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Borsa Istanbul as an Inflation Hedge: A Post-COVID-19 Perspective

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ABSTRACT

This study delves into the intricate relationship between inflation and stock prices on Borsa Istanbul, with a particular focus on the turbulent post-COVID-19 era. While traditional assets like real estate have historically served as reliable inflation hedges, the emergence of Borsa Istanbul as a potential alternative warrants investigation, especially during the period 2019-2023. To assess the effectiveness of the Turkish stock market as an inflation hedge, we employ a rigorous econometric framework that extends beyond broad market indices to examine sector-specific responses. By adopting a Vector Autoregression (VAR) model, we capture the dynamic interplay between inflation and stock returns. Our analysis incorporates a comprehensive set of macroeconomic control variables spanning the period 2006Q1-2023Q4 and utilizes robust estimation techniques to account for potential structural breaks induced by the COVID-19 pandemic and unconventional economic policies. The primary objective of this study is to determine whether Borsa Istanbul stocks constitute an effective inflation hedge. In essence, our results suggest that the Turkish equity market has served as a safe haven for investors during inflationary periods. A deeper understanding of the relationship between inflation and equity markets is crucial for investors, policymakers, and financial market participants seeking to comprehend and manage inflation risks in emerging economies. In this context the study contributes to the existing literature by providing empirical evidence on the inflation hedging capabilities of Borsa Istanbul stocks, particularly in the context of recent economic and geopolitical upheavals.

Keywords: Inflation, Stock Market, Borsa Istanbul, Hedging, Volatility, Economic Policy
JEL Classifications: G10, G15, C32, E44, E31

1. INTRODUCTION

Since 2018, Turkey's monetary policy has been characterized by a complex interplay of factors, including economic experiments, political influences, and global market dynamics. A notable trend has been the consistent increase in the dollar-TL exchange rate, M2 money supply, and interest rates on three-month deposits and those maturing in over a year. However, the overall upward trajectory of interest rates has been punctuated by periods of decline, primarily attributable to government-led economic experiments.

One particularly intriguing phenomenon has been the inversion of the yield curve, where short-term interest rates have exceeded long-term rates. This inversion, often observed in the lead-up to economic downturns, has been exacerbated in Turkey by a combination of factors. Firstly, the government's unorthodox economic policies, including unconventional monetary interventions and credit expansion, have created uncertainty and eroded investor confidence. Secondly, the political climate leading up to and following general elections has introduced additional volatility, as investors often anticipate policy changes or shifts in economic priorities. This combination of factors has contributed to a preference for shorter-term investments, driving up demand for short-term bonds and, consequently, their interest rates.

This increase means more expenses and less profitability. As it is safer and more profitable for market investors to invest in short-term bonds, stock prices fall. In 2022 and beyond, two main

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reasons stand out in the CPI increase in countries. First, consumers changed their spending behaviour due to COVID-19-related lockdowns. They overspent to compensate for the consumption they did not make after the lockdown. The supply side, on the other hand, experienced major shocks due to high prices and the breakdown of both goods and labour in the supply chain. The second is the shortages in the supply of energy and other goods caused by the Russia-Ukraine war. These two situations raised inflation and inflation expectations in general (Bouri et al., 2023).

Periods of high inflation mean a fall in the real value of money. As a result, purchasing power and real returns on investments fall. Fama (1981) emphasised the negative relationship between stock returns and the expected and unexpected components of inflation and based this hypothesis on the US economy in 1953. In the proxy effect hypothesis, both real variables and expected and unexpected inflation components are used to explain stock returns. Thus, the relationship between stock returns and inflation yields more consistent results. Of course, there are cases where this hypothesis is not valid. Lee (1998) and Kaul (1998) presented results contradicting this Proxy Effect Hypothesis as studies close to the date when the hypothesis was introduced. Ogbebor et al. (2021), Neifar and Hachicha (2022) confirm that the stock market is a good investment vehicle for hedging inflation. Fisher (1930), on the other hand, states in the Generalised Fisher Effect that an increase in the expected inflation rate triggers a shift towards stocks. Mundell (1963) develops this hypothesis and states that this substitution will reduce the real rates of stocks and interest rates. Besides these results, the correlation between individual stock returns and expected and actual inflation is ambiguous.

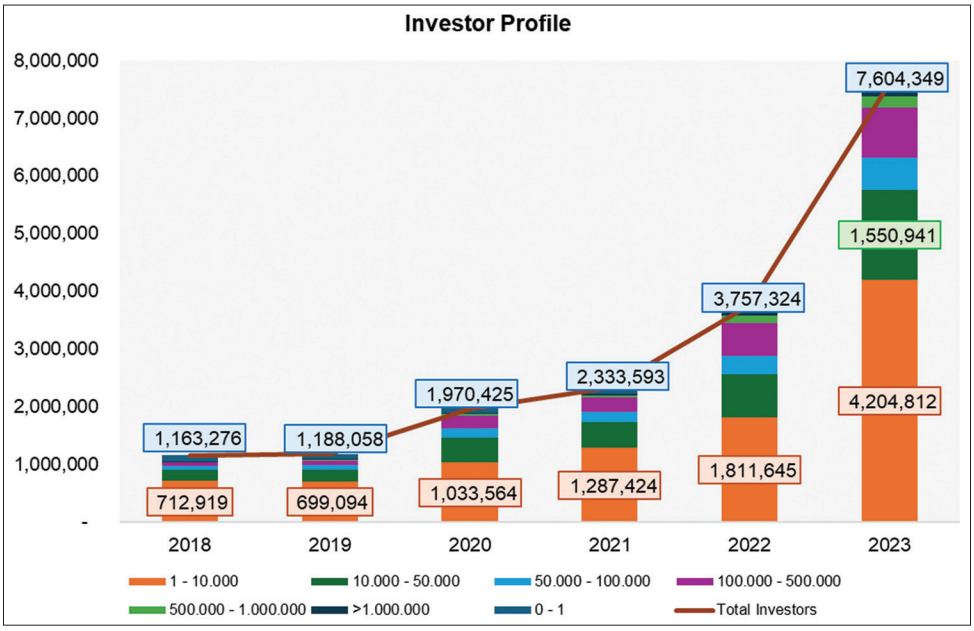
The results obtained for Türkiye in this study contradict the Proxy Effect Hypothesis. The results suggest that investors seek refuge in the stock market to hedge against inflation when inflation exceeds 80%. Figure 1 shows that the number of investors supports this conclusion in only 4 years.

The number of equity investors in Turkish stock market was only 1.2 million in 2019 but exceeded 7 million in 2023. While investors that have 1 million TL and above in their accounts was 1% of total investors in 2019, which increased to 2% in 2023. The most striking issue during this period was the spread of stock investors to the base, in other words, the replacement of large institutional investors by small investors. While boom in initial public offerings (IPOs) after 2020 became the focus of attention of small investors, the stock performances of companies that went public was 5 times of BIST 100 companies. While the BIST 100 index provided a return of 913% in the last 5 years, the IPO index gained 5003%. Given the decline in real interest rates to negative levels, particularly post-2021, investors' pursuit of higher yields has significantly driven demand for Initial Public Offerings (IPOs).

This heightened interest, coupled with an influx of new investors, has likely been a direct consequence of these favourable market conditions. The significant increase in investor numbers, trading volume, and the Borsa Istanbul index after 2019 coincides with a surge in construction costs. This correlation can be attributed to several factors, primarily related to rising inflation rates. As inflation erodes the purchasing power of currency, investors often seek to preserve their wealth by investing in assets, such as stocks and real estate, that are expected to appreciate in value. In Figure 2, the BIST100 Index and the Construction Cost Index are increasing together as of 2019. In TURKSTAT's (a.d. 26.11.2024) report dated March 2024, it increased by 67.87% in January 2024 compared to the previous year. The biggest reason for this increase is the material index with 53.29% and the labour index with 103.46%.

The increasing popularity of Borsa Istanbul can be seen as a reflection of investors' confidence in the potential for stock market growth. Meanwhile, the surge in construction costs is likely driven by a combination of factors, including increased demand for housing, rising material prices, and higher labor costs. As inflation pushes up the cost of living, individuals may be more

Figure 1: Investor profile of Türkiye



inclined to invest in real estate as a hedge against inflation and as a potential source of rental income. In Figure 3, the new house price index and the non-new house price index move together with the Construction Cost Index. Another point here is that the trend towards USDTRY remains relatively low.

However, the relationship between stock market activity and house sales is complex and influenced by various factors, including economic conditions, government policies, and investor sentiment. While the correlation between the two may be apparent in the short term, long-term trends may vary depending on specific circumstances. This study seeks to answer the investors' search for safe harbour especially during the recent high inflation in Türkiye. Therefore, this study contributes to the literature in many ways. Firstly, it is inclusive of the recent studies on this subject for Türkiye. Secondly, it is a recent study that proves that the Proxy Effect Hypothesis is invalid for Turkey. Thirdly, the results of the study are an important source for policy makers and investors. The inclusiveness of the study, of course, has some limitations. In order to see the results of the study more clearly, Inflation, Borsa

Figure 2: BIST100 and real estate market ındicators

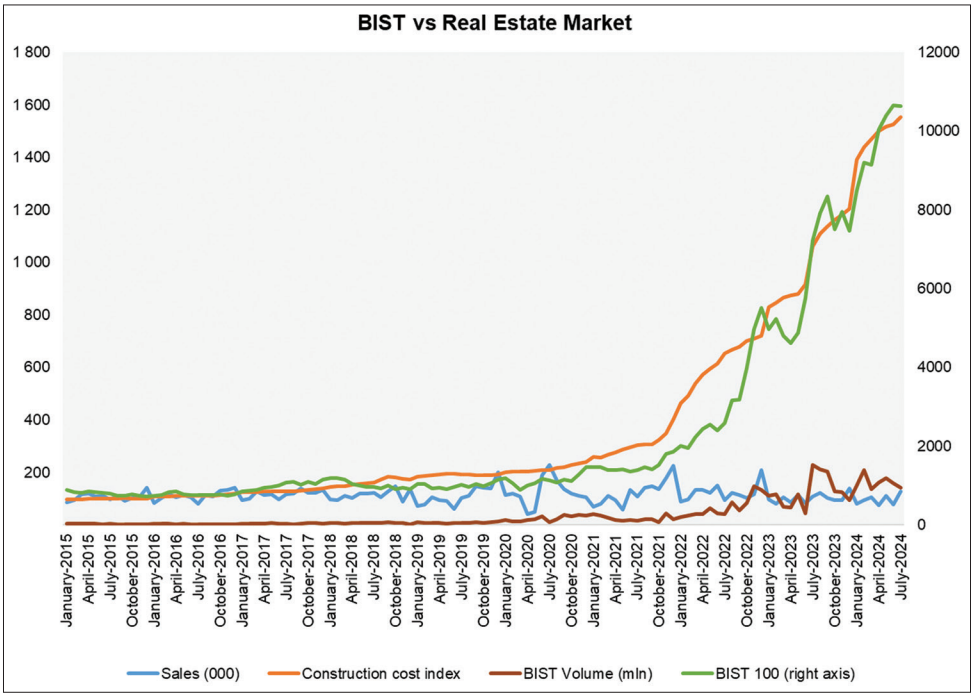
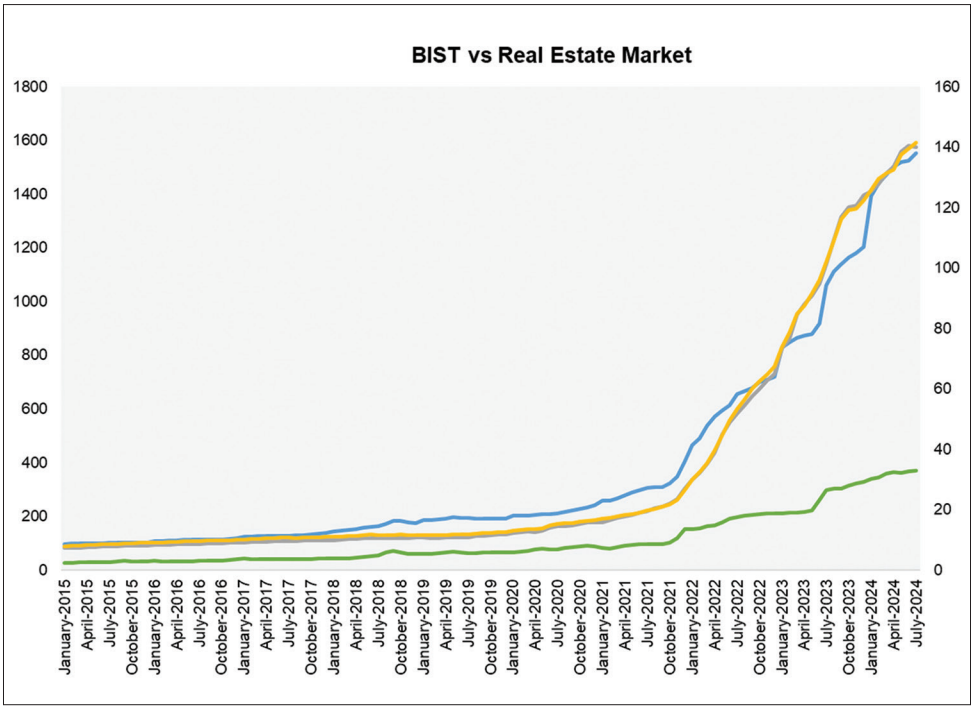


Figure 3: BIST100 and real estate market (Construction cost index housing index, new housing index, USDTRY exchange rate)



Istanbul Index (BIST30), The number of initial public offerings (IPO), Housing prices index, New housing prices index, Deposit interest rate, USD/TRY exchange rate, Goods inflation, Service inflation, BIST30 return, IPO return and M1+ TL and foreign currency term deposit account data were used. These data cover the period 2006Q1-2023Q3. The study consists of four main sections. In the first section, approaches and the theoretical framework are explained. The second section includes a literature review with supporting recent studies on the subject. The third section includes the methodology section where the data is analysed, while the fourth section presents the conclusions and recommendations of the whole research.

2. LITERATURE REVIEW

After 2019, there was a turbulent period both in Türkiye and in all other economies. This process triggered by the pandemic was accompanied by wars. Crises are now experienced in different ways in countries. Countries that are in a constant state of crisis now use other definitions instead of the word "crisis." In Türkiye, the result of the low interest rate policy, which came to the agenda as of September 2021, Türkiye is trying to pay a heavy price. In this process, with the fall in interest rates, dollarization and inflation have become the country's biggest economic problem. In addition to many economic factors affected by inflation, financial markets also took their share from this situation. There are many studies on what awaits investors in the stock market during periods of high inflation. While some of these studies indicate that high inflation reduces stock returns, others emphasize that returns are negatively affected.

In this part of the study, the results of the studies that find a positive-negative relationship and/or causality between inflation and stock returns are included. For example, Ameen et al. (2020) investigate the relationship between inflation and stock market indices in Türkiye. They use the BIST-100 index and CPI index to represent stock market indices and inflation rate, respectively. The VAR model and Granger Causality test were applied to analyse the monthly data from January 2009 to March 2020. The results suggest a one-way causality relationship from inflation to BIST-100, but no significant relationship was found between the variables through impulse responses.

Coşkuner and Özer (2024) also investigated the relationship between monthly exchange rate, inflation rate and BIST100 index data in Türkiye between 2010 and 2012. Causality was found between the variables. The effect of exchange rate on stock returns was more reliable than the effect of inflation. Sönmez and Noyan (2022) analysed the effect of economic growth and inflation on stock returns in Türkiye between 2008 and 2022 and concluded that the stock market is more reliable during the high inflation period. In addition, stock markets and economic growth interact with each other.

Saka Ilgın and Sarı (2020) state that the increase in exchange rates and interest rates in Türkiye decreases stock returns. In addition, there is a long-term relationship between inflation and BIST All, BIST Financial and BIST Services indices, and a short-term relationship between BIST All, BIST Financial and BIST Industrial indices. It is reported that stock returns are more reliable in periods of high inflation. Durgut and Arici (2022) state that the relationship between macroeconomic variables and stock markets is weak in Türkiye, while Karagöz (2024) reports that BIST sub-sector returns do not develop a statistically significant response to the expected inflation rate.

The issue of whether the stock market is a safe haven in a high inflation environment can be quite controversial. As a matter of fact, it is quite natural that the results are different even on a single country basis. When analysed on the basis of other countries, Boons et al. (2020), for example, state that inflation risk in the US changes prices in the stock market over time. When inflation increases, stocks with high inflation betas are risky. However, this situation varies over time. In the study, it is stated that in the 1970s, although stock markets were attractive in high inflation, returns were low, while in the 2000s, it is proved that high inflation also increases the risk of stocks.

Chiang and Chen (2023) analysed the short-term relationship between stock returns and inflation in the US economy. A negative relationship was observed between stock returns and inflation in the total market. On a sectoral basis, only energy sector stock returns were positively correlated with inflation. In addition, inflation-induced stock market volatility has a negative impact on returns.

In a similar study by Chiang (2023), stock returns of 12 major countries and inflation were analysed. It is stated that stock returns are positively correlated with inflation and negatively correlated with stock market volatility. Again, monetary policy uncertainty is positively correlated with inflation and negatively correlated with stock returns. In addition, volatility in the US stock markets and/or uncertainty in monetary policy have a negative impact on global markets.

Farooq and Ahmed (2018) analysed the sensitivity of investments and inflation to stocks in 37 emerging economies. According to this study, firm investments centred in high inflation countries are less sensitive to stock prices. This is because stock prices are less informative in countries with high inflation.

Dridi and Boughrara (2023) examined the effect of Flexible Inflation Targeting (FIT) on stock market volatility. The results showed that FIT reduces inflation uncertainty and market volatility. Countries implementing FIT are less prone to financial instability. In addition, FIT has the effect of reducing institutional quality and stock market volatility even during crisis periods.

Lopez (2018) investigated the relationship between inflation, investment and stock prices in the context of the New Keynesian Q theory. It is stated that stock prices, investment and inflation move according to information about the future in a linear combination. It is also stated that when prices are sticky, firms hold investment constant and market-to-book ratios will increase as inflation expectations decrease.

Jelilov et al. (2020) analysed the relationship between stock market returns and inflation in Nigeria during the COVID-19 period. The

results show that the pandemic increased stock market volatility and the positive relationship between stock returns and inflation deteriorated.

Asravor and Fonu (2021) examined the relationship between macroeconomic variables and stock market returns in Ghana and concluded that all variables move together. While inflation, money supply and human capital have a negative effect on stock market returns, direct investment and interest rate have a positive effect.

Raghutla et al. (2019) analysed inflation and stock returns and found a negative relationship between both variables. Nasir et al. (2020) investigated the role of the local economic environment and regional markets in explaining the dynamics of the Vietnamese stock market. Using the structural VAR model, the study emphasized the negative impact of inflation shocks on the Vietnamese stock market.

Sreenu (2023) analysed the volatility effect of exchange rate and inflation on market return dynamics in India. ARDL, GARCH and ECM models were applied to the data between January 2000 and June 2020. The results proved that there is co-integration between inflation, exchange rate and stock market returns, while a negative significant relationship was found between the variables.

Javaheri et al. (2022) analysed the effect of economic policy uncertainty and economic factors on the stock market index in the USA with the Non-ARDL test. The results showed that decreasing economic and economic policy factors will increase the stock market index. In addition, the effect of inflation and GDP follows a non-linear pattern.

The implementation of expansionary monetary policy may yield different results in each country. For example, Rahman and Serletis (2023) analysed the relationship between unconventional monetary policy and stock market returns in the US using weekly changes in the size of the Federal Reserve's balance sheet. The findings showed that unconventional expansionary monetary policy had a positive effect on stock market returns.

Wang and Li (2020) investigated the dynamic relationship between industrial growth, inflation, long-term interest rate and stock market in China. A positive relationship was observed between stock returns and industrial growth and inflation. According to the authors, the Chinese stock market is underdeveloped. This conclusion was reached by the distorted relationship between the stock market and macroeconomic indicators.

The positive relationship between the stock market and inflation was also emphasised by Camilleri et al. (2019). They analysed stock prices and inflation, industrial production, interest rates and money supply for Belgium, France, Germany, the Netherlands and Portugal. It is stated that stock prices lead inflation in the selected countries.

Eldomiaty et al. (2020) examined the effects of inflation and interest rates on quarterly data of non-financial firms listed in the DJIA30 and NASDAQ100. Using the stock duration model, the authors find a negative relationship between inflation and stock returns and a positive relationship with interest rates.

Ali et al. (2023) analysed the relationship between sectoral indices and inflation in India using Pearson correlation method. The result showed that the child of the indices has a significant relationship with inflation.

Algarini (2020) found a long-run relationship between annual stock market values and macroeconomic variables between 1993 and 2018 for Saudi Arabia. In particular, both a short-term and long-term relationship was observed between inflation and GDP.

Bui and Nguyen (2023) investigated the impact of inflation on the stock market in emerging markets and economies in Asia. When the threshold level of 1.9% inflation is accepted, the stock market is positively affected. However, when inflation rises above 1.9%, the effect turns negative. The authors also state that economic growth and trade openness will positively affect the stock market. Therefore, inflation control has a significant effect on stock markets.

Magweva and Sibanda (2020) argue that investors in emerging markets should take the concept of portfolio optimization to hedge inflation and reduce risk.

Sadeghi et al. (2023) analysed the relationship between financial markets and macroeconomic factors in two countries with different political stances, Argentina and Iran. The causality between markets and inflation and economic growth was bidirectional in Iran and unidirectional in Argentina. Interest rates are insignificant in Iran but strongly correlated in Argentina. Therefore, while the central bank is active in inflation volatility in Argentina, it is passive in Iran. In addition, financial markets affect economic growth in both countries. Saadatmehr (2023) also analysed the effect of stock market on inflation in Iran. Applying the ARDL method to annual data between 1990 and 2019, the author states that the value of being traded in the stock market has a negative effect on inflation. In addition, it was proved that a 1% increase in the value of trading in the stock market will cause a 1.47% decrease in inflation.

Sathyanarayana and Gargesa (2018) emphasize a negative relationship between selected indices and inflation for 14 countries. Therefore, expected and unexpected inflation information is important for investors' portfolio optimisation.

Chaudhary and Marrow (2024) investigated how inflation expectations affect stock returns. Measuring investor expectations using inflation-indexed contracts, the authors provide evidence that stocks after 2000 offer positive returns to expected high inflation. This positive relationship is entirely driven by aggregate variation in expected excess returns.

Alqaralleh (2020) made a critical study on the asymmetric nature of the relationship between stock returns and inflation. This study

concluded that stock returns are generally asymmetric. That is, stock returns decline more during tight monetary policy periods than during expansionary monetary policy periods.

Bouri et al. (2023) investigated the cointegration between inflation expectations and stock returns in the US economy. Although the correlation structure changes periodically, it was stated that stock returns also increased as the expectation that inflation would be high after COVID-19 increased. Of course, this situation varies across sectors.

Singh and Padmakumari (2020) state that the response of stock returns to inflation announcements in the Indian stock market is highly sensitive. In addition, abnormal returns were observed as a result of this sensitivity.

3. METHODOLOGY AND DATA

This section of the study covers the econometric analysis for Borsa İstanbul for the period 2012M06-2024M06 as monthly. Table 1 shows the definition and sources of the variables.

First, cointegration test and VECM model were applied to the variables in the context of VAR (Vector Autoregression) model developed by Sims (1980). We then used impulse response analysis and variance decompositions. Impulse response analysis and variance decomposition are the two main tools used in the context of Vector Autoregressions (VARs) to understand the dynamic interactions between variables in a system. They offer insights into how the system responds to unexpected shocks and how the variability of a given variable can be attributed to these shocks. An impulse response function (IRF) traces the path of a variable in a VAR model following a one-unit shock to another variable, holding everything else constant. In simpler terms, it allows us to assess the impact of an unexpected change in one variable on the future values of all variables in the system. IRFs are typically presented graphically and show the response over a selected number of periods.

3.1. VAR Model

Sims (1980) criticized the temporal restriction of definitions in the simultaneous equation system and the temporary classification of endogenous/exogenous variables. VAR assumes that all variables under study are endogenous. It presents the vector of endogenous variables as an autoregressive function of their lagged values. Although this model includes seasonal dummies and trends, it is essential that all variables are perceived as endogenous (Baltagi and Baltagi, 2011: 378). As per the existing literature the VAR method has been demonstrated as a coherent and credible approach (Stock and Watson, 2001). The VAR model can be presented as follows:

$$y_t = \beta_1 y_{t-1} + \beta_2 y_{t-2} + \beta_3 y_{t-3} + \ldots + \beta_n y_{t-n} + \varepsilon_t \quad (1)$$

This equation models how an asset's return Y_t depends on its past performance Y_{t-1}, Y_{t-2}, Y_{t-3}. The coefficients β_1, β_2, β_3 capture the influence of these past returns. In Vector Autoregression (VAR) models, each variable is predicted by its own history, similar to Y_t here. VAR models are best suited for stable data (stationary series) and require choosing the most impactful lags Y_{t-1}, Y_{t-2} and etc.

The VAR model has many advantages and disadvantages (Brooks, 2008: 292-293). The Vector Autoregression (VAR) model offers several distinct advantages over traditional econometric techniques. Notably, its endogenous treatment of all variables enables the simultaneous estimation of their interdependencies, a crucial feature for understanding complex economic systems. Furthermore, the VAR model's multivariate nature allows for a more nuanced examination of the dynamic relationships between variables, capturing intricate patterns and features that may be overlooked in univariate models. This increased flexibility often leads to more accurate and informative forecasts compared to traditional structural models.

However, the VAR model is not without its limitations. One significant drawback is its lack of theoretical underpinnings. While it can effectively describe the empirical relationships between variables, it provides little insight into the underlying economic mechanisms driving these interactions. Additionally, the VAR model can be susceptible to spurious relationships, where correlations between variables appear statistically significant but lack meaningful economic causation. This can complicate the interpretation of model results and make it challenging to estimate accurate coefficients. Moreover, the assumption of stationarity at the same level is essential for hypothesis testing within the VAR framework. While some researchers argue for analyzing non-stationary data without differencing to preserve information about long-run relationships, this approach can introduce challenges and potential biases in the estimation and interpretation of results.

Table 1: Definition of variables

Variables	Description	Source
Inflation	Consumer Price Index	CBRT
BIST30	Borsa Istanbul Index	Bloomberg
IPO	The number of initial public offerings	Bloomberg
Houseinf	Housing Prices	TURKSTAT
Newhouseinf	New Housing Prices	TURKSTAT
Dep	Deposit interest rate	CBRT
Usdtry	USDTRY exchange rate	CBRT
Goods	Goods inflation rate	TURKSTAT
Services	Service inflation rate	TURKSTAT
BIST30R	BIST30 Return	TURKSTAT
RIPO	IPO Return	TURKSTAT
M2	M1+TL and foreign currency term deposit account	CBRT

3.2. Cointegration and VECM Model

Engle and Granger (1987) combined cointegration and error correction modeling to construct the trace error correction model with VAR model logic. If there is cointegration between variables, the error correction model can be generated from the autoregressive distributed lag model. In fact, each equation in the VAR model is an autoregressive distributed lag model. In this respect, VECM can be considered as a VAR model with cointegration restrictions (Zou, 2018). When variables with different degrees of integration

come together, the new combination has an integration that is equal to the greatest degree. That is, when two variables with I(1) are linearly combined, the new combination will be I(1).

If for i=1,2,3...k, $X_{i,t} \sim I(d_i)$, then each of the *k* variables is integrated at level d_i.

$$Z_t = \sum_{i=1}^{k} \alpha_i X_{i,t} \tag{2}$$

A linear combination of *k* variables is then X_i in the context of Z_t. Rearrangement:

$$X_{1,t} = \sum_{i=2}^{k} \beta_i X_{i,t} + Z'_t \tag{3}$$

Here $\beta_i = \frac{\alpha_i}{\alpha_1}, Z'_t = \frac{z_t}{\alpha_1}, i = 2,\ldots\ldots k$. Generally, if x_i's are I(1), z'_t will be non-stationary (Brooks, 2008; 336-337). The cointegration testing approach based on the Vector Error Correction Model proposes a function as follows:

$$\Delta Z_t = \prod_0 d_t + \sum_{j=0}^{p-1} \prod_j \Delta Z_{t-j} + \alpha\beta^T Z_{t-p} + \varepsilon_t \tag{4}$$

Here $\Delta Z_t = Z_t - Z_{t-1}$, and d_t is the vector of deterministic variables. The most confusing question in cointegration tests is whether it is healthy to estimate the variables in levels or to estimate the variable levels in logarithmic order. According to Hendry and Juselius (2000), if the variables are cointegrated in level, they are also cointegrated in logarithmic order.

The VECM model is a system that detects long-run deviations between variables. The VECM model for cointegrated data is based on the Engle and Granger (1987) error correction theory. If there is cointegration between series, the dynamic relationship between these series is examined with the VECM model. A three-variable error correction function is formed as follows:

$$\Delta y_t = \beta_1 \Delta x_t + \beta_2 \Delta w_t + \beta_3 \left(y_{t-1} - \gamma_1 x_{t-1} - \gamma_2 w_{t-1} \right) + \varepsilon_t \tag{5}$$

In error correction theory, if the data in a dynamic linear model with non-stationarity structure are I(1), the variables are expected to be cointegrated at degree (1,1). VECM models provide a flexible framework for analyzing the dynamic interactions between multiple variables. The model's structure allows for the examination of both contemporaneous and lagged relationships, enabling researchers to identify causal pathways and feedback effects. This is particularly valuable in macroeconomic analysis, where complex interdependencies between variables are often observed. Furthermore, VECM models can be used to forecast future values of the variables. By estimating the model's parameters and incorporating information on past values, researchers can generate predictions that account for both the long-run equilibrium relationships and the short-run dynamics. This forecasting capability is essential for policymakers and businesses alike, as it provides valuable insights into future economic conditions.

However, it is important to note that constructing VECM models requires careful consideration of several factors. First, the variables must be cointegrated, meaning that there exists a long-run relationship between them. This can be tested using various statistical techniques, such as the Johansen test. Second, the appropriate lag order for the model must be determined. This can be done using information criteria, such as the Akaike Information Criterion (AIC) or the Bayesian Information Criterion (BIC). Finally, the model's adequacy should be evaluated using diagnostic tests to ensure that the residuals are serially uncorrelated, normally distributed, and homoscedastic.

3.3. Variance Decomposition and Impulse-Response Analysis

Once we estimate the VAR model, we can use variance decomposition to analyze the sources of variability in the dependent variable. This technique helps us quantify how much of the future forecast errors (how much the actual values deviate from the predictions) for each variable are explained by its lagged values, compared to the influence of other variables in the model. Moreover, impulse response analysis and variance decomposition are often used in conjunction. IRFs reveal the dynamic nature of the response, while variance decomposition helps quantify the relative importance of each shock in explaining the variability. In particular, variance decompositions offer a different way to examine variable structures in the VAR method.

Briefly, variance decomposition is a statistical technique that allows researchers to break down the variance of a variable (such as the return of a stock index) into the contributions of different factors. This is useful for understanding what factors are most important for driving the movement of the variable. This combined approach provides a comprehensive understanding of how shocks propagate through the system and influence the behavior of individual variables.

4. RESULTS OF ANALYSIS

Between 2019 and 2023, Turkey experienced a period of economic growth characterized by a surge in several key indicators (Figure 4):

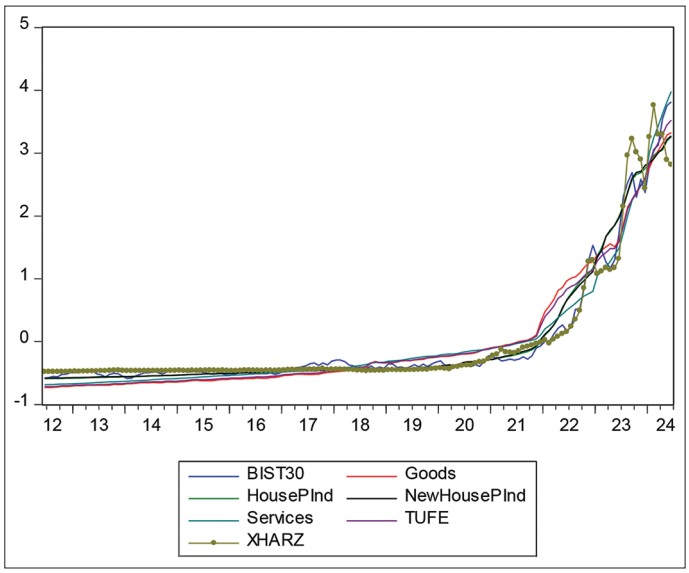
- House Prices: Both all-house and new-house prices experienced significant increases.
- Borsa Istanbul: The Turkish stock market index, Borsa Istanbul, saw a substantial rise.
- IPOs: The number of initial public offerings (IPOs) grew during this period.
- Inflation: Both headline inflation and goods and services inflation rose.

The Turkish economy has been influenced by a complex interplay of factors, including economic experiments, political influences, and global market dynamics. The dollar-TL exchange rate, M2 money supply, and interest rates on three-month and long-term deposits have consistently increased (Figure 5). However, interest rates have periodically declined due to government-led economic experiments. This has led to a yield curve inversion, where short-

term interest rates have exceeded long-term rates. Contributing factors include the government's unorthodox economic policies and the political climate leading up to and following general elections. Investors have shown a preference for short-term investments due to uncertainty and volatility. Figure 6 presents a trend analysis, derived using Hodrick-Prescott filters, indicating a persistent upward trajectory for the Borsa Istanbul 30 (BIST30) index, the IPO index, and services inflation from 2020 through the projected end of 2024. Despite these upward trends, an examination of return trends for the BIST30 and IPO indices suggests a concurrent decline, potentially reflecting diminished investor interest in equity markets due to competition from rising deposit interest rates. Conversely, the trend for goods inflation exhibits a downward pattern, indicative of moderating inflationary pressures. This deflationary tendency is further corroborated by declining trends observed in both new and existing house price indices over the same period.

The overall trend observed is with most indicators showing an upward trajectory over time. However, there are also fluctuations and cyclical patterns evident in some indicators, like the House Trend and New House Trend exhibit a cyclical pattern with rising periods followed by periods of decline. The Repo Trend, on the other hand, shows a more stable trend with a gradual upward slope. These findings suggest a complex interplay of economic factors influencing the behavior of these indicators.

Figure 4: Post Covid-19 Markets and Inflation Trend in Turkiye



The VECM analysis for RBIST30 suggests that the dynamics of Borsa İstanbul returns are primarily driven by their own historical values, indicating a strong degree of autocorrelation. However, the model also highlights the significant influence of short-term interest rates and new house price inflation on Borsa İstanbul returns. These findings imply that changes in monetary policy and shifts in the housing market exert substantial pressure on stock market performance, suggesting a complex interplay between financial and economic factors. Consequently, The VECM analysis for HOUSEINF suggests house inflation is primarily driven by its own historical values, indicating a strong degree of autocorrelation however the influence of headline inflation and Borsa İstanbul returns increase significantly in the upcoming periods while impact of new house prices decrease (Figure 7).

If we breakdown headline inflation to goods and services inflation and include in to the model in this way, the VECM analysis reveals that Borsa İstanbul returns are predominantly determined by their own past values, indicating a significant degree of persistence. While short-term interest rates and new house price inflation emerge as the most influential exogenous variables, the disaggregation of inflation into goods and services components reveals a substantial collective impact of both on BIST30, suggesting that the breaking down the inflation types plays a more critical role in shaping stock market returns than headline inflation alone. Interestingly, The VECM analysis for HOUSEINF suggests house inflation is primarily driven by goods inflation rather than its own historical values. Moreover, the influence of money supply and new house prices decrease while Borsa İstanbul returns increase significantly in the upcoming periods (Figure 8).

The VECM analysis suggests that the IPO index returns are primarily driven by their own historical values, indicating a strong degree of autocorrelation. This pattern implies that past performance significantly influences future trends in IPO returns. Moreover, the model identifies short-term interest rates and new house price inflation as significant exogenous variables influencing IPO returns. This suggests that changes in monetary policy and housing market dynamics exert a substantial impact

Figure 5: Money market and ınterest rates developments

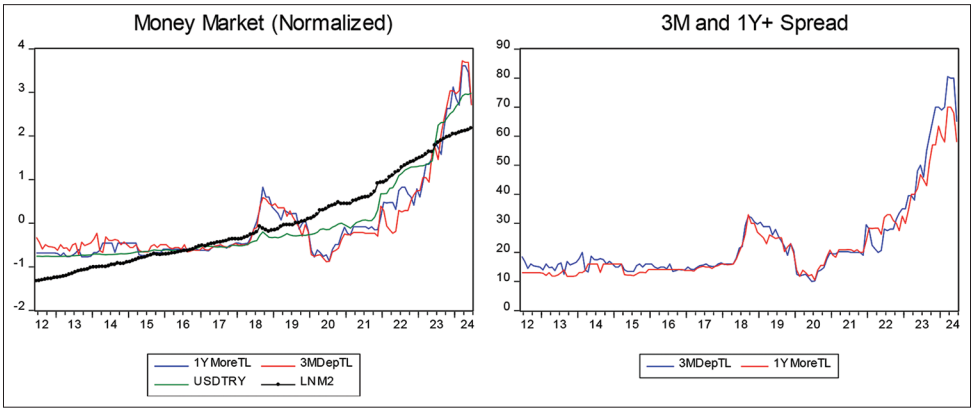


Figure 6: Post Covid-19 market trends

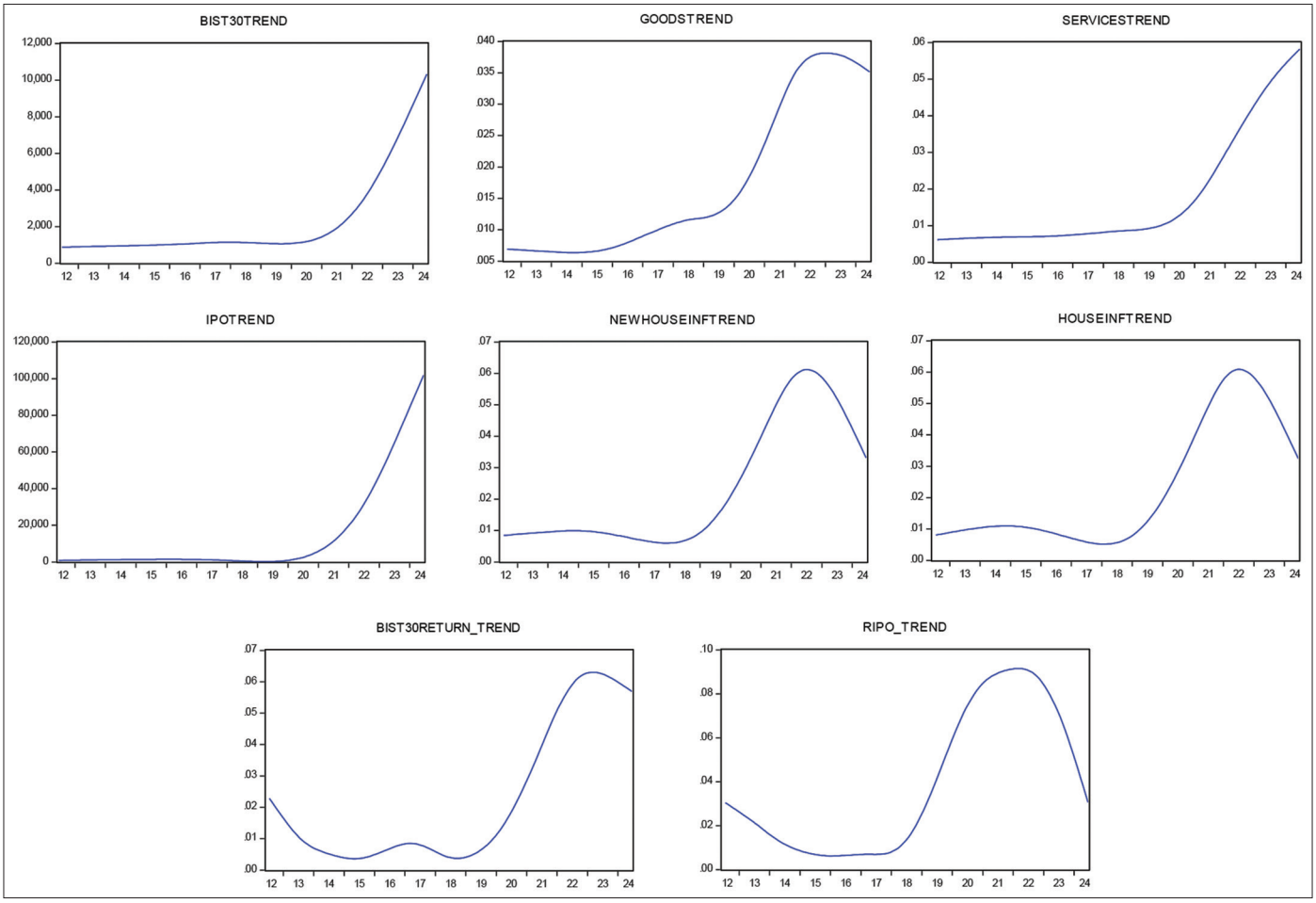
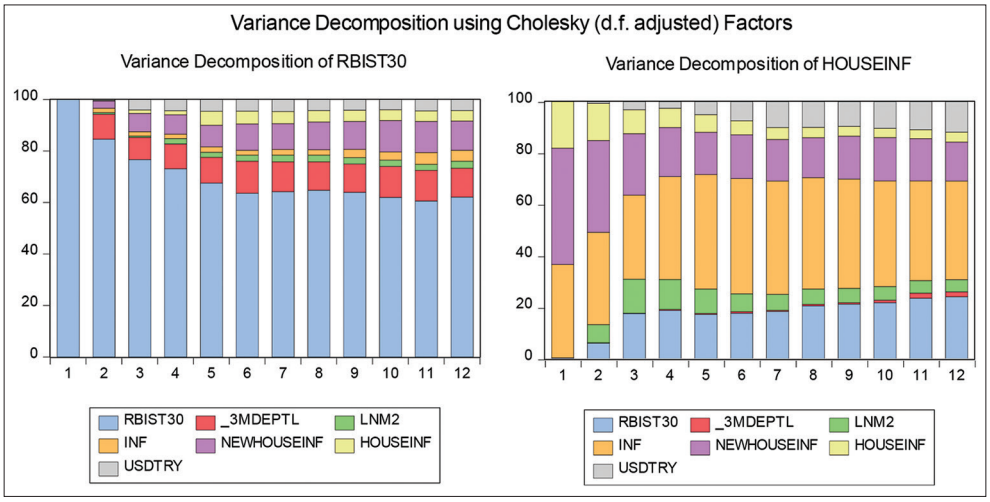


Figure 7: Variance decomposition graph for borsa istanbul 30 index and house inflation



on the performance of IPOs. Moreover, The VECM analysis for HOUSEINF suggests house inflation is primarily driven by headline inflation as well as its own historical values. Interestingly, the influence of money supply decreases, and IPO index returns have no significant impact (Figure 9).

If we breakdown headline inflation to goods and services inflation and include into the model in this way, the VECM analysis suggests that the IPO index returns are primarily driven by their own historical values, indicating a significant degree of autocorrelation. While short-term interest rates and new house price inflation emerge as the most influential exogenous variables, the disaggregation of inflation into goods and services reveals that services inflation exerts a more pronounced impact on IPO returns than overall headline inflation. This finding suggests that the dynamics of services inflation, rather than goods inflation, are more

Figure 8: Variance decomposition graph for borsa istanbul 30 index and house inflation

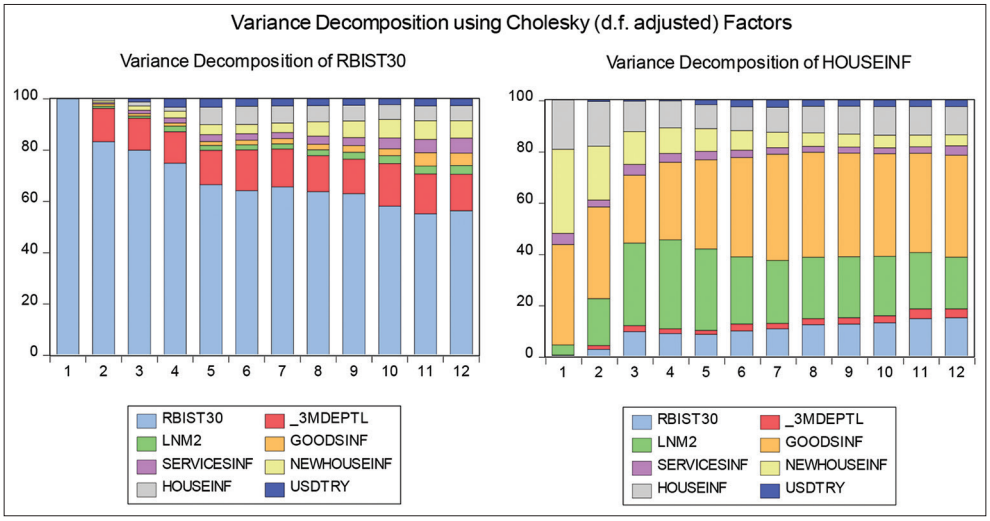


Figure 9: Variance decomposition graph for IPO Index and house inflation

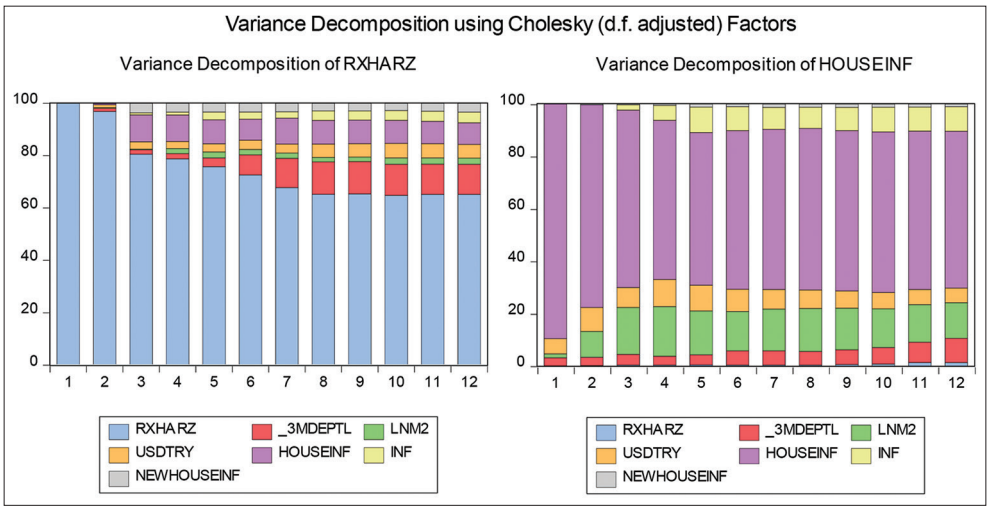
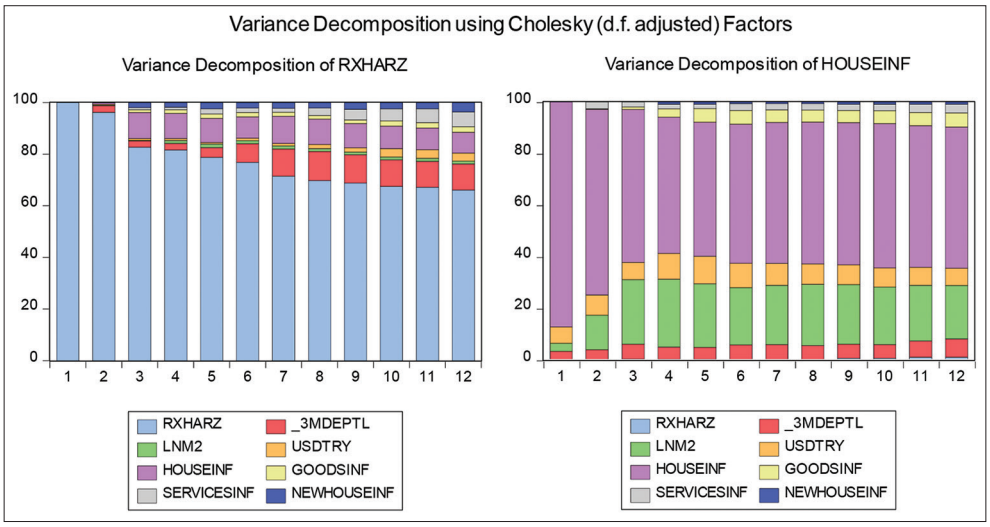


Figure 10: Variance decomposition graph for IPO index and house inflation



closely linked to the performance of IPO markets. Interestingly, The VECM analysis for HOUSEINF suggests house inflation is primarily driven by goods inflation rather than its own historical values. Moreover, the influence of money supply and new house

Figure 11: CUSUM squares for Borsa Istanbul 30 index

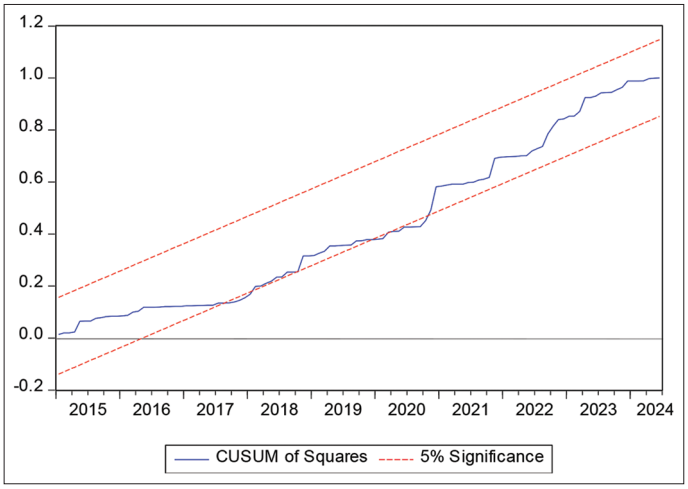
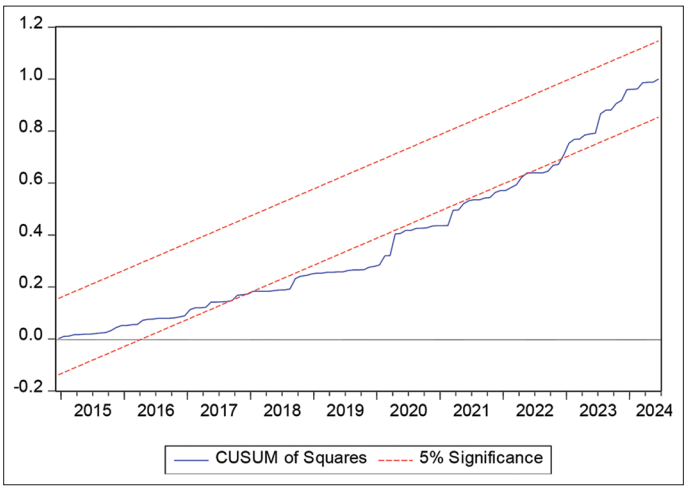


Figure 12: CUSUM squares for IPO index



prices decreases, and IPO index returns have no significant impact (Figure 10).

While residual normality tests and cointegration tests indicate statistical validity, the CUSUM of squares test, which is sensitive to structural changes or non-linearities, does not reveal a significant departure from stability between 2019 and 2023 for BIST 30 (Figure 11).

While residual normality tests and cointegration tests indicate statistical validity, the CUSUM of squares test, which is sensitive to structural changes or non-linearities, reveals a significant departure from stability between 2018 and 2023 for IPO index returns (Figure 12).

5. CONCLUSION

The findings of this study offer valuable insights into the intricate relationship between inflation, interest rates, and stock market performance in Turkey during the post-pandemic period of heightened inflationary pressures. By disaggregating headline inflation into its constituent components of goods and services inflation, the analysis reveals a nuanced picture of how these variables interact to shape stock market returns. One of the key findings is the significant impact of goods inflation on house price inflation. This suggests that the rising costs of goods, particularly essential commodities, have a direct bearing on the housing market. This is consistent with the broader economic trend where inflation erodes purchasing power, making it more expensive to acquire assets like real estate.

Another noteworthy finding is the differential impact of goods and services inflation on stock market returns. While goods inflation appears to have a more pronounced impact on house price inflation, services inflation seems to be a more influential factor for IPO returns. This suggests that the dynamics of the service sector, which is often more closely tied to domestic economic conditions, play a crucial role in shaping the performance of newly listed companies.

The analysis also highlights the importance of monetary policy in influencing asset prices. Short-term interest rates emerge as a key driver of both stock market and house price inflation. As interest rates rise to combat inflation, the cost of borrowing increases, which can dampen economic activity and, consequently, asset prices. However, the impact of monetary policy can be complex and multifaceted, as it can also affect investor sentiment and risk appetite. The study's findings have important implications for investors, policymakers, and researchers. For investors, understanding the interplay between inflation, interest rates, and asset prices can help them make informed investment decisions. By identifying the factors that drive asset prices, investors can better position their portfolios to weather economic storms and capitalize on opportunities.

For policymakers, the study underscores the importance of effective monetary policy in managing inflationary pressures. By carefully calibrating interest rate policy, policymakers can help to stabilize the economy and prevent excessive price increases. Additionally, policymakers may need to consider the impact of their policies on different sectors of the economy, as the effects of monetary policy can vary across different asset classes and industries.

For researchers, this study provides a foundation for further exploration of the relationship between inflation, interest rates, and asset prices. Future research could delve deeper into the mechanisms through which these variables interact, such as by examining the role of expectations and uncertainty. Additionally, researchers could explore the implications of different inflation targeting frameworks and the impact of fiscal policy on asset prices. While this study offers valuable insights, it is important to acknowledge its limitations. The analysis is based on a relatively short sample period, which may limit the generalizability of the findings. Additionally, the study focuses on a specific country, Turkey, and may not be directly applicable to other economies with different economic structures and policy frameworks.

Despite these limitations, this study represents a significant contribution to the literature on the relationship between inflation, interest rates, and asset prices. By providing empirical evidence

on the impact of these variables on the stock market and house price inflation, the study offers valuable insights for investors, policymakers, and researchers. As the global economy continues to evolve, it is imperative to conduct ongoing research to better understand the complex dynamics of inflation and its implications for financial markets and economic growth.

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