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VOLATILITY DYNAMICS: INTEREST AND EXCHANGE RATE EFFECTS ON BIST-100 RETURNS PERFORMANCE*

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Abstract

This research empirically analyses the dynamic effect of interest rate and exchange rate volatilities on BIST stock returns, elucidating how fluctuations in these rates influence market performance. Specifically, the analysis uses monthly panel data from BIST-100 companies between July 2012 and June 2023, applying ARCH and GARCH estimation methods. In addition, returns of stocks trading at the BIST-100 index are obtained. The findings reveal significant linkages between these variables: stock market returns, interest rate and exchange rate volatilities. It was determined that the majority of stocks trading in the BIST-100 were significantly affected by interest rates and exchange rate volatilities. In particular, the BIST-100 return index was negatively affected by interest rate changes and positively affected by exchange rate volatility. The results obtained reveal the high volatility of BIST as an emerging market stock market and contribute to the literature. It is anticipated that the results of the research will also guide investors and policymakers, and provide a thorough assessment of their impact in the context of an emerging market economy.

Keywords: Interest Rate, Exchange Rate, Volatility, ARCH-GARCH, Turkish emerging market.

JEL Classification: C22, C32, G15

OYNAKLIK DİNAMİKLERİ: FAİZ VE DÖVİZ KURUNUN BIST-100 GETİRİ PERFORMANSI ÜZERİNDEKİ ETKİSİ

Öz

Bu çalışma, faiz oranı dalgalanmaları ve döviz kuru oynaklıklarının BIST pay senedi getirileri üzerindeki dinamik etkilerini ampirik olarak analiz ederek, bu değişkenlerdeki dalgalanmaların piyasa performansını nasıl etkilediğini incelemektedir. Analizde, BIST-100 şirketlerine ait Temmuz 2012-Haziran 2023 dönemi aylık panel verileri kullanılmış ve ARCH ile GARCH tahmin yöntemleri uygulanmıştır. Ayrıca, BIST-100 endeksinde işlem gören pay senetlerinin getirileri de dikkate alınmıştır. Bulgular, borsa getirileri ile faiz oranı ve döviz kuru oynaklıkları arasında anlamlı ilişkiler olduğunu ortaya koymaktadır. Çalışma, BIST-100 endeksinde işlem gören pay senetlerinin büyük bir kısmının faiz oranı ve döviz kuru oynaklıklarından önemli ölçüde etkilendiğini göstermektedir. Özellikle, BIST-100 getiri endeksinin faiz oranı değişimlerinden olumsuz, döviz kuru oynaklığından ise olumlu etkilendiği gözlemlenmiştir. Bu bulgular, Türkiye'nin gelişmekte olan piyasasında mevcut olan yüksek oynaklığı vurgulamaktadır. Çalışmanın sonuçları, Türkiye ekonomisindeki uzun vadeli yatırım fırsatlarına ve etkin sermaye yapılındırmasına dair önemli ipuçları sunmakta olup, yatırımcılar ve politika yapıcılar için değerli bilgiler sağlamaktadır. Bu dinamikleri anlamak, yatırımcıların ve politika yapıcıların değişken finansal ortamda bilinçli ve stratejik kararlar almasına yardımcı olabilir.

Anahtar kelimeler:Faiz oranı, Döviz kuru, Volatilité, ARCH-GARCH, Türkiye gelişmekte olan piyasalar.

JEL Kodları: C22, C32, G15

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1.INTRODUCTION

Financial markets are often subject to various shocks and downturns, prompting critical examination of the stability and resilience of the global financial system (Liang and Wei, 2012; Caggiano and Castelnovo, 2023). As a critical component, the equity market performs an indispensable function in sustaining the financial system (Ho et al., 2013; He and Wei, 2023). It is susceptible to adverse shocks and downturns, which generate periods of turbulence within the financial system. Such market turbulence is closely linked to increased risk and uncertainty, both of which significantly affect stock trading performance. Particularly, the risk profile of stocks can fluctuate over time, prompting investors to adjust their required rates of return in the stock market (Brown et al., 1993; Liang and Wei, 2012; Rashid and Aib, 2021; He et al., 2023; Li et al., 2023).

Common stocks are substantially impacted by the fundamental dynamics—interest rate and exchange rate volatilities—which represent key economic and financial risk factors (Okoli, 2012). The fluctuating interest rates policy changes by central banks (Akşehirli, 2024; Kanat, 2024), along with currency fluctuations (exchange rate changes) within financial markets, which have imposed a deleterious effect on the stock market's functioning. Particularly, inappropriate policy implementations have been identified as contributing factors to the negative performance and crises in the equity market (Caggiano et al., 2017; Guo et al., 2020). In addition, the detrimental impacts of interest rate and exchange rate instabilities have been identified as principal factors contributing to the equity market downturns (Osazevaru, 2021; Sezal and Kendirli, 2024). These impacts on the stock markets have elicited significant concern among regulatory authorities, market participants, financial institutions, banking professionals, and the scholarly community (Kasman et al., 2011).

Exchange rate volatility denotes the sustained variability and fluctuation in exchange rates over time, which accordingly influences investment and growth through various channels (Morina et al., 2020). Significantly, the high volatility and continues instability in exchange rates; in particular, lead to a contraction in global trade volume and overall economic expansion (Ozata, 2020). On the other hand, interest rate is recognized as a key macroeconomic variable exerting a direct influence on economic growth (Alam and Uddin, 2009). Hyde (2007) illustrates that exchange (or interest) rate exposure pertains to the degree to which variations in the exchange (or interest) rate exert a profound effect on the company's valuation.

Numerous theoretical and empirical researches have explored how stock returns react to the dynamic changes in interest rates (Flannery and James, 1984; Choi et al., 1992; Khan and Mahmood, 2013; Ferrer et al., 2016) and exchange rate volatility (Malik, 2021; El-Diftar, 2023). The Intertemporal Capital Asset Pricing Model (ICAPM) posits that investors actively hedge their positions against potential risks. The fluctuations in interest rate, representing shifts in the investment opportunity set; introduce the interest rate risk that can be incorporated as an additional market factor in the Intertemporal Capital Asset Pricing Model. As a result, investors typically demand higher compensation for assuming the risk associated with interest rate volatility (Merton, 1973). This expanded model highlights the role of interest rate changes in influencing investment decisions and asset pricing.

Furthermore, the Arbitrage Pricing Theory (APT), advanced by Roll and Ross (1984) and later expanded by Burmeister and Wall (1986), argues that investors prioritize portfolios offering superior hedges against adverse shifts in risk factors. This theory helps explain whether interest rate risk (Yourougou, 1990) or exchange rate risk (Wetmore, 1994) serves as a significant pricing factor in equilibrium stock valuation. In this context, risk-averse investors make portfolio decisions based on the covariance between portfolio returns and various market factors, including interest rate and exchange rate fluctuations. As a result, they tend to prefer portfolios that provide stronger hedging against unfavourable shifts in these risk factors, thereby minimizing exposure to potential downturns in the market. These studies collectively provide an in-depth analysis of the financial factors shaping stock market valuation and investment behaviour.

Theoretically, share prices and interest rates are inversely related. While investors typically seek to invest in efficient markets, a small number of skilled investors may achieve excess profits when public confidence declines in inefficient markets (Butler and Mailaikhah, 1992). The reduction in interest rates by the central bank often triggers a reallocation of capital from banking institutions to the stock market, with the reverse occurring when rates are increased. A reduction in interest rates stimulates lending, which, in turn, boosts investment levels in the economy. This heightened investment activity exerts upward pressure on prices of shares, fueling their growth (Alam and Uddin, 2009). Correspondingly, interest rates and exchange rates are closely interrelated, with a well-documented correlation between the two. Specifically, central bank interest rate adjustments have a direct impact on inflation and currency valuation (Joseph and Vezos, 2006). When the Central Bank of Türkiye (TCMB) lowers interest rates, resulting in domestic rates falling below foreign rates, capital outflows ensue (López-Mejía, 1999). This reduction in demand for the national currency leads to its depreciation (Saraç and Karagöz, 2016). Considerably, attracting significant foreign investment is less effective with lower borrowing costs (Gumus, 2015; Kanat, 2024).

The opening of the stock market significantly facilitates the rise in global portfolio investment. Nevertheless, this expansion is generally accompanied by pronounced stock price volatility. Despite the fact that many stocks underperform the market portfolio and are highly susceptible to market risk during financial crises, certain stocks demonstrate comparatively strong performance (Cao and Petrasek, 2014). Several researches have focused on the interconnection between interest rates, exchange rates, and stock market dynamics. Okoli (2012) investigates how interest rates and exchange rates influence the Nigerian stock market performance. By employing the All-Share Index as a market proxy, the findings indicate that significant increases in exchange rates and interest rates lead to a reduction in stock market returns, which in turn dampens the overall market activity. In terms of the long run, Muktadir-al-Mukit (2012) and Khalid (2017) demonstrate that stock prices are negatively influenced by interest rates, whereas exchange rates contribute positively to stock price movements. Sreenu (2023) illustrates a substantial, enduring link between exchange rates and overall market outcomes. Alternatively, Naidoo et al. (2024) explore the differential effects of exchange rate fluctuations on market prices. Their study documents that increased fluctuations in exchange rates contribute to higher volatility in the stock market, suggesting that exchange rate volatility has a constrained impact on market prices.

Considering the international market, Hyde (2007) investigates the reaction of sector-specific equity returns to the risks of interest rates and exchange rates across four leading countries of Europe, highlighting susceptibility to risks associated with exchange rate and interest rate fluctuations. In the same line, Alam and Uddin (2009) examine the market efficiency of fifteen countries through an analysis of how changes in interest rates influence equity valuations. They provide evidence for the negative linkage between equity valuations and interest rate dynamics, considering the returns to be the determinant of the market efficiency.

Equity markets are marked by intense fluctuations in the emerging economies (De Santis, 1997; Xu, 1999; Karanasos et al., 2022) and pronounced susceptibility to external disturbance (Conrad and Karanasos, 2010; Conrad and Loch, 2015). Akkaya (2021) studies the volatility spread in eight emerging markets and provides evidence that stock markets of the European region have no significant effect on the emerging economies.

Considering Türkiye as a developing country, the exchange rate is more closely related to stock prices and stock returns in the market (Kılıç et al., 2023). Ouattara (2023) analyses the profound effect of exchange rate fluctuations on global trade dynamics and finds that interest rates have a considerable negative impact on the returns, though their effect on volatility is comparatively limited. Similarly, Çelik (2020) has analysed how exchange rates, interest rates, and market risk factors influence the equity performance of insurance firms traded on the Turkish stock market.

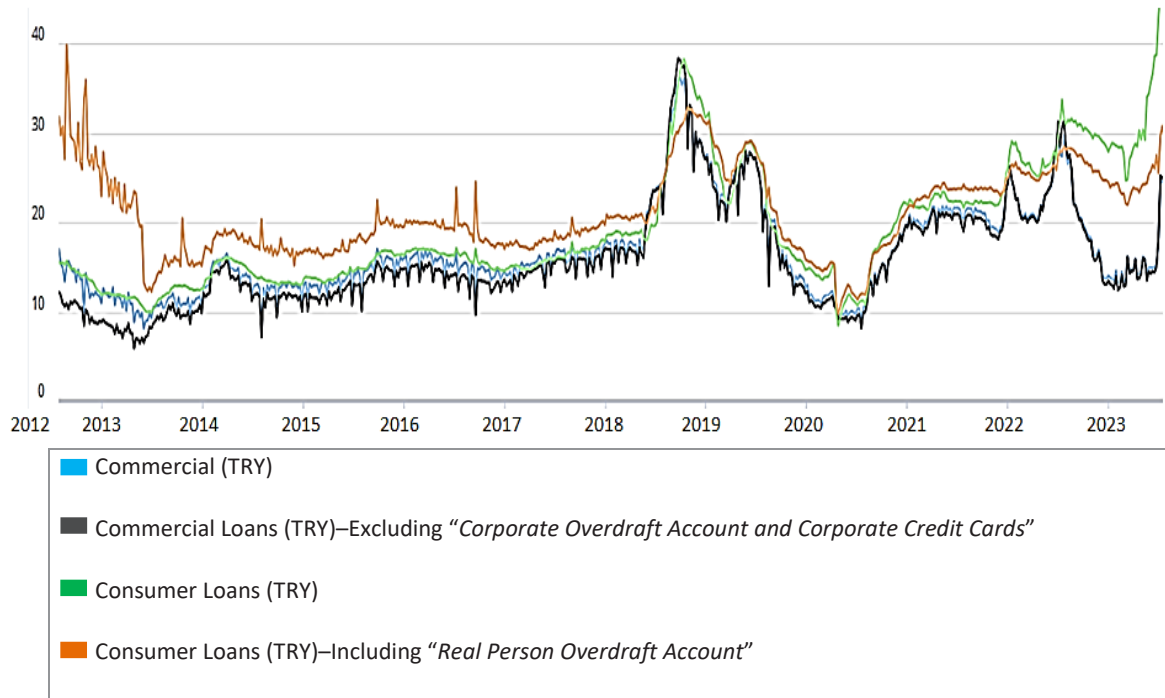


Figure 1. TRL Loans Interest rates changes from July 2012 to June, 2023.

Source: EVDS Data Central (TCMB), 2023.

The aforementioned studies have provided key insights, clarifying the dynamics of both interest rate fluctuations and exchange rate volatility. Figure 1 illustrates the variation of interest rates in Türkiye over the period from July 2012 to June 2023. As shown, the interest rate exhibited a sharp decline followed by a significant increase during the period from 2013 to 2014. Following the 2018 crisis, Türkiye has witnessed fluctuations in interest rates, characterized by both upward and downward movements.

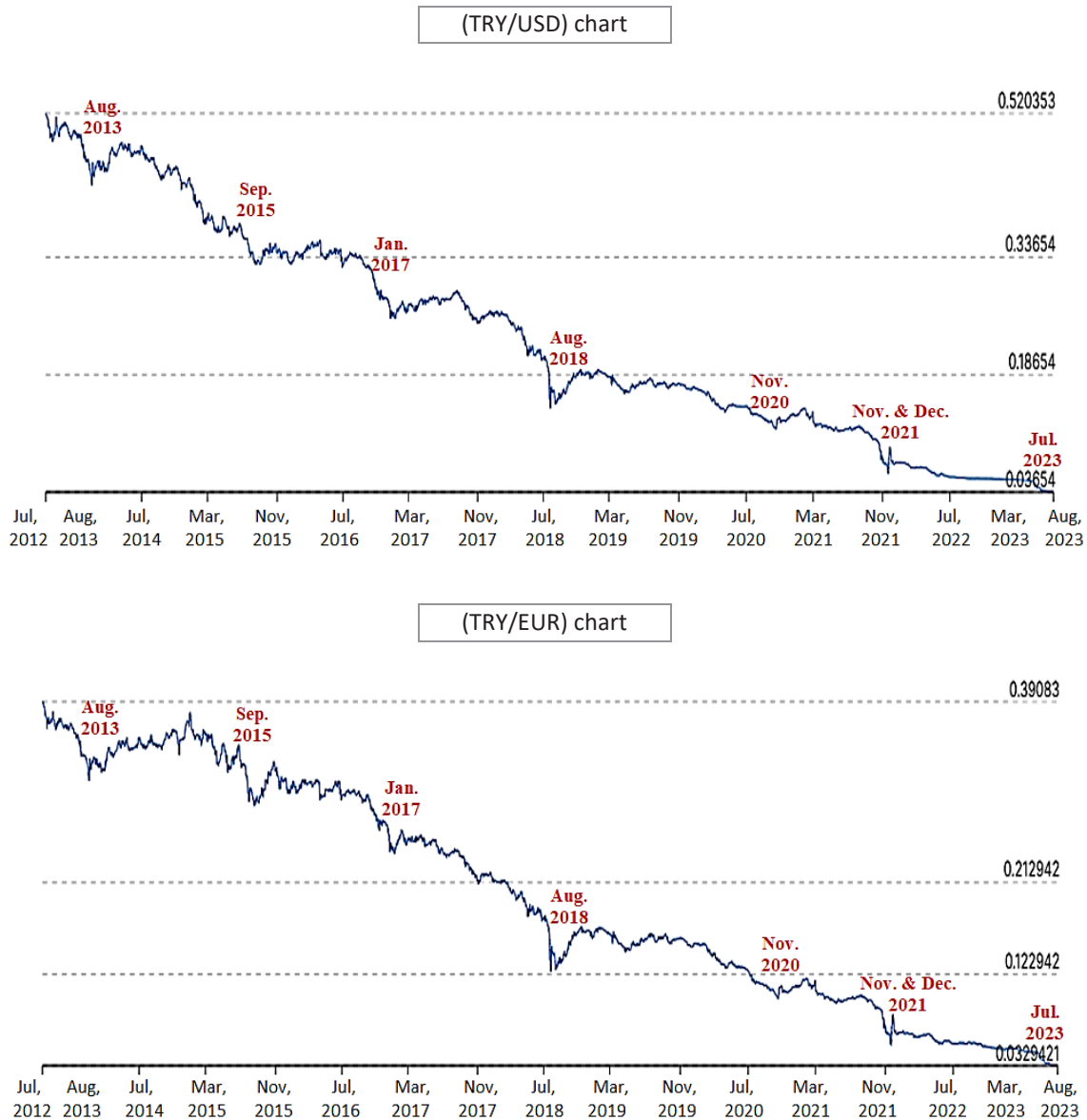


Figure 2. Exchange rates (TRY/USD) and (TRY/EUR) fluctuations in Türkiye.

Figure 2 illustrates the movements of exchange rates in Türkiye, in terms of US dollar and Euro; between July 2012 and June 2023. Particularly, the Turkish lira experienced considerable fluctuations throughout this period, with varying levels of intensity. The figures highlight significant volatility in the Turkish lira, especially throughout the last decade; where the currency experienced prominent fluctuations during the critical periods, including August 2013, September 2015, January 2017, August 2018, November 2020, November and December 2021, and July 2023.

Extensive research has investigated how interest rates and exchange rates influence stock market performance (Kasman et al., 2011; Blau, 2018; You and Liu, 2020). As an illustration of analysing the interest rate volatility power over equity returns, Aljarayesh et al. (2018) suggest that interest rates have a substantial negative impact on stock prices in the long term. Kennedy and Nourizad (2016) further conduct an empirical analysis of the impact of US/EUR exchange rate volatility on the volatility of US stock market returns. In addition, Çetiner et al. (2018) explore the influence of exchange rate risk on stock index return volatility across 22 emerging markets, finding that exchange rate volatility negatively affects stock index returns. In the context of short-term consequences, over the last two decades, the short-term interest rate has served as a primary tool of monetary policy in Türkiye (Saraç and Karagöz, 2016).

In recent years, Türkiye has been grappling with a series of interrelated political, economic, and financial instabilities, which have had a profound impact on the country's overall stability and growth prospects (Erdaş, 2022). For instance, the Turkish central bank's (TCMB) implementation of new economic policies (Kanat, 2024), coupled with the war on terror (Gok et al., 2020), high levels of debt (Eğrican et al., 2022), and persistent financial market turbulence, has led to significant and sustained fluctuations in the Turkish lira (Hadi et al., 2023). As a result, the volatility of the Turkish lira has exerted a detrimental effect on the equity market returns in Türkiye. Additionally, while there is a substantial body of literature on developed financial markets, research concerning emerging markets remains comparatively underexplored. Specifically, following the 2008 financial crisis, a significant body of research has emerged examining the volatility in Türkiye's stock market, particularly through the application of GARCH models. Nevertheless, much of the literature extends beyond merely examining the direct impact of volatility, also addressing the diverse shocks that contribute to fluctuations in the Turkish stock market (Abou-Zaid, 2011; Dedi and Yavaş, 2016; Bala and Takimoto, 2017; Akkaya, 2021). Other studies have explored the dynamics volatility of interest and exchange rates on the returns of Turkish stock market, with a specific focus on financial institutions, particularly the stock prices of banks (Kasman et al., 2011; Sezgin Alp et al., 2024; Kanat, 2024). In contrast, Çelik (2020) has focused on the volatility of Turkish insurance companies. Within this framework, our study contributes to the emerging market literature by examining the response of equity returns in the Turkish stock market, with a specific emphasis on companies included in Istanbul stock market.

In addition, the stock market of Türkiye exhibits substantial growth volatility (Sezgin Alp et al., 2024), fluctuations in real interest rates (Sezal and Kendirli, 2024), and pronounced exchange rate instability (Akkaya, 2021; Burgaç Çil and Biçer, 2024). Therefore, our study contributes to the existing body of literature by evaluating the extent of volatility in the Turkish emerging market, as heightened volatility amplifies the necessity of measuring risk to effectively mitigate potential threats. Further, the volatility results can be used by investors for the valuation of stocks and by policymakers to evaluate the fragility of financial markets (Gençyürek, 2024). The Turkish emerging market offers a particularly relevant and compelling case for this study, given its unique characteristics of high volatility and significant market fluctuations, making it an ideal context for examining risk and return dynamics.

While numerous studies have examined the impact of interest and exchange rates on stock market volatility using GARCH models, research specifically focusing on the BIST-100 index remains limited. This study contributes to the literature by employing an extended set of econometric tests to justify the selection of the variance model and by considering alternative GARCH specifications. Additionally, it explores the nature of volatility in the Turkish stock market, an aspect that has not been sufficiently analysed in prior studies. These enhancements allow for a more comprehensive understanding of volatility dynamics in the Turkish emerging market.

Thus, this study aims to explore how the interest and exchange rate dynamics affect the return performance in the Turkish stock market. This empirical analysis utilizes a monthly unbalanced panel dataset of BİST-100 listed firms, covering the period between July 2012 and June 2023, and applies the ARCH and GARCH models to capture and analyse the volatility dynamics in the Turkish emerging market. Specifically, this study explores the interdependent relationship between stock market returns, interest rates, and exchange rate volatility, highlighting the intricate three-way linkage among these variables. Hence, this study aims to rigorously examine the following hypotheses:

Hypothesis 1: H_0 : *Interest and exchange rate dynamics exert a significant influence on market returns in Türkiye*

Hypothesis 2: H_0 : *Interest rate fluctuations exhibit a negative impact on market returns.*

Hypothesis 3: H_0 : *Exchange rate volatility exhibits a positive impact on market returns.*

Our findings indicate that stocks listed in the BIST-100 are significantly influenced by both interest rates and exchange rate volatility. Significantly, the fluctuations in interest rates exert a detrimental effect on the BIST-100 returns index, whereas exchange rate fluctuations exert a favorable impact on the Turkish returns.

The remainder of the paper is organized as follows: Section 2 outlines the methodology employed in the empirical analysis. Section 3 provides a description of the data and its sources. Section 4 presents and discusses the results and findings, while Section 5 concludes the study.

2.METHODOLOGY

In order to ensure the appropriateness of the GARCH model, we conducted an ARCH-LM test, which confirmed the presence of heteroscedasticity in the residuals, necessitating the use of an ARCH–GARCH framework. The ARCH is as follows:

$$\begin{aligned} R_t &= \gamma_0 + \gamma_1 INT_t + \gamma_2 ER_t + \varepsilon_t \\ \sigma_t^2 &= \alpha_0 + \alpha_1 \varepsilon_{t-1}^2 + \varepsilon_t \end{aligned} \quad (1)$$

where the parameters are: R_t is the market returns that is considered to reflect economy-wide factor. INT_t is the monthly change in interest rate, ER_t represents the exchange rate changes; is the intercept term—ARCH parameter, capturing the impact of past squared shocks— and ε_t is the error term (with the assumption of *iid* condition).

We follow Bollerslev (1986) in estimating the generalized autoregressive conditional heteroscedasticity (GARCH) process. The GARCH (1,1) process is specified as follow

$$\begin{aligned} R_t &= \gamma_0 + \gamma_1 INT_t + \gamma_2 ER_t + \varepsilon_t \\ \sigma_t^2 &= \alpha_0 + \alpha_1 \varepsilon_{t-1}^2 + \beta \sigma_{t-1}^2 + \varepsilon_t \end{aligned} \quad (2)$$

Where β is the intercept term—GARCH parameter, capturing the impact of past variance.

To analyse whether interest rate and exchange rate volatilities have any impact on the stock market returns in *Borsa Istanbul* (BIST-100 index),

$$\begin{aligned} R_t &= \gamma_0 + \varepsilon_t \\ \sigma_t^2 &= \alpha_0 + \alpha_1 \varepsilon_{t-1}^2 + \beta \sigma_{t-1}^2 + \theta_1 INT_t^2 + \theta_2 ER_t^2 \end{aligned} \quad (3)$$

where α_1 and θ_1 are used to measure the interest rate and exchange rate return volatilities.

3.DATA DESCRIPTION

This study uses a monthly time series dataset of the BIST-100 index from July 2012 to June 2023. The study draws on interest rate and exchange rate data obtained from the “Elektronik Veri Dağıtım Sistemi” (EVDS), provided by the “Central Bank of the Republic of Türkiye” (TCMB). Moreover, data on market index prices and trading volumes were retrieved from the official “Borsa İstanbul” website to assess the response of Türkiye’s market returns. In addition, monthly interest rates, along with exchange rate data for TRY/USD and TRY/EUR, were sourced from the “Central Bank of the Republic of Türkiye” (TCMB) official website.

We compute the continuously compounded monthly market returns using the following formula: $R_t = \ln(P_t / P_{t-1})$, where P_t refers to monthly index price at time t , and P_{t-1} is the monthly index price at the previous time period $t-1$. A positive change in the (TRY/USD) or (TRY/EUR) exchange rate signifies an appreciation of the Turkish lira, reflecting an increase in its value relative to the US dollar or the Euro. This suggests that an increase in the (TRY/USD) or (TRY/EUR) exchange rate signifies a reduction in the quantity of Turkish lira necessary to obtain a single US dollar or euro, thereby signalling a strengthening of the lira against these foreign currencies.

3.1.Volatility Parameters

Figure 3 provides a comprehensive graphical representation of the BIST-100 index, market returns, interest rates, and the fluctuations in both (TRY/USD) and (TRY/EUR) exchange rates, covering the period from July 2012 to June 2023. The graphical representation distinctly exhibits volatility clustering, a concept defined

by Mandelbrot (1963), where substantial movements in the BIST index are consistently followed by further significant fluctuations, while smaller variations are succeeded by similarly modest changes in the time series data. Brooks (2008) argues that financial time series typically do not follow a normal distribution. That is, the data series represented in our graphical analysis exhibit fat tails, suggesting a higher probability of extreme values compared to a normal distribution. In the presence of volatility clustering, price changes exhibit clear dependencies, indicating that they are not independent from one another. As a result, the characteristics of the time series suggest the application of ARCH-GARCH models, which provide more accurate and unbiased results in capturing the underlying dynamics.

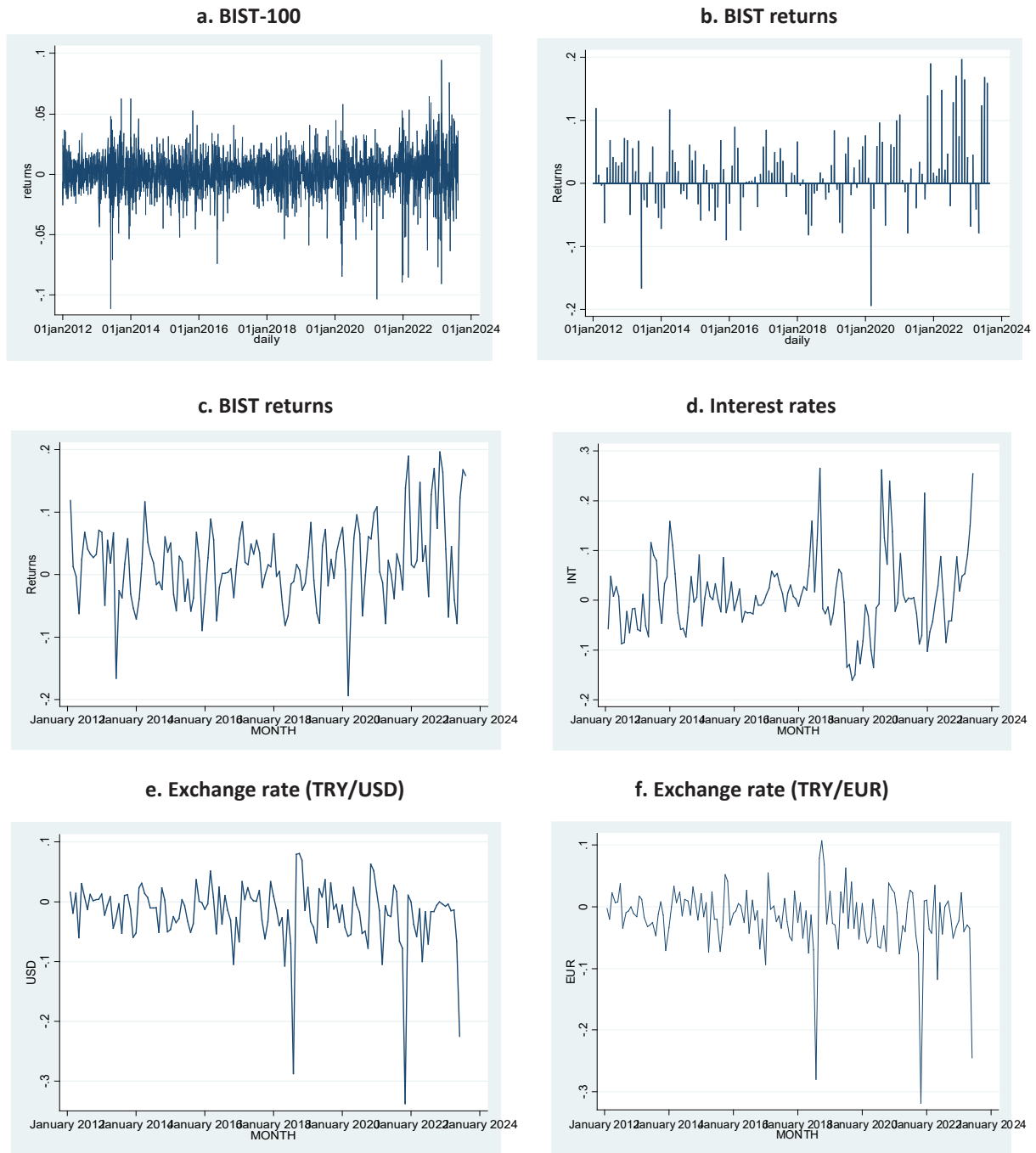


Figure 3. Time series graphics of BIST-100 index, market returns, interest rate and exchange rates

4.1.EMPIRICAL RESULTS AND FINDINGS

4.1.Descriptive Statistics

Table 1 provides a summary of the descriptive statistics for the variables used in our models, including mean, median, standard deviation, skewness, and kurtosis. These statistics offer key insights into the distributional properties of our data. These metrics reveal the distributional characteristics of the data, providing insights into market behaviour and volatility, and help assess central tendency, dispersion, and distribution shape, which are essential for evaluating their impact on the BIST-100 index.

The mean value of the BIST-100 index reflects overall growth and development observed in the market over the analysed period. Additionally, the computed BIST-100 returns' () mean value exhibit positive skewness in the return distribution, as the mean surpasses the median. This suggests that the BIST-100 returns index is characterized by a higher frequency of above-average returns. Similarly, the mean values of the interest rate and exchange rate variables surpass their medians, signalling significant positive skewness in their volatility, and indicating sensitivity to market fluctuations, particularly in lira-denominated trading volumes.

Table 1. Descriptive Statistics

	BIST- 100 index	BIST- 100 Returns	Interest Rate	Interest Rate returns (INT)	(TRY/USD) Exchange rate	(TRY/EUR) return	(TRY/EUR) Exchange rate	(TRY/EUR) return
Mean	1341.3	0.0182	12.112	0.0081	0.2810	−0.1963	0.2329	−0.0180
Median	941.32	0.0165	10.114	0.0011	0.2652	−0.0119	0.2319	−0.0141
Standard Deviation	1218.3	0.0642	4.7701	0.0770	0.1662	0.0555	0.1245	0.0534
Skewness	2.7642	0.1621	0.9158	0.9228	0.2919	−2.7230	0.0734	−2.5283
Kurtosis	10.254	3.9605	3.1842	4.8892	1.8071	15.681	1.6658	14.619

The analysis of variables clearly indicates that the BIST-100 index exhibits the highest standard deviation, highlighting its extreme volatility within the Turkish stock market. This is followed by the interest rate and exchange rate components. The significantly higher kurtosis value strongly indicates for the presence of leptokurtosis, suggesting that the underlying data deviate from a normal distribution and, consequently, implying a higher probability of extreme market movements. This characteristic challenges conventional risk models that assume normality, as such models may underestimate the likelihood of sudden and significant price fluctuations.

4.2.ARCH Estimation

The ARCH model's estimated parameters are presented in Tables 2 and 3. The coefficient , which captures the effect of interest rate changes, is negative but statistically insignificant, suggesting a weak inverse relationship. Additionally, the results indicate a positive correlation between market returns and exchange rate fluctuations, highlighting the impact of exchange rate volatility on stock performance.

Table 2. ARCH model estimation for interest and exchange rate (TRY/USD) volatilities

Empirical Estimation		
Parameters	Coefficients	t-Value
Panel A: Mean equation		
γ_0	0.0197*** (0.0056)	3.50
γ_1	-0.1117 (0.0691)	-1.62
γ_2	0.1087 (0.0990)	1.10
Panel B: Variance equation		
α_0	0.0031***	
α_1	0.1642**	

Note: ***, **, and * represent the 1%, 5% and 10% significance level, respectively.

The ARCH test result indicates moderate evidence of heteroskedasticity, suggesting the presence of conditional variance dynamics in the return series. Given the well-documented volatility clustering in financial markets and the economic relevance of interest rate and exchange rate fluctuations, the GARCH(1,1) model remains an appropriate framework for capturing time-varying volatility. This model selection is further reinforced by its ability to provide robust insights into market risk, investment decisions, and financial stability in the Turkish stock market. The results confirm that GARCH(1,1) provides the best fit for modelling BIST-100 return volatility.

Table 3. ARCH model estimation for interest and exchange rate (TRY/EUR) volatilities

Empirical Estimation		
Parameters	Coefficients	t-Value
Panel A: Mean equation		
γ_0	0.0178*** (0.0056)	3.18
γ_1	-0.1201* (0.0698)	-1.72
γ_2	0.0096 (0.1006)	0.10
Panel B: Variance equation		
α_0	0.0032***	
α_1	0.1275*	

Note: ***, **, and * represent the 1%, 5% and 10% significance level, respectively.

Given the dataset's volatility persistence and significant market fluctuations, GARCH(1,1) effectively captures the conditional variance process. Particularly, the statistical tests confirm that the estimated parameters satisfy stationarity and stability conditions, reinforcing the model's reliability in representing BIST-100 volatility dynamics.

4.3. GARCH Estimation

The GARCH (1,1) model's predicted parameters are rigorously detailed in Tables 4 and 5. The coefficient γ_1 , which quantifies the impact of the interest rate, is significantly negative, indicating a substantial inverse relationship. The results further suggest a statistically robust positive correlation between market returns and exchange rate variability, underscoring the critical influence of exchange rate volatility on market performance.

The findings clearly indicate that the volatilities of interest rates and exchange rates exert a significant influence on the mean equation in our sample, where the primary rationale for the observed negative connection

between market returns and interest rate changes is attributed to the fact that the instability associated with in interest rates affect the valuation of corporate equities by impacting their interest-sensitive income.

Similarly, our results confirm that interest rate fluctuations have a significant negative effect on market returns, reinforcing the theoretical expectation that higher interest rates reduce stock prices by increasing the discount rate applied to future cash flows. From a theoretical perspective, rising interest rates typically exert downward pressure on stock market prices by reducing the present value of future dividend income. This decline in discounted cash flows drives down stock prices, reflecting the adverse effect of higher interest rates on market valuations. Additionally, low interest rates significantly lower the opportunity cost of borrowing, thereby encouraging investment and boosting economic activity. This increased financial momentum leads to rising market prices, reflecting the beneficial effect of reduced rates on the macroeconomic performance (Hamrita and Trifi, 2011).

In the context of financial institutions, rising market interest rates typically have an unfavorable influence on the financial statement of bank and other financial firms. This phenomenon is largely due to the deterioration of borrowers' cash flows, as higher interest rates can strain their financial capabilities and increase the risk of default, ultimately compromising the stability of these institutions (Kasman et al., 2011).

Table 4. Dynamic effect of interest and exchange rates (TRY/USD) volatilities on stock returns

Empirical Estimation		
Parameters	Coefficients	t-Value
Panel A: Mean equation		
γ_0	0.0161*** (0.0061)	2.61
γ_1	- 0.1287** (0.0544)	- 2.38
γ_2	0.1219** (0.0556)	2.21
Panel B: Variance equation		
α_0	0.0025***	
α_1	0.2132*	
β	0.1229**	

Note: ***, **, and * represent the 1%, 5% and 10% significance level, respectively.

In contrast, exchange rate fluctuations have a substantially positive effect on the returns, indicating that volatility in exchange rates directly contribute to the rise in equity returns. This underscores a strong, positive link between exchange rate dynamics and broader market performance. Amid globalization, financial institutions and firms have experienced substantial foreign currency value risk throughout the sample period, which has led to a positive impact on equity market returns (Kasman et al., 2011).

Our findings align with prior research (Gokmenoglu et al., 2021) indicating that exchange rate fluctuations significantly contribute to stock market volatility. However, unlike previous studies, our analysis reveals a stronger asymmetric effect, suggesting that negative shocks in exchange rates have a greater impact on volatility than positive shocks. This emphasizes the need for policymakers to consider currency stability as a crucial factor in financial market regulation. Furthermore, firms in Türkiye may lack comprehensive hedging mechanisms—such as cross-currency swaps, options, and foreign exchange forwards (Choi et al., 1992; Wetmore & Brick, 1994)—to mitigate exchange rate risks, which could further amplify volatility in equity markets.

The intercept in both conditional variance equations is statistically significant and positive, confirming the existence of a substantial time-invariant component within the return-generating process. Furthermore, both parameters and of the ARCH and GARCH meet the non-negativity condition, while their sum is less than 1. This satisfies the requirements for the ARCH and GARCH estimation processes and ensures covariance stationarity in the conditional variance.

Table 5. Dynamic effect of interest and exchange rates (TRY/EUR) volatilities on stock returns

Empirical Estimation		
Parameters	Coefficients	t-Value
Panel A: Mean equation		
γ_0	0.0143** (0.0059)	2.41
γ_1	- 0.1276** (0.0569)	- 2.24
γ_2	0.0626 (0.0575)	1.09
Panel B: Variance equation		
α_0	0.0024***	
α_1	0.2219*	
β	0.1563**	

Note: ***, **, and * represent the 1%, 5% and 10% significance level, respectively.

5.CONCLUSION AND POLICY RECOMMENDATION

This research empirically analyses the dynamic effect of interest rate and exchange rate volatilities on equity returns within the Turkish emerging market. It specifically explores how fluctuations in these rates influence market returns performance in Türkiye. We utilize the ARCH and GARCH methods to satisfy the requisite analytical criteria. Our results reveal that variations in interest rates and exchange rate volatilities considerably impact majority of stocks trading in the BIST-100. Additionally, while fluctuations in interest rates negatively affect the BIST-100 returns index, exchange rate volatility positively influences these returns in Türkiye.

The findings of our research highlight key policy recommendations. An accurate evaluation of interest rate fluctuations and exchange rate volatility in stock markets yield the essential required rate of return, which is vital for uncovering long-term investment prospects and optimizing capital-allocation in Türkiye. The differing responses and perspectives of investors during periods of market decline offer significant insights for refining portfolio diversification strategies and strengthening risk management practices in the context of market volatility. Equally important, this study is anticipated to contribute to the decision-making processes of investors and policy makers, and provide a comprehensive assessment of their influence within the context of an emerging market economy.

This study enhances the understanding of stock market volatility in emerging markets by employing a rigorous model selection process. The findings provide valuable insights for policymakers, investors, and financial analysts, offering a more refined approach to assessing risk in the BIST-100 index. Future research may further explore sectoral differences in volatility responses to macroeconomic variables. Our research assesses the dynamic effects of the interest and exchange rate volatilities on equity returns, with specifically focusing on the stocks trading at the BIST-100 index. To enrich the analysis and ensure comprehensive insights, the application of a comparative approach between financial and manufacturing firms would be advantageous.

Disclosure Statements (Beyan ve Açıklamalar)

1. The authors of this article confirm that their work complies with the principles of research and publication ethics (Bu çalışmanın yazarları, araştırma ve yayın etiği ilkelerine uyduklarını kabul etmektedirler).
2. No potential conflict of interest was reported by the authors (Yazarlar tarafından herhangi bir çıkar çatışması beyan edilmemiştir).
3. This article was screened for potential plagiarism using a plagiarism screening program (Bu çalışma, intihal tarama programı kullanılarak intihal taramasından geçirilmiştir).

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