# Examining the Financial Development Channels Affecting Economic Growth in Turkey

## Banu Demirhan

Afyon Kocatepe University, Afyon, Turkey
E-mail: bdemirhan@aku.edu.tr
ORCID: https://orcid.org/0000-0002-0902-4629

**Abstract.** In the early 1980s, Turkey took steps towards financial liberalization. Accordingly, policymakers have implemented policies for the development of the financial system. Since then, developments in the banking sector have driven economic growth and met the private sector's demand for funds. The research problem involves analyzing the relationship between financial development and economic growth in Turkey, which is crucial in determining the effectiveness of policies implemented for financial development. Determining the source through which financial development is vital for economic growth is also critical in designing these policies. This research examines the channels through which financial development impacts economic growth in Turkey. By using data from 1974 to 2023 for Turkey, this study conducted a Granger causality test based on VECM and the Toda Yamamoto method to analyze the causal relationship between economic growth and financial development. The analysis also included impulse response functions. Our study reveals that financial development contributes to economic growth. Policymakers should implement policies that prioritize the development of the financial system.

**Keywords:** Financial development, economic growth, VECM, Toda-Yamamoto, impulse response function, Turkey.

## 1. Introduction

Have Turkey's financial development efforts over the years contributed to economic growth? If so, which components of the financial system play a role in this contribution? In 1980, the financial system began to advance in Turkey. The early 1980s witnessed significant measures implemented, including the development of the capital and interbank money markets. Furthermore, the Government implemented measures to liberalize foreign exchange legislation. These developments enhanced the efficiency of the financial system and had a positive effect on the real economy. Turkey adopted an open economy approach and liberalized its financial sector by implementing significant reforms since the 1980s. The process aimed to target the liberalization of capital flows on a domestic and international level and the expansion of trade volumes and foreign investment (Pamuk, 2019; Fırat, 2009).

Many studies on the relationship between financial development and economic growth use Turkish data. Studies analyzing the relationship between financial development and economic growth have mainly used time series methods. Examples of these studies are Kuzucu (2022), Coşkun and Kuloğlu (2022), Aşık (2023), Kılıç et al. (2019), and Eroğlu and Yeter (2021). These studies used loans to the private sector as an indicator of financial development. On the other hand, they did not analyze the development of the capital market. In addition, although the studies conducted by using quarterly data cover the data for 2023, the studies conducted using annual data include the latest data for 2019 only. Finally, the studies that used annual data did not incorporate significant structural changes in the Turkish economy into their models. Our study differs from recent studies in that it considers the development of the capital market, covers a more extended period, and examines structural changes in the Turkish economy. Therefore, the research problem in this study is whether the financial development policies implemented in Turkey for a long time contribute to economic growth. Another research problem is to determine the channels through which these policies contribute to economic growth. In other words, we aim to assess the contribution of the components of the financial system.

This study set out to answer the following questions: (1) *Has financial development in Turkey since the 1980s impacted economic growth*? (2) *If so, what is the source of this impact*? We expect the development of the Turkish banking system and capital markets to facilitate the transfer of savings to investments and boost consumption expenditures. Therefore, the study hypothesizes that financial development positively affects economic growth. Furthermore, given the high level of development in Turkey's banking system, the study also hypothesizes that the source of financial development comes mainly from the banking system.

This study aims to investigate the channels through which financial development affects economic growth in Turkey. In this context, we will determine whether the banking system or the capital market is more effective for economic growth. For this purpose, we will frequently use time series methods, as used in the literature. First, we will apply VECM and impulse-response functions for our analyses. Next, we will conduct Toda-Yamamoto analysis to provide methodological support. We will also determine short-term and long-term effects by using these methods.

This study examines the causal relationship between financial development and economic growth in Turkey from 1974 to 2023. This study makes various contributions to the existing literature. First, this research analyzes the relationship between financial development and economic growth over a very long period, considering the structural breaks in the Turkish economy. The financial system in Turkey has undergone significant development since the 1980s; therefore, this study provides a long-term perspective on the consequences of the combinations of financial development. Secondly, the study uses components of financial development in Turkey in econometric models. In this framework, we will determine the effects of the banking system and the capital market on economic growth separately.

We organize the rest of the article as follows: Section 2 presents the theoretical and empirical literature. Section 3 describes the model specification and data. Section 4 includes the empirical estimations. Section 5 presents the robustness check. Section 6 presents a discussion, and the final section comprises the concluding remarks.

## 2. Theoretical and Empirical Literature Review

The financial system transfers surplus funds from economic units to those in need. This leads to an increased investment and economic growth. Current developments in the financial system enhance its positive impact on economies. The fact that the total value of all financial assets and liabilities exceeds that of the entire economy demonstrates the financial system's critical role in the modern world. The significance of financial tools to economic growth is evident during the economy's up and down cycles (Rutkauskas, 2015). King and Levine (1993) found a strong correlation between financial development, real *per capita* GDP growth, physical capital accumulation, and improvements in physical capital efficiency.

Schumpeter (1911) conducted the first study of the correlation between financial development and economic growth, thereby marking the beginning of theoretical explanations on this subject. According to the prevailing viewpoint, supported by Schumpeter's seminal study in 1911, the stock market's growth benefits the economy by providing liquidity and a method for distributing while minimizing risks. Furthermore, it facilitates the effective distribution of resources toward profitable projects, minimizes expenses related to information and transactions, and eventually empowers organizations to pursue successful ventures (Ibrahim, 2011). According to the Schumpeter's model, the financial sector's growth is one of the main factors that trigger economic growth.

Many economists have recognized the crucial role of financial markets in economic development. Schumpeter (1934) noted the role of financial intermediaries in directing resources toward more productive investments, while Bagehot (1873) and Hicks (1969) emphasized the significance of financial development for the economy. The authors believed that the presence of financial markets and institutions played a crucial role in facilitating the industrial revolution. This was achieved by enabling enterprises to borrow and lend, encouraging the adoption of new technologies, and pursuing riskier yet potentially more profitable investments (Capasso, 2004). Moreover, McKinnon (1973) and Shaw (1973) describe financial liberalization as establishing higher interest rates that equalize the demand and supply of savings. According to the two authors, higher interest rates will enhance savings and financial intermediation while improving savings efficiency (Balassa, 1990).

Patrick (1966) provided two definitions of the connection between financial development and economic growth. Economic growth closely correlates with the increasing demand for financial services. Financial development enables the effective transformation of savings into investments, which supports economic growth. Moreover, according to Robinson (1952), there is a correlation between the growth of the financial system and

economic development. Certain viewpoints argue that financial development does not impact economic growth. The pioneer of these investigations, Lucas (1988), highlighted that physical and human capital and technological advancements drive economic progress.

Several analyses in the literature on the relationship between financial development and economic growth employ time series techniques for a specific country, while others rely on estimating panel data models that combine data from many countries. Some studies in the literature on financial development and economic growth employ time series techniques that focus on a particular country, while others combine data from multiple countries to construct panel data models. While several of these models focus on the influence of financial development on economic growth, others examine the causal relationship between these two variables.

Recent studies that conduct causality analyses based on panel data models demonstrate the relationship between economic growth and financial development. Mtar and Belazreg (2021) can be given as an example of these studies. Once more, recent studies (e.g., Nguyen et al., 2022; Pradhan et al., 2013; Çınar et al., 2024) have proven a two-way causality relationship between economic growth and financial development.

The relationship between financial development and economic growth in countries may also depend on their income levels. Canbaloğlu and Gürgün (2019) conducted a study where they found that there was no relationship between financial development and economic growth in countries in the upper-middle and high-income categories. Despite this, they discovered a unidirectional causality, indicating that financial development drives economic growth in countries classified as low- and lower-middle income.

Several studies have examined the relationship between financial development and economic growth by employing panel data techniques and combining data for country groups. For instance, the studies conducted by Ibrahim and Alagidede (2018) and Asante and Takyi (2023) have determined that the development of financial systems supports economic growth in sub-Saharan countries. Ahmed (2016) conducted another study on countries in sub-Saharan Africa, which found that international financial integration positively impacts economic growth by enhancing financial development. Bist (2018) demonstrates that financial development in low-income countries positively influences economic growth. In their study, Ekanayake and Thaver (2021) employed a large dataset to determine various panel relationships that exhibit differences across various country groups within developing countries. According to Abbas et al. (2022), financial development in middle-income countries contributes to economic growth, with a particularly significant impact in upper-middle-income countries. While most of the literature indicates that financial development has a positive effect on economic growth, some studies suggest that financial development has a negative impact on economic growth, as shown by Wen et al. (2022).

In addition to the impact of financial development on economic growth, some studies examine the consequences of financial reforms. For instance, Boikos et al. (2022) determined that financial reforms have a greater impact on economic growth than financial development in developed and developing countries. Furthermore, researchers have ex-

amined the relationship between financial development and economic growth on a sectoral basis. Ustarz et al. (2021) conducted a study that demonstrated the positive influence of financial development on the growth of the agriculture and service sectors. After a certain point, financial development begins to influence the industry sector.

Furthermore, researchers have conducted studies in the literature by using the panel data technique, employing data from industrialized countries. Swamy and Dharani (2019) found a long-term inverted U-shaped relationship between financial development and economic growth. Financial development facilitates firms' financing of private investment, thereby supporting economic growth. Castro et al. (2015) used firm-level data to demonstrate how financial development in Brazil influences investments of firms.

Many studies have been conducted in Turkey to investigate the causal relationship between economic growth and financial development. Studies examining the causal connection between financial development and economic growth in Turkey have produced different findings. While some studies, such as Aşık (2023), Acaravcı et al. (2007), Eroğlu and Yeter (2021), and Şeyranlıoğlu (2024), indicate that financial development leads to economic growth, other studies, such as Aslan and Küçükaksoy (2006), Kandır et al. (2007), Taşseven and Yılmaz (2022), Atay (2020), and Özcan and Arı (2011), suggest that economic growth leads to financial development. Some studies (Demirhan et al., 2011; Kuzucu, 2022; Coşkun and Kuloğlu, 2022; Kılıç et al., 2019) have found a bidirectional causal relationship. Moreover, Atgür (2019) demonstrates that financial development does not significantly impact economic growth.

Furthermore, several studies in the literature indicate that there is no causal relationship between financial development and economic growth. Such studies include Nur (2021) and Tekin et al. (2024), Shahzadi et al. (2023), Çetin et al. (2023), Alhassan et al. (2022), and Li et al. (2021) have all recently conducted studies which undertook to estimate the relationship between financial development and variables such as energy consumption and air pollution. Moreover, Sghaier (2023), Asteriou et al. (2024), and Emara and Said (2021) have conducted research indicating that the influence of financial development on economic growth is dependent on trade openness, fiscal policy, and governance. Studies such as those performed by Younsi and Bechtini (2020) have investigated the influence of financial development on income inequality.

## 3. Data and Model Specification

### 3.1. Data

Econometric estimations cover the years 1974 to 2023. The reason for selecting this period was the availability of data. The models use annual time series data. The data used for the models is a yearly time series dataset. Financial development indicators were based on two variables. The first variable is the total bank credit to the private sector, expressed as a percentage of GDP (*cre*); the second is the share of the broadly defined money supply in GDP (*m2*). We depicted that previous studies frequently used these indicators. Since our research covered an extended period, we were able to obtain these indicators consistently.

The dependent variable, economic growth, is defined as the natural logarithm of the real GDP (*gdp*). The control variable, trade openness, is the sum of exports and imports of goods and services expressed as a percentage of GDP (*open*). We sourced all variables from the *World Bank* (2024). After 1980, outward-oriented policies were implemented in the Turkish economy, and financial liberalization began. This situation made significant contributions to financial development. In addition, the Turkish economy faced two major crises in 1994 and 2001, independent of the global crises. In this context, we included dummy variables in the econometric models for the period after 1980 and the 1994 and 2001 crises. The Appendix displays summary statistics and correlation matrix in Tables A1 and A2.

### 3.2. Econometric Model

The first step in analyzing the relationship between financial development and economic growth is to determine if the series has unit roots. This study employs the *Augmented Dickey-Fuller* (ADF) and *Phillips-Perron* (PP) unit root tests to determine whether the series in question has a unit root (Dickey and Fuller, 1979 and 1981; Phillips, 1987; Phillips and Perron, 1988). We will proceed with our investigation by applying cointegration tests if we find a unit root, or I(1), in the series. This study employs the *Johansen* multivariate cointegration technique, as Johansen (1988) and Johansen and Juselius (1990) suggested. This method offers two likelihood ratio tests, employing trace and maximum eigenvalue statistics. In the trace and maximum eigenvalue tests, the null hypothesis is that the number of cointegrating vectors is less than or equal to *r*, where r is *0*, *1*, or *2*. In the $\lambda_{trace}$ and $\lambda_{max}$ tests, the null hypothesis is tested against at least *r + 1* cointegrating vector and *r + 1* cointegrating vector, respectively.

We will perform the causality test after the cointegration test. According to Engle and Granger (1987) and Granger (1988), the cointegration of two time series variables results in at least a unidirectional Granger causality. Granger (1988) asserts that when cointegration exists between I(1) variables, the Granger causality test necessitates the incorporation of the error correction term derived from the cointegration equation. When there is a long-term relationship between the variables, we apply the causality analysis using VECM, as shown below.

$$\Delta gdp_t = \alpha_1 + \sum_{i=1}^{p} \beta_{1i} \Delta gdp_{t-i} + \sum_{i=1}^{p} \phi_{1i} \Delta cre_{t-i} + \sum_{i=1}^{p} \lambda_{1i} \Delta open_{t-i} + \psi_1 z_{t-1} + \varepsilon_{1t} \tag{1}$$

$$\Delta cre_t = \alpha_2 + \sum_{i=1}^{p} \beta_{2i} \Delta gdp_{t-i} + \sum_{i=1}^{p} \phi_{2i} \Delta cre_{t-i} + \sum_{i=1}^{p} \lambda_{2i} \Delta open_{t-i} + \psi_2 z_{t-1} + \varepsilon_{2t} \tag{2}$$

$$\Delta open_t = \alpha_2 + \sum_{i=1}^{p} \beta_{3i} \Delta gdp_{t-i} + \sum_{i=1}^{p} \phi_{3i} \Delta cre_{t-i} + \sum_{i=1}^{p} \lambda_{3i} \Delta open_{t-i} + \psi_3 z_{t-1} + \varepsilon_{3t} \tag{3}$$

where $\Delta$ is the difference operator, $\varepsilon_t$ is zero mean, serially uncorrelated random error terms, *p* represents the number of lags, and $z_{t-1}$ is the error correction term, the lagged values of the error term derived from the estimated long-term cointegration relationship.

The error correction term shows the short-run deviations from the long-run equilibrium, reflecting the speed of adjustment of any disequilibrium to the long-run equilibrium. If there is no cointegration relationship, we estimate Equations (1–3) without using error correction terms. The choice of the model in this study relies on the existing cointegration relationship. We employ dummy variables in VECM to explore the effects of the 1994 and 2001 crises and the period of financial liberalization following 1980. We assign the dummy variable to one during periods of crisis and financial liberalization, and to zero otherwise.

To examine causality from financial development to economic growth, we computed the *Wald* test statistics under the null hypothesis that all coefficients of $\varphi_{1i}=0$ as a group. Similarly, when performing the Wald test to determine causation from economic growth to financial development, the null hypothesis being tested is that all coefficients of $\beta_{2i}=0$ as a group. After estimating Equations (1–3), if the null hypothesis of all coefficients of $\varphi_{1i}=0$ or the coefficient of $\psi_{1i}=0$ is rejected, then it is concluded that there is a causality from financial development to economic growth. On the other hand, if the null hypothesis of all coefficients of $\beta_{2i}=0$ or the coefficient of $\psi_{1i}=0$ is rejected, then the causality relationship is from economic growth to financial development.

We will also conduct causality analyses using the *m2* variable, a different financial development indicator, instead of the *cre* variable in Equations (1–3). Rejecting the null hypothesis that the explanatory variables as a group are different from zero indicates a short-run causality from the explanatory variables to the dependent variables. The statistical significance of the coefficient $\psi_{1i}$ indicates long-term causality from explanatory variables to dependent variables.

## 4. Empirical Results

Table A1 in the Appendix presents the descriptive statistics for the variables used in the econometric model. The Jarque-Bera test reveals a normal distribution of all variables at the 5% level. The standard deviation indicates the extent of dispersion in the data from the mean value. The data show the highest variation in *cre*. Table A2 in the Appendix displays the correlation between the variables. Table A2 shows a strong correlation between *gdp*, *cre*, *m2*, and *open*.

Table 1 represents the ADF and PP test results for the levels and first differences of all variables used in the econometric models. According to the ADF and PP tests, all variables are integrated in order one in first differences; thus, all variables are I(1) or non-stationary. We determine the optimal lag by minimizing Akaike's FPE criterion. Since the unit root test results show that all variables are I(1), we can use the Johansen cointegration technique. We will, therefore, perform both short-term and long-term analyses. Table 2 presents the results of the Johansen cointegration test for the *cre* and *m2* variables, which represent financial development indicators. Table 2 indicates that there is a statistically significant cointegration relationship between the variables. Therefore, we conclude that *gdp*, *cre*, and *open* have a long-run relationship. This relationship is also valid when *m2* is considered the financial development variable. Table 2 displays the normalized cointegrating coefficients at the bottom.

**Table 1.** Unit root tests

| *Series* | ADF | PP |
|---|---|---|
| gdp | 0.40 (0) | 0.68 (5) |
| Δgdp | -6.80 (0)*** | -6.87 (4)*** |
| cre | -2.19 (0) | -0.94 (3) |
| Δcre | -2.06 (2) | -4.71(1)*** |
| m2 | 1.80 (10) | -0.79 (17) |
| Δm2 | -5.35 (3)*** | -16.03 (47)*** |
| open | -0.74 (2) | -0.71 (7) |
| Δopen | -6.71(1)*** | -7.06 (12)*** |

*Source:* the author's computation

PP is the Phillips-Perron, and ADF is the Augmented Dickey-Fuller test.

*** signifies the rejection of the non-stationary null hypothesis at the 1% level.

The optimal lag order for the ADF test is chosen by considering the Akaike Information Criteria, represented in parentheses.

The bandwidth is chosen for PP tests using the *Newey-West* method, and spectral estimation uses the Bartlett kernel, represented in parentheses.

The 1%, 5%, and 10% critical values for the ADF and PP tests are -3.57, -2.92, and -2.60, respectively.

**Table 2.** Cointegration test results

| | | (gdp, cre, open) | | | (gdp, m2, open) | | |
|---|---|---|---|---|---|---|---|
| Hypothesized No. of CE(s) | Trace Statistic | 0.05 Critical Value | Prob. | Hypothesized No. of CE(s) | Trace Statistic | 0.05 Critical Value | Prob. |
| r = 0* | 45.74 | 29.79 | 0.0009 | r = 0* | 39.15 | 29.79 | 0.0305 |
| r ≤ 1 | 12.60 | 15.49 | 0.3312 | r ≤ 1 | 11.02 | 15.49 | 0.7438 |
| r ≤ 2 | 1.29 | 3.84 | 0.5184 | r ≤ 2 | 1.62 | 3.84 | 0.2215 |
| gdp= 24.95 + 0.01 cre + 0.04 open<br>　　　　(0.001)　　(0.002) | | | | | | | |
| gdp= 24.87 + 0.02 m2 + 0.03open<br>　　　　(0.005)　　(0.005) | | | | | | | |

*Source:* the author's computation

* denotes rejection of the hypothesis at the 5% level.

The optimal lag order for the cointegration test is determined as 3, chosen by considering the Akaike Information Criteria. Standard errors of the coefficients in the cointegration equations are shown in parentheses.

Below Table 2, we display the results of the cointegration equation showing the long-term effect of financial development indicators on economic growth. The first equation shows that the effect of credit to the private sector on economic growth is positive. The second equation shows that the broadly defined money supply contributes positively to economic growth. According to the cointegration equation, both financial development indicators positively affect economic growth in the long run.

The Granger causality test based on VECM investigated the causal relationship between financial development and economic growth. The test results indicate that the credit

supply to the private sector is the leading cause of short-term and long-term economic growth. Using money supply growth as the indicator for financial development revealed no causal relationship. The causality test results show a short-term causality from the openness indicator to bank credits given to the private sector. In addition, there is a two-way causality between the openness indicator and broadly defined monetary growth in the short term. Table 4 presents diagnostic tests at the bottom to assess the robustness of the model. Diagnostic tests include the *Breusch-Godfrey* serial correlation LM test, the *Breusch-Pagan-Godfrey* heteroskedasticity tests, and *Jarque-Bera* normality tests. The diagnostic test results show the absence of serial correlation, the absence of heteroskedasticity, and the presence of normality.

We apply the *CUSUM* and *CUSUM-square* tests to determine the structural stability of Equations (1–3). The CUSUM test is based on the cumulative sum of the recursive residuals, whereas the CUSUM-square test is based on the squared recursive residuals. According to the test results, the models have structural stability in general. CUSUM and CUSUM square tests for models where the dependent variables are *gdp, cre,* and *m2* are shown in the Appendix in Figures (A1–A6).

**Table 3.** Causality test results (*gdp*, *cre*, *open*)

| Dependent Variable | $\Delta$gdp | $\Delta$cre | $\Delta$open | $z_{t-1}$ (t) |
|---|---|---|---|---|
| $\Delta$gdp | - | 8.16** | 1.73 | -0.10** |
| $\Delta$cre | 4.60 | - | 11.98*** | - |
| $\Delta$open | 3.47 | 4.01 | - | - |
| **Diagnostic Tests** | | | | |
| Dependent Variable | J.B. | LM(2) | B-P-G | |
| $\Delta$gdp | 0.11 | 0.75 | 0.90 | |
| $\Delta$cre | 0.52 | 0.36 | 0.55 | |
| $\Delta$open | 0.65 | 0.57 | 0.34 | |

*Source:* the author's computation

**Table 4.** Causality Test Results (*gdp*, *m2*, *open*)

| Dependent Variable | $\Delta$gdp | $\Delta$m2 | $\Delta$open | $z_{t-1}$ (t) |
|---|---|---|---|---|
| $\Delta$gdp | - | 3.07 | 1.84 | -0.10** |
| $\Delta$m2 | 0.92 | - | 15.29*** | - |
| $\Delta$open | 10.87** | 20.45*** | - | - |
| **Diagnostic Tests** | | | | |
| *Dependent Variable* | *J.B.* | *LM(2)* | *B-P-G* | |
| $\Delta$gdp | 0.15 | 0.32 | 0.92 | |
| $\Delta$m2 | 0.71 | 0.90 | 0.71 | |
| $\Delta$open | 0.19 | 0.10 | 0.70 | |

*Source:* the author's computation

Impulse response function analyses were conducted to determine the relationship between financial development and economic growth. Impulse response functions describe the response of other variables to a one-standard deviation shock in the variables. Figures 1 and 2 display the impulse response functions. It is observed that economic growth responds positively to loans to the private sector, which is an indicator of financial development, in every period (first row, third chart in Figure 1). Furthermore, the response of bank credits to the private sector to economic growth is positive in all periods (second row, third chart in Figure 1). The response of economic growth to the broadly defined money supply, one of the financial development indicators, fluctuates but is generally positive (first row, third chart in Figure 2). On the other hand, the broadly defined response of the money supply to economic growth also shows an up-and-down trend (second row, third chart in Figure 2).
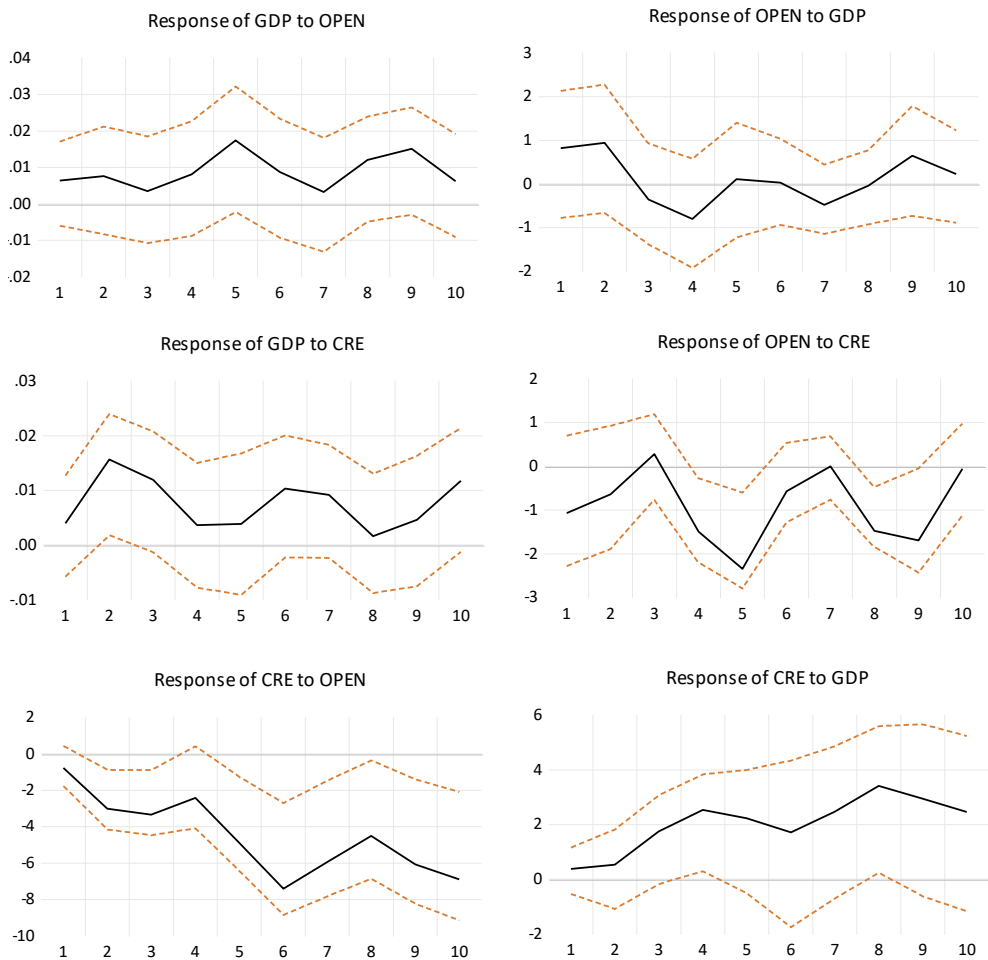


**Figure 1.** Impulse response functions (*gdp*, *cre*, *open*)
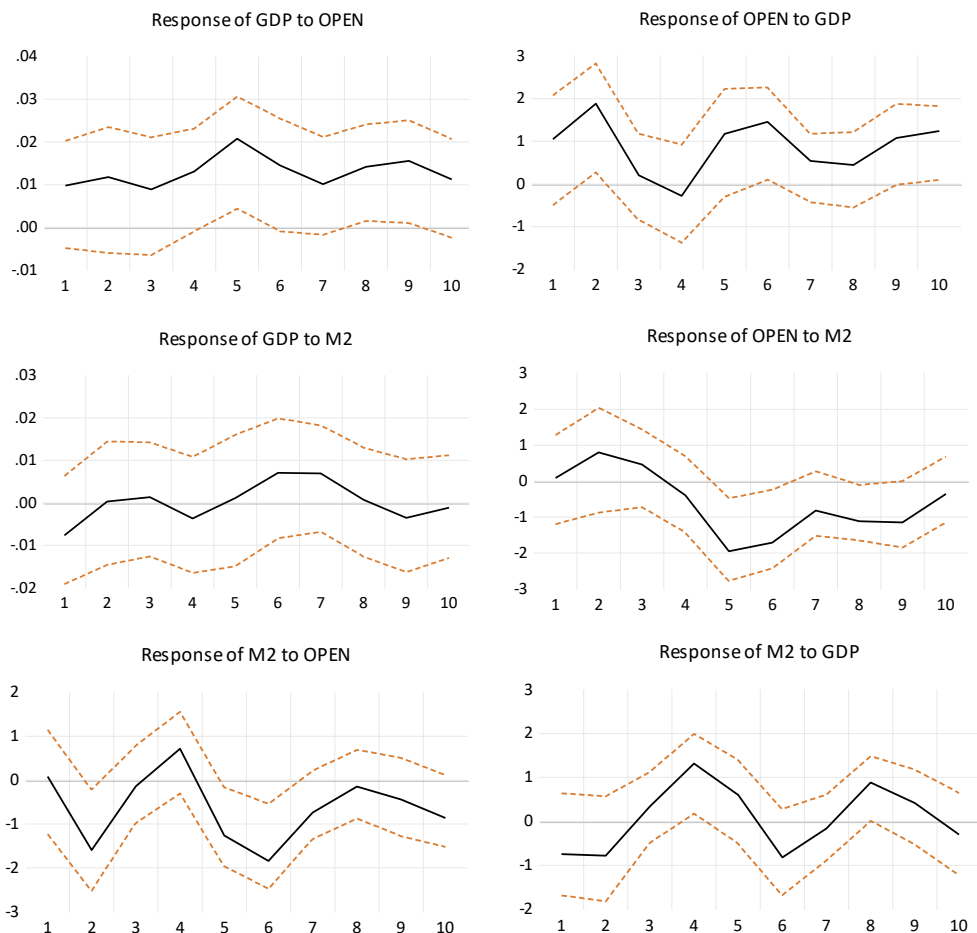*Source:* the author's computation

**Figure 2.** Impulse response functions (*gdp*, *m2*, *open*)

*Source:* the author's computation

## 5. Robustness Check

In the first part of the study, we carried out the causality relationship between financial development and economic growth based on VECM. In this part, we carried out two robustness checks to determine the reliability and validity of the findings obtained. Firstly, we conducted a Toda-Yamamoto (1995) (TY) causality analysis to ascertain the causal relationship between the variables. Second, we used market capitalization as the financial development indicator (*cap*) for the robustness check. In TY causality analyses, the variables do not need to be stationary at the same degree and have a cointegration relationship. We determine the maximum integrated degree ($d_{max}$) of the variables and the appropriate VAR model lag (k) when performing the Toda-Yamamoto causality test. Equations (4–6) show the models to which the Toda-Yamamoto causality test will apply.

The stationarity test results (Table 1) showed that all variables were I(1). The optimal lag of the VAR model was determined according to the AIC criterion, which was 4. To estimate Equations (4–6), we used 5 lags (dmax=1 + k=4).

$$gdp_t = \alpha_1 + \sum_{i=1}^{k+d\max} \beta_{1i}gdp_{t-i} + \sum_{i=1}^{k+d\max} \phi_{1i}cre_{t-i} + \sum_{i=1}^{k+d\max} \lambda_{1i}open_{t-i} + \varepsilon_{1t} \tag{4}$$

$$cre_t = \alpha_2 + \sum_{i=1}^{k+d\max} \beta_{2i}gdp_{t-i} + \sum_{i=1}^{k+d\max} \phi_{2i}cre_{t-i} + \sum_{i=1}^{k+d\max} \lambda_{2i}open_{t-i} + \varepsilon_{2t} \tag{5}$$

$$open_t = \alpha_3 + \sum_{i=1}^{k+d\max} \beta_{3i}gdp_{t-i} + \sum_{i=1}^{k+d\max} \phi_{3i}cre_{t-i} + \sum_{i=1}^{k+d\max} \lambda_{3i}open_{t-i} + \varepsilon_{3t} \tag{6}$$

Tables 5 and 6 show the Toda-Yamamoto causality analysis results for the variables *m2* and *cre* representing financial development indicators. The test results indicate a causality from the *cre* variable to the *gdp* variable, as in the VECM-based causality analysis (Table 3). In the Toda-Yamamoto causality analysis, unlike the VECM-based causality analysis, there is a causality from *gdp* to both *cre* and *m2* variables. According to the Toda-Yamamoto analysis, these results indicate a two-way causality between *cre* and *gdp.* Diagnostic tests show that the models are generally acceptable. CUSUM and CUSUMSQ tests also show that there was no structural break during the period examined. The results of these tests are not given due to space constraints. They can be provided upon reasonable request.

**Table 5.** Toda-Yamamoto causality test results (*gdp*, *cre*, *open*)

| Dependent Variable | gdp | cre | open |
|---|---|---|---|
| gdp | - | 15.97*** | 5.78 |
| cre | 11.41** | - | 31.36*** |
| open | 4.17 | 6.29 | - |
| **Diagnostic Tests** | | | |
| Dependent Variable | J.B. | LM(2) | BPG |
| gdp | 0.01 | 0.24 | 0.86 |
| cre | 0.49 | 0.01 | 0.64 |
| open | 0.60 | 0.01 | 0.46 |

*Source:* the author's computation

The optimal lag order (k) is determined as 4, chosen by considering the Akaike Information Criteria. The Wald test is applied to k-lagged variables to determine whether there is causality.

**Table 6.** Toda-Yamamoto causality test results (*gdp*, *m2*, *open*)

| Dependent Variable | gdp | m2 | open |
|---|---|---|---|
| gdp | - | 2.75 | 9.02* |
| m2 | 16.40*** | - | 22.99*** |
| open | 8.96* | 21.02*** | |

| Dependent Variable | gdp | m2 | open |
|---|---|---|---|
| **Diagnostic Tests** | | | |
| **Dependent Variable** | **J.B.** | **LM(2)** | **BPG** |
| gdp | 0.62 | 0.49 | 0.30 |
| m2 | 0.59 | 0.11 | 0.73 |
| open | 0.11 | 0.12 | 0.76 |

*Source:* the author's computation
The optimal lag order (k) is determined as 4, chosen by considering the Akaike Information Criteria. The Wald test is applied to k-lagged variables to determine whether there is causality.

In the second robustness check, we use market capitalization as a percentage of GDP (*cap*) as a proxy for financial development. Since we obtained market capitalization data between 1993 and 2022 from the World Bank, we conducted the causality analysis for this period. We detected that the market capitalization variable is stationary at the level I(0). Since the economic growth and openness variables are stationary in their first differences, the Toda-Yamamoto test was performed in the causality analysis. We estimated Equations (4–6) by using the *cap* variable as the financial development indicator instead of the *cre* variable. The optimal lag of the VAR model was determined according to the AIC criterion, which was 2. We estimated Equations (4–6) with 3 lags (dmax=1 + k=2). Table 7 displays the results of the Toda-Yamamoto causality analysis for the variable *cap* representing the financial development indicator.

**Table 7.** Toda-Yamamoto causality test results (*gdp*, *cap*, *open*)

| Dependent Variable | gdp | cap | open |
|---|---|---|---|
| gdp | - | 19.45*** | 1.13 |
| cap | 0.73 | - | 0.70 |
| open | 4.24 | 1.15 | - |
| **Diagnostic Tests** | | | |
| **Dependent Variable** | **J.B.** | **LM(2)** | **BPG** |
| Gdp | 0.63 | 0.20 | 0.09 |
| Cap | 0.44 | 0.29 | 0.56 |
| open | 0.84 | 0.10 | 0.45 |

*Source:* the author's computation
The optimal lag order (k) is determined as 2, chosen by considering the Akaike Information Criteria. The Wald test is applied to k-lagged variables to determine whether there is causality.

Table 7 indicates a one-way causality from the *cap* variable to *gdp*. The results of the causality analyses (Table 3), which used loans to the private sector to indicate financial development, are consistent with this finding. As seen in Table 7, there is no causality from economic growth to the *cap* variable. This finding is also consistent with the results presented in Table 3. Diagnostic tests show that the models are generally acceptable. CUSUM and CUSUMSQ tests also show that there was no structural break during the period

under examination. The outcomes of these tests are not given due to space constraints. They can be provided upon reasonable request. Robustness check results generally show that the causality from financial development to economic growth is valid. These results confirm the findings based on VECM.

## 6. Discussion

This study aimed to analyze the relationship between financial development and economic growth in Turkey. The results indicate a unidirectional causal relationship from financial development to economic growth, both in the short and long term, over the period under investigation in Turkey. The results of our research demonstrate that financial development contributed to economic growth in Turkey. Considering the TY method, we find a causality from economic growth to financial development.

The causality from financial development to economic growth is valid for loans provided to the private sector and market capitalization. This result shows that economic growth is quite sensitive to developments in the banking system and capital market. The broadly defined money supply, representing financial development, does not cause economic growth. This is because the expansion in the money supply could lead to high inflation, negatively affecting economic growth. Moreover, the impact of economic growth on financial development is mainly due to the banking system. In periods of economic growth, the increasing investment appetite can increase the loans provided to the private sector by the banking system. Additionally, financing increased consumption expenditures, mainly through individual loans, during economic growth may have contributed to this outcome. The results show that capital markets in Turkey can be more sensitive to foreign capital inflows and political developments than to the development of the economy.

These results confirm the validity of the Schumpeterian theory, which posits that financial development is a causal factor in Turkey's economic progress and corroborates Patrick's (1966) supply-leading approach. On the other hand, Robinson's (1952) 'demand following hypothesis' corroborates the findings from the TY method. In this context, the results run in parallel with the theoretical explanations in this field.

Turkey has implemented policies for developing and stabilizing financial markets for many years. The findings are essential because they provide evidence that Turkey's financial development and financial stability policies have yielded positive results. The possible results of the findings can be explained as follows: (1) The development of the financial system in Turkey will positively affect the economy in the future. (2) Giving more weight to the development of the banking system compared to the capital market will significantly impact the economy. (3) Bank loans are a tool for implementing policies to stimulate the economy. (4) There will be an acceleration in bank loans during periods of economic growth.

The results of our research support the findings of previous studies (Aşık, 2023; Acaravcı et al., 2007; Şeyranlıoğlu, 2024; Eroğlu and Yeter, 2021), which showed that financial development led to economic growth. Moreover, the finding that economic growth causes

financial development, obtained by using the TY method, confirms the studies of Özcan and Arı (2011) and Atay (2020).

Policymakers can benefit from the significant policy recommendations provided by the empirical findings. The research findings indicate that the financial system's growth in Turkey since the 1970s contributed to economic growth. Implementing policies to enhance the financial system is crucial to sustaining an average growth rate of 4.5 percent. The empirical results suggest that the financial system is vital for economic growth in Turkey, which is an economy with a robust banking system. Policymakers must prioritize policies designed to eliminate constraints on the financial system's development and ensure financial stability. High inflation has been an ongoing problem in Turkey for a long time. To prevent inflation, policymakers limit the credit possibilities of the financial system, which, in turn, restricts the financial system's influence on economic growth. In this context, it is favorable to implement fiscal and monetary policies rationally so that to ensure that the financial system can perform its functions to the highest level.

Further studies are needed to investigate whether the impact of financial development on economic growth is sensitive to monetary and fiscal policies. Monetary and fiscal policies can play a role in the effect of financial development on economic growth. Implementing monetary policies that effectively reduce inflation will decrease uncertainty and stimulate the private sector's demand for credit, thereby fostering economic growth. Furthermore, the establishment of fiscal discipline will be the foundation for allocating additional resources to the private sector, thereby supporting economic growth. Considering the current implementation of economic policies in Turkey which prioritize price stability and financial stability, further study is necessary to investigate the relationship between the financial system and monetary policies. Moreover, further studies will provide more detailed information on the effects of financial development on sectoral growth rates.

Certain limitations of this study could be addressed in future research. Firstly, we performed analyses with limited data, as we only obtained the annual data. Second, significant economic and political developments affected the Turkish economy during the period examined. Our models incorporate structural changes and crises but do not include economic policies implemented since 2021. This is due to the unavailability of time data necessary to measure the impact of these policies. Despite all these limitations, the study findings provide important information about the relationships between financial development and economic growth.

## 7. Conclusions

Analyzing the relationship between financial development and economic growth, as well as determining the source of financial development in Turkey, is crucial for assessing the effectiveness of policies implemented for financial development. This study analyzed Turkey's data of 1974–2023 with various time series methods. The results show that financial development contributed to economic growth during the discussed period. This

contribution comes mainly from the banking system. The results show a unidirectional causal relationship from financial development to economic growth in Turkey in the short and long term. Although economic growth affects financial development, methodological differences are observed. The results confirm the validity of the Schumpeterian theory that financial development is a trigger factor in economic growth. The results also support Patrick's (1966) supply-leading approach.

Policymakers in Turkey have long encouraged financial market development and stability. Evidence suggests that Turkey's financial development and stability measures are working. In this context, the development of the financial system in Turkey will significantly impact economic growth in the future. In particular, the development of the banking system will increase this impact. Empirical evidence supports the argument that policies aimed at enhancing financial development in Turkey yield gains by stimulating economic growth. In this context, it is beneficial to continue implementing policies to develop the financial system and ensure financial stability. These policies will enable the private sector to access the funds it needs and increase economic growth.

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# Appendix

**Table A1.** Summary statistics

|            | gdp   | cre   | m2    | open  |
|------------|-------|-------|-------|-------|
| Mean       | 26.72 | 29.99 | 37.47 | 41.42 |
| Median     | 26.69 | 20.67 | 33.73 | 45.19 |
| Maximum    | 27.85 | 70.90 | 71.60 | 81.17 |
| Minimum    | 25.69 | 13.59 | 18.03 | 9.10  |
| Std. Dev.  | 0.63  | 18.27 | 13.73 | 16.15 |
| Skewness   | 0.14  | 1.06  | 0.55  | -0.07 |
| Kurtosis   | 1.85  | 2.53  | 2.25  | 2.69  |
| Jarque-Bera| 2.93  | 9.82  | 3.73  | 0.23  |
| Probability| 0.23  | 0.01  | 0.15  | 0.89  |
| Obs.       | 50    | 50    | 50    | 50    |

*Source:* the author's computation

**Table A2.** Correlation matrix

|       | gdp  | cre  | m2   | open |
|-------|------|------|------|------|
| *gdp* | 1    |      |      |      |
| *cre* | 0.81 | 1    |      |      |
| *m2*  | 0.94 | 0.88 | 1    |      |
| *open*| 0.93 | 0.67 | 0.87 | 1    |

*Source:* the author's computation
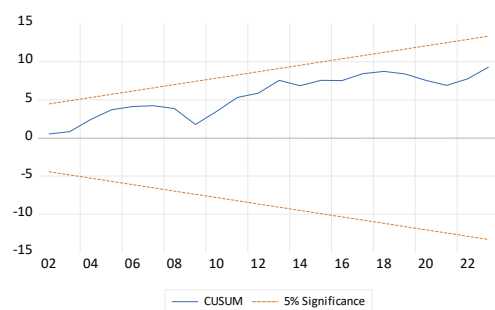


*Source:* the author's computation
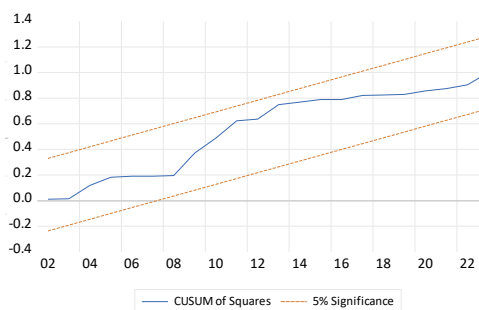
*Source:* the author's computation

**Figure A1.** CUSUM and CUSUMSQ tests (dependent variable: *gdp*, independent variables: *cre* and *open*)
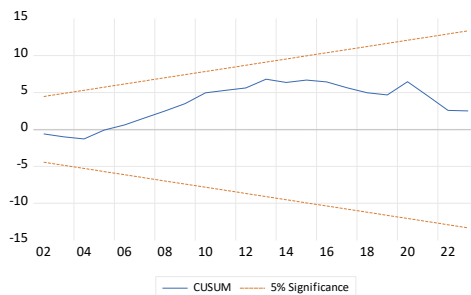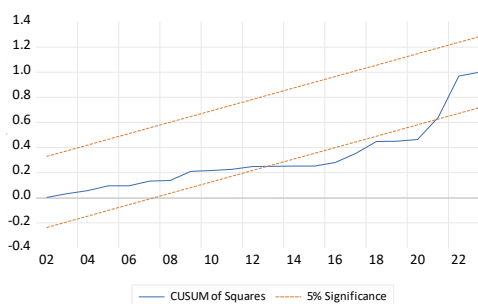
*Source:* the author's computation
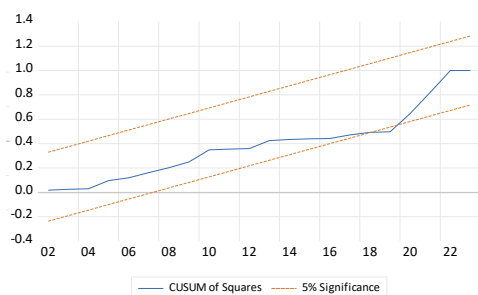
*Source:* the author's computation

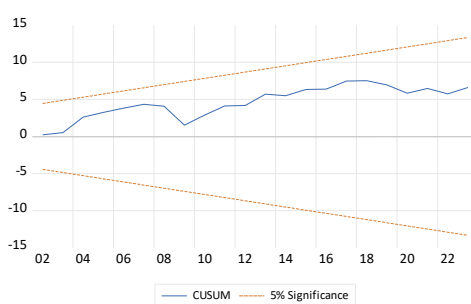**Figure A2.** CUSUM and CUSUMSQ tests (dependent variable: *cre,* independent variables: *gdp* and *open*)
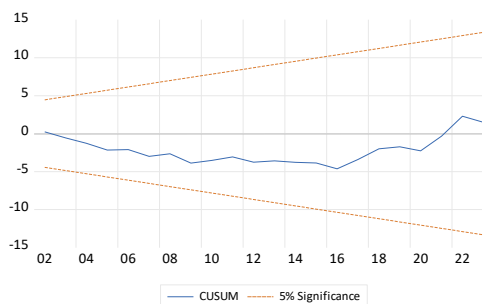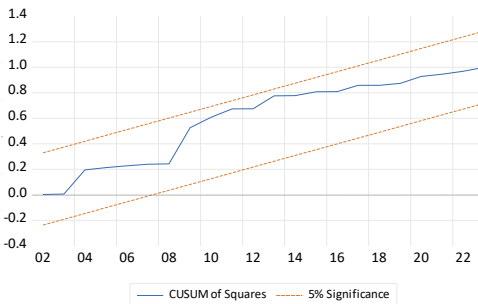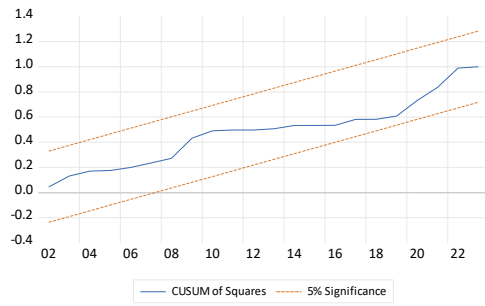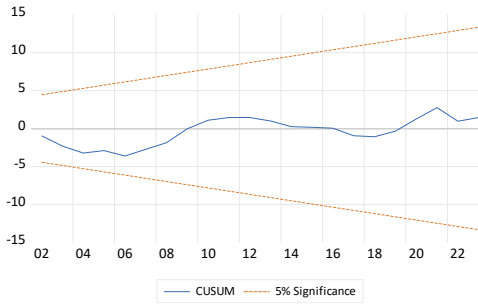


*Source:* the author's computation

*Source:* the author's computation

**Figure A3.** CUSUM and CUSUMSQ tests (dependent variable: *open,* independent variables: *cre* and *gdp*)



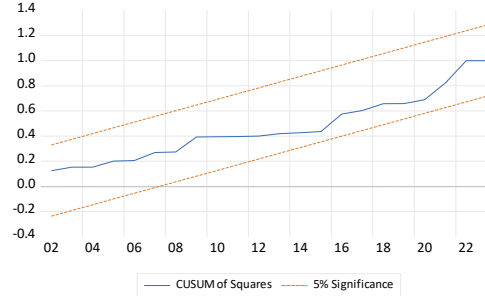*Source:* the author's computation

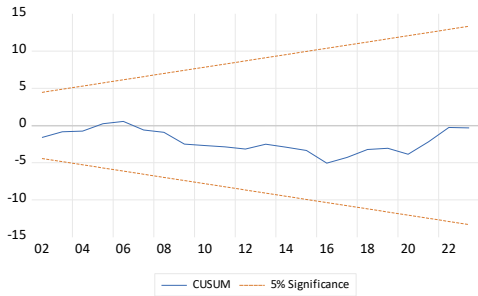*Source:* the author's computation

**Figure A4.** CUSUM and CUSUMSQ tests (dependent variable: *gdp*, independent variables: *m2* and *open*)

*Source:* the author's computation                    *Source:* the author's computation

**Figure A5.** CUSUM and CUSUMSQ tests (dependent variable: *m2*, independent variables: *gdp* and *open*)



*Source:* the author's computation                    *Source:* the author's computation

**Figure A6.** CUSUM and CUSUMSQ tests (dependent variable: *open,* independent variables: *m2* and *gdp*)