

## DYNAMIC INTERACTIONS BETWEEN FINANCIAL SECTOR DEVELOPMENT AND ECONOMIC GROWTH: VAR ANALYSIS ON THE CASE OF NORTH MACEDONIA

**Andrijana Bojadjievska Danevska**

Faculty of Economics and Administrative Sciences, International Balkan University – Skopje

[andrijanab.danevska@ibu.edu.mk](mailto:andrijanab.danevska@ibu.edu.mk)

**Abstract:** Stock market capitalization and domestic credit provided by banks are of crucial importance for economic growth, due to their roles in investment, consumer spending, and economic stability. A well-developed stock market allows companies to raise capital more easily, which they can further invest in new projects, expansion, and innovation, thereby contributing to economic growth. A robust stock market also reflects investor confidence, leading to more investments, and efficient channeling of funds. Additionally, rising stock market values creates a wealth effect, where investors feel wealthier and are more likely to spend more money, thereby boosting GDP growth. On the other hand, domestic credit is vital for business expansion and consumer spending. Access to credit enables businesses to invest in new ventures, and encourages and supports entrepreneurs to invest in innovation, again leading to higher output and GDP growth. Moreover, a well-functioning credit system helps smooth out economic fluctuations by providing liquidity during downturns and supporting growth during upturns, ensuring sustained economic growth. Therefore, the purpose of this research paper is to investigate the relationship and interactions between stock market capitalization, domestic credit (both as proxies for financial sector development), and economic growth in North Macedonia. By employing a Vector Autoregression Model (VAR) and Granger Causality Test, the findings of this paper narrow down to that in the case of North Macedonia, the interaction between stock market capitalization and domestic credit create a positive feedback loop, where a growing stock market increases credit availability, further stimulating economic growth. Therefore, policymakers should focus on strengthening financial markets and institutions, with additional focus and accent on capital markets, by fostering financial innovation and improving regulatory frameworks, to support economic growth. Additionally, efforts to enhance financial literacy and inclusion can further amplify the positive effects of financial sector development on economic growth.

**Keywords:** economic growth, stock market capitalization, domestic credit growth, VAR, granger causality

### 1. INTRODUCTION

Stock markets and banking financial institutions play complementary roles in supporting economic growth, with their impact varying depending on a country's stage of economic development. (Yemelyanova, 2021) Stock markets contribute to long-term economic growth by providing companies sources of financing for their expansion and innovation. Additionally, well-developed stock market offers and fosters diverse options for investment and savings, leading to more efficient resource allocation. At the same time, the existence of high level of liquidity in the stock market, supports economic growth by allowing quick conversion of investments into cash. Banks, on the other hand, with their transformative functions, facilitate the flow of funds between savers and borrowers, provide credit for investment in productive opportunities, manage financial risks by assessing borrower creditworthiness and monitoring financial health, thereby contributing to greater financial stability and correcting financial market inefficiencies.

In developed countries both sectors are well-established and efficient, providing robust support for economic activities. Companies and investors have a secure, efficient and diversified platform for capital raising thereby reinforcing the investments in the economy. Developed banking systems, additionally, offer wide range of bank and non-bank financial services, financial and investment advice to both legal and natural entities, engage in innovative financial products, partner with Fintech companies, contributing to increase in the efficiency and performance of the banking system, and ultimately stimulating economic growth (Demirgüç-Kunt, 2006). In developing countries, access to stock markets is limited to larger corporations, and small and medium companies rely mostly on bank credits, limiting the efficiency of channeling funds from savers to investors (Ekanayake & Thaver, 2021). North Macedonia, as developing country, presents an excellent example of how banks have a dominant and significant role in supporting economic growth, due to fact that stock markets are smaller and not highly liquid as in the developed countries, thereby limiting their ability to support economic growth (Levine & Zervos, 1998).

According to the empirical evidence and research conducted by many scholars, and practitioners, there exists a positive correlation between stock market capitalization, domestic credit provided by the financial sector and economic growth, particularly in Western European countries. According to Alshubiri (2021), who investigated the

nexus between stock market capitalization and financial growth in 12 Western European countries during the period of 1989–2018, there are positive and significant relationships between financial growth, i.e. domestic credit provided by the financial sector, stock market capitalization, and foreign direct investment (FDI), while between financial growth, inflation and GDP per capita there are negative relationships.

When considering Central and Eastern European economics, Prats&Sandoval (2020) conducted research among 10 of these countries by using VAR and found that there is evidence of bidirectional relationship between stock market capitalization and GDP, especially in those countries where a long-term relationship between stock market capitalization and GDP (cointegrated) is noted.

Dibor-Alfred et al. (2023) study examine the impact of stock market performance on Nigeria's economic growth from 1985 to 2021 by utilizing the Autoregressive Distributed Lag (ARDL) model. Their findings conclude that there is a long-term relationship between stock market performance and GDP growth; in the long-run market capitalization and the total value of transactions have positive effect over GDP, while in the short-run, market capitalization positively affects GDP, but the value of transactions negatively impact GDP.

For North Macedonia, researchers Spaseska & Hristoski (2022) tried to determine the factors that influence Macedonian capital market liquidity led by the main arguments that illiquidity of Macedonian capital market is the main problem of its development. Their findings conclude that GDP growth rate, inflation rate, and exports to GDP ratio have a positive and statistically significant impact on stock market turnover to GDP ratio (proxy for stock market liquidity), while imports and reference interest rate have a statistically significant and negative impact. According to the study conducted by Spaseska et al. (2016), based on yearly data from 2005-2015 there is a strong correlation between GDP and the performance of the Macedonian stock exchange, including market capitalization, the average value of MBI10, trading volume, and the number of listed companies. In terms of the impact of the bank credits on economic growth, Saiti and Trenovski (2021) in their study covering yearly data from 1996 to 2018 found that lending to the private sector in North Macedonia positively impacts economic growth. Additionally, they have found that a long-term linear relationship exists between credit and economic growth, especially after the Great Financial Crisis, due to the macroeconomic environment, economic recovery, and capital inflow.

Having in mind previous findings and data, it can be noted that empirical evidence from North Macedonia regarding the relationship between stock market capitalization, domestic credit provided by banking sector (financial growth) and economic growth is lacking. Therefore, this paper tries to analyze the short run dynamics and relations between these three variables: stock market, bank lending and economic growth. By addressing this gap, the paper contributes to assessing the effectiveness of the financial system in promoting economic growth, and confirms the necessity of further developing and strengthening the capital markets. Additionally, while long-term relationships are important, this paper investigates short-run dynamics and provide insights into how these variables interact over shorter periods, which is essential for understanding immediate effects and making timely policy adjustments. Given the potential volatility in emerging markets like North Macedonia, understanding these dynamics can help manage economic stability.

## 2. DATA AND METHODOLOGY

This research utilizes secondary quarterly data for the time period 2006q1-2023q3 (70 observations), derived from International Monetary Fund (IMF), National Bank of Republic of North Macedonia (NBRNM), and Macedonian Stock Exchange (MSE), by employing Vector Autoregression Model (VAR). By using VAR, this research intends to estimate the relationship between stock market capitalization growth rate (measured as the quarterly growth rate of stock market capitalization), domestic credit provided by the banking sector (measured as the quarterly growth rate of domestic credit provided by banking sector), and economic growth (measured as the quarterly growth rate of real GDP), by capturing the dynamic interrelationships among them. In the investigation the specification of VAR model with  $p$  lags is as follows:

$$\begin{aligned} Y_t &= \alpha_1 + \beta_{11,1}Y_{t-1} + \beta_{12,1}S_{t-1} + \beta_{13,1}D_{t-1} + \dots + \beta_{11,p}Y_{t-p} + \beta_{12,p}S_{t-p} + \beta_{13,p}D_{t-p} + \epsilon_{1t} \\ S_t &= \alpha_2 + \beta_{21,1}Y_{t-1} + \beta_{22,1}S_{t-1} + \beta_{23,1}D_{t-1} + \dots + \beta_{21,p}Y_{t-p} + \beta_{22,p}S_{t-p} + \beta_{23,p}D_{t-p} + \epsilon_{2t} \\ D_t &= \alpha_3 + \beta_{31,1}Y_{t-1} + \beta_{32,1}S_{t-1} + \beta_{33,1}D_{t-1} + \dots + \beta_{31,p}Y_{t-p} + \beta_{32,p}S_{t-p} + \beta_{33,p}D_{t-p} + \epsilon_{3t} \end{aligned}$$

where:

$Y_t$  – economic growth rate (*gdpr*)

$S_t$  – stock market capitalization growth rate (*smcgr*)

$D_t$  – domestic credit growth rate (*dcgr*)

$\alpha_i$  - intercept term for each equation

$\beta_{ij,k}$  - Coefficients for the  $k$ -th lag of variable  $j$  in equation  $i$

$\epsilon_{it}$  – error term for the  $i$ -th equation at time  $t$

Once the VAR model in this research was estimated, Granger causality tests were conducted to examine the predictive relationships between the variables. Specifically, the past values of domestic credit growth rate and stock market capitalization growth rate are tested to determine whether they significantly predict GDP growth, and vice versa. The results from these tests inform the understanding of the interconnectedness and causal dynamics among financial development indicators and economic growth in the case of North Macedonia.

### 3. RESULTS AND DISCUSSION

Firstly, in order to confirm the robustness and the credibility of this research, Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) tests were used to check the stationarity of the variables. Table 1 shows that each of the variables is stationary and does not require differencing, i.e. the time series do not exhibit trends or seasonal patterns that change its behavior over time. The ADF and PP tests yielded a test statistic which is significantly lower than the 1%, 5%, and 10% critical values, and the MacKinnon approximate p-value for the test is 0.0000 for both *gdpgr* and *smcgr*, and 0.00019 for *dcgr*, leading us to reject the null hypothesis of a unit root at 1% and 5% significance level, respectively.

**Table 1 Unit Root Test Results**

| Variable                                                 | ADF Test statistics | PP Test Statistic | Conclusion |
|----------------------------------------------------------|---------------------|-------------------|------------|
| GDP growth rate ( <i>gdpgr</i> )                         | -5.147***           | -5.266***         | stationary |
| Stock market capitalization growth rate ( <i>smcgr</i> ) | -5.319 ***          | -5.328***         | stationary |
| Domestic credit growth rate ( <i>dcgr</i> )              | -3.915**            | -3.689**          | stationary |

Notes: \*, \*\*, \*\*\* indicate rejection of null hypothesis at significance levels of 10 %, 5 %, and 1%, respectively.

Source: Author's calculations

The lowest values of Final Prediction Error (FPE), and Akaike Information Criterion (AIC) occur at lag 4, for Hannan-Quinn Information Criterion (HQIC) at lag 2, and for Schwarz Bayesian Information Criterion (SBIC) at lag 1. Based on the selection criteria, as shown on table 2, lag length 4 is selected due to its lowest FPE and favorable values for AIC and HQIC, despite SBIC favoring lag length 1. Lag length 4 provides the best overall performance according to FPE, and AIC, indicating that it balances model fit and complexity well. It suggests that while SBIC indicates a simpler model (lag length 1) and that it might be preferable due to its lower penalty for complexity, lag length 4 will be chosen because it strikes a balance between model accuracy and complexity, offering a robust and reliable VAR modeling.

**Table 2 Lag length criteria**

| Lag | p     | FPE     | AIC      | HQIC     | SBIC     |
|-----|-------|---------|----------|----------|----------|
| 0   | ...   | 15129.3 | 18.138   | 18.1771  | 18.2367  |
| 1   | 0.000 | 6527.48 | 17.297   | 17.4532  | 17.6919* |
| 2   | 0.001 | 5649.68 | 17.1507  | 17.4241* | 17.8417  |
| 3   | 0.815 | 6868.08 | 17.3415  | 17.7322  | 18.3287  |
| 4   | 0.000 | 4592*   | 16.9308* | 17.4386  | 18.2141  |

Source: Author's calculations

After VAR estimation, the model shows that the domestic credit growth rate equation has the highest R-squared (0.6118) which is statistically significant, indicating that this model explains a substantial portion of the variance in domestic credit growth. In contrast, the stock market capitalization growth rate equation has a low R-squared (0.0379) and is not statistically significant, suggesting that the model does not adequately capture the dynamics of stock market capitalization growth. The GDP growth rate equation has a moderate fit of R-squared of 0.2935 and is statistically significant, reflecting its importance in the model.

**Table 3 VAR Model Coefficients**

| Dependent Variable | Independent Variable (Lags) | Coef.     | Standard Error | t-Statistic | p-Value |
|--------------------|-----------------------------|-----------|----------------|-------------|---------|
| <i>gdpgr</i>       | <i>Gdpgr</i> (4)            | -.4316734 | .1117665       | -3.86       | 0.000   |
|                    | <i>Smcgr</i> (4)            | .0538259  | .0191567       | 2.81        | 0.005   |
|                    | <i>Dcgr</i> (4)             | .3972924  | .1279122       | 3.11        | 0.002   |
|                    | cons                        | 1.898125  | .468785        | 4.05        | 0.000   |
| <i>smcgr</i>       | <i>Gdpgr</i> (4)            | -.9493976 | .6647151       | -1.43       | 0.153   |

|             |                  |           |          |       |       |
|-------------|------------------|-----------|----------|-------|-------|
| <i>dcgr</i> | <i>Smcgr</i> (4) | -.0468759 | .1139319 | -0.41 | 0.681 |
|             | <i>Dcgr</i> (4)  | .924159   | .7607392 | 1.21  | 0.224 |
|             | cons             | 2.307773  | 2.788031 | 0.83  | 0.408 |
|             | <i>Gdpgr</i> (4) | -.0449176 | .0667772 | -0.67 | 0.501 |
|             | <i>Smcgr</i> (4) | .0748334  | .0114456 | 6.54  | 0.000 |
|             | <i>Dcgr</i> (4)  | .4931844  | .0764237 | 6.45  | 0.000 |
|             | cons             | .8998537  | .2800851 | 3.21  | 0.001 |

Source: Author's calculations

In table 3 the VAR model coefficients are presented showing the significant and negative impact of past *gdpgr* and significant and positive effects of past *smcgr* and *dcgr* on current *gdpgr*. The coefficient of *gdpgr* indicates that a 1pp. increase in *gdpgr* four periods ago is associated with a 0.432pp. decrease in the current *gdpgr*. The positive coefficient of *smcgr* suggests that a 1pp. increase in *smcgr* four periods ago is associated with a 0.054pp. increase in the current *gdpgr*. A 1pp. increase in *dcgr* four periods ago is associated with a 0.397pp. increase in the current *gdpgr*.

When analyzing *smcgr*, it can be noted that there is a lack of significant relationships with the past values of *gdpgr*, *smcgr*, and *dcgr*. In other words, in the case of North Macedonia, past values of *gdpgr*, *smcgr* and *dcgr* do not affect the current *smcgr* and this finding suggests that these variables have limited predictive power of the *smcgr*. Past values of *gdpgr* do not have statistically significant effect on current *dcgr*, however, the model shows that there exist significant effects from past values of *smcgr*, i.e. a 1 pp. increase in past *smcgr* is associated with a 0.075 pp. increase in current *dcgr*. Additionally, past values of *dcgr* have positive and statistically significant effect on current *dcgr*. Both of these effects of *smcgr* and *dcgr* on *dcgr* indicate strong internal dynamics.

For the purpose of understanding how these three time series variables interact, and which is their directional influence, which can be essential and of great usage for effective forecasting, policy-making, and theoretical exploration, the Granger causality test was conducted.

**Table 4 Granger Causality Test**

| Equation     | Excluded     | Chi2   | df | Prob > Chi2 |
|--------------|--------------|--------|----|-------------|
| <i>gdpgr</i> | <i>smcgr</i> | 7.8948 | 1  | 0.005       |
| <i>gdpgr</i> | <i>dcgr</i>  | 9.6471 | 1  | 0.002       |
| <i>gdpgr</i> | ALL          | 20.657 | 2  | 0.000       |
| <i>smcgr</i> | <i>gdpgr</i> | 2.04   | 1  | 0.153       |
| <i>smcgr</i> | <i>dcgr</i>  | 1.4758 | 1  | 0.224       |
| <i>smcgr</i> | ALL          | 2.55   | 2  | 0.279       |
| <i>dcgr</i>  | <i>gdpgr</i> | .45246 | 1  | 0.501       |
| <i>dcgr</i>  | <i>smcgr</i> | 42.748 | 1  | 0.000       |
| <i>dcgr</i>  | ALL          | 43.224 | 2  | 0.000       |

Source: Author's calculations

The findings, as shown on Table 4, show that both lagged values of *smcgr* and *dcgr* at significance level of 1% Granger-cause *gdpgr*, indicating that past values of *smcgr* and *dcgr* are useful predictors of *gdpgr*. According to the results, neither lagged values of *gdpgr* nor lagged values of *dcgr* granger cause *smcgr*. Additionally, both *smcgr* and *gdpgr* at significance level of 1% granger cause *dcgr*.

In the case of relationship between *gdpgr* and *dcgr* exists bidirectional relationship, with flowing causality from *dcgr* to *gdpgr*, translating to the fact that changes in the GDP growth rate can cause changes in the domestic credit growth rate, and vice versa. This means that an increase in GDP growth rate can lead to more domestic credit being issued, and more domestic credit can also stimulate GDP growth.

Between *gdpgr* and *smcgr* there exists unidirectional relationship, with flowing causality from *smcgr* to *gdpgr*. This means that changes in the growth rate of the stock market's total value (stock market capitalization) cause changes in the GDP growth rate, but not the other way around. For example, if the stock market capitalization grows, it can lead to an increase in GDP growth rate, but changes in GDP growth rate do not necessarily affect the stock market capitalization growth rate. This finding is in line with the finding of Naik&Padhi (2015) which suggests that other factors might be more influential in driving stock market development, such as market liquidity, quality of regulatory environment and investor protection mechanism, confidence and behavior. In the case of North Macedonia, and as already investigated by researches Spaseska & Hristoski (2022), market illiquidity is the main obstacle of its development. However, this finding also coincides with the need for strengthening the capital market

and regulatory frameworks in order to develop robust market infrastructure including trading platforms, settlement systems and increasing the financial literacy among companies, investors and the general population and thereby contributing towards improving market liquidity and overall development of capital markets.

When looking at the relationship between *smcgr* and *dcgr* there is unidirectional relationship with flowing causality from *smcgr* to *dcgr*. This indicates that changes in the stock market capitalization growth rate cause changes in the domestic credit growth rate, but not the other way around. So, if stock market capitalization grows, it can lead to an increase in domestic credit growth, but changes in domestic credit growth do not necessarily affect the stock market capitalization growth rate. This finding suggests that the stock market acts as a leading indicator of economic activity and investor confidence, which can drive demand for credit, and indirectly again boost economic growth.

Security and Exchange Commission (SEC) of North Macedonia, as the main regulator of Macedonian capital market, throughout the history has been playing an important role in capital market development. Its efforts to develop capital markets and improve their infrastructure and liquidity are most importantly justified and confirmed by these findings. The latest changes in legislation can be seen with their latest regulatory changes, where the Law on Securities from 2005 has been subject to change with the aim of modernizing and aligning with the EU standards. Additionally, the new regulations from 2024, but with postponed application for September, 2025, i.e. the Law on Financial Instruments and the Law on Prospectuses and Transparency Obligations for Issuers of Securities include measures to increase market transparency, such as improved disclosure requirements for companies and financial institutions, stricter measures for investors' protection, and improved mechanisms for dispute resolution to build investor confidence and ensure a fair-trading environment.

#### 4. CONCLUSION

The findings from this research reveal significant interactions between financial sector development (with proxies used – stock market capitalization growth rate and domestic credit growth rate) and economic growth, i.e. the results indicate that stock market capitalization growth rate has a positive impact on economic growth, but not vice versa, while domestic credit growth exhibits a more complex relationship, i.e. it affects economic growth and economic growth affects domestic credit growth. This potentially reflects the ongoing transition in the financial sector. The transition nature of the economy is reflected in the varying impacts of domestic credit growth and stock market capitalization, i.e. stock market capitalization affects domestic credit growth and gdp growth, but not the other way around. In other words, these findings underscore the importance of developing robust financial markets in developing economies to support sustainable economic growth. In emerging markets, such as North Macedonia, economic growth alone may not be sufficient to drive stock market development. Instead, a comprehensive approach that includes improving market infrastructure, regulatory frameworks, and investor confidence is essential. Therefore, policymakers should focus on development and enhancing capital markets to ensure that it continues to support domestic credit growth and ultimately lead to sustainable economic growth. Further development of the stock market and prudent management of domestic credit expansion are essential for fostering a more robust financial sector. More precisely and based on these findings, policymakers should consider implementing policies that foster a healthy and growing stock market, as this can positively impact GDP growth, solely and combined together with the banking sector.

#### REFERENCES

- Alshubiri, F.(2021). The Stock Market Capitalisation and Financial Growth Nexus: An Empirical Study Of Western European Countries. *Future Business Journal*, 7 (46). <https://doi.org/10.1186/s43093-021-00092-7>
- Demirgüç-Kunt, A. (2006). *Finance and Economic Development: Policy choices for developing countries* (Policy Research Working Paper No. 3955). The World Bank. <https://documents.worldbank.org/curated/en/825071468316170479/pdf/wps3955.pdf>
- Dibor-Alfred, C., Somoye, O.A. & Ozdeser, H. (2023). Stock Market Performance and Economic Growth: Empirical Evidence from Nigeria Employing the ARDL Approach. *SN Business&Economics*. Vol. 3. <https://doi.org/10.1007/s43546-023-00603-4>
- Ekanayake EM, Thaver R. (2021). The Nexus between Financial Development and Economic Growth: Panel Data Evidence from Developing Countries. *Journal of Risk and Financial Management*, 14 (10). <https://doi.org/10.3390/jrfm14100489>
- Levine, R., & Zervos, S. (1998). Stock Markets, Banks, and Economic Growth. *The American Economic Review*, 88(3), pp. 537–558. <http://www.jstor.org/stable/116848>
- Maria A. Prats and Beatriz Sandoval (2020). Does Stock Market Capitalization Cause GDP? A causality study for Central and Eastern European countries. *Economics: The Open-Access, Open-Assessment E-Journal*, 14 (17), pp. 1– 29. <http://dx.doi.org/10.5018/economics-ejournal.ja.2020-17>

- Naik, P.K. and Padhi, P. (2015). On the linkage between stock market development and economic growth in emerging market economies: Dynamic panel evidence. *Review of Accounting and Finance*, Vol. 14 (4), pp. 363-381. <https://doi.org/10.1108/RAF-09-2014-0105>
- Saiti, D., & Trenovski, B. (2021). The impact of the private sector credits on the economic growth in the Republic of North Macedonia. *Knowledge - International Journal*, 45(1), 286-325
- Spaseska, T., & Hristoski, I. (2022). How do the macroeconomic determinants underpin the capital market development in North Macedonia? *Management & Marketing. Challenges for the Knowledge Society*, 17(2), 286-325.
- Spaseska, T., Vitanova, G., Sotiroski, K., Odzaklieska, D., Risteska-Jankuloska, A., & Risteska, F. (2017). The impact of Macedonian stock exchange performance on economic growth in Republic of Macedonia. *International Balkan and Near Eastern Social Sciences Conference Series*, 3, 13-25.
- Yemelyanova, L. (2021). Relationship Between the Stock Market Development, Banking Sector Development and Economic Growth In the Cee Countries. *Baltic Journal of Economic Studies*, Vol.7 (3). pp.118-126. <https://doi.org/10.30525/2256-0742/2021-7-3-118-126>