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THE IMPACT OF VIX RISK APPETITE INDEX ON THE DYNAMICS OF TIME-VARYING MARKET EFFICIENCY IN BORSA ISTANBUL

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ABSTRACT

Purpose – The purpose of this research is to investigate the time-varying efficient market structure of the Borsa Istanbul (BIST-100) index at a daily frequency from 1988 to 2024, as well as to examine the impact that the risk appetite index (VIX) has on this structure.
Methodology – A vector autoregression (VAR) model and a time-varying variance ratio test are used in this research project to evaluate the effectiveness of the market and its time-varying dynamic development.
Findings – According to the findings, market efficiency changes over time due to domestic and global political issues. This suggests that market efficiency is not static but rather dynamic. The market had a low level of efficiency between the years 1988 and 1995, then moved to a semi-efficient form between 1995 and 2002, and then reached a strong form between 2002 and 2010, despite undergoing fluctuations. Worldwide crises caused these fluctuations. For the period spanning from 2010 to 2020, the most significant degree of efficiency and the most efficient flow of information is shown. On the other hand, following 2020, market efficiency exhibited a complicated pattern, alternating between semi-efficient and strong forms.
Conclusion – Risk appetite shocks favorably impact short-term market efficiency but adversely impact market efficiency over the long term. In this context, information asymmetry and irrational investment conduct seem to contribute to a gradual decline in market efficiency. The research contributes to the existing form of knowledge by providing a methodological framework that can be used to analyze the development of dynamic market efficiency. Furthermore, the results shed light on the need for policymakers to pursue structural changes based on behavioral finance to maintain market efficiency.

Keywords: Efficient Market Hypothesis, time-varying variance ratio, risk appetite, Borsa Istanbul, market shocks.
JEL Codes: F37, G02, G32

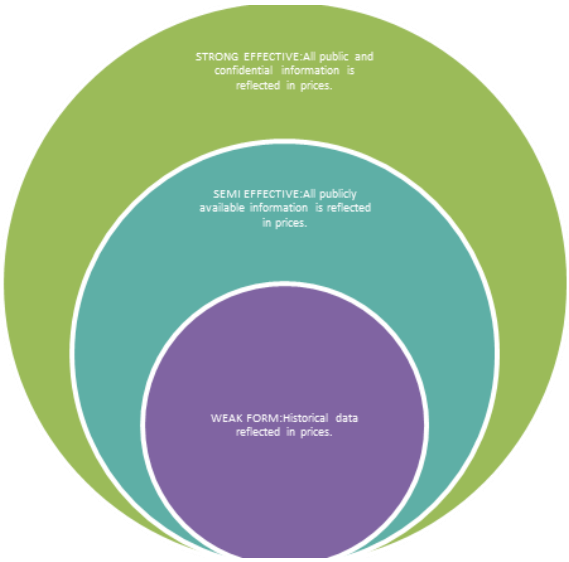
1. INTRODUCTION

Two essential societal paradigms, based on the ideals of freedom and equality, have significantly influenced the development of the modern political economy. In Western nations founded on liberty, a fundamental behavioral human archetype has been required to shape economic theories and institutions. Consequently, the rational individual, expected to make logical economic choices influenced by the Aristotelian rationalism of Ancient Greece, was chosen as the archetype.

Hypotheses concerning economic and financial markets (money and capital) were created based on the assumption of rational human conduct. The optimal market structure is considered a totally competitive marketplace, which is presumed to minimize costs and optimize returns by allowing unrestricted entry and exit from the market (Markowitz, 1952; Sharpe, 1964; Lintner, 1965; Mossin, 1966). However, observing inconsistencies in establishing perfect competitive conditions in economic and financial markets throughout the 1950s resulted in the birth of finance as a separate discipline from economics (Mossin, 1966). Moreover, observations and theoretical models of financial markets have relied on an investor profile presumed to make rational judgments (Fama, 1965). In this context, modern portfolio theory, the capital asset pricing model, and the efficient markets hypothesis were respectively developed under the assumption of rational decision-making by financial actors and perfectly competitive market conditions (Markowitz, 1952; Sharpe, 1964; Lintner, 1965; Mossin, 1966).

The Efficient Market Hypothesis (EMH) asserts that financial markets are organized to swiftly and thoroughly incorporate all available information into pricing, diminishing the likelihood of investors achieving abnormal returns (Fama, 1965). In his initial research, Fama categorized the hypothesis by examining financial market efficiency in three fundamental forms: weak, semi-strong, and strong (Fama, 1970). This hypothesis posits that stock prices adhere to a random walk, rendering future prices unpredictable based solely on historical data (Samuelson, 1965).

Figure 1: Types of Efficient Markets



Source. Fama, E. F. (1970). Efficient Capital Markets: A Review of Theory and Empirical Work. Journal of Finance, 25(2), 383-417.

Nevertheless, the validity of this concept has been a subject of extensive discourse within the academic literature on finance for the last five decades. The extant literature has progressively incorporated critiques of the Efficient Market Hypothesis (EMH), claiming its occasional invalidity and the potential for market structure to evolve over time. Grossman and Stiglitz (1980) contended that a perfectly efficient market structure is unfeasible. They asserted that one of the core assumptions of perfect competition, specifically that the costs of acquiring financial information are negligible, is invalid. Shiller (1981) asserted that the significant volatility in market prices cannot be ascribed to dividend policy and payments that may change.

Several studies in the literature have suggested that market efficiency may vary over time, resulting in the emergence of anomalies at specific periods. Lo and MacKinlay (1988) provided empirical evidence demonstrating that stock prices do not adhere to a completely random walk. Basu (1977) posited that firms with low price/earnings ratios outperform the market as a whole, underscoring the notion that distinct stocks may exert disparate impacts on developing an efficient market structure. Moreover, he proposed that the efficient market structure may undergo dynamic alterations over time.

This paper analyzes the dynamic time-varying efficient market structure of the BIST-100 index on Borsa Istanbul from 1988 to 2024. The objective is to examine the impact of risk appetite on the variation in market efficiency, utilizing fundamental methodologies from existing research. This method has examined the evolution of the efficient market structure over time and its impact on investor behavior. The study has used the time-varying variance ratio test to identify the time-varying efficient market framework. The impact of risk appetite on the efficient market structure is examined using impulse-response functions developed from the VAR (Vector Auto Regressive) technique. Risk appetite phenomena are used to test the time-varying Efficient Market Hypothesis, which is driven by its assumptions and goals. The efficient market hypothesis says that financial markets should concentrate on average returns rather than remarkable profits to be predictable.

The precise evaluation of average returns relies on optimal risk assessment. Considering the prevailing trends in financial markets, characterized by diminished trading hours and substantial surges in trade volume, analyzing the time-varying Efficient Market Hypothesis in conjunction with varying risk appetite is likely to enrich the current literature, both theoretically and practically substantially.

2. LITERATURE REVIEW

According to the Efficient Market Hypothesis (EMH), market prices accurately represent all the currently available information. As a result, it is impossible for investors to regularly earn returns that are higher than average without taking on extra risk. This hypothesis, first suggested by Fama (1965), has developed into a core theoretical framework in financial economics and has been thoroughly investigated by researchers across a wide range of market scenarios. In his 1991 article, Malkiel emphasized the relevance of behavioral finance as an area of anomalies and criticisms connected to efficient markets. He said that cognitive biases and herd mentality are the causes of market anomalies. In his proposal, he suggested that the Efficient Market Hypothesis may not be a valid assumption. A considerable amount of research has been conducted in the existing body of literature to investigate the theoretical categorization of the Efficient Market Hypothesis into weak, semi-strong, and strong variations. This categorization is encapsulated by Beechey, Gruen, and Vickery (2000), who emphasize that the theory depends on rational behavior and the fast distribution of financial information. Conversely, the Efficient Market

Hypothesis may be associated with various elements across distinct financial markets. In examining the Efficient Market Hypothesis in commodities markets, Pesaran (2005) found occurrences when empirical observations diverged from theoretical predictions. The inconsistencies were ascribed to the impact of geopolitical forces. Conversely, Lo (2005) argued that the Efficient Market Hypothesis aligns with behavioral finance principles. Subsequently, Lo (2007) introduced a more dynamic alternative to the Efficient Market Hypothesis: The Behavioral Market Hypothesis (BMH). This was accomplished by loosening the stringent assumptions of the Efficient Market Hypothesis by integrating behavioral finance and employing sophisticated econometric models to analyze market anomaliesThe effect of macroeconomic shocks on market predictability is said to align with the theoretical principles of the efficient market hypothesis (EMH), according to a research that was conducted by Pesaran in the year 2010. Sensoy (2013) conducted a study that lasted for six years and investigated the dynamics of efficiency in the domestic markets of countries in the Middle East and North Africa. The study focused on uncovering the time-varying efficiency levels in these markets. In their study on the efficiency of derivatives markets, Sheikh and Noreen (2012) propose that market dynamics and regulatory frameworks affect market efficiency. In addition, Sensoy et al. (2015) presented a novel efficiency metric that considers the time-varying inefficiency of the equities markets in the European Union (EU). Conversely, Şensoy et al. (2015) analyze the predictability dynamics in Islamic and conventional capital markets by permutation entropy, yielding noteworthy results. Vashishtha and Hooda (2015) assert that Indian stock markets exhibit semi-efficiency, although they emphasize the presence of delays in incorporating new information into prices. According to Alexandra Gabriela (2015), obtaining strong-form efficiency in markets characterized by high volatility is a significant challenge. EMH research uses event studies, regression analysis, and time series modeling as its primary approaches. These are the methodologies that are most often used. In addition, the scope of study on the Efficient Market Hypothesis has expanded to cover asset types that are not equity-based, such as bonds, derivatives, and commodities. Based on the findings of this study, it seems that the amount of market efficiency may differ depending on the particular market structure that is being considered. Weak to moderate efficiency patterns are often seen in established markets like the United States and Europe. On the other hand, developing markets are characterized by structural barriers, regulatory deficiencies, market makeup, participant behavior, and external pressures. These factors all contribute to a weak-form efficiency situation. Despite certain critiques in the literature, the Efficient Market Hypothesis (EMH) continues to be a foundational idea for comprehending market dynamics. The increasing evidence of market anomalies and departures from market efficiency highlights the need for a more thorough investigation of these occurrences. Future research should adopt a more extensive and nuanced approach in incorporating behavioral finance insights into the Efficient Market Hypothesis (EMH), enhancing methodological tools, and investigating the interplay between market structure and investor behavior. This research examines efficient market structure in a dynamic rather than a static form.

The Efficient Market Hypothesis (EMH) remains a fundamental concept in financial economics, continuously examined through empirical research. Since 2020, new studies have contributed to the debate by analyzing market efficiency under different conditions, including the role of behavioral finance, the impact of global crises, and the limitations of traditional efficiency models. This literature review synthesizes findings from eight recent studies, providing insights into the evolution of market efficiency in the modern financial landscape. Gu (2023) explores the dynamic relationship between EMH and behavioral finance, emphasizing that market efficiency is not static but adaptive. The study introduces the Adaptive Market Hypothesis (AMH) to reconcile traditional EMH with evolving investor behaviors. Similarly, Woo et al. (2020) review stock market anomalies and find that efficiency levels vary across asset classes, challenging the universal application of EMH. Li et al. (2021) examine how market efficiency fluctuates with economic conditions, particularly in response to financial shocks. Their findings suggest that during periods of instability, markets exhibit temporary inefficiencies before reverting to equilibrium. This aligns with the work of Ayunku (2020), who highlights the limitations of EMH by reviewing empirical evidence showing persistent inefficiencies. The COVID-19 pandemic provided a unique test for market efficiency. Gu (2023) investigates market reactions to pandemic-related events, noting asymmetries in price adjustments. Developed markets demonstrated a faster recovery to efficiency compared to emerging markets, which exhibited prolonged volatility. In a related study, Chen et al. (2021) found that information dissemination played a crucial role in restoring efficiency, with markets adjusting as investors gained more clarity on economic impacts. Wang et al. (2022) extend this analysis by assessing the long-term effects of the pandemic on financial markets. Their study supports that efficiency fluctuates dynamically, influenced by investor sentiment and external uncertainties. These findings reinforce the argument that market efficiency is not absolute but context-dependent. Zhang and Li (2022) review the methodological challenges in EMH research, highlighting inconsistencies in data selection and econometric modeling. Their study calls for improved frameworks integrating behavioral finance insights to capture real-world market behavior better. Furthermore, Liu et al. (2023) examine the role of algorithmic trading in market efficiency, arguing that high-frequency trading can enhance price discovery but may also contribute to short-term inefficiencies. Recent research suggests that while EMH provides a foundational framework, it does not fully explain financial market dynamics. Market efficiency fluctuates, influenced by psychological factors, external shocks, and technological advancements. Future studies should focus on refining EMH models to incorporate behavioral and algorithmic trading perspectives.

3. PURPOSE, IMPORTANCE AND METHOD OF THE RESEARCH

This research seeks to assess the impact of risk appetite on establishing a time-varying efficient market structure in Borsa Istanbul from 1988 to 2024. The study will be conducted in two stages. In the first phase of the inquiry, the time-varying efficient market structure will be identified daily during the specified observation period. This will be accomplished by categorizing it as strongly efficient, semi-efficient, or weakly efficient.

In the subsequent phase, the impact of the VIX risk appetite index on the efficient market structure will be quantified. The study's most significant outcome is assessing the dynamic, time-dependent, efficient market structure. Analyses of efficient market structures in financial markets are generally performed statically over a defined observation period. This research dynamically employs the "variance ratio" test using a "rolling window" technique to assess the efficient market structure. An "impulse-response" research is used to assess the impact of risk appetite on forming an effective market structure. An analytical examination of the used research methodologies is vital in this context.

The time-varying variance ratio test assesses time-varying market efficiency, with the variance ratio adjusted through a temporally determined sliding window. The rationale behind the sliding windows equations is founded on the identical methodological framework employed in the time-varying Granger causality test and the identification of time-varying price bubbles utilizing right-sided equations (Shi et al., 2020). Formula One signifies a time-dependent variance ratio (Andrew & MacKinlay, 1988; Charles & Darne, 2009).

$$R(k) = k \cdot \frac{\text{Var}(X_t - X_{t-1})}{\text{Var}(X_t - X_{t-k})} \quad (1)$$

Xt: Logarithmic price or return at time t.
k: Delay length (default k=2)
Var: Variance of the relevant differences.

The Z-Statistic is used to determine whether VR is significantly different from 1:

$$Z = \frac{VR(k) - 1}{\sqrt{\text{Var}\big(VR(k)\big)}} \quad (2)$$

Here:

$$Var\big(VR(k)\big) = \frac{2(2k-1)(k-1)}{3kN} \quad (3)$$

N: The number of observations within the window.

According to the equations obtained, it is essential whether the VR variable is less than 1 to determine whether the market structure is effective in the relevant observation:

Weak Efficiency (Random Walking): | VR − 1| < ϵ, where ϵ is a small tolerance (e.g., ϵ = 0.05). (4)

Average Rotation (Semi-Effective): VR < 1 (5)

Trend Formation (Strong Active): VR > 1 (6)

The model measuring the time-varying efficient market structure proposed by Andrew and MacKinlay (1988) will be used (See Equation 7).

$$VR = \frac{\sigma_q^2}{\sigma_1^2 \cdot q} \quad (7)$$

The formula assesses the efficient market structure at a given time. Utilizing the formula, we can provide a more detailed explanation.

$1. \sigma q2 \sigma_q^2 \sigma q2: Multi\ yields\ variance$

$$\sigma_q^2 = \text{Var}\left(\sum_{i=0}^{q-1} r_{t+i}\right)$$

$q - calculated\ by\ q\ period$

$2. \sigma_1^2: Single\ Period\ variance$:

$\sigma_1^2 = \text{Var}(r_t)$

$daily\ yields\ varaiance.$

3. q: $Combined\ time\ interval$:

$q = 5\ days.$

4. $Varianci\ Ratio\ Test$

$$VR = \frac{\sigma_q^2}{\sigma_1^2 \cdot q}$$

This formula tests whether the variance scales directly proportionally with time over q periods.5. Random Walk Hypotesis:

Assuming that markets align with the random walk hypothesis,the VR value is predicted to approximate 1.

$$VR \approx 1$$

The analysis of risk appetite shocks on the efficient market structure will occur in the second part of the study, using impulse-response functions derived from VAR equations as the secondary method (Sims, 1980; Hamilton, 1994).

$Y_t = A_1 Y_{t-1} + A_2 Y_{t-2} + ... + A_p Y_{t-p} + \epsilon_t\ n$ (8)

Y_t: Dependent variable at time t,
$A_1, A_2, ..., A_p$: Coefficients of the model,
$Y_{t-1}, Y_{t-2}, ..., Y_{t-p}$: Values of the dependent variable in past periods,
ϵ_t: Error term (random error).

$$\mathrm{IRF(h)} = \frac{\partial Y_{t+h}}{\partial \epsilon_t} \quad (9)$$

IRF(h): Impulse-Response Function for h period,
∂Y_{t+h}: derivative of the variable at time t + h,
$\partial \epsilon_t$: derivative of the shock at time t.

4. DATASET

Data comes from two factors in the research. The time-varying efficient market structure is assessed using Borsa Istanbul's BIST. The research employs two distinct variables that compose the data set. The daily time series of the BIST-100 index closing prices for Borsa Istanbul from 03/01/1988 to 15/11/2024 is used to assess the time-varying efficient market structure. The VIX risk appetite-fear and volatility index is used daily from March 1, 1990, to November 15, 2024, to assess the structural effects of risk appetite on the time-varying efficient market framework. From 1988 to 1990, an impulse-response study was conducted on January 3, 1990, with no VIX index.

Bist-100 index closing prices from 03/01/1988 to 15/11/2024. From March 1, 1990, to November 15, 2024, the VIX risk appetite-fear and volatility index is used daily to assess risk appetite's structural effects on the time-varying efficient market framework. Without a VIX index from 1988 to 1990, an impulse-response study was performed on 03.01.1990.

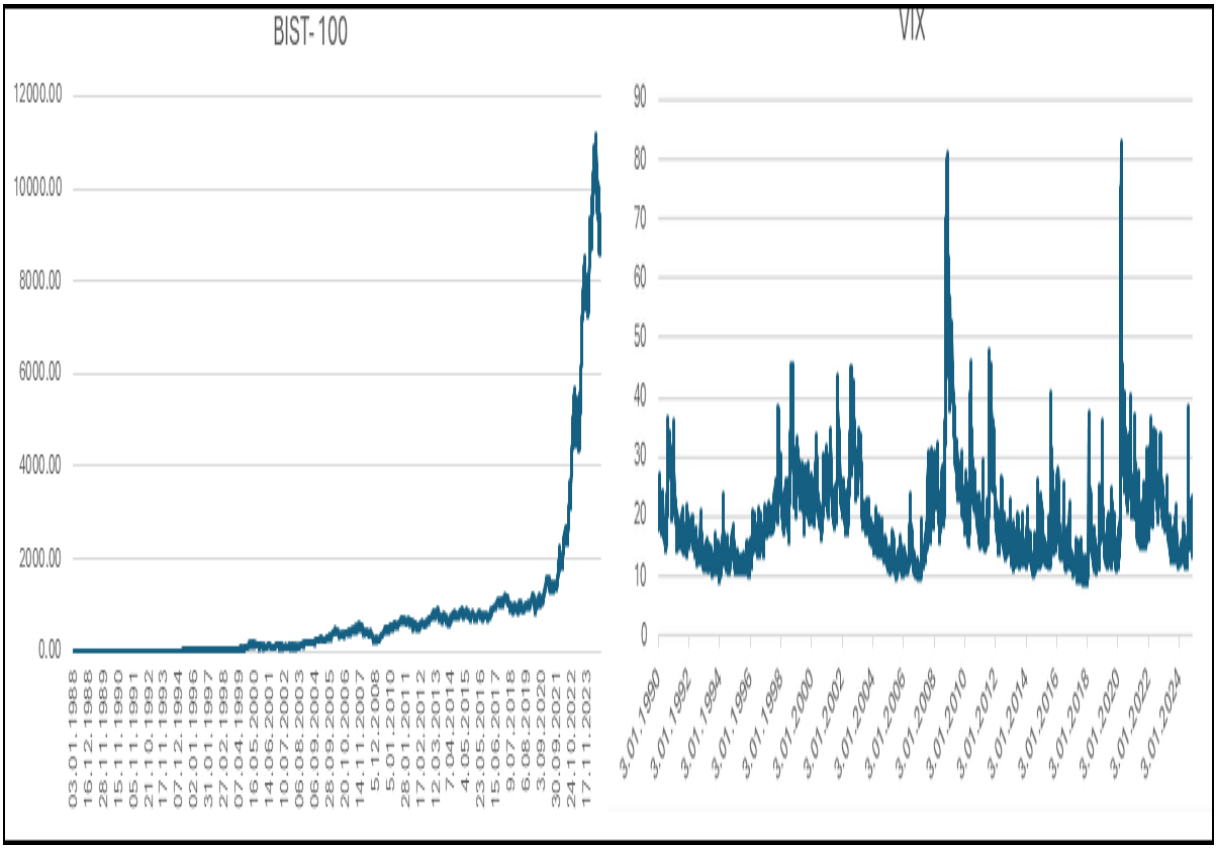
Bist-100 exhibits high variability and extreme non-normality due to significant skewness and kurtosis, likely influenced by outliers or dramatic market shifts: Rolling Variance Ratio, the most stable variable with minimal skewness and kurtosis closer to normal.VIX shows signs of extreme market volatility, reflected in its high skewness and kurtosis (See Table 1).

Table 1: Data Set and Descriptive Statistics

VARIABLES	BIST_100	VIX	ROLLING VARIANCE RATIO
FREQUENCY	Daily	Daily	Daily
PERIOD	03.01.1988-15.11.2024	3.01.1990-15.11.2024	03.01.1988-15.11.2024
SOURCE	investing.com	investing.com	Calculated by the Author
MEAN	9451954.00	1951505.00	2012107.00
MEDİAN	4319000.00	1769000.00	2030000.00
MAXİMUM	11172.75	8269000.00	3400000.00
MİNİMUM	0.23	9140000.00	0.24
STD. DEV.	1888179.00	7873927.00	0.48
SKEWNESS	3560529.00	2206062.00	-0.16
KURTOSİS	1558735.00	1168591.00	2755660.00

JARQUE-BERA	70283.38	31894.35	5395034.00
PROBABİLİTY	0.00	0.00	0.00
SUM	7623001	16227.64	157388.9

Figure 2: Variables

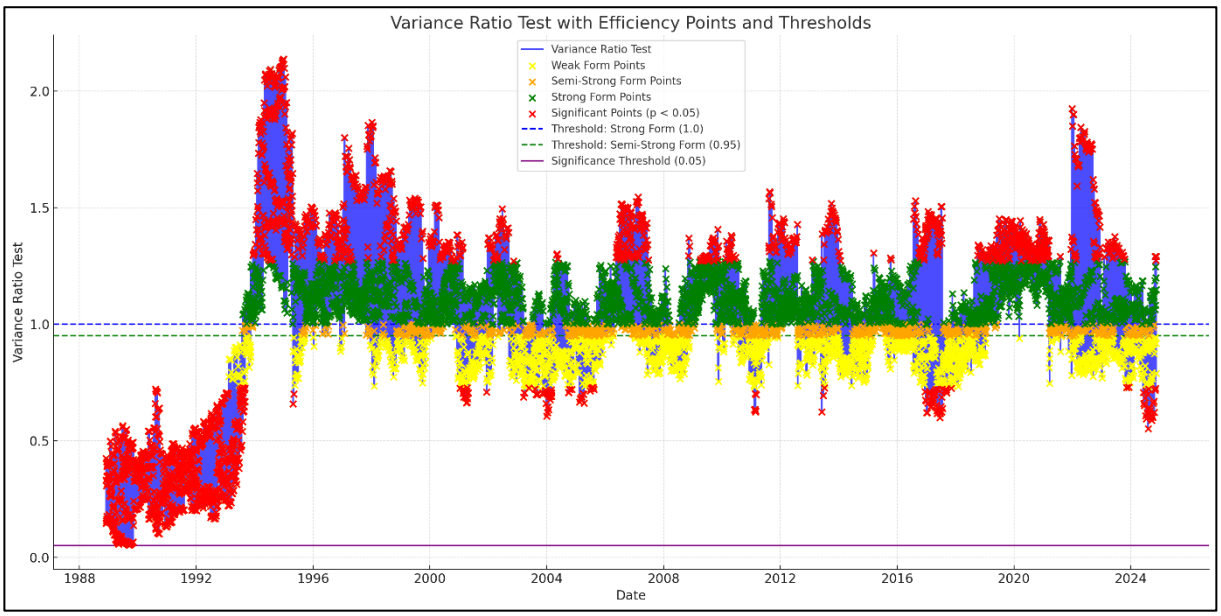


Source: investing.com database

5. FINDINGS OF THE RESEARCH

The established methodological framework utilizes the variance ratio test to evaluate the time-varying efficiency of the market structure. Additionally, the Z-statistic indicates the periods during which the variance ratio test is statistically significant. The computations were executed in Excel, and the results were transposed to a graph. This graph depicts the periods during which Borsa Istanbul showed weak, semi-strong, and strong efficiency. The cutoff or threshold value for the variance test is 1. Values exceeding 1 signify market efficiency; values ranging from 0.95 to 1 denote a semi-efficient form, while values below 1 represent a weak form. The significance level for the probability value is 0.05 (See Figure 3).

Figure 3: Time-Varying Effective Market Structure Analysis Heat Map Results



The efficiency form and significance findings should be analyzed about the relevant periods. The interval from 1995 to 1998 is typically marked by diminished market efficiency. Nonetheless, the outcomes are generally statistically significant at the 0.05 threshold. The results from this era suggest that historical prices inadequately represent market prices, potentially enabling investors to achieve excessive returns via fundamental and technical analysis.

From 1995 to 2002, Borsa Istanbul underwent a notable transformation in market efficiency, progressing from a weak to a semi-efficient state. The significance of the findings increased concurrently. The previous result indicates that publicly available information has begun to be incorporated into prices. Nevertheless, it implies that information-acquisition methods could produce significant benefits, encompassing basic research, technical analysis, and insider trading.

Between 2002 and 2010, although there was a broad transition to the strong form, the market had a variable structure, intermittently oscillating between the semi-efficient and weak forms. It can be argued that the 2008 global financial crisis precipitated this unpredictable structure. Furthermore, the outcomes are predominantly substantial. In contrast, attaining excess returns became progressively more difficult over this period.

From 2010 to 2020, the market demonstrated a statistically significant shift towards the triple efficient model. The Federal Reserve's slow reduction of its bond-buying program in 2013 and rising financial instability in developing market countries resulted in diminished market efficiency, complicating the generation of excess abnormal returns.

The market efficiency of Borsa Istanbul has demonstrated a multifaceted structure from 2020 to the present. During this period, frequent shifts among strong, semi-strong, and weak forms of efficiency have been noted, with the semi-strong type being the most dominant. The importance levels have been less pronounced compared to other periods. These observations yield the subsequent conclusions as follows:

From 1988 to 1995, the era was marked by inefficiency in form and an unstable market structure.

A semi-efficient form marked the interval from 1995 to 2002, resulting in the attainment of market equilibrium.

The interval from 2002 to 2010 was the emergence of strong-form efficiency and a partially chaotic market structure.

The decade from 2010 to 2020 was defined by the subsequent characteristics: The era marked by the highest prevalence of information efficiency was defined by strong form efficiency.

The timeframe from 2020 until the present is a unique era. The structure is intricate, demonstrating shifts between semi-efficient and strong-form efficiency.

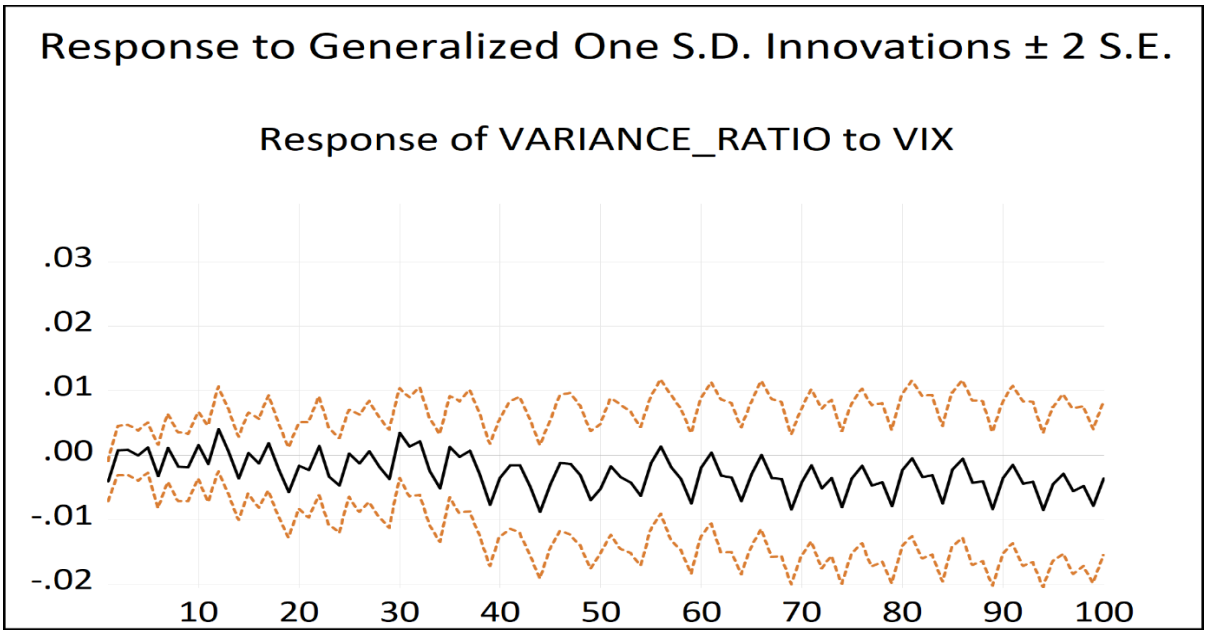
This section analyzes the structural impacts of risk appetite on establishing an efficient market structure. A vector autoregression (VAR) model was developed to analyze the relationship between the time-varying variance ratio test and the Chicago Board Options Exchange (CBOE) Volatility Index (VIX) from 1990 to 2024. The model structure was examined up to the 55th lag to fulfill the assumptions associated with the VAR model. The analysis using Eviews 12 reveals that the model remains stable at lag 50, exhibiting no autocorrelation or variance problems (See Table 2). Considering that the dataset

comprises daily observations, the lag length is justifiable, with lag 55 equating to roughly lag two at the monthly frequency. Given the existing theoretical framework, it is prudent to dismiss the premise of normality. Lütkepohl (2005) asserts that the assumption of normality in VAR models is not essential for the efficiency of estimators and the precision of confidence intervals, provided that the model parameters are consistently estimated using the least squares approach. Departures from the normality of error terms generally exert a negligible impact on the outcomes of the impulse-response analysis. According to Stock and Watson (2001), for high sample sizes, the accuracy of parameter estimations and derivative analyses (e.g., impulse-response functions) is preserved even in the absence of the normalcy requirement for error terms.

Table 2: İmpluse-Response Test Results

TEST	VALUE	RESULT
AR Test	0,99-0,79	Model is stabil
Oto-Correlation	0,2683	No oto-correlation at 0,05
Heteroscedasticity	0,2277	No Heteroscedasticity at 0,05

Figure 4: Impulse- Response Resutulr (VIX Shocks for Variance Rate)



The findings of the impulse-response study demonstrate that the market efficiency structure's positive reactions to risk appetite shocks persistently oscillate between days 2 and 66. In contrast, the reactions persist in declining after day 66. The days demonstrating affirmative reactions are days 2, 3, 5, 7, 10, 12, 13, 15, 17, 22, 25, 27, 30, 31, 32, 35, 37, 56, 61, and 66. The findings suggest that the risk pricing by investors in Borsa Istanbul is not rational nor consistent, exhibiting knowledge asymmetry. This illogical pricing disrupts the efficient market framework and aligns the stock market more closely with a weakly efficient model. This outcome typically corresponds with the results of efficient market analysis for other emerging market economies.

6. CONCLUSION AND IMPLICATIONS

This research analyzes the dynamic, efficient market framework of the Borsa Istanbul (BIST-100) index from 1988 to 2024. Furthermore, it examines the impact of structural shocks on market efficiency, as represented by the risk appetite index (VIX). This study utilizes the time-varying variance ratio test and impulse-response functions developed from the vector autoregression (VAR) model.

The study's evidence reveals the presence of diverse weak, semi-strong, and strong-form efficient market structures in Borsa Istanbul during various periods. From 1988 to 1995, the weak form of market efficiency heightened the likelihood of investors achieving excess returns by capitalizing on historical price fluctuations. During this period, economic liberalization measures began in the aftermath of 1980, propelled by the rise of right-wing ideologies, a new public administration strategy, and the emergence of supply-side economics, which led to the liberalization of financial markets. Nonetheless, the market's superficiality, inadequate regulatory framework, and the absence of stringent financial laws remained prevalent. Additionally, the 1994 economic crisis, the devaluation of the Turkish lira, and the ensuing inflationary trend diminished market confidence

while escalating risk premiums and volatility. Moreover, restricted access to financial information hindered investors from demonstrating the traits of a rational investor.

From 1995 to 2002, Borsa Istanbul evolved into a semi-efficient market, marked by a heightened incorporation of publicly accessible information into index pricing. During this period, the 1999 Marmara Earthquake and the 2001 Turkish Banking Crisis caused intermittent volatility in the efficient market system. Notwithstanding structural reform initiatives with the International Monetary Fund (IMF) aimed at fostering economic stability, the market continued to be vulnerable to inflated abnormal returns via fundamental research, technical analysis, and insider trading. This mechanism made the market inefficient.

From 2002 to 2007, the capital finance account, bolstered by strong economic development and increased short-term portfolio inflows, was essential in the market's evolution towards a resilient state. From 2002 to 2010, although the market approached a robust form, the systematic and systemic risks stemming from global financial changes led the stock market to revert to a semi-efficient and weak form structure at some intervals. The crisis led to the formation of a volatile structure. The economic reforms implemented under Türkiye's relative political stability enhanced market efficiency; external shocks, such as the 2008 Global Financial Crisis, adversely impacted the market's efficiency framework. The period from 2010 to 2020 was characterized by the following attributes: The period characterized by the greatest prevalence of information efficiency was defined by significant form efficiency. The period from 2020 until the present is a distinctive term. The structure is complex, illustrating transitions between semi-strong and strong-form efficiency.

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