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# Effects of the domestic and ECB interest rates on Türkiye's stock market: Empirical evidence from a newly developed combined co-integration and causality analysis

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## Abstract

The research examines the influence of the domestic interest rate and spillover effect of the European Central Bank (ECB) interest rates on Türkiye's stock market from January 1999 to January 2019. The research applied the Autoregressive Distributed Lag (ARDL) co-integration method to analyze the interaction among the tested variables. The Fully Modified-Ordinary Least Square (FMOLS), and Canonical Co-integrating Regression (CCR) tests are employed to support the findings of the ARDL model. A newly developed combined co-integration approach as proposed by Bayer-Hanck (BH) is utilized to promote the ARDL co-integration method. Furthermore, the Granger Causality approach is utilized to explore the causal linkage among tested variables. The findings indicated that Türkiye's stock market was negatively affected by the domestic interest rate volatility. Moreover, the study found that Türkiye's stock market was negatively affected by the ECB interest rate policy. The research suggested that the economic ties and integration among Turkey and the European Union (EU) countries led to increasing the sensitivity and volatility of Türkiye's stock market to ECB interest rate policy. It is suggested that the monetary authorities of Türkiye should pay more attention to stock market stability through monetary policy channels. Furthermore, they should pay more attention to the effects of external shocks such as ECB policy to maintain market stability.

JEL classification: E00, G00

Keywords: ECB, interest rate, ARDL, Bayer-Hanck, economic crises

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## 1. Introduction

Although Turkey has faced some economic crises over the period from 1980 to 2019, Türkiye made efforts to boost international trade, economic growth, and foreign direct investment (FDI). In this sense, gross domestic product (GDP) per capita increased from USD 4,989 in 1980 to USD 13,312 in 2014. Total exports in Türkiye increased from USD 5 billion in 1980 to USD 257 billion in 2016. On the other hand, the interest rate decreased from 87% in 1994 to 14% in 2011 and 16% in 2014. Besides, the inflation rate decreased from 105% in 1994 to 8% in 2014. Furthermore, the banking sector experienced rapid growth in performance during this period. The total assets have increased by 150% and the credit provided by the bank as a percentage of

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GDP increased from 16.9% in 2000 to 56% in 2014. Türkiye's markets are easily affected by global external shocks such as European Central Bank (ECB) policy. This paper provides fresh empirical evidence by evaluating the spillover effect of the ECB interest rates on Türkiye's stock market. Besides, the study also aims to test the effect of domestic interest rates on the Türkiye's stock market.

The stability of the financial markets in emerging stock markets is a critical issue in the literature, and the monetary authorities can affect stock market stability through monetary policy channels, such as the interest rates channel (Samour et al. 2020). In this way, the investors or other market participants regulate their forecasting based on any information or expectations that are received from the central bank (Zhao et al., 2023). This information is used by investors or market participants when making their investment decisions (Ioannidis & Kontonikas, 2008). In this study, we will extend the literature and address two critical issues. The first issue to be considered is how the domestic interest rate affects the emerging stock market, as in the case of Türkiye.

Theoretically, interest rate affects stock prices through various channels. Firstly, interest rates affect financing costs, investment, and the values of stock prices (Jammazi et al., 2017). Secondly, previous channels affect the stock market through investments' portfolios with rebalancing channels (Jammazi et al., 2017). When a central bank has a tight monetary policy with high-interest rates, this will reduce capital inflow and investment, leading to a decrease in stock prices.

In contrast, when the central bank has an expansionary monetary policy, which involves decreasing interest rates, the market will receive any decrease in interest rates as positive news, which will lead to an increase in capital inflow and investment opportunities and will cause stock prices to rise (Ioannidis & Kontonikas, 2008). Empirical papers have attempted to understand the association amongst the domestic interest rate and the stock market (Thorbecke, 1997; Basistha and Kurov, 2008; Jansen and Tsai, 2010; Duran et al., 2012; Kucukkocaoglu et al., 2013; Jansen and Zervou, 2017). In these studies, empirical evidence has been provided showing that monetary policy strongly affects stock markets.

The paper differs from other studies by analyzing the spillover influence of the ECB interest rates on Türkiye's stock market which is defined as an emerging stock market. One of the significant challenges of the policymakers in Türkiye is how to

maintain the stability of the stock market, especially from any external shock events, such as the ECB interest rate policies. However, the impact of spillover effects of the ECB interest rates on Türkiye's stock market depends on how the domestic monetary policy responds to any change in the ECB monetary policy and how it will affect foreign investment opportunities, international trade, and macroeconomic factors such as exchange rates. Belke and Dubova (2018) argue that the impact of international spillover effects of monetary policies depends on economic ties. Few studies have examined the impact of spillovers of ECB interest rates on emerging markets outside the Euro area (e.g., Dominguez, 2006; Pirovano, 2012; Kucharcukova et al., 2016; Hajek and Hovath, 2018). These findings suggested different results of ECB interest rate effects on countries outside the euro area.

Secondly, this research aims to explore the effect of financial crises on Türkiye's stock market, namely the 2001 Turkish crisis and the 2008 global financial crisis. In February 2001, Türkiye faced one of the worst financial crises. In this regard, Türkiye's currency depreciated more than 60%, and the interest rate increased, which moved forward to its peak level in April 2001. The crisis forced Türkiye to change the exchange rate system from a fixed exchange rate to a floating exchange rate system. During the crisis, losses in the banking sector had grown to around USD 19 billion. The total foreign debt of Türkiye increased from USD 50 billion in 1991 to USD 114 billion in 2001. After 2002 the financial stability attracted the attention of foreign banks to the Türkiye's financial market. On the other hand, the majority of economies have faced financial crises. Economic stability has a powerful influence on the markets as investors interpret any financial crisis news negatively. This research aims to explore the impact of financial crises on the stock market, namely the global financial crisis.

To achieve this research's objectives, the ARDL, CCR, and FMOLS testing models are utilized to explore the interaction among the tested variables. The new technique of the BH combined co-integration method is employed to support the ARDL co-integration results. The Granger causality approach is utilized to explore the causal linkage among the tested variables. The rest of this study is structured as follows: Section II is the review of the literature, Section III is the methodology, Section IV concentrates on empirical findings, and Section 5 is the conclusion.

## 2. Review of literature

Thorbecke (1997) and Li (2010) applied time-series testing models and showed that US interest has a negative influence on the US stock market. Kholodilin et al. (2009) suggested that the rate of interest has an inverse influence on the European stock markets. Pirovano (2012) analyzed the impact of domestic and ECB interest rates on European stock markets. The findings demonstrated that the influence of ECB interest rates has a powerful influence on the stock markets. Duran et al. (2012) used the GMM panel approach to explore the interaction amongst the interest rate channel and the Türkiye's stock market. The findings demonstrated that the local interest rate has a significant inverse influence on Türkiye's stock market. Kucukkocaoglu et al. (2013) indicated that any rise in the interest rate channel in Türkiye led to a decline in stock prices over the period 2005-2009 and 2005-2013. Bein (2018) analyzed the correlations among Türkiye and European stock markets. The findings suggested that there is a significant correlation among the Türkiye stock market and European stock markets. Samour et al. (2020) investigated the linkage among the local interest rate and Türkiye's stock market from 2002 to 2018 by using the Granger causality test the findings demonstrated a causal link between the interest rate channel and asset prices. Gilchrist and Leahy (2002) presented a literature survey on the prices of assets and monetary policy and considered the shocks that affect the economy and prices of the assets by the future growth expectations. The authors found that movements of the prices of the assets were positively correlated with inflation.

Yao et al. (2013) investigated the long-run linkage among China's monetary policy and asset prices over the period from June 2005 to February 2012. The findings demonstrated that monetary policies have little immediate effect on asset prices in China. Furthermore, the findings showed a causal linkage among the interest rate channel and asset prices in China.

In the testing of international spillover influences of the monetary policies, the empirical literature has focused on the international spillover effect of the US interest rate e.g., Conover et al., 1999, Laeven and Tong, 2012. The authors indicated that foreign stock prices were more outstanding under expansionary US monetary policy than under tight policy. Prabu et al. (2016) demonstrated that the US interest rates do not affect the Indian stock market. However, limited papers have focused on the

spillover effects of ECB interest rates on emerging markets. Dominguez (2006) found that ECB monetary policy significantly affects the global stock markets. Moreover, Kucharcukova et al. (2016) found that the ECB monetary policy has significant spillover effects on output in six EU countries (Denmark, the Czech Republic, Sweden, Poland, Hungary, and the UK). The authors stated that monetary policy affects output and inflation in the same way as within countries of the Euro area. Hajek and Hovath (2018) examined the impact of spillover effects of ECB monetary policy on countries outside the Euro area from 2001 to 2016 by using a global VAR model. The results found that the spillover effect of euro area price on countries outside the Euro is limited. The authors suggested that unexpected changes in the euro area consumer prices do not impact inflationary in countries outside the Euro area. Belke and Dubova (2018) suggested that the impact of spillover effects of ECB monetary policies depends on the number of economic ties between the countries.

In addition, the study aims to explore if the financial crises had any effect on stock markets. Few studies have explored the effect of both the global financial crisis and Türkiye's 2001 crisis on Türkiye's stock markets. In this regard, Dungey and Gajurel (2014) suggested that the global financial crisis had an inverse influence on the global stock market. Dua and Tuteja (2017) found that emerging markets were significantly affected during the global financial crisis. However, Rjoub et al. (2017) suggested that Türkiye's 2001 crisis had an inverse effect on Türkiye's stock market.

### **3. Methodology**

#### **3.1. Model specification and data**

The research data was collected from the ECB and the Organization for Economic Co-operation and Development (OECD) databases. The data of this research covers the period from January 1999 to January 2019. The primary assumption of the research is that the short-term interest rates of Türkiye, the ECB, the 2001 Türkiye economic crisis, the 2008 global financial crisis, and have a powerful influence stock market. The model is represented by the following equation:

$$\ln Si_t = \beta_0 + \gamma_1 \ln Ti_t + \gamma_2 \ln Ei_t + Gfc + Tc + \varepsilon_{it} \quad (1)$$

$\ln Si_t$  is a logarithm of the stock prices of Türkiye,  $\ln Ti_t$  and  $\ln Ei_t$  are the logarithms of the short-term interbank rates of Türkiye and the 1-month EURIBOR interest rate of the ECB (Akinci et al, 2013) (Kholodilin et al, 2009), where  $Gfc$  (09-2008 to 04-2009) represents the 2008 global financial crisis, and  $Tc$  (02-2001 to 09-2001) represents the 2001 Türkiye economic crisis.

### 3.2. Stationary and co-integration tests.

To test the stationarity among the variables this research uses the Perron-Vogelsang and Clemente-Montanes-Reyes (CMR) unit root tests including one and two structural breaks (SB). The research employs the ARDL bounds co-integration test introduced by Pesaran et al. (2001). The ARDL bounds testing approach is applied to check co-integration in three options I(0) level, I(1) level, or mixed of I(0) and I(1). The ARDL model employs different lags to estimate the parameters (Li et al., 2023). By using the ARDL model the study aims to determine if the co-integration among the variables is valid. In this regard, the *F. statistics* will be compared to the critical values suggested by Pesaran et al. (2001). If the values of *F. statistics* exceed the upper bound I(1), the  $H_{0\text{-no co-integration}}$  will not be acceptable. But if the values of *F. statistics* are lower than the lower bound I(0), the  $H_{0\text{-no co-integration}}$  will be acceptable. The result will be inconclusive if the values fall among I(0) and I(1). The ARDL model is presented in the following Equation:

$$\Delta \ln Si_t = \beta_0 + \sum_{i=1}^n \gamma_1 \Delta \ln Si_t + \sum_{i=1}^n \gamma_2 \Delta \ln Ti_{t-j} + \sum_{i=1}^n \gamma_3 \Delta \ln Ei_{t-j} + Gfc + Tc + \sigma_1 \ln Si_{t-1} + \sigma_2 \ln Ti_{t-1} + \sigma_3 \ln Ei_{t-1} + \varepsilon_{1t} \quad (2)$$

In Equation (2),  $\Delta$  means the variables at the first difference,  $n$  is the optimal lags; and  $\varepsilon_t$  is the *error term*,  $Tc$ ,  $Gfc$  are dummy variables of the 2008 global financial crisis and 2001 Turkish economic crisis. To determine the velocity of adjustment, the error correction model ( $EC_{model}$ ) is applied and formulated Equation (3):

$$\Delta \ln Si_t = \beta_0 + \sum_{i=1}^n \beta_1 \Delta \ln Si_{t-j} + \sum_{i=1}^n \beta_2 \Delta \ln Ti_{t-j} + \sum_{i=1}^n \beta_3 \Delta \ln Ei_{t-j} + Gfc + Tc + \omega ECT_{t-1} + u_t \quad (3)$$

$EC_{term}$  shows the adjustment speed in the short and long run. The  $EC_{term}$  is anticipated to have a negative sign and to be significant. To confirm the robustness of the ARDL model results in diagnostic tests such as the Jarque-Bera normality test is utilized to emphasize that the testing model has a normal distribution. The Breush-Pagan Godfrey heteroscedasticity test is used to emphasize that there is no 'heteroscedasticity', the Breusch-Godfrey serial correlation and ARCH tests are applied to confirm that there is no auto-correlation and the Ramsey-Reset test is utilized to emphasize that the testing model is stable.

In this paper, the new technique of BH (2013) combined co-integration is employed to support the findings of the ARDL co-integration model. This test includes four co-integration tests as Banerjee et al. (1998) ( $BA_{Test}$ ), Banerjee et al. (1998) ( $BA_{Test}$ ), Johansen (1988) ( $JO_{Test}$ ), and Engle and Granger (1987) ( $EG_{Test}$ ). The BH technique combines the co-integration findings of these tests and includes Fisher *F. statistics* to provide robust findings. This test is formulated as follows:

$$EGt - JOHt = -2[IN(P_{EGt}) + (P_{JOHt})] \quad (4)$$

$$EGt - JOHt - BOt - BDMt = -2[IN(P_{EGt}) + (P_{JOt}) + (P_{BOt}) + (P_{BAT})] \quad (5)$$

In Equations (4) and (5),  $P$  are the values of individual co-integrations ( $EG_{Test}$ ), ( $JO_{Test}$ ), ( $BO_{Test}$ ), ( $BA_{Test}$ ). To estimate the combined co-integration, Fisher *F. statistics* will be compared to the critical values of BH.  $H_0$ -no combined co-integration will not be accepted if the computed Fisher- *F. statistics* values are higher than the BH critical values.

In this paper, the long-run elasticities are also estimated by the CCR and FMOLS tests. These tests were proposed by Phillips and Hansen (1990) and Park (1992). The Granger causality approach is used within the Error Correction Model (ECM). Thus, the causality direction amongst the considered variables can be tested (Samour et al.,

2019, Isiksal et al., 2019). This test allows  $ECT_{term}$  to determine the short-term variation of the variables from their long-term equilibrium. The ( $ECT_{model}$ ) formula is presented in Equations 6-8:

$$\Delta \ln Si_t = \beta_0 + \sum_{i=1}^p \gamma_1 \Delta \ln Si_{t-1} + \sum_{i=1}^q \gamma_2 \Delta \ln Ti_{t-1} + \sum_{i=1}^q \gamma_3 \Delta \ln Ei_{t-1} + \partial_1 ECT_{t-1} + \varepsilon_t \quad (6)$$

$$\Delta \ln Ti_t = \beta_0 + \sum_{i=1}^p \gamma_1 \Delta \ln Ti_{t-1} + \sum_{i=1}^q \gamma_2 \Delta \ln Si_{t-1} + \sum_{i=1}^q \gamma_3 \Delta \ln Ei_{t-1} + \partial_1 ECT_{t-1} + \varepsilon_t \quad (7)$$

$$\Delta \ln Ei_t = \beta_0 + \sum_{i=1}^p \gamma_1 \Delta \ln Ei_{t-1} + \sum_{i=1}^q \gamma_2 \Delta \ln Ti_{t-1} + \sum_{i=1}^q \gamma_3 \Delta \ln Si_{t-1} + \partial_1 ECT_{t-1} + \varepsilon_t \quad (8)$$

#### 4. Empirical Findings

The findings of the Perron-Vogelsang and CMR tests are reported in Table 1. The findings demonstrate that all the tested variables are stationary at I(1). Thus, all variables are integrated at I(1).

**Table 1 Findings of the Perron-Vogelsang and CMR**

	The PV		CMR		
	t-statistics	SB1	t-statistics	SB1	SB2
lnSi	-3.111	2009M04	-3.411	2001M12	2014M01
lnTi	-3.365	2017M08	-3.331	1999M09	2001M01
lnEi	-3.613	2008M10	-2.211	2001M01	2008M11
$\Delta \ln Si$	-6.411 ***	2001M06	-11.315 ***	2008M10	2018M09
$\Delta \ln Ti$	-5.421 ***	1999M09	-12.315 ***	2009M01	2009M08
$\Delta \ln Ei$	-5.211 ***	2002M11	-7.881 ***	2008M02	2014M11

\*\*\* signalizes to the statistical significant at 1% level

**Table 2 Findings ARDL bounds testing approach**

	F.statistic	(95%) lower-bound	(95%) upper-bound
F Si/Ti, Ei, Gfc, Tc	8.546 **	3.47	4.57

\*\* signalize statistic-sign at 5% level



The findings of the ARDL bounds testing approach are shown in Table 2. The findings indicate that the *F. statistics* exceeds a 5% statistical significance. Thus there is co-integration among all the variables. The result of the BH test is shown in Table 3. The findings demonstrate that the computed *F. statistics* exceed the tabulated *F. statistics* in (EG<sub>T</sub>), (JO<sub>T</sub>) and (EG<sub>Test</sub>), (JO<sub>Test</sub>), (BO<sub>Test</sub>), (BA<sub>Test</sub>) at 5 percent of the statistical significance level. Therefore, the BH (2013) result confirms the results of the ARDL bound testing approach.

**Table 3 Findings of BH co-integration test**

Model	Fisher.F.stat	
	EG-J	EG-J-Ba-Bo
F Si/Ti, Ei	16.412**	22.337**
Sig. level: 5%	10.895	21.106
Sig. level: 10 %	8.479	16.444

\*\* signalize statistic-sign at 5% level respectively

The normality, the ARCH, LM, and Breusch-Pagan Godfrey findings emphasize that the testing model is stable. Besides, the findings of the Ramsey-Reset (R-R) test confirmed the stability of the model. Moreover, Figures 1 and 2 (CUSUM and CUSUM) show that the tested model of this study is stable.

**Table 4 Findings of ARDL and Diagnostic Test**

Variable	Coefficient	Std. Error	T <sub>Statistics</sub>	Prob.
<b>Short run</b>				
ΔTi	-0.003893	0.009495	-0.409972	0.6823
ΔEi	-0.004489	0.005935	-0.756487	0.4504
<b>Long run</b>				
lnTi	-0.027777*	0.016054	-1.730166	0.0854
ln Ei	-0.032036**	0.012545	-2.553701	0.0115
Gfc	-0.541119***	0.040541	-13.34741	0.0000
Tc	-0.048837***	0.012984	-3.761261	0.0002
ECMt-1	-0.027777*	0.016054	-1.730166	0.0854
<b>Diagnostic tests</b>				
JB.normality-test	1.984 (0.337)			
ARCH	0.007 (0.932)			
B.P.G- Test	1.237 (0.269)			
Rmasey_RESET	2.295 (0.196)			

\*, \*\*, \*\*\* signalize statistic-sign at 1%, 5% and 10% level

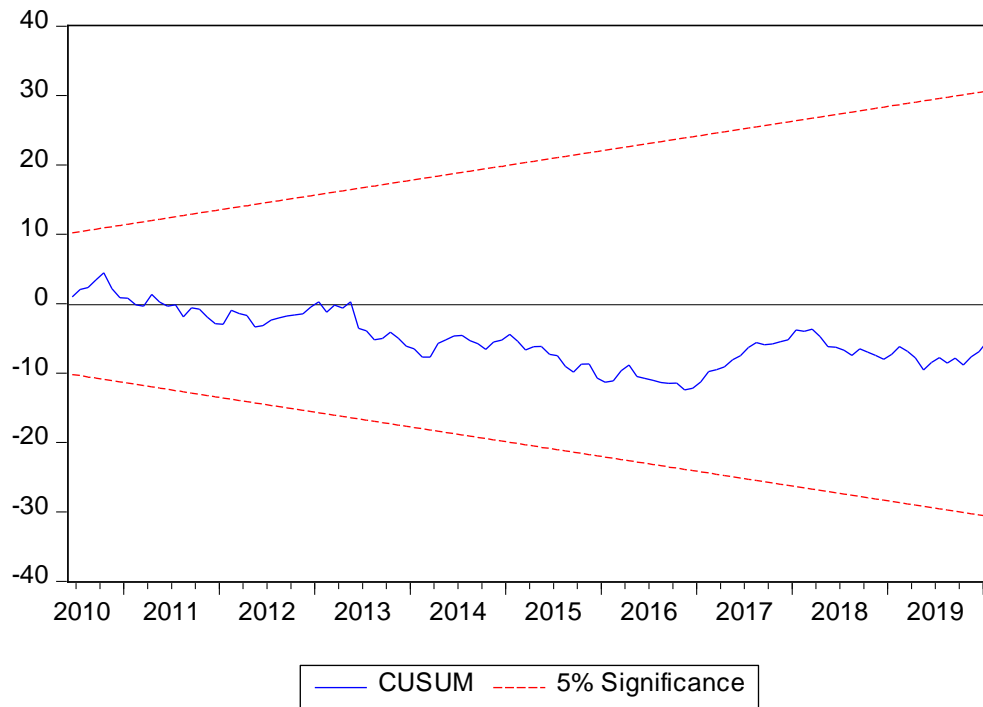


Figure 1. CUSUM.

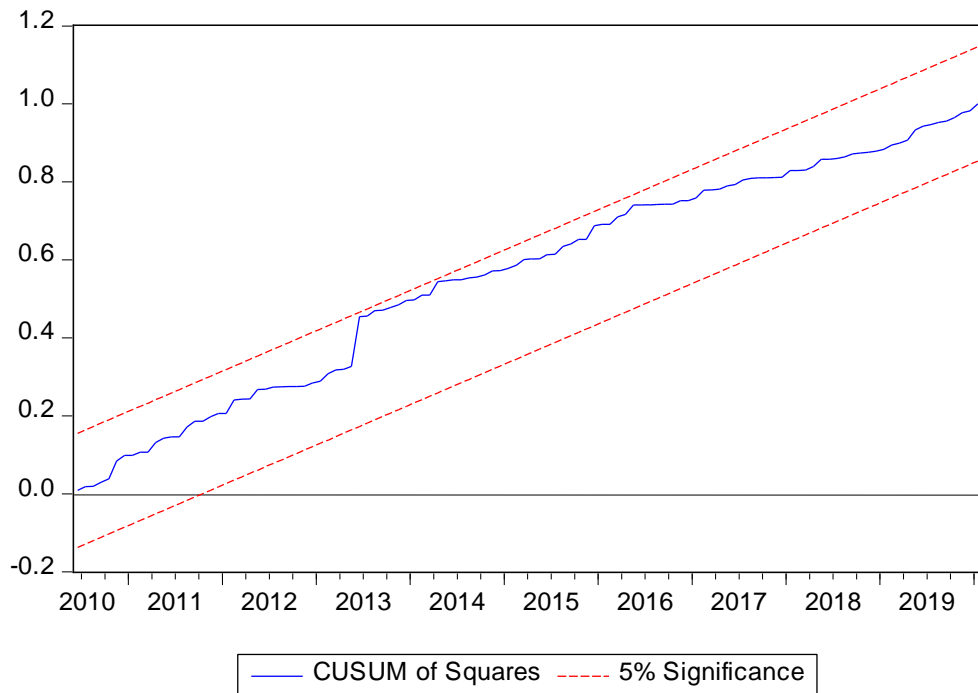


Figure 2. CUSUM-squares.

The estimation of coefficients in the short term is reported in Table 4. The findings indicate that  $ECT_{t-1}$  is negative and significant, and the convergence rate from the short-term to long-term equilibrium is -0.0227. The ARDL, CCR, and FMOLS

long-run coefficient estimations are presented in Table 4 and Table 5. The empirical findings show a robust negative association among Türkiye's interest rate and stock prices in the long run. Besides, the findings show that there is unidirectional causality among the domestic interest rate and Turkey's stock market. Hence, the study provides evidence that the local interest rate has a powerful influence on the stock market of Türkiye. It is suggested that any increase in the local interest rate will increase credit costs and a reduction in capital inflow and investment chances. Therefore, this will lead to a decrease in stock prices. In contrast, any decrease in the local interest rate will lead to a decrease in the riskiness of stock markets due to reducing credit costs and increasing capital inflow and investment chances, thus causing the stock prices to increase. The finding is in line with Samour et al. (2020), who examined the linkage among the local interest rate and Türkiye's stock market. This finding is also similar to Gilchrist and Leahy (2002) who found by using the Granger causality test that there is a causal linkage among the interest rate channel and asset prices in Türkiye. These findings are also in line with Yao et al. (2013) who studied the long-run linkage among the monetary policy and asset prices in China.

**Table.5 The coefficients estimation from FMOLS and CCR models**

<b>Regressor</b>	<b>FMOLS Coeff.</b>	<b>CCR Coeff.</b>
ln Ti	-0.070**	-0.019**
ln Ei	0.009**	0.006**
Gfc	-0.023***	-0.011***
Tc	-0.001***	-0.031***
Adjusted.R2	0.97	0.96

*\*\* ,\*\*\* signalize statistic-sign at 5%, and 1% level*

However, these findings suggested that investors in emerging markets such as Türkiye rush to buy shares or houses whenever tightening monetary actions are taken. However, the local lower interest rates are used to boost economic growth rates, as lower financing costs can support borrowing and investing, which will increase the stock prices. On the other hand, when there is too much growth, the local central bank can raise interest rates to slow inflation and return growth to more sustainable levels. In this sense, higher financing costs will decrease borrowing and investing, leading to a decrease in stock prices.

Furthermore, ARDL, CCR, and FMOLS (Table 5) findings show that the ECB interest rate coefficient has a negative sign in the long run. Moreover, the Granger causality test results in Table 6 indicate a unidirectional causality among stock prices and domestic interest rates. In addition, there is a unidirectional causality among the ECB and the Türkiye stock market and a unidirectional causality between the ECB and the domestic interest rates. Therefore, the study provides evidence that the spillover effect of the ECB interest rate has a powerful influence on the stock market of Türkiye through the domestic interest rate channel. In the long run, the coefficient of  $ECT(\ln Ti, \ln Ei \text{ to } \ln Si)$  is negative and significant. However, one of the significant challenges of the policymakers in Türkiye is maintaining the stock market's stability, especially from any external shock, such as the ECB policy rates. Hence, the study suggests that the impact of spillover effects of the ECB interest rates on the Türkiye stock market depends on how the domestic monetary policy responds to any change in the ECB monetary policy and how they will affect foreign investment opportunities, international trade, and macroeconomic factors such as exchange rates.

**Table. 6 Findings of Granger Causality**

Variable	Short-Run F-stat			Long-Run T-stat
	$\Delta TSi$	$\Delta Ti$	$\Delta Ei$	$ECT_{t-1}$
$\Delta \ln Si$	-	6.431**	5.915**	-0.0456(-1.9610)**
$\Delta \ln Ti$	1.301	-	4.910*	0.0461(1.4150)
$\Delta \ln Ei$	2.418	1.565	-	0.1013(4.3121)

\*, \*\* signalize statistic-sign at 10% and 5% level

Finally, the findings indicated that the 2008 global financial crisis had an inverse influence on Turkish stock prices. The findings are in line with (Samour et al., 2020), who found 2008 global financial crisis affect negatively Turkish stock markets. Besides, the findings indicated that the 2001 Turkish economic crisis had an inverse influence on Türkiye stock prices. This result is consistent with Rjoub et al. (2017) who presented that the 2001 Türkiye economic crisis has a negative impact on Türkiye stock markets.

## 5. Conclusion

This paper aims to evaluate the influence of the domestic interest rate and spillover impacts of the ECB interest rates on the Türkiye stock market during the

period from January 1999 to January 2019. The ARDL, CCR, and FMOLS models are utilized to explore the interaction among the tested variables. The new technique of BH combined co-integration is employed to emphasize the findings of the ARDL testing model. The Granger causality is applied to analyze the causal linkage among the tested variables. The findings from the ARDL model in the short and long run show that tight (expansionary) domestic monetary policy leads to a decrease (increase) in the Türkiye stock market. Thus, there is an inverse interaction among the domestic interest rate and stock prices. It is suggested that any increase in the local interest rate will increase credit costs and a reduction in capital inflow and investment chances. Therefore, this will lead to decreases in stock prices.

In contrast, any decrease in the local interest rate will lead to a decrease in the riskiness of stock markets due to reducing credit costs and increasing capital inflow and investment chances, thus causing the stock prices to increase. It is consistent with the results of many empirical studies such as (Thorbecke, 1997; Samour et al. 2020). However, these findings suggested that investors in emerging markets such as Türkiye rush to buy shares or houses whenever tightening monetary actions are taken. However, the local lower interest rates are used to boost economic growth rates, as lower financing costs can support borrowing and investing, which in turn leads to an increase in stock prices. On the other hand, when there is too much growth, the local central bank can then raise rates of interest to slow inflation and return growth to more sustainable levels. In this sense, higher financing costs will lead to a decrease in borrowing and investing, which in turn leads to a decrease the stock prices.

Moreover, the findings from the ARDL, CCR, and FMOLS models show that the Türkiye stock market was affected negatively by the ECB interest rate policies. Besides, the findings show that there is a unidirectional causality among the ECB and the Türkiye stock market, and there is a unidirectional causality between the ECB and the domestic interest rate. Therefore, the study provides evidence that the spillover effect of the ECB interest rate has a powerful influence on the stock market of Türkiye through the domestic interest rate. However, the economic ties and integration among Türkiye and the EU countries led to an increase in the sensitivity and volatility of the Türkiye stock market to ECB interest rate policy. The study's findings are in line with Bein (2018), who analyzed the correlations among Türkiye and European stock markets. The

findings suggested that there is a significant correlation among the Türkiye stock market and European stock markets. The findings are in line with Dominguez (2006) and Kucharcukova et al. (2016) who found that the ECB monetary policy has significant spillover effects on output and stock markets in countries outside the euro area.

Finally, the findings indicate that the 2008 global financial crisis and the 2001 Türkiye economic crisis negatively affected the Türkiye stock market. It is suggested that the monetary authorities of Türkiye should pay more attention to stock market stability through monetary policy channels. Furthermore, they should pay more attention to the effects of external shocks such as ECB policy to maintain market stability. This study has tested the impact of the domestic and ECB interest policy on the Türkiye stock market, using a newly developed combined co-integration and causality analysis. Further research for other countries or regions is suggested for comparison purposes, using different methodologies to examine the effect of interest rates on the stock market, such as the forecasting approach of stock as suggested by James et al. (2003).

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