Market Dynamics in Motion: Exploring the Interplay of Price Volatility, the Activity of Stock Exchange, and its Performance

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ديناميكيات السوق في الحركة: استكشاف التفاعل بين تقلب الأسعار ونشاط البورصة وأدائها

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Abstract:

The objective of this study is to analyze the relationship between the activity of emerging stock markets, characterized by high price volatility, and their performance. The case study focuses on the Amman Stock Exchange. Due to the study's nature and its sensitivity in terms of reflection and dynamic correlation, data were collected over three time periods during the year 2022. Multiple statistical models were estimated using statistical and technical tools to analyze the data and uncover the reasons behind the impact of price volatility on the exchange's performance. The Smart PLS4 software was employed for this purpose.

The study findings indicate that price volatility are not temporally correlated and have a simultaneous effect on returns. Moreover, these volatility do not influence the behavior of investors in the Amman Stock Exchange, as they do not consider them as a factor in their investment decisions. The study also concludes that the impact of the Amman Stock Exchange's activity on its returns varies depending on the investors' behavior.

Key words: price volatility, trading volume, total return, stock market.

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ملخص:

تهدف هذه الدراسة إلى تحليل العلاقة بين نشاط أسواق الأوراق المالية الناشئة، المميزة بارتفاع تقلبات الأسعار، وأدائها. تركز الدراسة على حالة بورصة عمان للأوراق المالية. نظرًا لطبيعة الدراسة وحساسيتها من حيث الانعكاس والارتباط الحركي، تم جمع البيانات على مدار ثلاث فترات زمنية خلال سنة 2022. تم تقدير العديد من النماذج الإحصائية باستخدام أدوات إحصائية وتقنية لتحليل البيانات وكشف الأسباب وراء تأثير تقلبات الأسعار على أداء البورصة. تم استخدام برنامج Smart PLS4 لهذا الغرض.

تشير نتائج الدراسة إلى أن تقلبات الأسعار غير مترابطة زمنياً ولها تأثير متزامن على العوائد. علاوة على ذلك، فإن هذه التقلبات لا تؤثر على سلوك المستثمرين في بورصة عمان للأوراق المالية، حيث أنهم لا يعتبرونها عاملاً في قراراتهم الاستثمارية. تخلص الدراسة أيضًا إلى أن تأثير نشاط بورصة عمان للأوراق المالية على عوائدها يختلف اعتمادًا على سلوك المستثمرين.

الكلمات المفتاحية: تقلبات الأسعار، حجم التداول، عائد كلي، سوق الأوراق المالية.

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1. INTRODUCTION

The stock exchange is considered a significant indicator of the economy and business, and it is influenced by various economic and political factors, such as economic growth, wars, financial crises, and geopolitical events. Therefore, understanding the relationship between the activity of the stock exchange and its performance is crucial for investors and traders. By studying this relationship, investors and traders can better determine the timing of buying and selling and achieve better returns on their stock investments.

Price volatility are common occurrences in the stock market and can significantly impact its performance. Some studies indicate a prominent role of price volatility in affecting the activity and performance of the stock market. However, there have been diverse findings regarding the relationship between the activity and performance of the stock market in light of price volatility.

Recent studies have found that price volatility can affect both the activity and performance of the stock market in various ways (Jin & An, 2016) (Malinova & Park, 2010) (Alsubaie et al., 2022) (Talwar et al., 2021) (Huber et al., 2022) (Wang & Yang, 2018) (Su & Wang, 2020) . A sharp increase in prices leads to an increased demand for stocks and consequently an increase in market activity. Conversely, a steep decline in prices leads to a decrease in trading activity and a reduction in trading volume. Therefore, it can be said that the impact of stock market activity on its performance largely depends on price volatility in the market. Considering that studies suggest that price changes in emerging markets are often more volatile than in developed markets, it is crucial to conduct such a study on an emerging securities market to understand the direct impact of price volatility on market performance and to identify the most effective strategies for dealing with them. The Amman Stock Exchange (ASE) has been chosen as a case study, as it is an emerging market that has witnessed price volatility due to several factors.

The volatile stock prices have a significant impact on the activity and overall performance of the stock market. Understanding this prominent role of price volatility is important because it can lead to significant changes in the financial performance of companies and investors, thereby affecting investments and market trends in general.

This study aims to understand the role of price volatility in the relationship between the activity and performance of the stock exchange. Therefore, studying this relationship can help gain a better understanding of the actual impact of price volatility on the activity of the stock market, which, in turn, has a broader impact on the economy. This is why we will try to answer the following question: **What is the extent of the impact of the activity of the Amman Stock Exchange (ASE) on its performance in light of price volatility?**

In this perspective, we present the concept of the stock exchange and its importance in the economy, along with an exploration of price volatility in the stock market and their mechanism of impact on performance.

2. LITERATURE REVIEW

2.1. Stock market

The stock market, also referred to as the stock exchange, is a financial market where publicly traded companies' stocks and various securities like bonds, options, and futures are bought and sold through licensed financial intermediaries. It serves as a vital component of the financial sector in any economy, enabling the accumulation of savings and directing them towards investments. Moreover, it offers companies and institutions a means to obtain essential funding for their operations and growth, while providing investors with opportunities to trade and invest in stocks and other securities, aiming to generate profits (Draze, 2021).

Additionally, the stock market plays a crucial role in the overall economy by facilitating the flow of funds between individuals, institutions, and various sectors in society, mobilizing and developing savings for investment in the national economy (Djabou, 2012).

The stock market is of utmost importance in modern economic systems, particularly in capitalist economies, as it acts as a means to pool the savings of individual investors and channel them into significant investments. Moreover, it plays a critical role in financing large-scale economic development plans that demand substantial capital. By facilitating the transfer of funds from surplus entities (savers) to those in need of funds (borrowers), the stock market contributes to balancing supply and demand forces while allowing unrestricted transactions and exchanges. The importance of the stock market and its necessity in serving economic activity are highlighted through: savings mobilization (cameron et al., 2007), promotion of investment awareness (shah & patel, 2018), optimal resource allocation (malinvaud, 1953), justice in determining the prices of tradable securities, indicator of economic status (ballings et al., 2015), economic development financing, provision of liquidity, provision of advice and guidance, mitigation of inflation rates in the national economy structure, and attracting foreign investments and technology localization (djabou, 2019).

Furthermore, it can be said that the stock market derives its importance from the multifaceted and diverse role it plays. It is an effective tool in the national economy, influencing various aspects and fields of economic activity while being influenced by them. It plays a highly significant role in attracting surplus idle capital and unutilized resources in the national economy, transforming it from dormant raw capital to employed and active capital in the economic cycle. This is achieved through investment in securities offered in the stock market.

2.2. Price volatility, trading volume, and returns

Price volatility refers to gradual or sharp changes in the prices of financial assets (Kotzé, 2005). It reflects the randomness that arises from the interaction of supply and demand forces and is considered one of the fundamental factors that impact the activity and performance of the stock market. There are several types of price volatility, including: market volatility, which pertains to price changes in stocks, commodities, currencies, and bonds within the overall market; sector volatility, indicating volatility in specific industries like heavy or medical industries; company volatility, reflecting price changes in individual companies influenced by company news, financial

performance, and developments; and emerging market volatility, where price changes in emerging markets tend to be more unpredictable compared to advanced markets (Caginalp & Caginalp, 2020).

Price volatility in the stock market can be influenced by various factors as identified by Mitra (2011). Economic changes, including political and economic events, can affect the performance of listed companies, leading to volatility in stock prices. Technical factors, such as company announcements and periodic reports, also contribute to market volatility. Moreover, psychological factors play a role, as investors' behaviors, strategies, and expectations impact stock prices. External events, like global economic crises and political conflicts, can influence the local financial market's performance. Additionally, natural factors, such as natural disasters or environmental catastrophes, have the potential to affect company performance and cause volatility in stock prices.

Price volatility plays a crucial role in analyzing the activity of the stock market as it significantly affects the financial performance of investors and determines their investment decisions (Zhussipova et al., 2023). Since the activity of the stock market is influenced by price volatility, studying these volatility can help understand the factors that impact market performance and predict future trends.

Trading volume refers to the total value of securities traded at various prices within a specific timeframe. It represents the overall value of securities exchanged during that period (Behrendt & Schmidt, 2019). Jin & An, (2016) concluded that significant price volatility lead to a reduction in market trading volume due to investors' reluctance to trade. Conversely, Malinova & Park, (2010) revealed an inverse relationship between price volatility and trading volume as a result of consistent improvements in traders' information quality and a decrease in market depth index.

Returns refer to the profit or loss generated by an investment over a certain period of time, and serve as an important metric for evaluating investment performance (Peeters et al., 2005). Alsubaie et al., (2022) study revealed that price volatility have negative effects on the returns of sustainable Islamic stocks. Talwar et al., (2021) found that significant price volatility increase the risk of losses for investors and can reduce returns due to investors' reluctance to participate in highly volatile markets and their preference for more stable markets. Huber et al., (2022) highlighted the negative relationship between price volatility and returns due to professional investor behaviors. Hence, several studies have shown that volatility are significantly influenced by large negative returns more than positive returns (Wang & Yang, 2018), (Su & Wang, 2020).

To address the research problem, and based on the literature above, the following hypotheses have been formulated:

- There is a time-varying impact of price volatility on the performance of the Amman Stock Exchange (ASE).
- There is a direct impact of price volatility on the activity of the Amman Stock Exchange (ASE).
- The impact of the activity of the Amman Stock Exchange (ASE) on its returns varies depending on investors' behaviors.

3. METHOD AND TOOLS

3.1. Sample and data collection

The study focuses on the most volatile financial markets, with a specific emphasis on emerging markets. The ASE has been chosen as the sample for this research. The ASE was established on March 11, 1999, as an independent non-profit institution and was granted a license to operate as an organized market for securities trading in the Kingdom. On February 20, 2017, the ASE was registered as a fully government-owned public shareholding company. It is governed by a board of seven members appointed by the General Authority, in addition to a full-time executive director who is responsible for managing and monitoring the daily operations of the exchange.

The ASE aims to engage in all activities of securities, commodities, and derivatives markets, both domestically and internationally. It strives to provide a suitable environment for the interaction of supply and demand forces on traded securities and to enhance fair and proper trading in accordance with international standards. The exchange also seeks to promote an investment culture in the financial markets and enhance knowledge related to financial markets and the services it provides (*Amman Stock Exchange*, 2023).

The necessary data for the study was collected from various sources, such as the website of the ASE, and official reports published by relevant financial entities. Due to the nature and sensitivity of the study in terms of reflection and dynamic correlation, the data was collected in three time intervals during the year 2022, with the first interval covering January to April, the second interval from May to August, and the third interval from September to December.

The data was processed using various statistical analysis tools such as linear regression and time series analysis to analyze the collected data (As shown in Figure 01). This was done using the Smart PLS4 software.

3.2. Measures

The study variables include price volatility as an independent variable and the activity of the ASE as a controlling variable, represented by trading volume, and the performance of the exchange as a dependent variable, represented by the average stock return.

3.2.1. Price Volatility

Price volatility is a crucial indicator of market volatility and future price expectations, also serving as a measure of investment risk (Duxbury & Summers, 2018). Various tools are used to measure price volatility in the stock market, such as standard deviation, daily percentage change, relative strength index, relative momentum index, Bollinger Bands, and Donchian channels (Mitra, 2011). For this study, the Volatility Index will be utilized as a common tool to measure price volatility, calculated based on the daily price volatility of stocks within a specific time frame.

3.2.2. Trading Volume

Trading volume is measured by dividing the total traded shares in the exchange by the gross domestic product. Therefore, it reflects liquidity in the economy. This indicator complements the market capitalization indicator (Levine & Zervos, 1996). It is important to understand the nature of

the relationship it has with stock market variables in order to make appropriate investment decisions (Zhussipova et al., 2023).

3.2.3. Total Return

In this study, the Amman Stock Echange Total Returns (ASETR) has been relied upon to express the performance of the stock exchange and assess the ability to optimize the use of financial resources in the short and long term to build wealth. This index is weighted by the market value of free-float shares and was introduced in accordance with international best practices for calculating financial market indices, as of March 27, 2022, which serves as the base point. The index measures the changes in the prices of companies' stocks (index constituents), in addition to cash distributions from these companies, assuming reinvestment in the stocks of index constituent companies.

This index is characterized by its assistance to investors in measuring the total return on their investments in the stock exchange. It not only includes the price changes of securities but also incorporates cash dividend distributions. The Total Return Index is calculated using the following formula (Amman Stock Exchange, 2023):

$$\textbf{Total Return Index Value} = \frac{(Index\ Value\ on\ the\ Previous\ Day\ -\ Market\ Value\ of\ Index\ Constituents)}{(Market\ Value\ of\ Index\ Constituents\ on\ the\ Previous\ Day\ -\ Total\ Distributed\ Profits)}$$

4. RESULTS AND DISCUSSION

After identifying the study population and sample, as well as the data collection process and research variables, we will thoroughly examine the hypotheses and provide a comprehensive discussion of the findings.

4.1. Analysis the effect of price volatility on the ASE performance

The results of the study, as shown in Table1, demonstrated through direct effects (P values: 0.796, 0.347) that price volatility does not have a direct impact (during the same period) on returns. However, it is evident from the indirect effects (P values: 0.008, 0.003) and the overall effects (P values: 0.007, 0.032) that price volatility does have an impact on future periods. This indicates the acceptance of the first hypothesis related to the existence of a time-dependent impact of price volatility on the returns of the ASE. Price volatility can lead to changes in the rates of return on financial securities, significantly affecting future investments in the market. As observed in Fig.1, price volatility is not correlated over time (P value: 0.452), which is consistent with the findings of the study by (Enow, 2023). Considering that price volatility varies significantly from one market to another and does not exhibit the same nature of volatility (Muguto & Muzindutsi, 2022), these results explain the association of the Amman financial market with external and natural factors and events that impact price volatility.

4.2. Analysis of the relationship between the ASE activity and price volatility

Through Table4, it is observed that all direct effects (P values: 0.281, 0.987, 0.740) are not significant. Therefore, price volatility does not have an impact on the activity of the ASE, either during the same period or across synchronous periods. This is contrary to the findings of the studies

by Jin & An, (2016), Talwar et al., (2021), thus rejecting the second hypothesis. These results explain that price volatility does not affect the behavior of investors in the ASE, and price movements cannot lead to an increase or decrease in demand for financial securities. Investors in the ASE do not consider these volatility as a factor in making their investment decisions.

4.3. Analysis of the relationship between the activity and returns of the ASE

The results of the study shown in Table2, through direct effects (P values: 0.000), have proven that the activity of the ASE directly affects the returns in the first period. The finding aligns with a previous study (Yusra, 2019) that examined the LQ45 index during the COVID-19 period and demonstrated the association between trading volume and returns. However, the results indicate that the activity of the ASE does not have a direct impact (P values: 0.961) on returns in the second period. Furthermore, it is evident from the direct effects of synchronous periods (P values: 0.259, 0.384) that the activity of the stock exchange does not affect the returns of future waves or periods. Instead, it has an indirect impact through favorable gaps, as confirmed by the overall effects (P values: 0.000, 0.000). Additionally, the results highlight that the activity of the ASE is not time-dependent, as indicated by the direct effects (P values: 0.059). This can be attributed to behavioral and technical factors on one hand, and fundamental factors influencing the ASE on the other.

Through the graphical representation shown in Fig.2, 3, and 4, it is observed that the returns of the ASE grow at a significant rate compared to the growth in trading volume. The latter has experienced volatile periods, mostly attributed to technical factors (such as company listings or delistings) and global events. As a result, there is generally an inverse relationship between the activity of the ASE and its returns. This finding is consistent with Yeoh'(2023) study, conducted in the NYSE market. This explains the behavior of investors in the ASE and their aversion to losses. On the contrary, Glaser & Weber (2007) study revealed a negative relationship due to investors' excessive confidence.

Through Table3, and based on the direct effects (P values: 0.000, 0.000), indirect effects (P values: 0.000), and the overall effects (P values: 0.000), it is observed that the overall returns are correlated over time during the study periods. This correlation exists both directly and indirectly, indicating that returns have a pattern and do not follow a random manner. They can be predicted based on previous returns, as confirmed by Bianchi & Dickerson (2018). This study proved that the positive relationship between trading volume and previous returns can predict future returns. Consequently, the behavior of investors in the ASE during the study periods is irrational.

Based on the above, the impact of the activity of the ASE on its returns varies depending on the behavior of investors. This implies the acceptance of the third hypothesis.

5. CONCLUSION

The aim of this study was to determine the role of price volatility in the relationship between the activity and performance of the ASE. This was done by understanding how price volatility affects the relationship between stock exchange activity and performance in the short and long term. The goal was to enable investors to better analyze the market and make informed investment decisions. The study relied on numerous previous research and studies in this field.

To achieve the study's objectives, various statistical models were estimated using statistical and technical methods to analyze the data and uncover the reasons behind the impact of price volatility on stock exchange performance. The study reached the following conclusions:

- Price volatility does not directly impact returns in the same period. However, it does have an impact on future waves, indicating a synchronous effect of price volatility on the returns of the ASE. Price volatility can lead to changes in the rate of return on securities, significantly affecting future investments in the market.

- Price volatility is not correlated over time, explaining the connection between the Amman financial market and external and natural factors that affect price volatility.

- Price volatility does not affect the activity of the ASE, neither in the same period nor across synchronous periods. This implies that price movements do not result in an increase or decrease in demand for securities. Investors in the ASE do not consider these volatility as a factor in their investment decisions.

- The activity of the ASE directly affects returns in the first period, but it does not have a direct impact in the second period. Additionally, the activity of the stock exchange does not affect the returns of future waves directly. However, it does have an indirect impact through favorable gaps. The activity of the stock exchange is not time-dependent and can be attributed to behavioral and technical factors on one hand, and fundamental factors influencing the ASE on the other.

- The returns of the ASE grow at a significant pace compared to the growth of trading volume. The latter experiences volatile periods primarily due to technical factors (such as listing or delisting of companies) and global events, resulting in an overall inverse relationship between the activity of the ASE and its returns. This explains the behavior of investors in the ASE and their aversion to losses.

- The overall returns are correlated over time during the study periods, both directly and indirectly. This explains the irrational behavior of investors in the ASE, as returns follow a specific pattern and do not occur randomly. Previous returns can be used to predict future returns.

Recommendations for investors and traders in the ASE:

Based on the findings and discussions presented, several recommendations can be proposed for investors and traders in the ASE, including:

Risk assessment: Investors and stock traders should determine the risk levels they can tolerate based on price volatility and their impact on the market's performance. Long-term timeframes should be adhered to in order to achieve the desired returns.

Portfolio diversification: Investors and stock traders should diversify their portfolios effectively to reduce potential risks arising from price volatility in the stock market. Their investments should be distributed across various financial assets such as stocks, bonds, real estate assets, and alternative assets.

Monitoring financial news: Investors and stock traders should monitor financial news related to the companies and sectors in which they invest. They should also keep track of changes in government policies, global and regional economic conditions, and their impact on prices.

Utilizing technical and fundamental analysis tools: Technical and fundamental analysis tools can be used to evaluate stock performance and forecast future price movements. This enables investors to make informed investment decisions.

Benefit from professional services: Investors and stock traders can benefit from the services of financial professionals and advisors or allocate their funds to investment funds.

Guidelines to Improve the Performance of the ASE:

Based on the findings and the discussed analysis, several guidelines can be provided to enhance the performance of the ASE and mitigate the impact of price volatility. These guidelines include:

- Enhancing control over the financial management processes of companies listed on the ASE. Investors and traders should have access to accurate and reliable information about the financial performance of companies before making any investment decisions.
- Improving the tools used to minimize the impact of price volatility on the exchange's activity. This can be achieved by enhancing the surveillance and monitoring system and utilizing advanced technology for data analysis and economic indicators.
- Increasing investment in diversified financial instruments, including stocks, bonds, derivatives, indices, and other financial products, in order to reduce the influence of volatility in a single market on the overall performance of the exchange.
- Expanding the investor base in the market by attracting more foreign investors and improving the availability of data related to economic performance and trading activities in the market.

Implementing these guidelines can improve the performance of the ASE and reduce the impact of price volatility on its activity.

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7. Appendices

Table1. Quality Measures of the Relationship between Price Volatility and Stock Returns.

	Std. Coeff	Standard deviation	T statistics	P values	Path type
Price Volatility_1 -> TRI_2	0.184	0.069	2.648	0.008	Direct effect
Price Volatility_2 -> TRI_3	0.261	0.089	2.925	0.003	Direct effect
Price Volatility_1 -> TRI_2 -> TRI_3	-0.085	0.037	2.281	0.023	indirect effects
Price Volatility_1 -> TRI_2	0.258	0.096	2.692	0.007	total effects
Price Volatility_2 -> TRI_3	0.223	0.104	2.149	0.032	total effects
Price Volatility_1 -> TRI_1	0.029	0.111	0.259	0.796	Direct effect
Price Volatility_2 -> TRI_2	0.082	0.087	0.941	0.347	Direct effect

***Source:** Author's own work*

Table2. Quality Measures of the Relationship between Stock Market Activity and Returns.

	Std. Coeff	Standard deviation	T statistics	P values	Path type
V.Traded_1 -> TRI_1	0.574	0.091	6.309	0.000	Direct effect
V.Traded_1 -> TRI_1 -> TRI_2	0.283	0.074	3.813	0.000	indirect effects
V.Traded_1 -> TRI_1 -> TRI_2 -> TRI_3	-0.131	0.035	3.797	0.000	indirect effects
V.Traded_1 -> TRI_2	0.423	0.097	4.379	0.000	total effects
V.Traded_1 -> TRI_3	-0.208	0.056	3.688	0.000	total effects
V.Traded_1 -> TRI_2	0.141	0.125	1.129	0.259	Direct effect
V.Traded_1 -> V.Traded_2	-0.146	0.077	1.888	0.059	Direct effect
V.Traded_2 -> TRI_2	0.005	0.107	0.049	0.961	Direct effect
V.Traded_2 -> TRI_3	0.079	0.091	0.870	0.384	Direct effect

***Source:** Author's own work*

Table3. Quality Measures of the Relationship between Stock Returns.

	Std. Coeff	Standard deviation	T statistics	P values	Path type
TRI_1 -> TRI_2	0.493	0.097	5.080	0.000	Direct effect
TRI_2 -> TRI_3	-0.465	0.081	5.720	0.000	Direct effect
TRI_1 -> TRI_2 -> TRI_3	-0.229	0.056	4.126	0.000	indirect effects
TRI_1 -> TRI_3	-0.229	0.056	4.126	0.000	total effects

Source: Author's own work

Table4. Quality Measures of the Relationship Path between Price Volatility and Stock Market Activity.

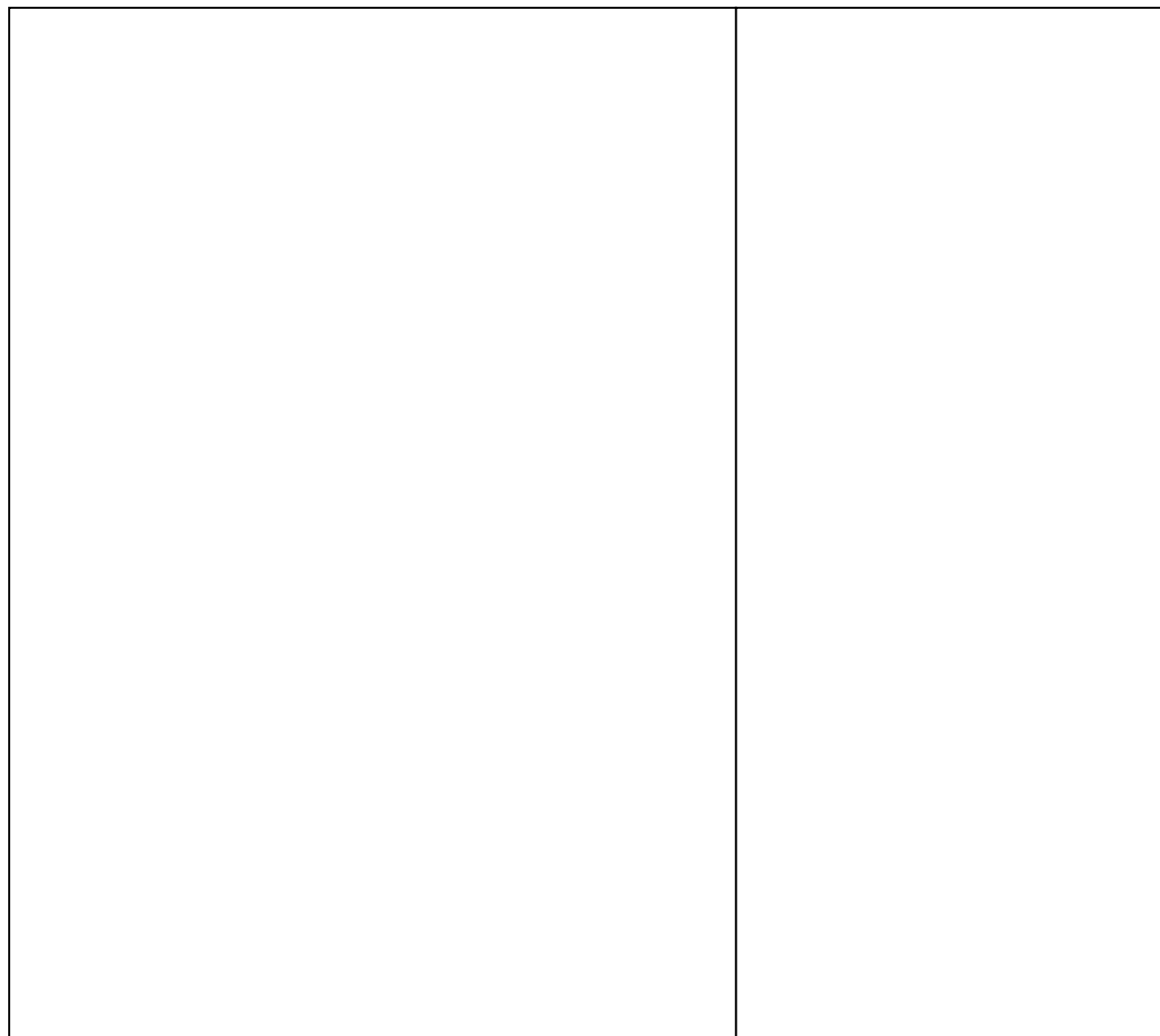|	Std. Coeff	Standard deviation	T statistics	P values	Path type
Price Volatility_1 -> V.Traded_1	0.153	0.142	1.079	0.281	Direct effect
Price Volatility_1 -> V.Traded_2	0.023	0.069	0.332	0.740	Direct effect
Price Volatility_2 -> V.Traded_2	0.002	0.116	0.017	0.987	Direct effect

Source: Author's own work
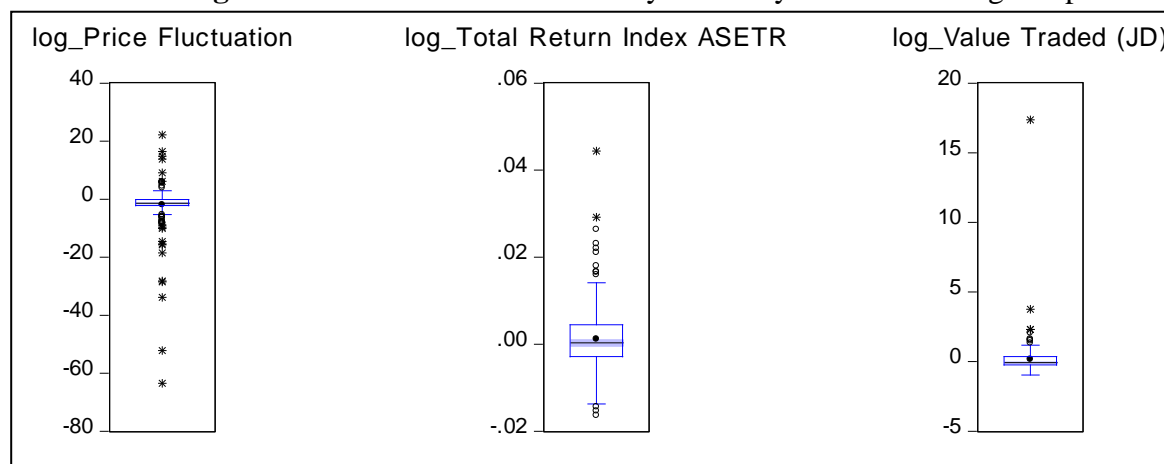
Fig.1. Research Model.
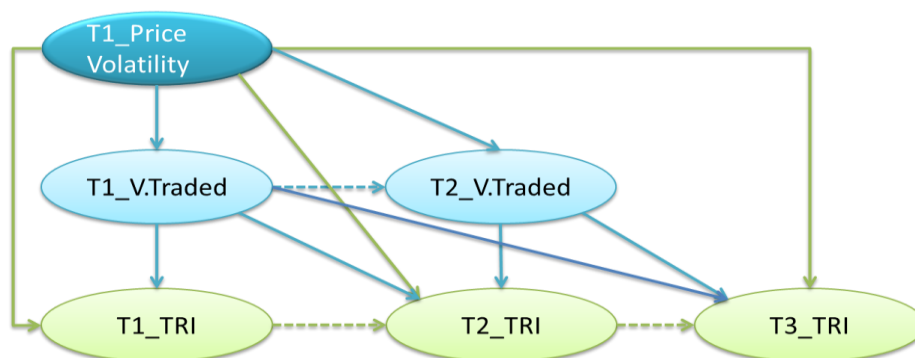
Source: Author's own work
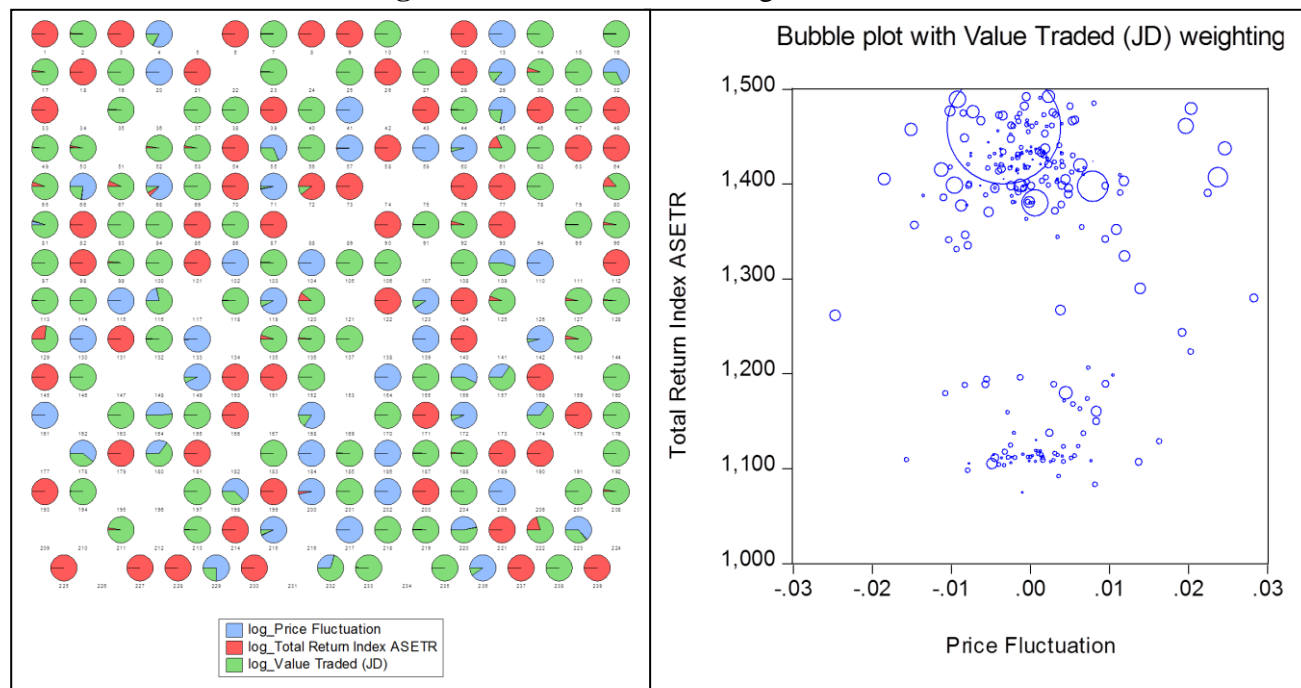
Fig.2. Evolution of Study Variables.

Source: Author's own work

Fig.3. Measures of Central Tendency for Study Variables Using Boxplot.

Source: Author's own work

Fig.4. Data Visualization Using Bubble Plot.

Source: Author's own work

7. Citations:

Salim Djabou, (2023), Market Dynamics in Motion: Exploring the Interplay of Price Volatility, the Activity of Stock Exchange, and its Performance, Journal Of North African Economies, Vol .. / N°(..) 2023, P x