ORIGINAL PAPER

The Empirical Approach of the Interplay of Macroeconomic Variables and the Dynamics of the Financial Market in Romania

Cristi Spulbar[1], Cezar Cătălin Ene[2]

Abstract:
The complicated interplay between the Romanian BET index, monetary policy rate, inflation rate, and RON/USD currency rate is studied using a Vector Autoregression (VAR) approach in this article. The methodology is based on the VAR model's ability to explain the dynamic relationship between multiple time series, with Granger causality tests used to identify the directionality of influence, impulse response functions used to trace the effects of economic shocks and forecast error variance decomposition used to measure the extent of variable interdependence. The findings show results about the links of monetary policy rate, inflation rate, BET index and exchange rate, with the purpose to find if capital markets are sensitive to macroeconomic policy decisions. The study emphasizes the central bank's policy rate's significance in influencing market expectations, as well as the complex impact of inflationary trends on currency valuation.

Keywords: *vector autoregression (VAR), macroeconomic indicators, economic policy, emerging markets, central bank, currency stability.*

[1] Professor, PhD, University of Craiova, Faculty of Economics and Business Administration, Romania, Email: cristi.spulbar@edu.ucv.ro.
[2] Ph.D. Student, University of Craiova, "Eugeniu Carada" Doctoral School of Economic Sciences, Finance specialization, Romania, Email: ene.cezar.k8x@student.ucv.ro.

1. Introduction

The interaction of financial market indices and macroeconomic variables is becoming increasingly important in modern economic discourse, particularly in emerging economies like Romania. Although research into this connection has gained prominence, the need for empirical clarification remains, particularly in considering Romania's increasing financial infrastructure and connectivity into global markets.

This theme's relevance comes from current discussions about the efficacy of monetary policy and its transmission mechanisms in post-transition economies. While theoretical models supply a foundational knowledge, actual inquiries into the characteristics of the Romanian market are less addressed. Thus, this study will examine how the monetary policy rate, inflation rate, and RON/USD exchange rate interact with and influence the Romanian BET index also, this study will rely on a theoretical and methodological framework based on financial econometric principles, with a focus on the use of Vector Autoregression (VAR) analysis to reveal structural patterns and causal relationships.

The monetary policy rate is a vital tool to measuring liquidity, investment, and consumption, whereas the inflation rate is an essential indicator of the economy's supply-demand balance. The exchange rate, particularly when it comes to a currency like the Romanian Leu vs the US Dollar, reflects international trade dynamics and foreign investor sentiment.

The aim of this study is to analyze how these variables affect the BET index and to give an idea to participants such as investors, decision makers and international observers about how these work together in the Romanian economy.

2. Literature Review

Camilleri et al. (2019) conducted a comprehensive study to examine the interactions between stock prices and a set of macroeconomic variables across five European countries during the period from 1999 to 2017. They employed a Vector Autoregressive (VAR) model, complemented by both parametric and non-parametric methods, to assess the dynamics between stock prices and macroeconomic indicators such as consumer price index (CPI), industrial production index (IPI), interest rates (IR), and money supply (MS).

In their investigation, Christou et al. (2019) studied beyond the commonly analyzed post-World War II era, employing a time-varying parameter vector autoregressive (TVP-VAR) model to assess over 150 years of monthly UK data, from January 1855 to December 2016. Their analysis focused on the impact of uncertainty, operationalized as corporate bond spread shocks, on a suite of macroeconomic variables including inflation rates, unemployment rates, monetary policy rates, and nominal exchange rate returns. The authors' findings articulate that positive uncertainty shocks, consistent with negative demand shocks, result in the contraction of inflation and interest rates alongside a depreciation in exchange rate returns, coupled with a rise in unemployment rates.

The BET index is a free float market capitalization-weighted index comprising the most liquid Romanian companies listed on the Bucharest Stock Exchange (BVB). This structure allows the index to represent the performance of a portfolio composed of shares included in the index, adhering to transparent rules for calculation and composition adjustments (Bucharest Stock Exchange, 2020, p. 5). The paper by Fischer and Merton (1984) critically examines the role of the stock market in macroeconomics, particularly in the context of corporate investment decisions. It highlights the distinct perspectives of finance and macroeconomics regarding the stock market's influence. While finance views the stock market as a crucial component in guiding corporate investment choices, macroeconomics traditionally assigns it a lesser role in investment decisions.

Bianchi et al. (2021) discuss the influence that central bank actions and announcements have on the valuation of long-term financial assets, including stock markets. Their research suggests that these assets respond significantly to monetary policy, a phenomenon that challenges traditional asset pricing theories. Bernanke and Kuttner (2005) closely investigated the impact of changes in monetary policy on equity prices. A significant finding of their study is that unanticipated adjustments in the federal funds rate have a substantial influence on stock market values. Specifically, the analysis reveals that an unexpected 25-basis-point cut in the federal funds rate is associated with about a 1% increase in broad stock indexes. In a more recent study, Heyden and Heyden (2021) investigated the impact of COVID-19 on stock markets, with a particular focus on the consequences of monetary policy pronouncements. They discovered that, whereas the announcement of country-specific fiscal policy measures typically had a negative impact on stock returns, monetary policy measures tended to stabilize and positively influence the markets.

The study conducted by Boons et al. (2020) presents an understanding of how inflation risk is priced in the stock market, emphasizing its time-varying nature. A key element of this variation is identified as the nominal-real covariance, which represents the dynamic relationship between inflation and real future consumption growth. Herwartz et al (2022) explored the impact of monetary policy on asset prices in the United States using a structural VAR model that uniquely employed non-Gaussian independent components for shock identification. Their analysis revealed that contractionary monetary policy moderately impacts both U.S. house and stock prices, with a less pronounced effect on stocks. Rai and Garg (2021) investigated the impact of the COVID-19 pandemic on the relationship between stock prices and exchange rates in BRIICS countries. Utilizing GARCH techniques, the research finds significant negative dynamic correlations and volatility spillovers between these two markets, particularly during the initial lockdown period.

3. Methodology

3.1. Data and the sources of data

The data for this research was obtained from reputable institutions within Romania. The data for our analysis has been collected on a monthly basis and covers the years January 2010 to December 2023. This timeframe enables us to capture and analyze the complex short-term changes as well as the longer-term patterns in the economic indicators of interest. The monthly resolution ensures that our analysis can respond to and include key economic events and policy changes as they occur, providing a solid foundation for our study's conclusions.

Table 3.1. Selected variables

Acronym	Indicator	Unit
Log_cap	Natural logarithm of Romanian BET INDEX	National currency (RON)
Mon_pol	Monetary policy rate regulated by the NBR	Monthly monetary policy (%)
Inf_rate	Inflation rate	Monthly inflation rate (%)
Exch_rate	Exchange rate (RON/USD)	Monthly exchange rate (RON/USD)

Source: Author's contribution

This study's econometric analysis was carried out using Eviews 12, a sophisticated statistical software suite. Eviews is built for advanced econometric research, allowing us to rapidly process monthly frequency data from 2010 to 2023.

3.2. VAR Model

A Vector Autoregressive (VAR) model is an econometric model used to capture the linear interdependencies among multiple time series data. VAR models are frequently used in economic and financial research to forecast and analyze the effects of policy changes or external shocks. This model gives a framework for investigating dynamic interactions in economic systems, such as the, in the context of our study, links between GDP, inflation, interest rates, and exchange rates. VAR models have the capacity to provide understanding into the causal links and dynamic interactions between economic variables.

Central to the VAR model is its formulation as VAR(p), where 'p' denotes the number of lagged observations included. In this structure, a system of equations is constructed, with each equation delineating the relationship of a variable with its own lagged values and those of other variables, encapsulated within coefficient matrices. These matrices, key to understanding the dynamics of intervariable relationships, are estimated from the data. Lag selection is a critical step in constructing a Vector Autoregressive (VAR) model, as it determines the number of past values to be included in the model. An appropriate lag length ensures that the model captures the essential dynamics of the data without introducing unnecessary complexity. In our study, the Akaike Information Criterion (AIC) is employed for selecting the optimal lag length.

Ordinary Least Squares (OLS) is a fundamental estimation technique for each equation in a Vector Autoregressive (VAR) model. OLS is a method for estimating unknown parameters in a linear regression model, and it works especially well with VAR models because of its linear structure. The OLS estimation method seeks to minimize the sum of squared differences between observed and predicted values from the linear model. Each equation in a VAR model can be evaluated separately using OLS because they are similar to a standard multiple linear regression model. Granger Causality Tests also play an important role in time series analysis, especially in the context of our VAR model. These are used to determine whether one time series is useful in forecasting another and contrary to the name, Granger Causality does not test for true causality in a philosophical sense. Instead, it tests whether past values of one variable are statistically significant in forecasting another variable, implying a predictive relationship.

3.2. Findings and discussion

For the first step in our analysis, we have used the VAR Lag Order Selection Criteria to get the best lag order for our Vector Autoregression (VAR) model, integrating up to 12 lags to find the best fit for our data. The Akaike information criterion (AIC) was helpful in this process, enabling us to choose a lag order of 5, which later proved effective for our model's predicted accuracy.

We have chosen 5 lags based on the Akaike Information Criterion (AIC). The AIC balances model fit and complexity, penalizing models with more parameters. At lag 0, the model is simplistic, not accounting for past values. The log-likelihood (LogL) increases with each additional lag, indicating better model fit. However, adding too many lags can lead to overfitting. Therefore, the fifth lag, where the AIC is minimized, represents the optimal balance, this essential step guarantees that the model is not underfit with too few lags, nor overfit with too many, achieving a critical balance for trustworthy econometric analysis.

Table 3.2. VAR Lag Order Selection Criteria

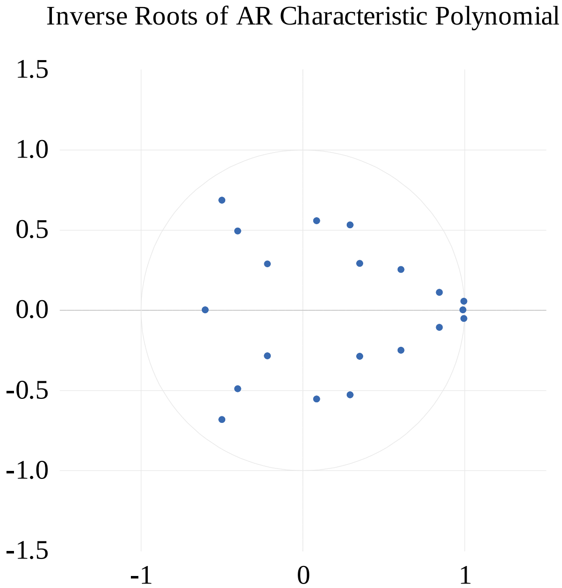
Lag	LogL	LR	FPE	AIC	SC	HQ
0	-761.5005	NA	0.214940	9.814109	9.892311	9.845871
1	301.2046	2057.288	3.19e-07	-3.605187	-3.214180*	-3.446377
2	329.9290	54.13440	2.71e-07	-3.768320	-3.064507	-3.482462*
3	338.5521	15.80905	2.99e-07	-3.673745	-2.657126	-3.260838
4	372.7719	60.98138	2.37e-07	-3.907332	-2.577907	-3.367377
5	389.0242	28.12895*	2.37e-07*	-3.910566*	-2.268336	-3.243563
6	402.6138	22.82358	2.45e-07	-3.879664	-1.924628	-3.085613
7	409.7038	11.54409	2.77e-07	-3.765434	-1.497592	-2.844335
8	420.0542	16.32169	3.00e-07	-3.693002	-1.112355	-2.644855
9	426.9816	10.56878	3.41e-07	-3.576687	-0.683234	-2.401492
10	432.4129	8.007631	3.96e-07	-3.441191	-0.234932	-2.138947
11	448.5582	22.97601	4.02e-07	-3.443054	0.076011	-2.013762
12	457.2152	11.87568	4.51e-07	-3.348913	0.482957	-1.792573

Source: Author's contribution

The next step was the analysis of the VAR model's stability condition, with five lags incorporated, revealed that all characteristic roots are located within the unit circle, affirming the model's stability. None of the roots displayed a modulus value exceeding one, which indicates there are no tendencies towards explosive behavior within the time series data being analyzed. This validation of stability is essential, as it ensures that the VAR model's forecasts and inferences remain reliable over time.

The modulus ranges from 0.360422 to 0.998861, with none breaching the threshold of one.

Figure 3.1. VAR model's stability condition



Source: Author's contribution

The autocorrelation function plots computed show the relationship between each economic variable's current value and its past values up to 12 lags.

These autocorrelations within approximately two standard error bounds are critical in identifying the inherent time dependency within the series. It appears that for most lags across different economic indicators, the autocorrelation coefficients lie within the bounds, which suggests that there is no significant autocorrelation at those lags. This is indicative of randomness in the data series, implying that past values do not have a strong predictive power for future values beyond what is captured by the model up to the selected lag.

For a VAR model, such as the one seemingly in use here, the absence of significant autocorrelation beyond the chosen lag is desirable. It indicates that the model is well-specified, capturing the essential temporal dynamics without leaving out valuable information or introducing redundancy.

The VAR Residual Serial Correlation LM Tests assess whether serial correlation is present at various lags in our vector autoregression model.

Our focus is on five lags, the null hypothesis is that there is no serial correlation at the lag specified, given the monthly frequency of our data, which allows for the capture of seasonal patterns and trends over time.

A p-value above 0.05 indicates that we fail to reject the null hypothesis of no serial correlation at that lag, whereas a p-value below 0.05 suggests the presence of serial correlation, thus rejecting the null.

Figure 3.2. Variance decomposition

Null hypothesis: No serial correlation at lag h

Lag	LRE* stat	df	Prob.	Rao F-stat	df	Prob.
1	25.67577	16	0.0588	1.627218	(16, 413.1)	0.0588
2	27.45150	16	0.0367	1.743476	(16, 413.1)	0.0368
3	20.90222	16	0.1823	1.317117	(16, 413.1)	0.1824
4	11.89743	16	0.7510	0.741652	(16, 413.1)	0.7511
5	11.45730	16	0.7804	0.713839	(16, 413.1)	0.7805

Source: Author's contribution

For our model, lag 1 shows a borderline p-value of 0.0588, marginally suggesting the presence of serial correlation, which is also the case for lag 2 with a p-value of 0.0367.

However, lags 3 through 5 display p-values of 0.1823, 0.7510, and 0.7804 respectively, indicating no significant serial correlation and thus they are deemed appropriate for our analysis.

The LRE* stat and Rao F-stat values provide additional support for these findings. At lag 1, the LRE* stat is relatively high at 25.67577, alongside the Rao F-stat of 1.627218, which corresponds to the borderline p-value, indicating a weak presence of serial correlation.

By lag 5, the LRE* stat significantly drops to 11.45730 with a corresponding Rao F-stat of 0.713839, reaffirming the absence of serial correlation at this lag. This trend suggests that as we progress to higher lags, the issue of serial correlation diminishes, supporting the decision to include up to five lags in our VAR model.

The VAR Granger Causality/Block Exogeneity Wald Tests evaluate the predictive causality between variables in the VAR model. We have two hypotheses:

H0: X does not Granger Cause Y;

H1: X Granger Cause Y.

The rule of decision is that:

- If p value is < 0.05 = "X" Granger Cause "Y" at the 5% significance level;
- If p value is > 0.05 then "X" does not Granger Cause "Y" at the 5% significance level.

Table 3.3. VAR Granger Causality/Block Exogeneity Wald Tests

Dependent variable: LOG_CAP

Excluded	Chi-sq	df	Prob.
INF_RATE	10.74941	5	0.0566
EXCH_RATE	9.007945	5	0.1087
MON_POL	5.073773	5	0.4069
All	21.43607	15	0.1235

Dependent variable: INF_RATE

Excluded	Chi-sq	df	Prob.
LOG_CAP	4.239523	5	0.5155
EXCH_RATE	2.350526	5	0.7988
MON_POL	15.13560	5	0.0098
All	22.40422	15	0.0976

Source: Author's contribution

Starting with the capitalization (LOG_CAP) as the dependent variable, the p-values associated with the inflation rate (INF_RATE) and the exchange rate (EXCH_RATE) are 0.0566 and 0.1087, respectively.

These figures sit just above the 0.05 threshold, leading us to maintain the null hypothesis that these rates do not Granger cause LOG_CAP. However, with the inflation rate p-value being marginally above the cutoff, there's a hint of potential predictive power over capitalization that merits further investigation.

The monetary policy (MON_POL) with a p-value of 0.4069 does not indicate a predictive relationship. When inflation rate (INF_RATE) is the dependent variable, MON_POL stands out with a p-value of 0.0098, clearly indicating a Granger causal relationship at the 5% significance level. It suggests that past monetary policy decisions are significant in predicting future inflation rates.

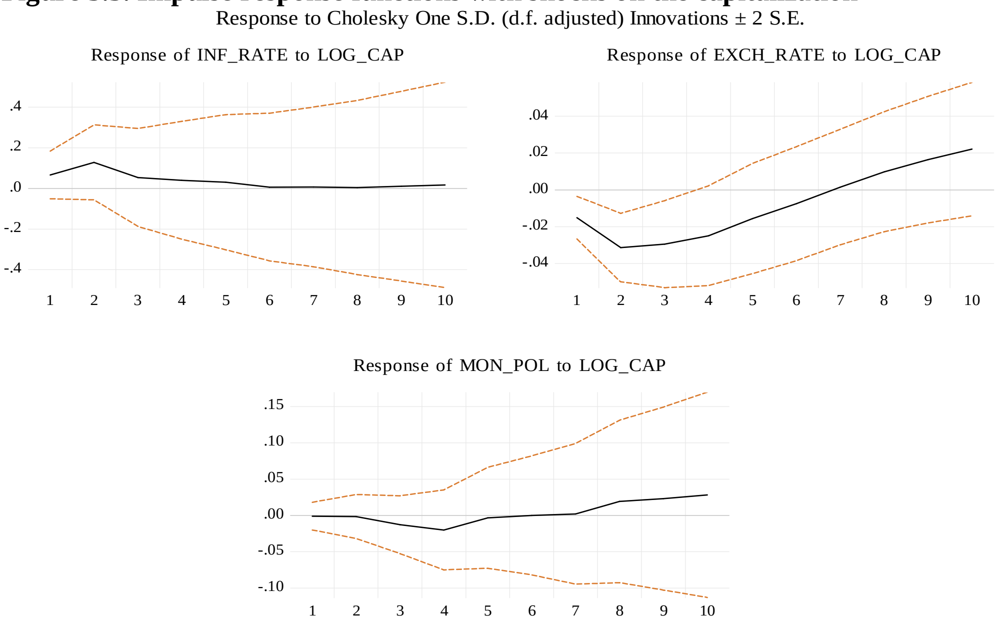
LOG_CAP and EXCH_RATE, with p-values of 0.5155 and 0.7988, show no such causality. For the exchange rate (EXCH_RATE) as the dependent variable, LOG_CAP's p-value of 0.0415 suggests Granger causes the exchange rate, potentially indicating that capitalization levels could be predictive of future exchange rate movements.

INF_RATE and MON_POL do not show evidence of Granger causality with p-values of 0.9885 and 0.6153, respectively. With MON_POL as the dependent variable, INF_RATE's very low p-value of 0.0004 is striking, indicating a strong Granger causal relationship. It suggests that past inflation rates could be a significant predictor of future monetary policy decisions. However, LOG_CAP and EXCH_RATE, with p-values of 0.3755 and 0.9563, do not show a predictive relationship with monetary policy.

Impulse Response Functions (IRF) are used in econometrics, to describe how one variable responds over time to a shock or impulse in another variable.

Analyzing the impulse response functions from a Vector Autoregression (VAR) perspective, we observe the dynamic interaction between key economic indicators.

Figure 3.3. Impulse response functions with shocks on the capitalization



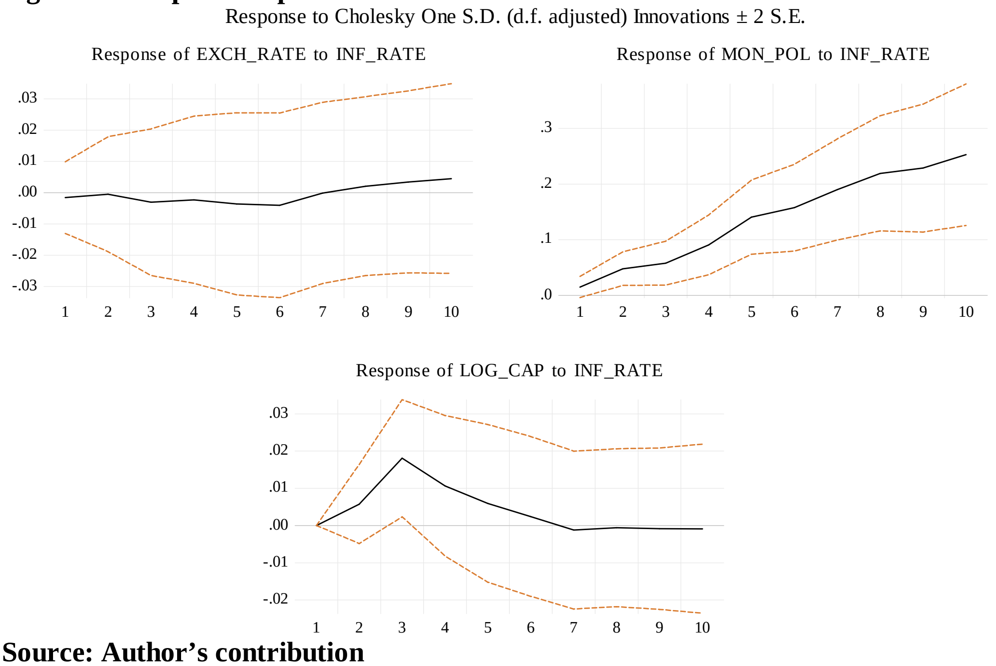
Source: Author's contribution

The response of the inflation rate starts slightly below zero, indicating an immediate, though minor, negative response to the shock in LOG_CAP. This negative response quickly dissipates, and the curve approaches the zero line, suggesting that the effect of the LOG_CAP shock on the inflation rate is transitory and becomes statistically insignificant as the response oscillates around the zero line within the confidence interval.

The response of the exchange rate to a shock in the logarithm of stock market capitalization displays a distinct pattern over the ten periods. Initially, the exchange rate depreciates, which is evident from the downward trend of the response line below the zero mark. This depreciation is short-lived, as the trend reverses, and a gradual appreciation is observed. The response line crosses above zero at the 7 period and continues to ascend, reflecting a sustained appreciation of the exchange rate. The graph concludes with the exchange rate maintaining this appreciation, suggesting a lasting adjustment to the shock in capitalization.

Initially, there is a slight contractionary move in monetary policy, as indicated by the slight dip below the horizontal axis. However, this contractionary stance is brief and minimal in magnitude. Subsequently, the trajectory of the response transitions to a neutral stance, hovering around the zero line between periods two and three. This indicates a momentary phase where monetary policy does not exhibit a strong reaction to the capital market shock. Progressing from period three onwards, the response curve begins to incline, suggesting a gradual shift toward an expansionary monetary policy stance.

Figure 3.4. Impulse response functions with shocks on inflation rate



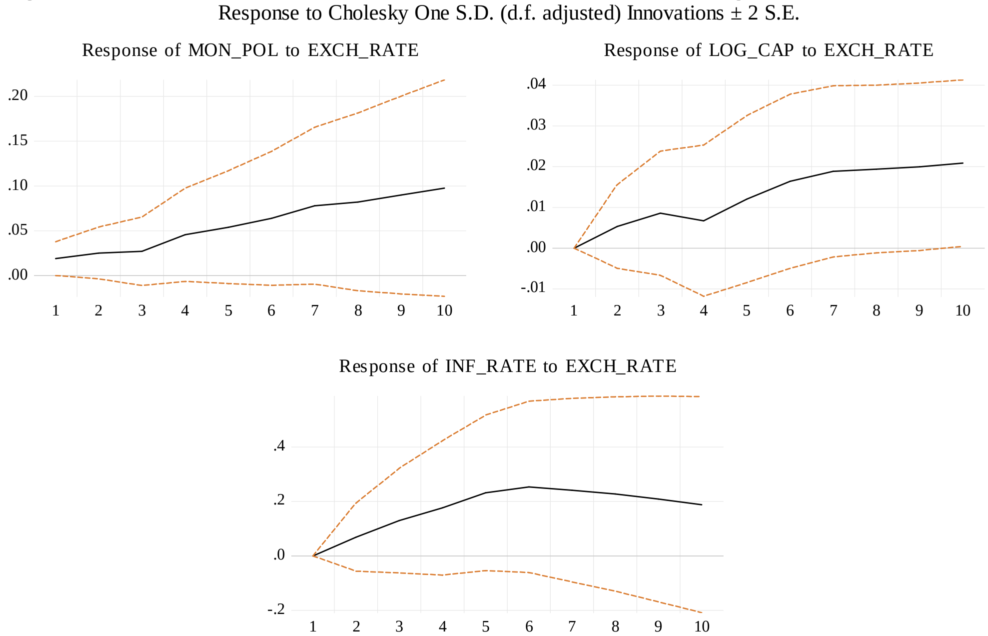
Source: Author's contribution

The central trajectory for the exchange rate response begins slightly below zero, indicating an immediate, though minor, depreciation following the inflation shock. This negative response is short-lived, and the line quickly levels off near zero, suggesting no strong or sustained initial effect. From period 6 onwards, the exchange rate shows a modest upward trajectory, implying a gradual appreciation in response to the inflation rate shock. This appreciation continues through the 10-period horizon, with the magnitude of the response remaining small but consistently positive.

The second graph illustrates the response of monetary policy to a shock in the inflation rate. The response is initially positive and increases over time, suggesting that monetary policy becomes tighter in response to higher inflation, which is consistent with economic theory of monetary policy reaction. The response is relatively larger and more persistent than the response of the exchange rate, indicating a more pronounced and lasting effect of inflation on monetary policy.

The trajectory for the logged capital response to an inflation shock shows a quick initial increase, peaking at around period 3, which suggests a brief positive impact on capital. However, this is quickly followed by a decline to negative values by period 3, indicating a downturn in the response. The magnitude of this negative response is moderate, but it is short-lived, as the response curve begins to level off and approach zero by the end of the horizon. This suggests that the initial negative impact on capitalization is tempered and becomes negligible over time.

Figure 3.5. Impulse response functions with shocks on exchange rate



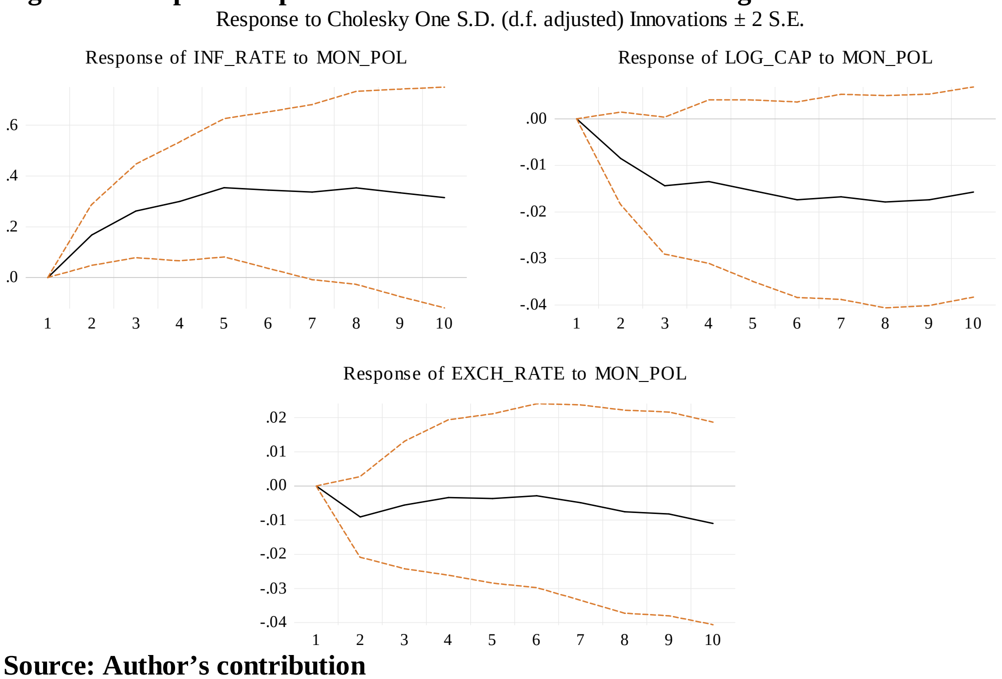
Source: Author's contribution

The trajectory of the monetary policy response to an exchange rate shock starts off slightly positive, suggesting a minor tightening of monetary policy immediately after the exchange rate shock. The trajectory then exhibits a steady upward trend, indicating a consistent and increasing tightening response from monetary policy. The magnitude of the response grows modestly but steadily over the 10 periods, indicating a sustained policy stance in reaction to the exchange rate movements.

The response of capitalization to the exchange rate shock begins just below zero, suggesting a small initial negative impact on capitalization. However, by the second period, the response turns positive and climbs slightly above zero, indicating a small increase in capital following the exchange rate shock. This positive response appears to be sustained but with some volatility, as the line wavers slightly yet remains above zero throughout the 10-period horizon, signifying that the positive impact on capital persists over time.

The trajectory of the inflation rate response to an exchange rate shock starts sharply positive, indicating a quick and strong inflationary response following the exchange rate shock. The response peaks around the first period and then begins to decline, although it remains positive. This suggests that the immediate impact on inflation is strong but appears to moderate over time. However, the response does not revert to zero within the 10-period horizon, implying a lasting inflationary effect from the exchange rate shock, although the magnitude diminishes as time passes.

Figure 3.6. Impulse response functions with shocks on exchange rate



Source: Author's contribution

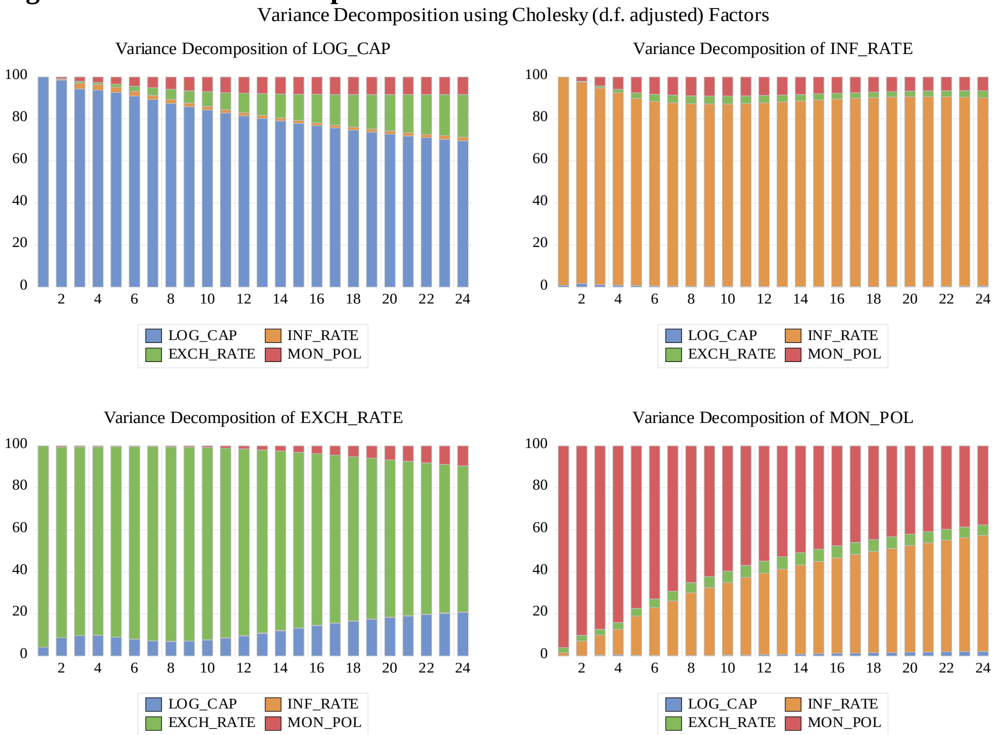
For the graph titled "Response of INF_RATE to MON_POL," the response curve shows an initially positive relationship, with inflation (INF_RATE) increasing in the short-term following a tightening of monetary policy. This is an intriguing phenomenon since conventional economic theory would predict that an increase in interest rates should lead to a decrease in inflation, which in our model is happening but in the long term. This counterintuitive result could suggest the presence of a puzzling result, where inflation does not react as expected to monetary policy shocks. A solution would be to incorporate commodity prices into the VAR model and that could indeed provide more insight.

The second graph, "Response of EXCH_RATE to MON_POL," shows a more muted and variable response. Initially, there is a slight decline in the exchange rate (EXCH_RATE) which then oscillates around the zero line, suggesting that the exchange rate's response to monetary policy is somewhat uncertain or that other factors may be influencing the exchange rate concurrently.

The third graph shows the response of the logarithm of the capitalization of the BET index from the Bucharest Stock Exchange to a monetary policy shock. An initial downward trend in the LOG_CAP suggests a negative reaction of stock market capitalization to an increase in interest rates. This outcome aligns with standard economic expectations. Following this initial drop, the LOG_CAP curve appears to stabilize and then oscillates, indicating that the market may be adjusting to the new monetary conditions or that other market dynamics are at play.

The variance decomposition over the 24-period horizon indicates a diminishing influence of LOG_CAP on its own variance, suggesting that as time progresses, LOG_CAP becomes less predictive of itself. There is a gradual increase in the variance explained by INF_RATE, EXCH_RATE, and MON_POL, indicating that these variables become more influential in explaining the movements in LOG_CAP. This trend suggests that market capitalization's movements are increasingly influenced by broader economic factors over time, such as inflation, currency fluctuations, and monetary policy actions.

Figure 3.7. Variance decomposition



Source: Author's contribution

For LOG_CAP, initially, it self-explains 100% of its own forecast variance. As time progresses, the contribution of other variables starts to appear. By the 24th period, LOG_CAP's variance is explained by itself by approximately 69.5%, by INF_RATE by about 1.85%, by EXCH_RATE by around 20.23%, and by MON_POL by approximately 8.43%. This indicates that while market capitalization is mostly influenced by its own shocks, inflation rate, exchange rate, and monetary policy also play a role as time goes on.

Moving on to the variance decomposition for the INF_RATE, which indicates that initially, it accounts for most of its own forecast error variance. However, as we move forward to the 24th period, we see a notable shift in contributions. The self-contribution of the inflation rate to its variance decreases from nearly 99% to approximately 89.56%, suggesting an increasing impact from other variables.

LOG_CAP's influence starts off minimal and grows to over half a percent, indicating a slight predictive power over inflation. The contribution of the exchange rate (EXCH_RATE) and the monetary policy rate (MON_POL) also increases over time, reaching about 3.37% and 6.56% respectively, signifying that exchange rate movements and monetary policy adjustments become more significant in explaining the inflation rate's variance. This trend reflects the complex interactions between these macroeconomic variables and inflation over time.

For the EXCH_RATE over a 24-period horizon using the Cholesky method indicates that initially, the exchange rate primarily explains its own forecast variance. However, as the periods progress, the contribution of LOG_CAP to the forecast variance of the exchange rate increases significantly, starting from about 4.08% in the first period and reaching approximately 20.65% by the 24th period. Interestingly, the contribution of INF_RATE remains relatively small, while the influence of MON_POL grows, starting from no contribution in the first period to about 9.56% by the end of the 24th period. This trend suggests that while the exchange rate is largely influenced by its own shocks, other variables such as market capitalization and monetary policy become more influential over time.

In the variance decomposition of MON_POL over 24 periods, the proportion of the forecast error variance of the monetary policy rate attributed to its own shocks and to shocks in other variables is quantified. Initially, MON_POL explains 96.11% of its variance, emphasizing its self-driven nature. By the 24th period, this self-explanation decreases to 37.70%, indicating a growing influence from other factors. Notably, INF_RATE's contribution increases significantly, accounting for 55.26% of the variance by the 24th period, highlighting inflation's increasing impact on monetary policy variability. LOG_CAP's and EXCH_RATE's influences also grew over time, reaching 2.08% and 4.96% respectively.

2.3. Conclusions

In finally of our analysis, we want to highlight the technical rigor and analytical depth that have distinguished our research. Our use of the Vector Autoregression (VAR) model offers an in-depth analytical structure for examining the dynamic interaction of macroeconomic variables and the Romanian BET index. This approach, along with Granger causality tests, impulse response functions, and variance decomposition, allowed us to understand the complex causal links and structural patterns present in Romania's emerging financial system.

We achieved an accurate equilibrium between model complexity and fit by including up to 5 lags in our study and using the Akaike Information Criterion for lag selection. This strategy improves the accuracy of our predictions, also reducing the risk of overfitting and increasing dependability. The use of Granger causality tests in our study was essential in determining the predicted causation between the monetary policy rate, inflation rate, exchange rate, and BET index. These experiments supplied us with measurable evidence to determine the directional influence of one variable over another. Moreover, impulse response functions have proven significant in determining the temporal effects of shocks on the economic indices. Our analysis of reaction dynamics has provided important knowledge into how unexpected changes in one variable, such as the inflation rate or monetary policy rate, spread through the market and alter variables such as the BET index over time. The use of variance decomposition has improved our study by quantifying how much exogenous shocks to one variable explain the forecast error variation in another, this component was determining the relative influence of each macroeconomic variable inside the VAR system, providing an expanded view of how market capitalization, inflation, and monetary policies interact over time.

Authors' Contributions

The authors contributed equally to this work.

References:

Baker, S.R., Bloom, N., Davis, S.J. and Sammon, M., 2021. What triggers stock market jumps? Social Science Research Network. [online] https://doi.org/10.2139/ssrn.3821973 .

Banca Naţională a României 2024b - Banca Naţională a României - Raport statistic. [online] Available at: <https://www.bnr.ro/Raport-statistic-606.aspx>

Banca Naţională a României, 2024a - Raport statistic. [online] Available at: <https://www.bnr.ro/Raport-statistic-606.aspx.

Bernanke, B. and Kuttner, K.N., 2005. What explains the stock market's reaction to Federal Reserve policy? *The Journal of Finance*, [online] 60(3), pp.1221–1257. https://doi.org/10.1111/j.1540-6261.2005.00760.x .

Bianchi, F., Lettau, M. and Ludvigson, S.C., 2016. Monetary policy and asset valuation. [online] https://doi.org/10.3386/w22572.

Bianchi, F., Lettau, M. and Ludvigson, S.C., 2022. Monetary policy and asset valuation. The Journal of Finance, [online] 77(2), pp.967–1017. https://doi.org/10.1111/jofi.13107 .

Boons, M., Duarte, F., De Roon, F. and Szymanowska, M., 2020. Time-varying inflation risk and stock returns. *Journal of Financial Economics*, [online] 136(2), pp.444–470. https://doi.org/10.1016/j.jfineco.2019.09.012.

Bucharest Stock Exchange, 2020. BET® Index Management Rules: Bucharest Exchange Trading® Index. [online] bvb.ro.

Bursa de Valori București, 2024 BVB - Evolutia pietei (actiuni). [online] bvb.ro.

Camilleri, S.J., Scicluna, N. and Bai, Y., 2019. Do stock markets lead or lag macroeconomic variables? Evidence from select European countries. *The North American Journal of Economics and Finance*, [online] 48, pp.170–186. https://doi.org/10.1016/j.najef.2019.01.019.

Christou, C., Gabauer, D. and Gupta, R., 2020. Time-Varying impact of uncertainty shocks on macroeconomic variables of the united kingdom: Evidence from over 150 years of monthly data. *Finance Research Letters*, [online] 37, p.101363. https://doi.org/10.1016/j.frl.2019.101363.

Fischer, S. and Merton, R.C., 1984. Macroeconomics and finance: The role of the stock market. *Carnegie-Rochester Conference Series on Public Policy*, [online] 21, pp.57–108. https://doi.org/10.1016/0167-2231(84)90005-8 .

Heyden, K.J. and Heyden, T., 2021. Market reactions to the arrival and containment of COVID-19: An event study. *Finance Research Letters*, [online] 38, p.101745. https://doi.org/10.1016/j.frl.2020.101745.

Institutul Național de Statistică, 2024. - Institutul Național de Statistică. [online] https://insse.ro/cms/.

Rai, K. and Garg, B., 2021. Dynamic correlations and volatility spillovers between stock price and exchange rate in BRIICS economies: evidence from the COVID-19 outbreak period. *Applied Economics Letters*, [online] 29(8), pp.738–745. https://doi.org/10.1080/13504851.2021.1884835 .

Scott R. Baker & Nicholas Bloom & Steven J. Davis & Marco C. Sammon, 2021. "What Triggers Stock Market Jumps?," NBER Working Papers 28687, National Bureau of Economic Research, Inc.

Article Info

Received: May 09 2023
Accepted: May 29 2024

How to cite this article:
Spulbar, C., Ene, C.C. (2024). The Empirical Approach of the Interplay of Macroeconomic Variables and the Dynamics of the Financial Market in Romania. *Revista de Științe Politice. Revue des Sciences Politiques*, no. 82, pp. 55 – 69.