovation. The emergence of Insurtech–encompassing technologies such as artificial intelligence, blockchain, and big data analytics–has significantly enhanced customer experience and improved underwriting accuracy (Qodirov et al., 2024). However, the sector is also increasingly exposed to adverse developments, such as climate change, pandemics, and cyber risks, which have resulted in higher claims and financial burdens (Krauss, 2024).

According to the SwissRe Sigma (2023) report, global insurance premium volume declined by 1.1% in 2022, amounting to $6.8 trillion. Nonetheless, a recovery is anticipated with a 1.7% increase in 2023, reaching $7.1 trillion. The global insurance penetration rate was 6.8%, and the average per capita

premium stood at $853. In Turkey, total premium production reached $13.1 billion, 90% of which originated from non-life insurance lines. Insurance penetration remained relatively low at 1.5%, with a per capita premium of $154 (SwissRe, 2023).

National data provided by the Insurance Association of Türkiye (IAT) indicate that, in 2023, non-life insurance premiums increased by 110.3%, while life insurance premiums rose by 83.7%, bringing total premium production to 486 billion TRY. With total assets amounting to 1.4 trillion TRY, the insurance sector ranks as the second-largest component of the financial system after the banking sector. Moreover, it contributes significantly to economic resilience, offering coverage totaling 576 trillion TRY–equivalent to 24 times the country's GDP–thus playing a vital role in sustaining economic activity (IAT, 2023).

Furthermore, the regulatory amendments introduced by the *Regulation Amending the Regulation on Insurance Agencies, published in the Official Gazette on January 22, 2025, have* imposed significant reforms on the insurance agency landscape (Regulation, 2025). These reforms encompass revised minimum capital requirements, enhanced qualification standards for technical personnel, alignment with international regulatory frameworks, sectoral stabilization measures, and the digitalization of administrative and registration processes.

As these figures indicate, the insurance market holds a very important position in both financial markets and the national economy. Direct or indirect growth in insurance will also trigger economic growth. Conversely, any negative development or stagnation in the insurance market will negatively impact economic growth. Furthermore, with the integration of markets and technology today, this impact occurs very quickly. In this context, examining the relationship between finance and growth is crucial. Identifying a positive or negative relationship will guide the importance given to or investments made in this area. In the literature, the relationship between insurance growth and economic growth within financial growth is generally observed to be positive (Adam et al., 2009). This relationship can be explained by the insurance market's contribution to economic growth and the increased demand for insurance with economic growth. However, this relationship is not always unequivocally positive. Some studies suggest that excessive growth or mispricing in the insurance market can threaten financial stability and exacerbate economic crises (Changa et al., 2014). Additionally, high insurance premiums can affect consumer spending and thus restrict economic growth. Therefore, the impact of the insurance market on economic growth is complex and multifaceted, requiring consideration of various factors (Ward and Zurbregg, 2000).

In this regard, it has been decided to conduct a study to determine the direction of the relationship between insurance growth and economic growth

in Türkiye. The insufficient academic studies in the field of insurance in Türkiye and the lack of studies in the literature aimed at identifying the relationship between the financial market and the economic market have motivated this study. The purpose of this study is to determine and evaluate the direction of the relationship between the insurance market in financial markets and economic growth in the long term. To investigate the causality relationship between the insurance market and economic growth, five variables are used: GDP, total gross premium production, gross claim payments, market share, and operating expenses of insurance companies. Using data spanning 30 years from 1993 to 2022 for these variables in Türkiye, the ARDL Bounds Test Approach and Granger Causality Test (GCT) are applied to explain the direction of the relationship.

The aim of this study is to determine and evaluate the direction of the long-term relationship between the insurance market in financial markets and economic growth. To investigate the causality relationship between the insurance market and economic growth, five variables are utilized: GDP, total gross premium production, gross claims paid, market share, and operating expenses of insurance companies. Using 30 years of data from 1993 to 2022 for these variables in Turkey, the ARDL Bound Test approach and Granger Causality Test (GCT) are applied to explain the direction of this relationship.

This paper is structured as follows: Following the introduction, the second section reviews the relevant literature on the relationship between the insurance market and economic growth. The third section presents the data and methodology, including a detailed explanation of the ARDL Bound Test and Granger Causality Test. The fourth section discusses the empirical findings based on the analysis of Turkey's insurance market and economic growth variables. Finally, the fifth section concludes the study with policy implications and suggestions for future research.

2. Literature review

Although there are various studies in the literature suggesting that financial growth stimulates economic growth, opposing views also exist. The first comprehensive study examining the relationship between insurance growth and economic growth was conducted by Ward and Zurbruegg (2000). Subsequently, Kugler and Ofoghi (2005) investigated the link between insurance companies' premium production and economic growth, finding that while insurance premium production affects economic growth in the short term, this effect does not persist in the long term.

Research conducted in Europe and the European Union (Ching, Kogid, and Furuoka, 2010; Ching et al., 2011; Jamil and Setiawan, 2023) has identified a causal relationship between the insurance market and economic

growth. Similarly, Akınlo (2013), examining Nigeria's insurance sector, found a unidirectional relationship between premiums, inflation, interest rates, and economic growth.

Analyses conducted in OECD countries (Changa, Lee, and Chang, 2014; Demirci and Eren, 2017; Apergis and Poufinas, 2020) have demonstrated a significant relationship between the insurance sector and economic growth. Research focusing on African countries (Akınlo, 2015; Alhassan and Biekpe, 2016) also revealed a positive link between the insurance market and economic growth.

Pradhan et al. (2017), investigating the insurance sector and economic growth in Eurozone countries, reported a bidirectional relationship. Further studies within Europe and the European Union (Peleckienė et al., 2019; Mitrasević, 2022) found that the insurance market contributes positively to economic growth.

Singhala, Goyal, and Singhal (2020) examined the causality between the insurance economy and overall economic conditions in 19 developing Asian countries, concluding that the insurance market has a unidirectional impact on the economy. Mouloudi and Benladgham (2020) analyzed the relationship between Morocco's life and non-life insurance markets and economic growth using Granger causality and ARDL tests, concluding that non-life insurance contributes to long-term economic growth, whereas life insurance has a short-term effect.

Ergün (2022) studied the relationship between private pension insurance and economic growth, finding no short-term relationship but a significant long-term link. Dalkılıç and Gülcemal (2022) investigated the impact of GDP and insurance expenditure growth on the insurance market share in Turkey and concluded that both variables contributed to the increase in market share. Yıldırım (2022) tested the contribution of premium production in the insurance sector to economic growth and identified a positive, unidirectional relationship. The study emphasized that economic growth positively affects premium production in the insurance sector and that premium production is a driving factor for economic growth.

Tran et al. (2023) examined the relationship between the insurance sector and economic growth in Vietnam and found that life insurance has both short-term and long-term relationships with economic growth, while non-life insurance affects only the long term. Saleh, Jawabreh, and Ali (2023) analyzed the relationship between the insurance market and economic growth in Jordan, identifying a long-term relationship.

Unlike the aforementioned literature, the present study aims to investigate the relationship between specific variables of the insurance market and Turkey's economic growth in both the short and long term.

3. Methods

3.1. Data Set and Variables

To investigate the Granger causality between the insurance market and economic growth, five macroeconomic variables were used. While the GDP variable represents economic growth, the variables representing the insurance market are total gross premium income (TGPI), total gross claims paid (TGCP), insurance market share (IMS), and operating expenses (OE) (Dalkılıç and Gülcemal, 2022; Apergis and Poufinas, 2020).

The dataset used in the research was compiled from publicly available annual data published by the Organization for Economic Co-Operation and Development (OECD), the Insurance Association of Türkiye (IAT), and the Turkish Statistical Institute (TSI). The study covers a period of 30 years from 1993 to 2022.

3.2. Model Formulation

The analyses in this study were conducted using the EViews 12 SV program. Firstly, the normality of the data was tested using the Jarque-Bera test. To test for the presence of a unit root in a time series, the Augmented Dickey-Fuller (ADF) test was employed (Ghimire, 2014). Following the unit root test, the ARDL Bound Test and Granger Causality Test (GCT) were used to determine the existence of relationships between different variable groups. The ARDL (Autoregressive Distributed Lag) Bound Test allows for the analysis of relationships between variables that are not stationary at the same order. In the ARDL (Autoregressive Distributed Lag) test, 'lag' (abbreviated as 'l') refers to the inclusion of a variable's past (lagged) values in the model. This allows for the examination of how both the dependent and independent variables past values influence their current values.

The ARDL Bound Test offers various advantages over other tests. It can identify relationships between variables with different levels of stationarity, it can be applied to small sample sizes, and it provides more reliable and consistent results due to the unrestricted error correction model, offering both long-term and short-term analysis results (Karaş, 2023). The ARDL Bound Test is mathematically formulated as follows (Gülmez, 2015):

The ARDL Bound Test comprises three stages. In the first stage, it is tested whether there is a long-term relationship between the relevant variables. Assuming the existence of a cointegration relationship, the second and third stages involve obtaining short-term and long-term elasticities. The formula used in the first stage of the test, adapted to this study, is as follows:

$$\Delta LGDP = a_0 + \sum_{i=1}^{k} a_i \Delta LGDP_{t-i} + \sum_{i=0}^{k} a_{2i} \Delta LTGCP_{t-i} + \sum_{i=0}^{k} a_{3i} \Delta LIMS_{t-i} + \sum_{i=0}^{k} a_{4i} \Delta LOE_{t-i} + a_5 \Delta LGDP_{t-1} + a_6 \Delta LTGPI_{t-1} + a_7 \Delta LIMS_{t-1} + a_8 \Delta LOE_{t-1} + \varepsilon_t \quad (1)$$

The variables used in this model aim to analyze the short- and long-term relationships between the insurance sector and economic growth in Turkey. LGDP represents the logarithm of Gross Domestic Product and serves as the dependent variable, reflecting economic growth. LTGPI is the logarithm of total gross premium income generated by insurance companies and indicates the production volume within the sector. LIMS refers to the logarithm of the insurance market share, representing the relative size of the insurance sector within financial markets. LOE denotes the logarithm of the total operating expenses of insurance companies and reflects the level of operational costs in the sector. The symbol Δ (delta) indicates the first difference of the variable, capturing its period-over-period change and representing short-term dynamics. k refers to the maximum lag length used in the model, while ε_t stands for the error term, representing random shocks or unexplained variations. This model structure enables the examination of both short- and long-term effects of insurance sector indicators on economic growth.

To test for the presence of a cointegration relationship, the differences of the variables used in Equation 1 were first taken, and the lag length value, denoted ask, was determined. For this purpose, information criteria such as Akaike (AIC) and Schwarz (SIC) are used in the literature. After determining the lag length, the presence of a cointegration relationship was tested by examining the significance of the lagged level values of the dependent and independent variables in Equation 1. The hypothesis tested and adapted for this study is as follows:

$$H_0 = a_5 = a_6 = a_7 = a_8 = 0$$

To test the above hypothesis, the standard F-statistic was used. If the calculated F-statistic is greater than the upper bound value (I), the presence of a cointegration relationship can be inferred. Subsequently, the second and third stages are carried out. The following formulas pertain to stages 2 and 3.

$$\Delta LGDP = a_0 + \sum_{i=1}^{k} a_i \Delta LGDP_{t-i} + \sum_{i=0}^{l} a_{2i} \Delta LTGPI_{t-i} \sum_{i=0}^{m} a_{3i} \Delta LIMS_{t-i} \sum_{i=0}^{n} a_{4i} \Delta LOE_{t-i} + \varepsilon_i \quad (2)$$

Equation 2 is used for the long-term ARDL bounds test.

$$\Delta LGDP = a_0 + \sum_{i=1}^{k} a_i \Delta LGDP_{t-i} + \sum_{i=0}^{l} a_{2i} \Delta LTGPI_{t-i} \sum_{i=0}^{m} a_{3i} \Delta LIMS_{t-i} \sum_{i=0}^{n} a_{4i} \Delta LOE_{t-i} + \beta ECT_{t-1} + \varepsilon_i \quad (3)$$

Equation 3 is used for the short-term ARDL bounds test and is examined with the error correction model. The error correction term is denoted by ECT. A coefficient of the ECT between 0 and -1 indicates a monotonic convergence to the long-term equilibrium, while a coefficient between -1 and -2 suggests convergence with dampening oscillations, and a coefficient smaller than -2 indicates divergence from equilibrium.

The Granger Causality Test (GCT), used in this study alongside the ARDL Bounds Test to enhance the reliability of the results, allows for the analysis of the lagged relationships between variables and is conducted with time series data. GCT statistically measures the direction of the relationship between the variables used in the analysis. It is an analysis method that tests the hypotheses of the presence or absence of a relationship between variables (Öner, 2022). GCT is calculated using the following formula (Doğan, 2024: 39):

$$X_t = a + \sum_{j=1}^{i} bixt - i + \sum_{j=1}^{i} ciyt - i + \varepsilon_t \quad (4)$$

$$Y_t = a + \sum_{j=1}^{i} bixt - i + \sum_{j=1}^{i} ciyt - i + \varepsilon_t \quad (5)$$

Equations 4 and 5 provide the formulas for the causality relationship between two variables. Through these equations, the direction of causality is determined in the presence of a lagged relationship between the two variables.

4. Results

Testing for Granger causality requires that the data used be normally distributed. A normality test has been conducted, and the Jarque Bera (J-B) statistic along with its probability value has been calculated. The results of the normality test are provided in Table 1.

In Table 1, the p-value of the Jarque-Bera statistic for all 5 variables was found to be above 5%. This indicates that the entire dataset follows a normal distribution. The data is suitable for the Granger causality test.

The Augmented Dickey-Fuller (ADF) test was applied to test for the presence of unit roots in the variables used in the analysis. Table 2 presents the results of the unit root test.

Upon examining the results in Table 2, it is observed that according to the Augmented Dickey-Fuller (ADF) unit root tests conducted on the variables, all series do not contain unit roots, indicating stationarity. When first-order

and second-order differences are taken for non-stationary variables, they become stationary. This indicates that all variables are stationary.

In this study, variables representing the insurance market indicators and the GDP value representing economic growth were analyzed to investigate the relationship between the insurance market and economic growth using the ARDL Bound Test. The diagnostic pre-test statistics measured for the ARDL Bound Test, where GDP is defined as the dependent variable, are provided in Table 3.

According to the diagnostic statistics results provided in Table 3, the analysis reveals no issues of autocorrelation (LM Test) or heteroscedasticity (Heteroskedasticity Test), and the model demonstrates a normal distribution (Jarque-Bera). These results indicate that the established model is highly reliable.

After confirming the analysis with diagnostic pre-tests, an F-test was applied to examine the long-term relationship between the variables and to identify the cointegration relationship. The results of the F-test are presented in Table 4.

The results presented in Table 4 show that the F-statistic value of 16.55 is greater than the upper bound critical values at the 1%, 2.5%, 5%, and 10% significance levels. The fact that the F-statistic value exceeds these critical values indicates a long-term relationship between GDP and the other variables used in the analysis. In other words, it demonstrates the existence of a cointegration relationship between GDP and the independent variables. After identifying the presence of a long-term relationship through the F-statistic value, the next step is to estimate the long-term coefficients in the analysis. The ARDL long-term coefficients and their probability values are presented in Table 5.

According to the ARDL long-term estimation results presented in Table 5, total gross premium income (TGPI) and insurance market share (IMS) have a statistically significant impact on the GDP variable at the 1% significance level, while total gross claims paid (TGCP) and operating expenses (OE) have a significant impact at the 5% significance level. These results indicate that increases in TGPI and OE positively and significantly affect GDP, whereas increases in TGCP and IMS negatively and significantly affect GDP.

The CUSUM test was employed to assess the coefficient stability of all explanatory variables included in the model. To determine whether there are any structural breaks in the analysis, or in other words, to measure the stability of the coefficients of the variables, the CUSUM and CUSUMQ tests were used. The graphs for these tests are presented in Figure 1.

The CUSUM and CUSUMQ graphs presented in Figure 1 show that the plotted lines remain within the boundary region at the 5% significance level. Accordingly, based on the results of the CUSUM and CUSUMQ tests for the ARDL bound test approach, it is observed that there are no structural breaks in the long-term analysis and that the model is stable.

In the final stage of the ARDL bound test, the ECM (Error Correction Model) coefficient was estimated to determine the short-term relationship between the relevant variables. The short-term results obtained from this estimation are presented in Table 6.

In the short-term estimation results presented in Table 6, the ECM coefficient is found to be negative (-0.4213) and statistically significant at the 1% level. This indicates that short-term deviations will converge to equilibrium in the long term. Specifically, 42.13% of a short-term deviation will be corrected in the following period. Thus, short-term deviations will reach equilibrium approximately 2.4 periods later, after which these deviations will be eliminated.

The Granger causality test demonstrates the dynamic relationship between variables. In the study, variables representing the insurance market and the GDP value, which represents economic growth, were examined. The relationship between the insurance market and economic growth was analyzed using the Granger causality test approach.

The results from the Granger causality analyses are presented in Table 7. The findings indicate either a unidirectional causality relationship between the variables and economic growth or no causality relationship at all. According to the results, there is a unidirectional causality relationship between the GDP variable and the TGPI, TGCP, and IMS variables. However, no causality relationship has been detected between the GDP variable and the OE variable.

The obtained results are similar to the findings of studies conducted by Kugler and Ofoghi (2005), Ching, Kogid, and Furuoka (2010), Ching et al. (2011), Akınlo (2013), Changa, Lee, and Chang (2014), Akınlo (2015), Alhassan and Biekpe (2016), Pradhan et al. (2017), Demirci and Zeren (2017), Peleckienė et al. (2019), Singhala, Goyalb, and Singhalc (2020), Apergis and Poufinas (2020), Mitrasević (2022), Yıldırım (2022), Saleh, Jawabreh, and Ali (2023), and Setiawan (2023), while they differ from the studies conducted by Ergün (2022) and Dalkılıç and Gülcemal (2022). This study offers several original contributions to the existing literature. First, it utilizes a long-term dataset spanning 30 years, which enhances the robustness and reliability of the findings by capturing structural changes and long-run dynamics in the relationship between the insurance sector and economic growth. Second, unlike many previous studies that relied on older or shorter datasets, the use of updated and extended time series data allows for a more accurate reflection of current economic and sectoral trends. Third, the study employs both the ARDL bounds testing approach and Granger causality analysis, offering a comprehensive methodological framework that investigates both long-term equilibrium relationships and the direction of causality. Fourth, while earlier research typically used a limited number of variables to represent the insurance sector, this study incorporates four distinct indicators, thereby

enriching the scope and depth of the analysis. Additionally, the study adopts a novel perspective by addressing the issue from both macroeconomic and policy-oriented angles, providing actionable recommendations for sectoral stakeholders and public authorities alike. These aspects collectively underscore the originality and practical relevance of the study.

5. Conclusion

Recently, global economies have faced significant challenges in economic growth, particularly exacerbated by the Covid-19 pandemic. The pandemic in 2019, followed by the Russia-Ukraine war, global warming, climate change-induced disasters such as earthquakes and floods, geopolitical factors, inflation, rising commodity prices, and disruptions in supply chains have continuously impacted economies negatively. Although there were signs of recovery in 2023, the desired growth has not yet been achieved. Türkiye's economic growth has also been affected by these factors and has not reached the expected high levels, despite positive developments in export growth supported by the depreciation of the Turkish lira as a result of high inflation. While sectors such as foreign trade, manufacturing, construction, and health play a role in growth, developments in financial markets, whether positive or negative, directly affect economic growth. Within financial markets, the insurance market holds significant importance following the banking sector. This is because the guarantees and protection provided by the insurance market enable other sectors to continue their activities with confidence.

Thus, there is a direct relationship between the growth of the insurance market and economic growth. However, this relationship can be either positive or negative, depending on developments in the markets. Studies in the literature have been conducted to determine the direction of this relationship. These studies show that the direction of the relationship varies based on the data obtained and differs from country to country. Therefore, it is not always possible to assert that there is a positive relationship between the growth of the insurance market and economic growth.

This study aims to determine the nature of the relationship between Türkiye's economic growth and the growth in the insurance market, both in the short and long term, using 30 years of data from 1993 to 2022. The Granger Causality Test and the ARDL Bound Test were employed for this purpose. Within this framework, Türkiye's economic growth (GDP), total premium production in the insurance market, total claim payments, market share, and operating expenses were selected as variables, and causality was investigated.

The analysis and the 30 years of data revealed that there is a unidirectional causality relationship between the used variables and economic growth, or in some cases, no causality relationship at all. It was concluded that the insurance market affects economic growth through various variables both

in the short and long term. Specifically, there is a unidirectional causality relationship between the GDP variable and the variables of total premium production, claim payments, and market share. Additionally, these variables were found to be related to economic growth both in the short and long term. However, no causality relationship was found between the GDP variable and the operating expenses variable, with a relationship being identified only in the long term and not in the short term.

Therefore, when premium production, claim payments, and the market shares of companies in the insurance market increase, GDP growth occurs; conversely, negative growth occurs when these decreases. Currently, the insurance market's share in financial markets is 5%, and its share in GDP (insurance penetration), including the private pension sector, is approximately 2%, which is still insufficient. In other words, there is substantial potential for growth. By increasing premium production and the number of policies, and better managing claims, it is possible to enhance the size of the insurance market and thereby increase its contribution to economic growth.

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Acknowledgements

Author contributions: Authors have given an approval to the final version of the article. Authors contributed to this work as follows: M.V.K., M.U., E.A. developed the concept and designed the study, E.A. collected the data, M.V.K., M.U., E.A. analysed and interpreted the data, M.V.K., M.U., E.A. prepared the draft of the article, M.V.K., M.U. revised the article critically for important intellectual content.

Appendix

Table 1. Normality Test of Variables

VARIABLES	GDP	TGPI	TGCP	IMS	OE
Jarque - Bera	3.27	3.34	3.72	2.52	3.33
P value	0.19	0.18	0.15	0.28	0.18
Observations	30	30	30	30	30

Table 2. Unit Root Tests of Variables

Augmented Dickey-Fuller (ADF) Test						
VARIABLE	LEVEL		1ST DİFFERENCE		2 ST DİFFERENCE	
	INTERCEPT	INTERCEPT AND TREND	INTERCEPT	INTERCEPT AND TREND	INTERCEPT	INTERCEPT AND TREND
GDP	1.98	0.05	-0.73	-2.69	-4.18*	-4.36*
TGPI	-0.22	-2.52	-2.45	-2.37	-9.84*	-9.60*
TGCP	-1.25	-0.44	-2.32	-4.96*	-10.13*	
IMS	-1.06	-1.77	-2.30	-2.62	-9.47*	-9.23*
OE	-0.91	-3.78**	-5.67*			

***, ** and * indicate significance at the 1%, 5% and 10% significance level, respectively.

Table 3. Diagnostic Statistics Results

Diagnostic Preliminary Tests	Test Statistic	Prob.
Heteroskedasticity Test: Breusch-Pagan-Godfrey	1.88	0.13
Breusch-Godfrey Serial Correlation LM Test	1.99	0.18
Jarque-Bera Normality Test	0.81	0.66
R-squared		0.99
Adjusted R-squared		0.99
Durbin-Watson stat		2.58

Table 4. F-test Results

Test Statistic	Value	Prob.	I(0)	I(1)
		%10	2.45	3.52
F-istatistiği (Wald)	16.55	%5	2.86	4.01
		%2.5	3.25	4.49
		%1	3.74	5.06

Table 5. ARDL Long-Term Forecast Results

VARIABLES	Coefficient	Std. Dv.	t- Statistic	Prob.
TGPI	467.77	44.43	10.52	0.0000***
TGCP	-314.67	120.92	-2.60	0.0219**
IMS	-0.19	46.80	-4.08	0.0013***
OE	561.00	237.58	2.36	0.0345**
C	661791.00	181569.40	3.64	0.0030***

***, ** and * indicate significance at the 1%, 5% and 10% significance level, respectively.

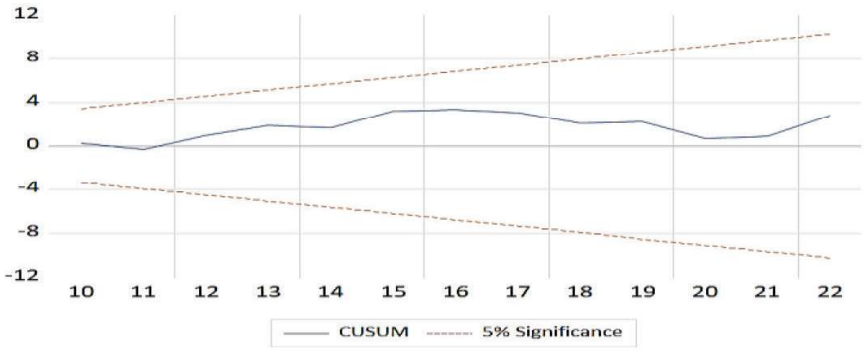
Table. 6. ARDL Short-Term Forecast Results

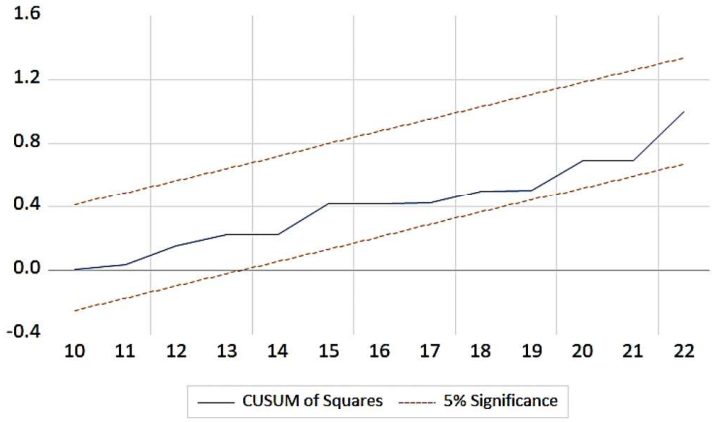
VARIABLES	Coefficient	Std. Dv.	t- Statistic	Prob.
D(GDP)	-0.64	0.13	-4.64	0.0005
D(TGCP)	-95.68	29.56	-3.23	0.0065
D(IMS)	-0.54	63.33	3.83	0.0021
D(OE)	0.42	50.54	0.84	0.4142
CointEq (-1)	-0.42	0.04	-10.40	0.0000

Table 7. Granger Causality Test Results

1-Granger Causality Test (GDP - TGPI)				
H_0	Chi-sq	Prob	df	Number of Observations
GDP is not the cause of TGPI.	14.06	0.0071	4	30
TGPI is not the cause of GDP.	4.37	0.3578	4	30
2-Granger Causality Test (GDP - TGCP)				
H_0	Chi-sq	Prob	df	Number of Observations
GDP is not the cause of TGCP.	5.84	0.2108	4	30
TGCP is not the cause of GDP.	18.16	0.0011	4	30
3-Granger Causality Test (GDP - IMS)				
H_0	Chi-sq	Prob	df	Number of Observations
GDP is not the cause of IMS.	13.61	0.0086	4	30
IMS is not the cause of GDP.	4.24	0.3740	4	30
4-Granger Causality Test (GDP - OE)				
H_0	Chi-sq	Prob	df	Number of Observations
GDP is not the cause of OE.	6.95	0.1381	4	30
OE is not the cause of GDP.	1.43	0.8388	4	30

Figure 1. CUSUM and CUSUMQ Test Results




1.6
1.2
0.8
0.4
0.0
-0.4
10
11
12
13
14
15
16
17
18
19
20
21
22
CUSUM of Squares
5% Significance