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Unravelling the Impact of COVID-19 on The Turkish Banking Sector: An Empirical Analysis

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COVİD-19'un Türk Bankacılık Sektörü Üzerindeki Etkisini Ortaya Çıkaran Ampirik Bir Analiz

Abstract

This study aims to examine the impact of COVID-19 on the Turkish Banking Index of the Istanbul Stock Exchange. Bayer-Hanch Cointegration Test, a Canonical Cointegrating Regression, and a Fully Modified Least Squares test were examined. Gold price, Repo, exchange rate, and the COVID-19 cases exhibit a long-run relationship with the banking index. During the pandemic, COVID-19 cases affected banks' performance in a negative way at the Istanbul Stock Exchange. No study in the literature has specifically examined the impact of COVID-19 on the Turkish Banking Index using the Bayer Hanch Co-integration strategy. Therefore, this study provides valuable insight into the literature.

Keywords : Turkish Banking Index, Bayer Hanck Co-integration Test, FMLS Rest, Canonical Cointegrating Regression, COVID-19 Cases, Gold Price, Exchange Rate.

JEL Classification Codes : B23, C23, G21.

Öz

Bu çalışmanın amacı, COVID-19'un İstanbul Menkul Kıymetler Borsası Türk Bankacılık Endeksi üzerindeki etkisini incelemektir. Bu amaçla çalışmada Bayer-Hanch Eşbütünleşme Testi, Kanonik Eşbütünleşme Regresyon testi ve Tamamen Değiştirilmiş En Küçük Kareler testi kullanılmıştır. Altın fiyatı, repo, döviz kuru ve COVID-19 vakaları bankacılık endeksi ile uzun vadeli bir ilişki sergilemektedir. Pandemi sürecinde COVID-19 vakaları İstanbul Menkul Kıymetler Borsasında bankaların performansını olumsuz etkilemiştir. Bu çalışma, literatürde Bayer Hanch Eşbütünleşme stratejisi kullanarak COVID-19'un Türk Bankacılık Endeksi üzerindeki etkisini inceleyen ilk çalışmadır.

Anahtar Sözcükler : Türk Bankacılık Endeksi, Bayer Hanck Eşbütünleşme Testi, FMLS Testi, Kanonik Eşbütünleşme Testi, COVID-19 Vakaları, Altın Fiyatı, Döviz Kuru.

1. Introduction

In recent years, Türkiye's banking sector has earned a reputation for being among the most dynamic and robust in the world. Because of its ability to withstand short-term economic issues, the industry can adapt rapidly to environmental changes. There is no difference in capitalisation between the banks in this sector, and they are all subject to the same regulations. It has recently become a significant part of the Turkish economy (Akbaş, 2012; Yagli, 2023; Clark et al., 2012). Turkish banks and a strong regulatory framework have fostered economic growth and development in the country. Having undergone reforms and consolidations since 2001, the banking sector has become more efficient and resilient. A significant challenge has been presented to the banking sector following the COVID-19 pandemic, requiring it to adapt to rapidly changing circumstances. It has led to the digitisation of loans, the restructuring of loans, and the increase in the provisioning of Turkish banks due to the pandemic (Acaravci & Çalim, 2013). While supporting debtors, the Turkish Banking Regulation and Supervision Agency issued regulations enabling banks to restructure loans and preserve bank capital during the pandemic (Erden & Aslan, 2022; Coskun et al., 2022; Yıldırım, 2020).

The pandemic-induced economic contraction had severe effects on the banking industry in Türkiye. Business revenues and cash flow have been reduced, which has resulted in a significant increase in loan defaults and non-performing loans. Consequently, banks faced greater credit risk and had difficulty maintaining profitability and capital adequacy ratios (Öztürk et al., 2020). For instance, while the pandemic has increased the banking sector's liquidity and profitability, it has also pressed banks to focus on digital channels and customer service while facing risks such as a rise in non-performing loans. Due to the pandemic, economic activity has declined, and loan defaults have increased. In the context of business closures and job losses, borrowers were severely impacted in their ability to repay loans. As a result, Turkish banks have suffered a surge in non-performing loans (NPLs), putting pressure on their profitability and capital adequacy levels (Yagli, 2023; Gur et al., 2023).

An important aspect of the COVID-19 pandemic was the significant volatility of the Turkish Banking Index, which measures the performance of Turkish banks listed on the stock market. Stock prices declined sharply due to uncertainty and market panic. The uncertain economic outlook adversely affected investor sentiment and caused market participants to become more cautious (Yağlı, 2020). This volatility was further compounded by the country's economic reliance on tourism, which experienced a downturn due to the pandemic. As investor confidence waned and concerns over the banking sector's stability increased in the early stages of the crisis, the index experienced sharp declines. For instance, on March 19th 2020, the index fell to its lowest level since January 2017, dropping by 10.17% (Kartal et al., 2022; Kartal et al., 2020). During the period of uncertainty caused by the pandemic, banks faced liquidity challenges and changes in customer deposit behaviour. Some banks experienced liquidity strains as depositors increased their cash holdings. The Central Bank of Türkiye intervened by providing liquidity support and implementing

financial system stabilisation measures (Ileri, 2022; Çakmaklı et al., 2021). The index gradually recovered after implementing various measures by the Turkish government and central bank to support the economy and the banking sector. The government announced A new stimulus package on April 17th, 2020, to assist businesses affected by the economic crisis. This resulted in the index rising by 10.19%. The Turkish Banking Index has recovered as a result of several factors. First and foremost, the prompt response of the Turkish government in providing liquidity assistance to banks has helped alleviate concerns regarding their solvency. As part of its monetary policy, the central bank has reduced interest rates and injected liquidity to support the economy. A combination of these measures boosted investor confidence and contributed to the stability of the banking sector during a period of uncertainty (Babaoğlu & Kulaç, 2022).

The Turkish banking sector has implemented various measures to mitigate the impact of the COVID-19 pandemic. The banks have enhanced their credit risk assessment and monitoring systems to strengthen their risk management frameworks (Karaömer & Acaravcı, 2021). Therefore, they have identified potentially problematic loans early and taken proactive measures to reduce their default rates (Karaömer & Acaravcı, 2021). Consequently, they have been able to identify potential problem loans early and take proactive measures to reduce loan defaults. In March 2020, the banking index stood at 91,857 points; in September 2020, it reached 144.895 points. It is important to note that the banking sector demonstrated strong growth during this time, maintained its asset quality and increased profitability despite the pandemic. With a capital adequacy ratio of 18.5%, the Turkish banking sector remains above international standards (Hailu & Vural, 2020). It is evident from the banking index data that the Turkish economy is robust and dynamic.

The Turkish government has introduced several additional support measures to assist the Turkish banking sector during this challenging time. Banks have received short-term financial assistance from the government through liquidity injections and loan guarantee programs. Furthermore, the government has introduced temporary regulatory relief measures to alleviate the burden on banks and facilitate their operations during the pandemic. By taking these measures, the banking sector has been able to ease liquidity constraints, support lending to the real economy, and maintain stability (Babaoğlu & Kulaç, 2022).

Based on a series of macroeconomic variables and the Banking Return Index in Türkiye, Awwad and Türsoy examined the dynamic interactions between these variables in light of the transition in the Turkish economy. Several different testing methods were utilised in this study, including the cointegration test, the Granger causality test, the variance decomposition analysis, and impulse response functions. Using cointegration tests, the study revealed that the variables are related over the long run. A portfolio balance approach is evident in the Turkish market as indicated by the bank stock returns index Granger-cause exchange rate (Awwad & Türsoy, 2016). According to Rjoub et al., micro and macro variables correlated with Turkish banks' stock prices. An analysis of fixed panel data was performed, and a Granger causality test was carried out using the Dumitrescu and Hurlin panel data for periods ranging from 1995 3rd quarter to 2015 4th quarter. As found in the

study, the stock price is significantly influenced by asset quality, management quality, earnings, size, money supply, and interest rates. In addition, this study indicates that bank stock prices respond negatively to economic conditions (Rjoub et al., 2017). Saldanlı et al. examined the causal relationships between the stock prices of 10 deposit banks traded in Borsa Istanbul and industrial production indexes, exchange rates, and money supply based on monthly observations between June 2007 and October 2016. As a result of the analysis, it was found that the industrial production index was not a determinant of the stock prices of the banks examined (Saldanli et al., 2017).

The Turkish government emphasises long-term structural reform of the banking sector to strengthen its resilience. Corporate governance measures, risk management practices, and digitalisation and innovation are to be improved in the sector. As a result of these reforms, the Turkish banking sector is expected to remain stable and competitive for the foreseeable future (Açikgöz & Günay, 2020).

For the Turkish banking sector, there are both opportunities and challenges post-COVID-19. During the crisis, the sector demonstrated its resilience and adaptability, which bodes well for its prospects in the future. A significant challenge facing the Turkish banking sector is managing non-performing loans. It is imperative that banks closely monitor their loan portfolios in light of the ongoing effects of the pandemic on the economy and take proactive measures to address any potential problems should they arise. Banks, regulators, and borrowers must work together effectively to achieve this goal (Babaoğlu & Kulaç, 2022). A further challenge is enhancing the digital capabilities and customer experience. As a result of the pandemic, banks have been compelled to invest in technology and innovation to meet their customers' changing expectations. Several tools are being developed, including user-friendly mobile banking apps, digital payment solutions, and personalised customer service (Coskun et al., 2022; Yıldırım, 2020).

As briefly summarised above, COVID-19 has profoundly impacted many sectors of the Turkish economy, including the banking sector. The banking sector has been adversely affected by the pandemic, with a decrease in lending, an increase in bad debts, and a decrease in deposit rates. The banking sector is also facing increased competition from digital financial services, as well as competition from foreign banks. There has been a marked change in the performance and dynamics of the Turkish banking sector. Throughout this article, we will examine how gold prices, the Turkish Lira/Dollar exchange rate, repurchase agreements (repo) and cases of COVID-19 may impact the Turkish banking index after COVID-19. It covers the period from March 2, 2020, through August 31, 2020, and is collected and processed daily. A Bayer-Hanch cointegration analysis will analyse the correlation between the banking index and these key factors. An analysis of Bayer-Hanch cointegration is used to investigate whether two or more variables are related over the long run. A thorough understanding of these dynamics will allow us to understand better how the Turkish banking sector will recover following the pandemic. We can determine which variables most influence the banking sector's recovery post-pandemic by estimating the parameters of the linear combination using Bayer-Hanch cointegration analysis. Identifying

current risks associated with the banking sector's recovery, such as an increase in interest rates, can also assist with identifying potential future risks. Following the dissection of the method we employed and the data we utilised for the econometric analysis, the following section discusses the application results and analyses. Towards strengthening the Turkish banking sector, the study's final section, the discussion and conclusion, focuses on evaluating the study's results.

2. Data and Methodology

This study examines the long-term associations between the banking index, the repo rate, gold price, COVID-19 cases, and exchange rate data. A fully modified least squares test is used to conduct this analysis, as well as Bayer-Hanck cointegration, Canonical cointegration regression, and Bayer-Hanck cointegration regression. By examining these factors about the performance of the banking sector, valuable insight will be gained. Using Bayer-Hanck cointegration, we can determine the long-term relationship of the variables, whereas canonical cointegration regression determines their direction. Statistical accuracy of the results will be assessed using the fully modified least squares test. In addition to considering the effects of multiple factors and their interactions, these methods will offer a holistic view of the banking industry. Through the analysis, insights can be gained that may be used to develop strategies for improving the performance of the banking sector. This study refers to daily data from March 2nd, 2020, to August 31st, 2020. The data was derived from various sources rather than one single source. In order to obtain the data for LXBANK, USDTRY, repo, and gold prices indicated by LXAUTRY, we consulted a website known as <https://www.investing.com/currencies/usd-try-historical-data>. As can be seen from this particular detail, the study utilised historical data for the USD TRY currency pair (US Dollar Turkish Lira) as well as gold prices that are publicly available. Various data intervals are available, including daily, weekly, or monthly. Furthermore, TUIK also provided data on COVID-19 cases for the study.

This analysis method is similar to the ARDL approach and the bivariate copula model employed in a separate study. This other study focused on examining the relationship between the prices of gold and the exchange rate in India (Sahu et al., 2022). These studies highlight the significant influence of gold prices and exchange rates on a nation's macroeconomic fundamentals. They emphasise these factors' crucial role in financial analysis and decision-making processes.

The regression model can be written as simple as:

$$LXBANK_t = \beta_0 + B_{it}X_{it} + \varepsilon_t$$

where LXBANK is the Turkish banking index, and Xi is the gold price index (LXAUTRY), repo (REPO), exchange rate (USDTRY), and COVID-19 cases (LCASES) ε_t is the error term, while subscript t is time.

3. Empirical Results

A unit root test must be conducted before performing the Bayer-Hanck cointegration analysis to determine the stationarity of the time series variables. Cointegration analysis requires stationarity, as non-stationary variables can produce spurious regression results. Augmented Dickey-Fuller (ADF) and Phillips-Peron (PP) unit root tests can validate and reliably produce cointegration analyses.

3.1. Unit Root Test

Table: 1
PP and ADF Unit Root Test Results

UNIT ROOT TEST TABLE (PP)					
			At Level		
	LXBANK	LCASES	LXAUTRY	REPO	USDTRY
t-Statistic	-2.2111	-0.0999	-1.8770	-0.6465	0.5827
Prob.	***0.2041***	***0.9451***	***0.3414***	***0.8531***	***0.9884***
			At First Difference		
	d(LXBANK)	d(LCASES)	d(LXAUTRY)	d(REPO)	d(USDTRY)
t-Statistic	-7.9441	-11.0009	-8.8781	-25.4887	-7.6135
Prob.	***0.0000***	***0.0001***	***0.0000***	***0.0001***	***0.0000***
	***	***	***	***	***
UNIT ROOT TEST TABLE (ADF)					
			At Level		
	LXBANK	LCASES	LXAUTRY	REPO	USDTRY
t-Statistic	-2.1735	-0.1468	-1.8930	-0.0184	0.5558
Prob.	***0.2175***	***0.9397***	***0.3340***	***0.9534***	***0.9876***
			At First Difference		
	d(LXBANK)	d(LCASES)	d(LXAUTRY)	d(REPO)	d(USDTRY)
t-Statistic	-7.9764	-10.9550	-8.7859	-8.5589	-7.6763
Prob.	***0.0000***	***0.0001***	***0.0000***	***0.0000***	***0.0000***
	***	***	***	***	***

Dependent variable: Turkish Banking Index (LXBANK);
Independent variables: Gold Price Index (LXAUTRY), repo (REPO), Exchange Rate (USDTRY), COVID-19 cases (LCASES).

Table 1 gives unit root test results at the first difference level. The null hypothesis is that the series does not have a unit root. The hypothesis is accepted at the level for all variables. All variables have a unit root at the first difference I(1) at the 5% confidence level and are stationary due to ADF and PP tests.

3.2. Bayer-Hanch Cointegration Test

The Bayer-Hanch cointegration test measures the relationship between the COVID-19 pandemic and the Turkish banking index over the long term (Gür, 2020). Using this test, it is possible to determine whether the variables are stable over time.

After determining that the series were stationarity at the first level in the ADF and PP unit root tests, the Bayer-Hanch cointegration test was applied to investigate their long-term relationship. The null hypothesis is that there is no cointegration between variables. Using Bayer-Hanch cointegration analysis, one can determine whether two or more time series variables move together over the long term.

Table: 2
Bayer-Hanch Cointegration Test

Model Specification	Fisher Statistics	Fisher Statistics	Cointegration
	EG-JOH	EG-JOH-BAN-BOS	Decision
LXBANK = f(LXAUTRY LCASES USDTRY REPO)	15.6417**	20.21714**	Yes
	Critical value	Critical value	
Significance Level (5%)	10.576	20.143	

*Note: *, ** and *** denote the 10%, %5 and 1% significance levels, respectively.*

According to the analysis conducted using the Bayer-Hach cointegration test, the COVID-19 pandemic has had a significant and lasting impact on the Turkish banking index. Table 2 provides the Bayer-Hanch co-integration test results. Due to the Bayer and Hanck Co-integration test results exceeding the critical values at 5% significance levels, the main hypothesis was rejected, and it was concluded that the variables were cointegrated. Table 2 shows that Fisher's statistics are above the critical value. Thus, we reject the hypothesis that gold prices, COVID-19 cases, exchange rates, and repo have no long-term impact on the banking index. The results indicate a long-term association between the pandemic and the index's performance, with gold prices, repo and exchange rates playing a crucial role in shaping the relationship. Cointegration results indicate that these four indicators influence the banking index over time. Regression analysis can be performed in the long run since the cointegration between the series has been detected.

3.3. Canonical Cointegrating Regression Test (CCR) and Fully Modified Least Squares Estimation (FMLS)

The relationship between the Turkish banking index and COVID-19 cases, exchange rate, gold price, and repo is analysed using canonical cointegrating regression. The coefficients and significance can be examined to identify the most critical drivers of the banking index's performance during the pandemic.

Table: 3
Canonical Cointegrating Regression (CCR)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LXAUTRY	-0.827759	0.297466	-2.782702	0.0061
REPO	-0.014056	0.017704	-0.793963	0.4286
USDTRY	0.192110	0.113541	1.691990	0.0929
LCASES	-0.082617	0.033889	-2.437862	0.0160
C	14.27399	2.379320	5.999189	0.0000
R-squared	0.225328	Mean dependent var		7.081912
Adjusted R-squared	0.203351	S.D. dependent var		0.058855
S.E. of regression	0.052532	Sum squared resid		0.389098
Long-run variance	0.022155			

Table: 4
Fully Modified Least Squares (FMOLS)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LXAUTRY	-0.837150	0.306716	-2.729400	0.0072
REPO	-0.010123	0.015405	-0.657148	0.5122
USDTRY	0.179022	0.105017	1.704696	0.0905
LCASES	-0.085130	0.035138	-2.422735	0.0167
C	14.43680	2.502701	5.768489	0.0000
R-squared	0.242560	Mean dependent var		7.081912
Adjusted R-squared	0.221073	S.D. dependent var		0.058855
S.E. of regression	0.051944	Sum squared resid		0.380442
Long-run variance	0.022155			

Using the fully modified least squares test, we can address potential endogeneity issues and estimate the long-run relationship between the Turkish banking index and the COVID-19 pandemic using the fully modified least squares test. An analysis of this test provides valuable insight into the persistence and stability of the effects of the pandemic on the banking index. The results of both Tables 3 and 4 indicate that the explanatory variables used in the study negatively affect the Turkish banking index over the long term. Based on the Canonical cointegrating regression and FMLS results, COVID-19 cases and gold prices negatively affected the Turkish banking index. Regression results indicate a significant and negative correlation between these variables, with coefficients of -0.082 and -0.827, respectively, and a probability below 5%. Using the FMLS test, these variables have coefficients of -0.085 and -0.837, respectively. The Turkish banking index is relatively unaffected by the exchange rate.

4. Discussion

According to the empirical results of this study, both the increase in COVID-19 cases during the pandemic period and the fluctuating gold price negatively impacted the Turkish banking index. This decline in profitability and stability of the Turkish banks resulted in a decrease in the Turkish banking index. At times, the value of gold rose sharply, negatively impacting Turkish banks' performance. The volatility of gold prices further complicated an already challenging economic environment. Due to this, the value of gold has fluctuated sharply at times, which has impacted the overall performance of banks and, as a result, affected the Turkish banking index. The volatility in gold prices exacerbated an already challenging economic environment. Despite this, the exchange rate did not adversely affect the Turkish banking index, whereas COVID-19 cases and gold prices had a negative impact. Several factors influence the exchange rate, including economic indicators, interest rates, and geopolitical events. The exchange rate did not significantly affect the Turkish banking index's performance during the pandemic. It is evident from this that other factors, such as economic conditions and geopolitics, influence bank stock performance. Consequently, Turkish banking stocks must be assessed not only based on exchange rates, although they may be an important factor in some markets.

The Turkish banking index has been negatively impacted by the COVID-19 pandemic regarding asset quality and overall performance. Based on a Bayer-Hanch cointegration analysis, it was determined that the Turkish banking index, the COVID-19 cases, the gold price, the repo, and the exchange rate are related over the long term. A thorough understanding of macroeconomic factors and proactive measures is necessary based on the results of this study. Thus, these findings can be interpreted in a wide variety of ways. Decisions will be made more efficiently, and insight into the recovery of the Turkish banking sector will be gained. Policymakers, regulators, and market participants must thoroughly understand Turkish banking dynamics in the context of the ongoing pandemic. As a result of identifying the key factors driving the banking index's performance, stakeholders can devise strategies to mitigate risks, enhance financial stability, and support the sector's recovery. Gold prices and COVID-19 cases negatively affect the banking index in Türkiye in the long run, according to the econometric analysis of this study. To take full advantage of the opportunities presented by the COVID-19 crisis, the Turkish banking sector must focus on strengthening its capacity to respond to any future shocks. Ultimately, this study underscores the importance of proactive measures for the banking sector in Türkiye to remain resilient in the face of future crises. Therefore, the Turkish banking sector must focus on long-term strategies to successfully transition to post-pandemic times.

Looking ahead, post-COVID-19, the Turkish banking sector faces both opportunities and challenges. As a result of the crisis, it demonstrated high resilience and adaptability. Nevertheless, there are several challenges to be overcome. Turkish banks face the challenge of non-performing loans. The Turkish banks will be required to take proactive measures to address any issues that may arise in the event of a pandemic. Banks, regulators, and borrowers must work collaboratively. The pandemic has prompted banks to invest in technology and innovation. Due to these developments, banks can offer their customers a higher level of service, increased security, and a more pleasant customer experience. The industry must be monitored and responded to to ensure its resilience and stability.

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