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THE IMPACT OF INFLATION AND GROSS DOMESTIC PRODUCT ON THE BANKING INDEX: THE CASE OF TURKEY

This study examines the effect of inflation and GDP on the banking index. As the research methodology, the stationarity of time series data was tested using the Augmented Dickey-Fuller (ADF) test, and analyzes were conducted using the Vector Auto regression (VAR) model and the Granger Causality Test. According to the findings, the banking index followed a general upward trend between 2005 and 2021, with a significant increase observed particularly after 2021. While the inflation rate remained low and stable from 2005 to 2019, it started to rise after 2019. GDP, on the other hand, consistently increased, indicating economic growth. Statistical analyzes revealed that inflation has a significant causal effect on the banking index, whereas GDP does not have a direct impact. Correlation tests showed that inflation has a positive relationship with both the banking index and GDP, and there is also a positive correlation between the banking index and GDP. This study highlights the significant effect of inflation on the banking index and emphasizes the necessity of considering this impact in economic policy decisions. Additionally, the lack of a direct effect of GDP on the banking index suggests that other macroeconomic factors and market dynamics play a more prominent role in the financial sector.

Key words: inflation, GDP, Banking, Banking Index, BIST.

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Инфляция мен жалпы ішкі өнімнің банк индексіне әсері: Түркия мысалында

Бұл зерттеуде инфляция мен ЖІӨ-нің банк индексіне әсері қарастырады. Зерттеу әдістемесі ретінде кеңейтілген Дики-Фуллер сынағы (ADF) арқылы уақыт қатарының деректерінің стационарлығын тексеру қолданылды және талдау векторлық Автоматты регрессия (VAR) моделі мен грейнджердің себеп-салдарлық сынағы арқылы жүргізілді. Алынған мәліметтерге сәйкес, банк индексі 2005 және 2021 жылдар аралығында жалпы өсу тенденциясына ие болды, әсіресе 2021 жылдан кейін айтарлықтай өсу байқалды. Инфляция деңгейі 2005 жылдан 2019 жылға дейін төмен және тұрақты болғанымен, 2019 жылдан кейін ол өсе бастады. Екінші жағынан, ЖІӨ үнемі өсіп отырды, бұл экономикалық өсуді көрсетеді. Статистикалық талдау инфляцияның банк индексіне айтарлықтай себеп-салдарлық әсер ететінін көрсетті, ал ЖІӨ тікелей әсер етпейді. Корреляциялық сынақтар инфляцияның банк индексімен де, ЖІӨ-мен де оң байланысы бар екенін және банк индексі мен ЖІӨ арасында оң корреляция бар екенін көрсетті. Бұл зерттеу инфляцияның банк индексіне айтарлықтай әсерін және экономикалық саясат шешімдерінде осы әсерді ескеру қажеттілігін көрсетеді. Сонымен қатар, ЖІӨ-нің банк индексіне тікелей әсер етпеуі басқа макроэкономикалық факторлар мен нарық динамикасы қаржы секторында анағұрлым көрнекті рөл атқаратындығын көрсетеді.

Түйін сөздер: инфляция, ЖІӨ, банк қызметі, банк индексі, BIST.

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Влияние инфляции и валового внутреннего продукта на банковский индекс: на примере Турции

В этом исследовании рассматривается влияние инфляции и ВВП на банковский индекс. В качестве методологии исследования была использована проверка стационарности данных временных рядов с использованием расширенного теста Дики-Фуллера (ADF), а анализ проводился с использованием модели векторной автоматической регрессии (VAR) и теста причинно-след-

ственной связи Грейнджера. Согласно полученным данным, банковский индекс в период с 2005 по 2021 год имел общую тенденцию к росту, причем значительный рост наблюдался особенно после 2021 года. Хотя уровень инфляции оставался низким и стабильным с 2005 по 2019 год, после 2019 года он начал расти. ВВП, с другой стороны, постоянно увеличивался, что свидетельствует об экономическом росте. Статистический анализ показал, что инфляция оказывает значительное причинно-следственное влияние на банковский индекс, в то время как ВВП не оказывает прямого влияния. Корреляционные тесты показали, что инфляция имеет положительную взаимосвязь как с банковским индексом, так и с ВВП, и также существует положительная корреляция между банковским индексом и ВВП. В этом исследовании подчеркивается значительное влияние инфляции на банковский индекс и необходимость учета этого влияния при принятии решений в области экономической политики. Кроме того, отсутствие прямого влияния ВВП на банковский индекс свидетельствует о том, что другие макроэкономические факторы и динамика рынка играют более заметную роль в финансовом секторе.

Ключевые слова: инфляция, ВВП, банковская деятельность, Банковский индекс, BIST.

Introduction

Macroeconomic indicators are fundamental tools for measuring a country's financial and economic structure. Among these indicators, inflation and Gross Domestic Product (GDP) constitute the core components of macroeconomic analyzes and are among the most significant factors influencing financial markets (Kendirli & Çankaya, 2016). Inflation represents the general increase in price levels within an economy (Barro, 1996), while GDP is considered a measure of a country's production capacity and economic size (Özsoy & Tosunoğlu, 2017). These two variables not only determine the overall performance of a country's economy but also significantly affect the functioning of financial markets, particularly the banking sector.

Furthermore, these key macroeconomic indicators play a crucial role in financial markets due to their direct and indirect effects. In particular, the close relationship between GDP and financial indicators such as banking indices has been a key subject in the literature. Banking indices serve as benchmarks for the stock performance of banks and directly influence financial stability and economic growth (Gertler & Kiyotaki, 2015). Additionally, the banking index tracks the overall structure and performance of a country's banking sector and consists of the publicly traded stocks of banks. Therefore, banking indices are essential tools for understanding the impact of economic variables on financial markets (Doğru & Medetoğlu, 2023).

Inflation, by causing a decrease in the value of money and an increase in price levels within an economy, can lead to significant consequences in financial markets. High inflation often prompts central banks to raise interest rates and implement measures to control economic activities (Alvarez et al., 2001). This, in turn, directly affects banks' lending capacity, cost structure, and profitability. In an environment of rising inflation, banks experience increased financing costs, while demand for consumer and corporate loans may fluctuate. In this context, the effects of inflation on the banking index can be shaped through channels such as interest rates and loan demand (Bravo, 2022).

GDP, on the other hand, is a critical macroeconomic indicator that measures a country's economic size and production capacity (Schreyer, 2016). Economic growth is generally associated with increased production, investments, and consumption. This process directly influences banks' lending activities. High GDP growth can be seen as an indicator of increased economic activity and rising demand for bank loans (Thaçi, 2022). While economic growth allows banks to expand their loan portfolios, periods of economic contraction can increase the risks of loan defaults, negatively impacting the banking sector (Lavrushin, 2010). In this regard, the impact of GDP on the banking sector is quite complex, involving both the opportunities provided by economic expansion and the challenges posed by potential economic downturns.

The aim of this study is to conduct an in-depth analysis of the effects of inflation and GDP on the banking index. Although various analyses in the literature examine the connection between inflation, economic development, and financial indicators, there is a small amount of practical investigations on the movement and correlations of these effects. In growing economies, in particular, the impact of macroeconomic variables such as inflation and growth on financial markets can vary significantly depending on different economic situations and market conditions. In this regard, an analysis based on the case of Turkey will not only help better understand the behavior of banking indices in emerging markets but also provide valuable insights into the effects of economic indicators on financial markets.

This study first examines the effects of inflation and GDP on the banking index within a theoretical framework and then evaluates the nature, magnitude, and direction of this relationship through empirical analyses. The study investigates how inflation and economic growth rates influence the banking sector, particularly in terms of bank profits, loan volume, interest rates, and economic confidence. Additionally, it aims to develop a new perspective on how banking indices respond to economic indicators by analyzing both short- and long-term dynamics.

Additionally, this analysis aims to emphasize that financial indicators are not only a reflection of financial scale and price levels but also measures of market uncertainty in investment sectors, capital availability, and financial optimism. The results of this study could serve as an essential guide for both decision-makers and market participants in influencing economic policy decisions and investment strategies.

Literature review

This research intends to examine the connections and correlations between inflation, Gross Domestic Product (GDP) or national income, and banking indices. The main objective of the research is to examine the possible effects of inflation and GDP on banking indices from causality and correlation perspectives. This analysis seeks to contribute to a better understanding of the dynamics between these fundamental economic parameters.

In terms of scope, the research applies econometric analysis methods using time series data. The stationarity of the time series data was tested using the Augmented Dickey-Fuller (ADF) test, as the influence of inflation and GDP on banking metrics were analyzed via techniques such as the VAR (Vector Auto Regression) framework and the causality assessment test. These techniques were utilized to analyze the connections and dependencies between these key financial elements.

An analysis of existing research shows that research has examined the relationship between GDP, inflation, and the banking sector/indices from various viewpoints. It has been noted that political and economic factors, in addition to measures like economic output have the power to influence investor decisions. Stock markets are also significantly affected by these factors, leading to considerable market fluctuations. However, predicting which specific variables directly impact the stock market remains challenging. Additionally, whether these interactions have positive or negative effects varies depending on the economic conditions of different countries and markets.

On the other hand, bank stocks are found to respond significantly to these changes due to their large size, balance sheet structures, and high trading volumes. The financial sector index has a strong presence in the Borsa Istanbul (BIST) relative to other publicly traded firms as a result of its funding models, trading activity, and high market values. Moreover, considering criteria such as adherence to corporate governance principles, transparency, and auditability, banks tend to have a more institutionalized structure compared to other companies. It is believed that macroeconomic variables such as inflation and GDP may influence the Banking Index.

Numerous national and international studies have examined these relationships. For instance:

Choi, Elyasian, and Kopecky (1992) examined changes in international foreign exchange markets and the stock returns of American banks. The study, which focused on 48 major U.S. banks with net foreign exchange positions after the 1970s, specifically analyzed how these banks were affected by exchange rate fluctuations. The findings indicated a negative relationship between exchange rates and bank stock returns until October 1979, but this relationship turned positive in the 1980s. The decline in major foreign currency holdings in the 1980s was cited as the reason for this shift.

King and Levine (1993) analyzed 80 countries from 1960 to 1989 and found that banking indices had a strong correlation with both current and future GDP growth rates.

Rajan and Zingales (1998) demonstrated that an efficient banking sector had a positive impact on GDP based on an analysis of data from 1980 to 1990.

Ewing (2002) examined the impact of macroeconomic developments on 100 stocks tracked by the NASDAQ index. The analysis revealed a positive and sensitive relationship between inflation and the financial sector index, while monetary policy shocks had a negative impact on the banking index, especially following the second month. Unanticipated market events were shown to have a positive effect on economic growth, highlighting the complex and advanced market structure of U.S. stock market indicators.

Durukan (1999) investigated the relationship between macroeconomic variables such as inflation, interest rates, exchange rates, and money supply with stock prices of companies listed on the Istanbul Stock Exchange. The study, which used data from 1986 to 1998 and applied the Least Squares

Method, identified an inverse correlation between interest rates and stock prices. Nevertheless, no substantial correlation was observed between inflation, exchange rates, and stock returns during financial crises and inflationary periods in the 1990s.

Al-Sharkas (2004) analyzed the connection between financial metric and share prices within the Amman Stock Market over the period March 1980-December 2003. The research incorporated factors like liquidity levels, manufacturing output index, price growth, and borrowing costs. The findings indicated an inverse correlation between inflation, interest rates, and stock prices, while there was a positive relationship between actual GDP expansion and liquidity levels; inflation adjusted economic development and monetary circulation.

Maysami, Howe and Hamzah (2004) studied the effects of macroeconomic variables on finance, hotel, and real estate indices in the Singapore Stock Exchange. Their findings indicated that inflation, three-month interbank interest rates, and money supply had a positive impact on financial industry benchmark, while manufacturing output, currency values and long-term lending rates negatively influenced.

Dritsaki (2005) examined the sustained connection between economic indicators and Greece's financial market. Using the Granger Causality Test and data from September 1988 to June 2003, the research revealed that economic factors had a favorable influence on Greece's stock market.

Gay (2008) analyzed the impact of changes in oil prices and exchange rates on stock prices in BRIC countries (Brazil, Russia, India, and China). The research determined that there was no relationship between these economic indicators and market prices, suggesting that other factors such as inflation, interest rates, and GDP growth rates impacted investment returns.

Dizdarlar and Derindere (2008) examined the effects of 14 key macroeconomic variables on the ISE-100 Index from 2005 to 2007. Their study explained that currency exchange rate fluctuations, which had a 0.55 effect on the index, could lead to a decline in company values due to overall economic deterioration, corporate balance sheet losses, and external debt issues. In addition, aside from exchange rate effects, domestic and global political-economic events, publicly available corporate information, manipulative activities, international investment sentiment, non-traditional financial assets were identified as other factors affecting stock prices.

Caporale et al. (2015) studied the key factors influencing the banking index in ten new EU member states between 1994 and 2007. Using a dynamic panel model, the research determined that the relationship between the banking index and GDP showed constraints in economies with underdeveloped financial sectors.

Aydemir and Demirhan (2009) analyzed the effects of currency volatility in relation to tourism banking, manufacturing and tech sector benchmarks, together with the Borsa Istanbul 100 index, in the Turkish equity market. The analysis incorporating daily currency and stock value records starting on February 23, 2001, to June 11, 2008, revealed that exchange rates had a negative impact on all indices. However, while national 100, finance, industry, and technology indices were similarly affected by exchange rate changes, the service sector showed lower sensitivity.

Demir and Göçmen Yağcılar (2009) analyzed the monthly returns of 13 banks, including Akbank, Alternatif Bank, Fortis, Finansbank, Garanti Bank, İş Bank, Şekerbank, Tekstilbank, TEB, Turkey Development Bank, Turkish Industrial Development Bank, Yapı Kredi Bank, and Denizbank, using Arbitrage Pricing Theory. Analyzing data from 2000 to 2006, the research analyzed the connections among the ISE-100 Index, exchange rate basket, capacity utilization rate, government debt yields, liquidity levels, manufacturing output measure, GDP growth rates, current account balance, short-duration borrowing costs, precious metal valuations, and financial sector equity values. The results indicated that the ISE-100 Index had the strongest positive effect on bank stocks, while no relationship was found between GDP growth rates and bank stock returns.

Van Antwerpen (2010) analyzed changes in 17 different sector indices within the NYSE, AMEX, and NASDAQ stock indices. Using data from 1928 to 2008, the study examined the effects of inflation, expected inflation, and unexpected inflation on stock indices. The findings revealed that inflation and expected inflation negatively impacted financial company stock indices, while unexpected inflation had a positive effect on stock returns.

Hsing (2011), employing the GARCH model, attempts to explain the extent to which the Hungarian equities sector is shaped by factors such as GDP growth rates, the ratio of public debt to GDP, currency values, the DAX index, inflation-adjusted borrowing costs, forecasted price level increases, European government bond valuations, and liquidity availability. In the study, which uses data from the period 2000:Q1 – 2010:Q2, it was determined that the ratio of public debt to GDP and the German stock index had a positive effect on Hungarian

stock prices. Additionally, the research pointed out that borrowing costs of European government securities and debt instruments, along with anticipated price level increases, had a negative effect. Additionally, it was highlighted that liquidity expansion supported growth until a threshold was reached but created a negative impact when this level was exceeded. This situation is explained by the fact that a high increase in money supply leads to inflationary effects. Likewise, while the interest rate on public debt was expected to have a positive effect, although government; the observed decline in stock prices due to rising public debt interest rates was seen as unexpected.

Sayılgan and Süslü (2011) examine the connection between stock returns and exchange rates, inflation, the Standard & Poor's 500 Index, interest rates, GDP growth rates, money supply, and oil prices in developing countries (Hungary, Jordan, Poland, Russia, Argentina, Brazil, Indonesia, Mexico, Malaysia, Chile, and Turkey) during the period from 1999 to 2006. The research found no strong correlation between stock returns and interest rates, money supply, and oil prices.

Yurttançıkmaz (2012) analyzes the impact of exchange rates and the Consumer Price Index on stock returns based on data spanning 1994 to 2010. The research determined that inflation had a high and positive effect on stock returns, while the effect of exchange rates was lower and negative. The statistical analysis showed that, a one-unit increase in inflation led to a 1.582-unit increase in stock prices, while a rise in currency exchange rates led to a 0.652-unit drop in market prices.

Tu (2012) analyzes Chinese banks and investigates the influence of price level changes, borrowing costs, and broad money (M12) on banking sector equity performance. The research identified a positive relationship between inflation and money supply (M2) and stock prices, while inflation and money supply (M2) were negatively correlated with interest rates. Additionally, the study indicated that exchange rate fluctuations, particularly an increase in the US dollar exchange rate, resulted in a rise in market prices.

Obilor (2013) examined the effect of the banking sector on GDP in Nigeria between 1984 and 2007 using the Durbin-Watson test and found that the financing provided by the banking sector contributed positively to GDP, while other financial services provided by banks had a limited impact on GDP.

Balago (2014) analyzed data from Nigeria between 1983 and 2012 using the ADF test and Johansen cointegration tests and showed that financing provided by the banking sector had a positive relationship with GDP.

Ogbuabor and Nwosu (2017) analyzed the link between Nigeria's financial sector and economic growth for the period 1981-2014 using the Error Correction Model and identified a strong positive association in the long run, while in the short term, the relationship had no significant effect.

Kaya, Çömlekçi and Kara (2013) examined the link between the ISE-100 using Index and selected macroeconomic factors data based on data spanning January 2002 to June 2012. In this study, a direct correlation was identified between ISE-100 Index returns and money supply (M2), whereas a negative relationship was observed between stock returns and exchange rates. However, no statistically significant relationship was found between stock returns, interest rates, and industrial production level.

Tandoğan and Özyurt (2013) analyzed the causality relationships from banking activities to GDP using Toda and Yamamoto's (1995) causality test with data from 1981-2009. The results revealed strong causality relationships from the banking sector to GDP.

Aktaş and Akdağ (2013) analyzed the link between the ISE-100 Index and key economic indicators over the period 2008-2012 employing the Granger Causality Test and Multiple Linear Regression method. Independent variables in the analysis included CPI, deposit interest rates, US dollar and euro currency values, production capacity usage levels, manufacturing output index, gold market values, export data, the consumer confidence index, unemployment rates, and petroleum market prices. According to the Multiple Regression Analysis results, deposit interest rates, CPI, USD exchange rate, capacity utilization rate, and the consumer confidence index influenced the ISE-100 Index. Additionally, an increase in deposit interest rates and the USD exchange rate had negative effects of 0.517 and 0.411 units, respectively, on the ISE-100 Index. However, a one-unit increase in CPI had a positive impact of 0.797 units, while the capacity utilization rate had a positive effect of 0.499 units. Moreover, a significant relationship was found between the capacity utilization rate, interest rates, and the ISE-100 Index through the Granger Causality Test.

Yüksel and Yüksel (2013) aimed to explain the relationship between the banking index and inflation in seven countries, including Germany, Argentina, the United States, Austria, Israel, Hungary, and Turkey, using the Granger Causality Test. The study found that inflation had no impact on the banking in-

dex data in Germany, Argentina, the United States, Austria, and Hungary. Similarly, no relationship was found between inflation and the banking index in Turkey. The study is significant as it demonstrates the lack of a relationship between inflation and the banking index in both developing and developed countries.

Emecheta and Ibe (2014) analyzed the relationship between the banking sector and GDP in Nigeria between 1960 and 2011 using the Dickey-Fuller and Phillips-Perron tests and examined it through the VAR technique. The study found a positive relationship between the banking sector and GDP.

Özkul and Akgüneş (2015) used a Multiple Linear Regression model to analyze the effects of macroeconomic variables on the BIST 10 Bank Return Index. The study examined ten different variables, including the BIST-100 Index, inflation, interest rates, exchange rates, and the industrial production index, for the period 2010:01 – 2014:07. The results identified the BIST-100 Index as the most influential variable. Although there were nine banks in the BIST 10 Bank Index since 1986:71, an increase in stock prices was not observed for banks outside the BIST-100 Index. The study found that an increase in money supply (M1) had a negative impact, which was explained by the change in demand for other firms due to the increase in money supply.

Awwad and Türsoy (2016) carried out a recent analysis on the effects of money supply (M2) on short- and long-term interest rates and the BIST Banking Index over the period 2002-2013 applying Impulse Response Function Analysis, Variance Decomposition, Cointegration techniques, and Granger Causality Tests. The results showed that macroeconomic variables had both short- and long-term effects on the index. Structural changes made after the 2001 crisis were proven to be responsible for the Banking Index's strong performance even during the 2008 crisis. Other results of the study indicated that, according to the Cointegration Test, there was a negative relationship between short-term interest rates, money supply, and exchange rates with the Banking Index in the long run. Therefore, a one-percent change in money supply and interest rates led to respective declines of 1.42% and 3.9%. This finding aligns with many previous studies, as changes in interest rates and exchange rates can reduce investors' interest in the Banking Index. Additionally, the increase in money supply was noted to have negative effects due to inflationary consequences, leading to uncertainty in the market.

Kamacı, Ceyhan and Peçe (2017) examined the effect of the banking sector on GDP using Granger causality, cointegration, and other econometric tests with data from 2005:Q4 – 2017:Q1. The results showed a one-way causality relationship from GDP to banking activities and a long-term cointegration relationship between the banking sector and GDP.

Ali, Bashir, Ahmed, Ishaq and Shahzad (2018) analyzed the relationship between Pakistani banks' stock prices, economic growth, exchange rates, and interest rates from 2005 to 2013 using the Granger Causality Test. The findings revealed an inverse correlation between, currency values, short-term borrowing costs, and equity prices. Moreover, bank stock data were found to be more sensitive to interest rates and exchange rates compared to the general stock market.

Bozkurt and Kaderli (2024) investigate the effects of inflation on the BIST 100 index using the RALS-LM unit root test, RALS-EG cointegration test, dynamic least squares (DOLS) and fully modified (FMOLS) method with data from 2016 to 2023. As a result, it is pointed out that increases in CPI in the long run will have positive effects on BIST 100 return.

Coşkuner and Özer (2024) conducted Johensen Co-integration test on the effects of exchange rate and inflation on stocks with data for the years 2010-2021. As a result of the study, it was determined that the dollar has a significant effect on Bist100 at 1% level and inflation has an effect on Bist100 at 10% significance level.

Bilalli, Sadiku and Sadiku (2024) tested the effects of inflation on the financial sector with both static and dynamic panel regression models for OECD countries with data from 2002-2021. As a result of the study, it is found that there is a consistently negative correlation between core finance and inflation. This implies that higher inflation levels weaken the performance of the financial sector.

Methodology

This study employed the Augmented Dickey-Fuller (ADF) test to assess the stationarity of time series data. Non-stationary series were made stationary by taking their first differences. Then, a Vector Autoregression (VAR) model was established, and the Granger Causality Test was applied to analyze the effect of inflation on the banking index and the relationship between GDP and the banking index. Büyüköztürk et al. (2008) state that this method is a frequently used approach in econometric analyses and an effective tool for revealing causal relationships in time series data. Findings / Econometric Results

Results and Discussion

This section presents the results of econometric analysis aimed at uncovering the relationships between inflation, GDP, and the banking index, based on the study's findings.

In the figure above, the time series of banking index values by year is presented. From 2005 to 2021, a general upward trend is observed, indicating that the value of the banking index has increased over time. However, sharp declines are also evident in certain periods. Notably, a drop occurred during the 2008 global financial crisis, followed by a recovery trend. From 2021 onwards, the index value has risen sharply. This increase can be attributed to factors such as sectoral growth, as well as the impact of inflation.

Figure 1 – Banking Index
Note – compiled by the authors

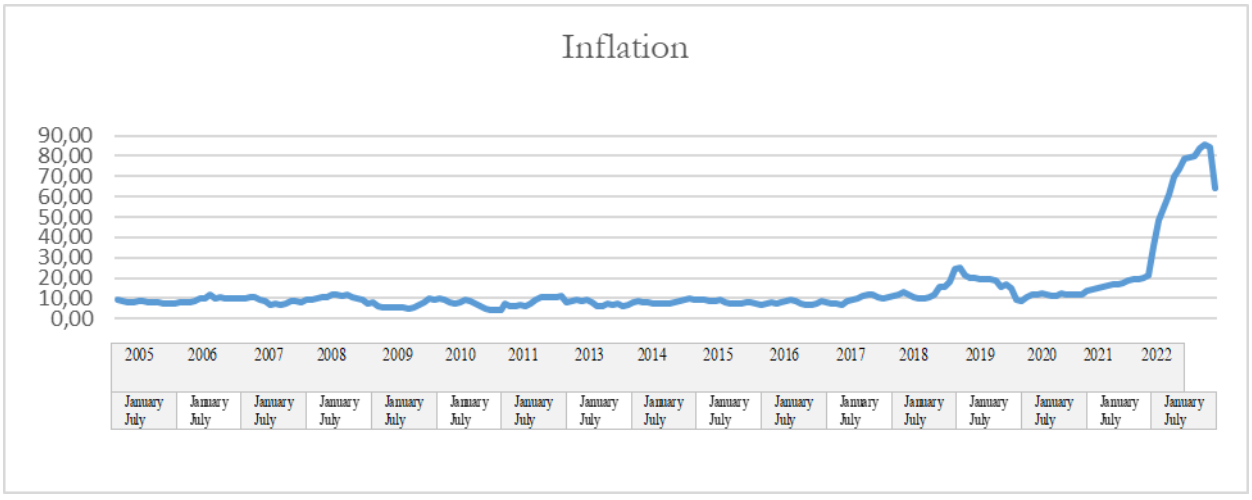

Figure 2 – Inflation
Note – compiled by the authors

The above figure displays inflation data for the period between 2005 and 2022. From 2005 to 2019, the inflation rate remained generally low and relatively stable. However, after 2019, a noticeable volatility (fluctuation) and an increasing trend in the inflation rate can be observed. This can be seen as a result of economic instability and economic shocks. Towards 2022, the inflation rate reached a very high level. This sharp increase may reflect demand shocks, cost-push inflation, or currency depreciation.

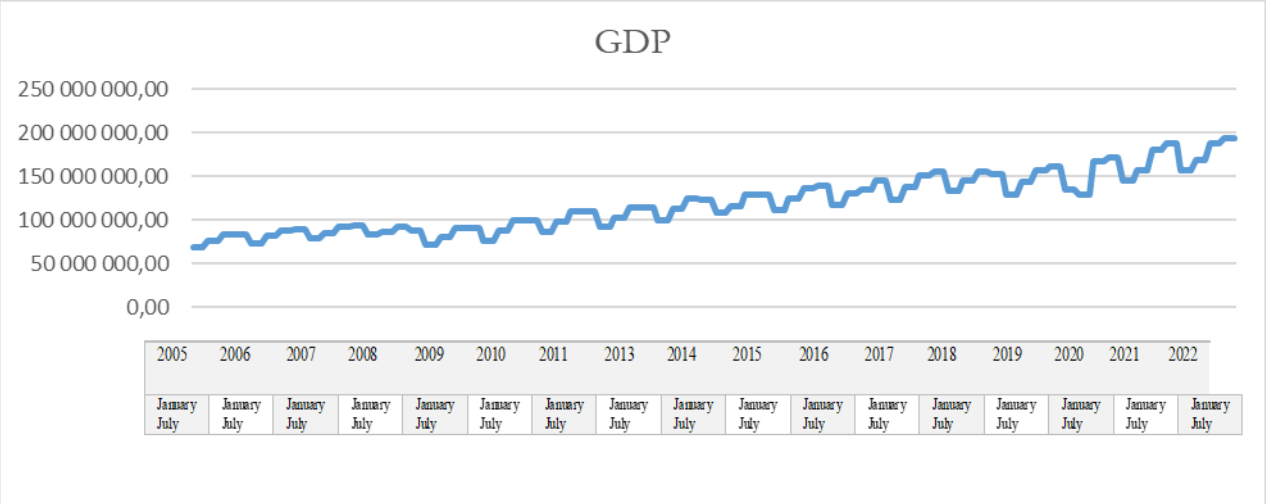

Figure 3 – GDP (Gross Domestic Product)
Note – compiled by the authors

The above figure represents GDP data for the period between 2005 and 2022. GDP values generally follow a continuous upward trend, indicating economic growth and expansion. A decline is observed in 2008 and 2009 due to the impact of the global financial crisis. However, following this decline, GDP resumed its upward trend.

The stationarity test results indicate that all variables are stable over time as the test statistics exceed the critical thresholds at the 1%, 5% and 10% significance levels. This indicates that these variables can be used in establishing the VAR model.

According to the Granger Causality Test results, inflation has a significant causal effect on the banking index. However, GDP does not have a significant causal effect on the banking index.

The results of the correlation analysis show that inflation has a significant positive correlation with both the banking index and GDP. Similarly, there is also a significant positive correlation between the banking index and GDP. These results indicate that inflation, the banking index, and GDP move in the same direction in economic activities.

Table 1 – Statistical Results of the Stationarity Test

Variable	Test Statistic	p-value	1% Critical Value	5% Critical Value	10% Critical Value
Banking Index	-3.20	0.0197	-3.46	-2.88	-2.57
Inflation	-3.74	0.0036	-3.46	-2.88	-2.57
GDP	-3.10	0.0267	-3.46	-2.88	-2.57
Note – compiled by the authors					

Table 2 – Granger Causality Test Results

Criterion	Lag Order	Inflation F Statistic	Inflation p Value	GDP F Statistic	GDP p Value
AIC	12	2.41	0.0048	1.19	0.287
BIC	12	2.41	0.0048	1.19	0.287
Note – compiled by the authors					

Table 3 – Correlation Test Results

		Inflation	BANK	GDP
Inflation	r	1	,667**	,572**
	p		,000	,000
	n	216	216	216
BANK	r		1	,639**
	p			,000
	n		216	216
GDP	r			1
	p			
	n			216
Note – compiled by the authors				

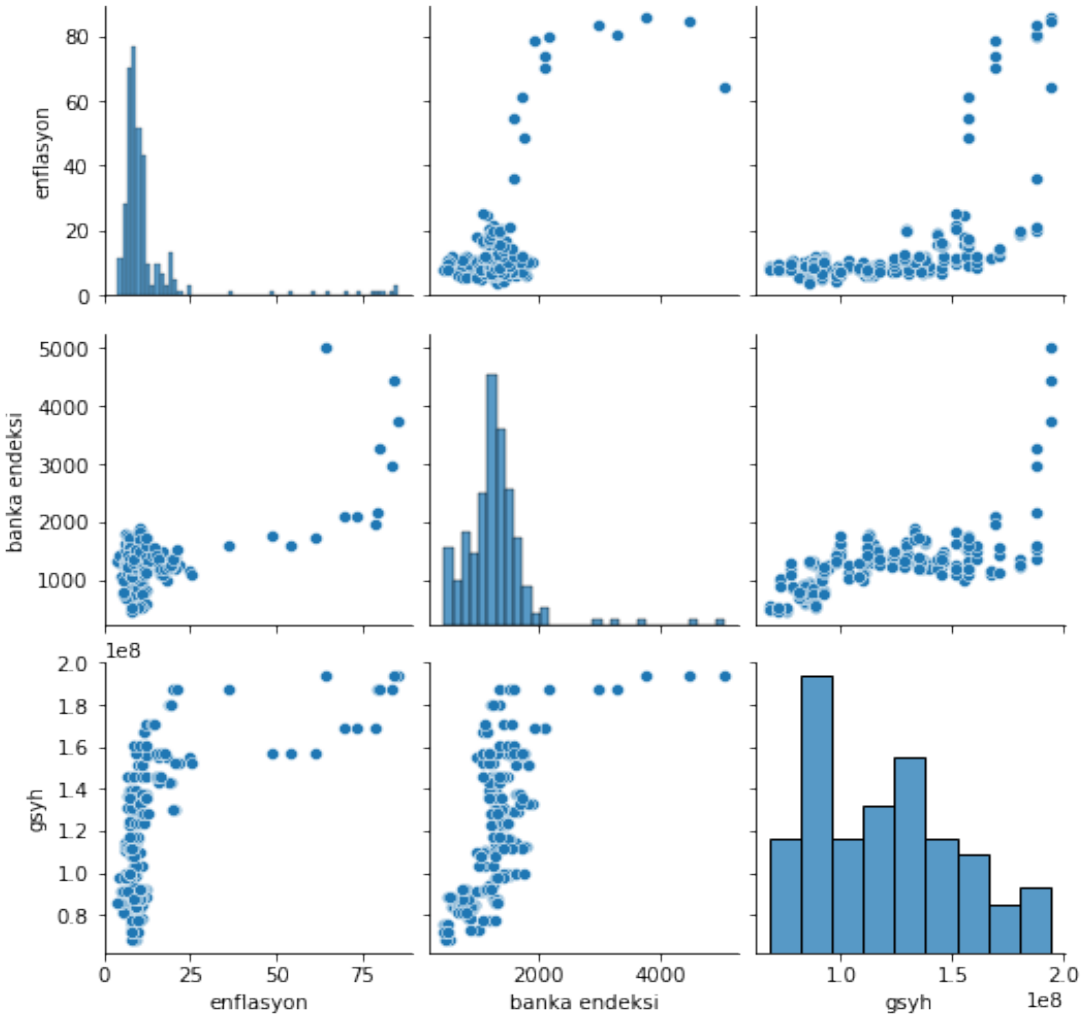

Figure 4 – The Bivariate Relationships and Distributions of Inflation, GDP, and the Banking Index
Note – compiled by the authors

Accordingly, Figure 4 illustrates the relationships between inflation, GDP, and the banking index data. The histogram of inflation reveals that the majority of observation values are concentrated in the lower ranges, while high inflation values are rare. This indicates skewness in the dataset, suggesting that inflation rates are generally low, but there are also a few instances of high inflation values. The histogram of the banking index shows that cumulative frequency is concentrated within a specific range, but there are also discrete and high index values present. This can be interpreted as an indication that the banking index can reach unusual levels during certain periods. The GDP histogram demonstrates that a large portion of the dataset is concentrated within a certain range, but it also has a tail extending toward higher GDP values.

The scatter plot between inflation and the banking index indicates an overall positive relationship, showing that as inflation values increase, banking index values also rise. The scatter plot between inflation and GDP exhibits a broader distribution, making it difficult to determine a direct relationship. However, there is a noticeable tendency suggesting that higher inflation rates might be associated with an uncertain positive relationship with GDP.

Ultimately, based on the results from Table 2, it can be stated that inflation has a significant causal effect on the banking index. However, GDP does not have a significant causal effect on the banking index. Therefore, when making economic policy decisions, the impact of inflation on the banking index should be taken into consideration.

Conclusion

The banking index exhibited a general upward trend from 2005 to 2021, with recovery tendencies observed following declines during specific periods, such as the 2008 financial crisis. Notably, from 2021 onward, a significant increase in the index's value was detected. While inflation remained relatively low and stable from 2005 to 2019, volatility increased in the subsequent period, and inflation rates rose significantly toward 2022. Meanwhile, GDP followed a continuous upward trend, indicating sustained economic growth.

Statistical analyses revealed that inflation has a significant causal effect on the banking index. However, GDP's impact on the banking index was not found to be statistically significant in terms of causality. Correlation tests showed that inflation has a positive correlation with both the banking index and GDP. Additionally, a positive correlation was detected between the banking index and GDP, suggesting that economic growth supports the financial sector.

Overall, this study highlights the substantial impact of inflation on the banking index, emphasizing that this effect should be considered in economic policy decisions. The absence of a direct causal relationship between GDP and the banking index suggests that other macroeconomic factors and market dynamics play a more prominent role in influencing the financial sector. These findings are deemed important in shaping economic policies and managing financial indicators such as the banking index.

In terms of policy recommendations, the banking sector in Turkey, as in other countries, interacts directly with macroeconomic indicators. Major determinants of banking indices include inflation, GDP and overall economic expansion. Therefore, the recommended actions involve adopting monetary strategies to control inflation, instituting policy reforms for long-term economic stability, programs supporting investment and production-based growth, regulating capital movements to balance hot money flows, and ensuring exchange rate stability while managing currency risks. These measures can strengthen Turkey's economic stability and enable the banking sector to achieve more sustainable growth.

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