Adv. Math. Fin. App., 2024, **9**(4), P.1166-1187

**Advances in Mathematical Finance & Applications**
**www.amfa.iau-arak.ac.ir**
**Print ISSN**: 2538-5569
**Online ISSN**: 2645-4610
**Doi: 10.22034/amfa.2023.1966543.1793**

Original Research

# Analyzing the Effect of Monetary Volatility on the Iranian Stock Market

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ARTICLE INFO

*Article history:*
Received 2022-09-04
Accepted 2023-03-19

Keywords:
Monetary Policy Uncertainty
Stock Market Price Index
VAR Model
EGARCH Model

ABSTRACT

Nowadays, financial markets and especially the stock market are important and undeniable sources of financing for investment toward the economic growth and development of countries. These markets also have a tangible role as a basis for implementing monetary policy. This study aims to investigate the effect of monetary volatility on the seasonal performance of the Iranian stock market from April 2001 to March 2021.The TEDPIX index of the Tehran Stock Exchange was used for designing and explaining the research model for measuring monetary policy uncertainty in terms of the debt of banks to the Central Bank and to measure the Iranian stock market's performance. With portfolio theory as the theoretical basis for the study, the housing price index and the exchange rate were added to the research model as other independent variables due to their importance to the portfolio of individuals. In this regard, monetary policy uncertainty was first calculated using the exponential general autoregressive conditional heteroskedastic (EGARCH) method. Then, the effect of uncertainty on the TEDPIX index was calculated using the vector auto regression (VAR) statistical method in EVIEWS 12. The findings indicate a significant negative correlation between monetary policy uncertainty and short and long-term TEDPIX index. Moreover, exchange rate and housing price index has a significant positive effect on the TEDPIX index.



## 1 Introduction

Any given country requires an organized, systematized capital market to continue down the development path. Such a marketplace exerts a significant impact on economic performance, while its absence will be detrimental. In the past few decades, countries have paid greater attention to these markets due to their remarkable contribution to economic development. The economic crises of the 1930s in Europe and the United States, 1997 in Southeast Asian countries, and other crises in developed countries are evidence of the reciprocal impact of financial market instability on the global economy and its variables. These crises have caused issues such as widespread unemployment, reduced investment, low economic

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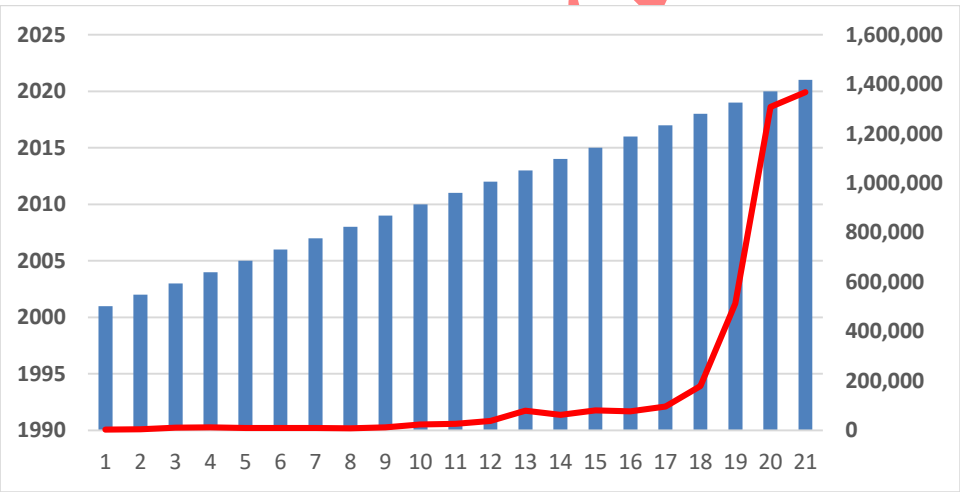
growth, and instability in the economic index in the affected countries. The stock market is one of the critical financial markets significantly contributing to countries' economic expansion or recession. Any recession or prosperity in this market changes economic variables, policies, and decisions in a fundamental manner. Conversely, macroeconomic policies and decisions also affect stock market performance. While the stock market has contributed to certain countries' economic growth and development in recent decades, it has been considered detrimental to the economic growth and development in other countries due to lax laws and regulations, government interference, and other economic and political factors [31]. Monetary policies tend to play an essential role in the economic stabilization of developing countries; therefore, economic policymakers can accomplish their objectives by employing monetary policy instruments effectively. The inappropriate application of these policies may also negatively impact the economic performance of nations by disrupting financial markets. Due to the volatility trend of Iran's stock market from 1990 to 1996, particularly the extreme price volatility in 1991, 1994, and 1995, there has been a significant decline in periodic volatility, the results of which have negatively impacted investor expectations and the prevailing level of uncertainty on this market. In the 2000s, the inappropriate situation and lack of coordination between monetary and financial policies undermined public confidence in the performance of the entire economy and negatively impacted the economic environment of the country. Additionally, this market faced a crisis due to the stock market's lack of development. The recession lasted between 2005 and 2006, as depicted in the following diagram.




Source: Central Bank of Iran

**Fig. 1:** Trend of Stock Market Price Index

As observed in charts 1, the stock market price index suddenly increased in 2008. It also faced a sharp drop from the middle of 2008 after the global financial crisis. From 2009 to 2021, the index has been again on an upward trend. Volatility is the nature of financial markets, but the crises that have arisen in the Iranian stock market are mainly caused by imbalances resulting from the government's policies and interventions. The stock market has anti-inflationary effects compared to the money market; therefore, it prioritizes financing investment projects. Knowledge of the factors contributing to the behavior of the stock market can be an effective step in directing the market toward economic enhancement in countries such as Iran, which is facing a huge volume of wandering capital and a lack of investment resources.

Therefore, it is increasing in importance in the country's economy on a daily basis, and monetary authorities are paying more attention to it. Inquiry into how monetary policy affects the stock market is particularly important and will be necessary for better policy-making. Since the studies carried out so far there has been no research on the effect of monetary volatility through measuring the variable uncertainty of the debt of banks to the Central Bank, which is an important component of the effect of monetary base on the Iranian stock market. Therefore, the novelty of this study is examining the effect of monetary volatility by measuring the variable uncertainty of the debt of banks to the Central Bank on stock market performance. Moreover, as an indicator of market performance, the TEDPIX index is an appropriate tool for knowing the general condition of the stock market and affects the decisions of investors. In this regard, there have been extensive research on investigating the relationship between the overall stock market index, macroeconomic variables, and uncertain monetary and fiscal policy. However, given the constantly-evolving data and financial and economic variables and the importance of this subject, there is a need for extensive research on the different variables in this field. To this end, this study also aims to estimate a dynamic model for the relationship between monetary volatility by measuring the variable uncertainty of the debt of banks to the Central Bank and the TEDPIX index since recognizing the factors affecting the index can help investors select from various investment opportunities.

### 1.1 Research Question

The primary question in the current research is, "How does the uncertainty of monetary policy affect the stock market?"

This article is broken up into six sections. In the first section, the introduction and primary research question are presented. The second and third sections discuss the theoretical foundations and context of the research. In the fourth section, the model's specifications are outlined, while the results are analyzed in the fifth section. Finally, the study's findings and recommendations are laid out in section six.

## 2 Theoretical Foundations

The stock market has multiple roles as regards the adoption of monetary policies. Monetary policy affects the stock market performance via various channels. Stock prices reflect economic developments. As such, they can be built on to guide political decisions. The stock market performance does not simply echo the reaction to monetary policy decisions and economic effects but also provides feedback to the central bank regarding the private sector's expectations about the future of macroeconomic variables [22]. Different schools have different stances concerning how alterations in the money volume affect real economic variables and the price of goods and assets. However, everyone approves that alterations in the amount of money, in the long run, lead to changes in the prices of goods and assets, including stock prices. Keynesians and Monetarists do not agree on what kind of financial assets people replace with money when the money volume increases. Keynesians typically consider assets that have fixed income (such as bonds and treasury) to be a good substitute for money. In the Keynesian approach, the returns of all assets, as well as stocks, are equal and risk-free. The impact mechanism is such that any increase in money supply beyond the reduction in interest rates causes a rise in the demand for financial assets, including stocks, and, consequently, a rise in their prices. Monetarists claim that the increase in the money volume will, directly and indirectly, affect the flow of costs and asset prices. The increase in the money volume distresses the balance between the real and the desired money balance. Moreover, in order to eliminate excess supply, excess demand will arise in a wide range of goods and services and financial assets. Instead, they assume that the assets that replace money are very varied. These assets comprise an extensive range of financial assets with different risks (such as treasury bonds, mortgages,

and shares) as well as real assets (durable goods). According to Monetarists' theory, increased demand for financial assets, including stocks, leads directly to their higher prices [21].The perspectives of various economic schools regarding the impact of monetary policies on the stock market indicate that the fluctuations of monetary policies can have an effect on the stock market. Hence, it is necessary to identify the influence channels. The next section will introduce these channels.

## 2.1 Channels of Influence of Monetary Policies On the Stock Market

Monetary policies affect economic activities in several ways, which are referred to as monetary transmission channels (MTM). Monetary policy is transmitted to the real economy via different channels, which concisely include the traditional interest rate channel, the exchange channel, and the asset/equity channel. These three channels will be briefly described below.

## 2.2 Interest Rate Channel

The interest rate channel is the principal channel of the monetary policy transfer mechanism to the economy in the early Kinesins models. According to this channel, in case a contractionary monetary policy is adopted under the assumption of price stability, it can result in an increase in the real interest rate, which causes an increase in the capital cost of firms and a decrease in the present value of their future net cash flows. As a result, it leads to a decrease in stock prices.

## 2.3 Credit Channel

Any deficiency or friction in the credit market strengthens the effect of monetary shocks on the real variables of the economy through people's expenditure decisions. These deficiencies include the lack of equal access to financial resources by large and small companies and the asymmetry of information among bank loan applicants. As proponents of the credit channel, Bernanke and Gertler [7], believe that monetary contraction reduces deposits in the banking network and bank facilities. A large share of households and enterprises (especially small and medium-sized enterprises that do not have access to other financing markets) rely on banking resources. As a result, households and businesses have reduced their consumption and investment costs as a result of the limited availability of bank credits, leading to a reduction in both total expenses and demand.

## 2.4 Asset/Equity Channel

The monetary policy effects on financial assets are transferred to the economy via the channel of asset/equity and changes in their prices. Effects of monetary policy are communicated through various channels, including the asset/equity channel, which has implications for the stock price.In the economic literature, there is no strong explanation as to how monetary policy affects asset prices. Research has established that monetary policy is not neutral and can change asset prices by changing asset yields [16]. There are three categories of financial assets through which monetary policy affects the economy:

### 2.4.1. Stock Prices

There are two important channels for transmitting the effects of monetary policy on stock prices [23]:

### 2.4.2. Tobin's Q Theory

Based on this theory, Tobin's investment theory offers a mechanism through which monetary policy affects stock valuation. Tobin defines q as the market price of firms divided by the capital replacement cost (value). When an expansionary monetary policy is executed, the upsurge in liquidity will increase the demand for assets, including stocks, and the price of stocks will increase, leading to a higher q. If q is high, the market price of firms is higher than the capital replacement cost, and the value of capital

equipment is low compared to the value of commercial firms. Firms can issue new shares and charge a higher price than the equipment they buy. Hence, investment expenses increase because companies can obtain new capital goods by issuing a few shares. Alternatively, firms do not purchase new capital goods when q is low because the market value of firms is low relative to the cost of capital.

### 2.4.3 Wealth Effect

Another channel is the effect of wealth, which alters consumers' consumption decisions by changing their balance sheets. This channel is justified via Modigliani's life cycle theory and the MPS model [17]. Based on this theory, consumption resources during life come from three sources: human capital, real capital, and financial wealth. One of the effective mechanisms of financial wealth is stocks. As stock prices increase, so do financial wealth and consumption. As in the preceding category, where an upsurge in money volume causes an increase in the stock price, increased money volume also leads to an increase in consumption and total production due to a rise in the expected stock price and, in turn, increased wealth.

### 2.4.4 Housing Price

Both of the above effects can be employed in this category as well. If we consider housing as an asset, expansionary monetary policy will increase the housing price-to-cost ratio (increase q) and the prosperity of this sector by increasing liquidity and demand and, as a result, higher housing prices [23]. The housing itself is a significant constituent of household wealth, and an upsurge in its price means an increase in wealth and leads to an increase in consumption [6].

### 2.4.5 Exchange Rate

Reducing the real interest rate is one way to implement expansionary monetary policy in a country with a floating exchange rate system, which has the effect of lowering demand for the currency of that country. The value of the national currency will fall, and the exchange rate will rise as a consequence. When the value of a country's currency rises relative to another, imports from other countries become more expensive there, while exports to other nations become more affordable. As a result of these exchanges, the assumed country's gross production will rise [13], and exports will rise while imports will fall.

### 2.4.6 Portfolio Theory

One theory used to create the theoretical basis of the model is the portfolio theory, which is related to the asset price channel in the mechanism of communicating the monetary policy to the entire economy. While monetary policy directly affects each of the assets of the asset/equity channel, it can change the composition of these assets in investment portfolios by changing the money volume or induction of a change in each of these assets, exerting an indirect effect on them. The investment portfolio is a concept beyond the stock portfolio and includes other investments (non-stocks). Technically, an investment portfolio is a complete set of real and financial assets. The asset portfolio theory was first presented by Markowitz [20]. It states that investors seek a portfolio of various assets, highlighting that an investor should keep a portfolio of different assets to avoid risk and that different assets do not need to have a positive or negative correlation with each other. What is significant in this theory is the diversity of assets in the asset portfolio and the unlikeness of asset changes. Since diverse assets are not equally affected by economic flows, they do not continuously move in the same direction. By diversifying an asset portfolio, the risk can be reduced so that the return does not decrease or even the risk is reduced. Here, the price change of a competing asset can affect the relative share of the target asset in the asset

portfolio. The combination of alternative and effective assets in stocks is vital for explaining the behavior of the stock price index. We use the asset/equity channel to consider several assets that can be placed in a portfolio with stocks, including exchange and housing. An alteration in the yield of each of these assets can change the asset portfolio's yield and each asset's relative share. Now we inspect the effect of portfolio assets on the stock market price index, focusing on the current research model.

### 2.4.7 Exchange Rate

The exchange rate affects the stock market in two ways. The effect of the exchange rate on the stock price index can be inspected from two viewpoints:

- The impact of exchange rate changes on the firm's performance and, as a result, alterations in their stock prices
- Maintenance of the exchange rate as an asset in the asset portfolio

Many economic enterprises in underdeveloped countries need imports from industrialized countries to supply raw materials, buy machinery, and transfer technology; as such, they are foreign currency demanders. Accordingly, changes in the exchange rate affect companies' production plans such that an upsurge in the exchange rate can increase companies' working capital. It is because production companies need additional financial resources to purchase the same amount from overseas. They either have to reduce their activity or start financing from financial intermediaries. In this case, in addition to the increase in the price of imported raw materials, intermediate materials, or services, the cost of granted facilities or bank interest will also rise, resulting in a decrease in the companies' profits. Thus, changes in exchange rates influence company costs and the expected current and future cash flows and stock returns of economic firms, which can lead to lower stock price. An alteration in the exchange rate can also affect the value of the company's shares from a credit point of view. An increase in the exchange rate makes the foreign currency assets of the company more valuable. Companies' foreign currency assets become valuable with the increase in the exchange rate. Conversely, debts that are in foreign currency become heavier with the increase of the exchange rate, and the value of the company decreases for the shareholders. Reduced profit and income flow of the company will lead to a decrease in stock prices. On the other hand, a change in the exchange rate can cause a change in the competitive position of domestic producers. Accordingly, with an increase in the exchange rate, the price of foreign goods increases in terms of the national currency, and the demand for foreign goods decreases. Domestic goods become relatively cheaper overseas, and as a result, the volume of imports decreases while exports increases [15]. Investors can potentially benefit from currency market fluctuations to adjust to fluctuations in other sectors if they keep a portion of their assets in currency. The foreign exchange market can complement other asset markets. This indicates that the free conversion of assets to each other and the transfer of capital items between markets can play a role in the optimal allocation of an investor's resources among his/her assets. The idea of keeping a portion of the wealth as currency has attained a special stance among wealth owners, and the currency market is one of the most profitable markets despite all its risks and dangers. It is important to keep currency as an asset, along with other assets. Under such circumstances, with each asset price change, the investor will change the composition of this portfolio so that the yield of the total assets increases or at least remains constant. Considering the substitution effect of two assets of currency and stocks in the assets portfolio, it is expected that if the exchange rate increases, the demand for currency will decrease, and, as a result, the demand for shares and the price of shares will increase. Based on the discussed issues, exchange rate fluctuations can affect the stock price index positively or negatively.

### 2.4.8 Housing

Unlike currency, which affects the stock market over numerous channels, housing will have more limited effects on the stock market. In the housing sector, it is expected that the execution of an expansionary monetary policy will increase the demand for housing by increasing the money volume. This depends on many issues, such as the characteristics and economic conditions of each society and people's perceptions. If the money volume increases because of implementing an expansionary monetary policy, people will try to buy other assets such as housing, currency, and stocks besides keeping part of their assets as money so as to make more use of this money volume. If the efficiency of the housing sector is higher than other sectors in the economy, or if people in a given society are more inclined to long-term investment, then the demand for housing will increase and investors will replace housing with other assets such as stocks [13].

## 3 Research Background

This section investigates several international and some domestic studies related to the research subject. Many studies have studied the relationship between monetary policy and the stock market. However, few have investigated the effect of monetary volatility on stock market performance.

Arouri et al. [3] conducted a study investigating the effect of economic policy uncertainty on the US stock markets from 1900 to 2014. They concluded that the increase in economic policy uncertainty significantly reduces stock market returns, which are more stable in volatile periods.

Awadzi and Gar [4] conducted a study entitled "The impact of macroeconomic variables on the capital market: A case of the Ghana stock market." This study used secondary quarterly time series data for thirty years from 1990 to 2019. The unit root test was performed using the generalized Dickey-Fuller test to evaluate the data stationarity. Regression analysis was used to evaluate the effect of macroeconomic variables on stock market performance. Market capitalization was utilized to measure stock market performance. The results revealed that inflation and exchange rate positively affected capital market performance, while the interest rate was detrimental to the capital market. It means that an increase in the inflation rate and the exchange rate increases the capital market performance, while an increase in the interest rate decreases the capital market performance.

Dodig [11] conducted a study entitled "Relationship between macroeconomic indicators and capital markets performance in Southeastern European countries." This study investigated the relationship between efficient capital markets and macroeconomic indicators in five Southeast European countries between 2005 and 2016. A pooled average group estimator was employed to examine the relationship between the macroeconomic index and the stock market indicators' performance, which is a suitable estimate for emerging markets. This category of markets has not matured to the same extent as a developed market, making them vulnerable in terms of efficiency; for example, their stock price may not accurately reflect the most recent public information. When the market is transparent and the investor's behavior is rational, macroeconomic data should be included in the stock index value. By aligning their capital market laws with those of developed nations and enhancing corporate governance and transparency, these five countries could increase investor confidence and liquidity. The results demonstrated a significant correlation between the macroeconomic index and the performance of the capital market.

Chiang [9] conducted a study investigating the effects of US market volatility and monetary policy uncertainty on the global stock market. This study investigated the impact of unexpected monetary growth and changes in US monetary policy uncertainty on international stock returns while controlling for changes in stock market volatility and dividend yield (DY). The tests of North American stock

market indicators consistently demonstrated that monetary growth and monetary policy uncertainty had a negative impact on stock returns, with these effects lasting for one month. More European, Latin American, and Asian market index tests had comparable qualitative results. According to the evidence, increases in the US monetary policy uncertainty were transmitted to international stock markets. This finding supports the international risk/uncertainty insurance hypothesis. The increase in unexpected US monetary growth is measured by monetary growth, which has a less consistent effect on Latin American and Asian stock markets.

Lakdawala [18] conducted a study investigating the effect of monetary policy growth in the United States on financial markets in India. According to them, a significant amount of research has been conducted on the international overflow effects of U.S. monetary policy. Despite this, the Federal Reserve placed significant emphasis on recent unconventional monetary policies. Before employing unconventional policy instruments, US monetary policy decisions significantly impacted Indian stock markets by combining high-frequency financial market data with a time-varying parameters approach. These effects became stronger over time. In addition to the conventional channel of unexpected changes in the policy rate, US monetary shocks were also transmitted through an uncertainty channel, which was especially important for announcements of large-scale asset purchases. Using companies' stock prices, they demonstrated that the increased sensitivity of the aggregate response was monotonous with the stock market and did not result from increased exposure of any specific industry to US monetary policy. The results revealed that the decisions guided the portfolio of foreign institutional investors. In addition, the exchange rate became more sensitive to US monetary policy and the global financial cycle, which worked through volatility and risk aversion.

Wen et al. [33] conducted a study investigating the effects of monetary policy uncertainty on stock returns in BRICS countries. This study examined the heterogeneous and asymmetric effects of monetary policy uncertainty on stock returns in G7 and BRICS countries using the quantile-in-quantile (QQ) approach. There was a general negative effect of monetary policy uncertainty on stock returns in most countries, especially in an area that combined higher quotients of monetary policy uncertainty with lower stock market quantiles. Based on the results, higher uncertainty reduces stock returns when the stock market crashes. It is possible to find the market's positive response to shocks of monetary policy uncertainty in the lower quotients of monetary policy uncertainty, which indicates that uncertainty can increase stock market performance.

Dai and Peng [10] investigated the effects of economic policy uncertainty on the stock market in China. This article examined the overflow effect of volatility in China's economic policy uncertainty index, stock markets, gold, and oil using a time-varying vector auto regression model (TVP-VAR) checks. Three main results were obtained. First, the optional consumption, industry, public services, and financial sectors were systemically important over the sample period. Second, fiscal and trade policy uncertainty contributed more to the overflow effect among the four policy uncertainties. In contrast, monetary policy uncertainty and exchange rate policy contributed less to the overflow effect. Third, during the COVID-19 pandemic, oil overflow from other sources had rapidly declined to a very low point, significantly impacting the net overflow of stock market volatility.

Plakandara et al. [29] explored the effects of conventional and unconventional monetary policies on stock market volatility. They stated that the effects of monetary policy stance during the stock market recession and prosperity had not been clearly defined due to the progress of econometrics over the past 30 years. This article drew on a heterogeneous vector autoregressive (SHVAR) model with identified structural breaks to analyze the impact of conventional and unconventional monetary policies on US stock market volatility. It was concluded that contractionary monetary policy increased stock market

volatility. The importance of monetary policy shocks in explaining volatility changes in different regimes was related to supply shocks (and volatility shocks). According to the authors, monetary policy shocks described a greater fraction of the variance of stock market volatility at shorter horizons, such as medium to longer horizons, than business cycle volatility. The main findings revealed a positive effect of monetary policy on stock market volatility (relatively stronger during quieter stock market periods).

Mousavi Jahromi and Rostami [26] conducted a study investigating the asymmetric effects of monetary policy impulses on the total price index of the stock market in the Tehran Stock Exchange. The estimation results revealed that liquidity volume impulses exerted asymmetric effects on the total stock market price index. Therefore, the unanticipated liquidity volume volatility in the stock market's total price index was more than the anticipated shocks. According to the results, the negative impulses of liquidity volume (lower liquidity volume) affected the total stock market price index more than the positive impulses of liquidity volume (higher liquidity volume).

Badri and Dolo [5] analyzed the effect of macroeconomic variables on stock market performance. The monthly information on the mentioned variables was collected from October 1998 to September 2014. In addition, the Granger causality test, Johanson cointegration test, correlation, regression analysis, and instantaneous reactions tests were used for analysis. The regression analysis revealed that official and unofficial exchange rates, interest rates, and world oil prices correlated positively with the stock market index and official exchange rate. In addition, the industrial production index and inflation rate were linked positively, while the money supply had a negative relationship with the current value of the stock market. In addition, the official exchange rate, inflation rate, and industrial production index positively correlated with the volume of stock market transactions. The Granger causality test demonstrated that the macroeconomic variables established a one-way causal relationship with the current value of the stock market and the volume of stock market transactions with no causal relationship with the stock market index. Fadainejad and Farahani [12] conducted a study investigating the effects of macroeconomic variables on the total index of the Tehran Stock Exchange. This study investigated the effect of eight macroeconomic variables of consumer price index, bank interest rate, gold price, industrial production index, oil price, stock price volatility, exchange rate, and money supply on the total price index of the Tehran Stock Exchange as the principal indicator of Iran's stock market based on monthly data from April 2005 to March 2015. The multifactor regression model tested the relationship between stock index returns and macroeconomic variables. The results revealed that the money growth rate changes harmed the stock index return. In addition, the industrial production index, oil price, stock price volatility, and price positively affected this index. On the other hand, the indicator was not affected significantly by the exchange rate and gold price. Aligholi [1] aimed to determine the effect of macroeconomic variables on the capital structure in the Iranian capital market. The study adopted a correlational design and a combined data approach to analyze the research data and estimate the models. According to the results, the inflation rate, exchange rate, and liquidity volume significantly affected the capital structure, whereas the interest rate did not significantly affect the capital structure. A change in interest rate did not change the debt ratio. The inflation rate and liquidity volume negatively affected the capital structure. Therefore, financial managers are recommended to investigate the required cash, the effect of changes in the inflation rate on the capital structure, the positive effects of the exchange rate, and the changes in these variables when making financial decisions and combining financial resources. Montasheri and Farid [25] inquired into the volatility in capital market performance and the role of macroeconomic variables (evidence from companies admitted to the Tehran Stock Exchange). This study's

statistical sample included 89 companies admitted to the Tehran Stock Exchange based on the data from 2014 to 2018, which were selected using the systematic elimination method. The research results revealed that an increased inflation rate led to higher volatility in companies' short-term and long-term debt structures, which would decrease with an increase in the interest rate. In addition, the results indicated that increasing the economic growth rate would slightly increase the volatility created in the long-term debt structure of companies. Rezaei et al. [30] probed into the impact of monetary policy instruments on Iran's stock market performance and volatility. Highlighting the recent financial crises, especially the financial crisis of 2007-2008, they posed a question: What is the role of monetary policy in the occurrence of financial crises and in preventing financial instability? The article investigated the dynamics of monetary policy's impact on the stock market's return and instability using the structural vector auto regression model from 1992 to 2016 in Iran. Moreover, it assessed the effect of monetary policy on the stock market through different monetary instruments the central bank uses. The four variables of balanced interest rate, monetary base growth rate, legal deposit ratio, and the growth of debt of commercial banks to the central bank were employed as monetary policy tools to capture the monetary policy performance. The instantaneous reaction function results showed that monetary policy instruments did not affect the stock market's return and instability. In addition, the analysis of forecast error variance results revealed that the share of monetary instruments in explaining changes in yield and instability of the stock market was insignificant and less than ten percent for each. However, the share of the monetary base was more pronounced than the others. It is consequently concluded that the central bank's policy tools did not affect the behavior and instability of the stock market. Amiri and Pirdad Biranvand [2] studied the uncertain relationship between Iran's economic policies and the stock market, relying on the Markov regime-change approach. They stated that the stock return rate was a factor taken into account by investors in their decisions. According to them, this efficiency could be achieved with economic stability. Economic policy stability is one aspect of economic stability with an important role in the country's economy. Economic activists will be uncertain about the future developments of the economy if there is uncertainty about economic policies. Moreover, the capital owners can no longer make decisions for the future, including investment, and the money market and the capital market will face problems. This article investigated the effect of economic policy uncertainty on stock market returns using linear and nonlinear models (Markov switching) during 1981-2016. The research employed the variables of economic growth rate, inflation rate, unemployment rate, real profit rate, the uncertainty of economic policies, and liquidity growth rate as independent variables. The article's findings reveal that economic policy uncertainty decreases stock market returns. In addition, the relationship held among stock market returns, the uncertainty of nonlinear economic policies, and the effect of uncertainty on stock returns was stronger and more stable in a regime with high volatility. Zare [34] studied Iran's monetary policy and stock market cycles. Seasonal data from 1990 to 2018 were used in this study. The logarithmic difference of the stock price index was used to calculate the nominal stock return. The inflation rate based on CPI was deducted from the nominal stock return to calculate the real stock return. The real stock returns were included in the analyses to use the results related to real returns and check the consistency of the result. This article employed real money growth (2M) and real interest rate changes to measure monetary policy. The findings of linear and MS models indicated that MS models outperformed linear models. Based on the research findings, MS models identified two regimes with different averages and variances: prosperity and recession. Both regimes were durable, lasting an average of 10-12 seasons. The results indicated that monetary policy significantly affected stock returns only during periods of stock market recession. An increased 2M led to higher stock returns, and the interest rate decreased the stock return. The monetary policy had a stronger impact on stock returns in

periods of market recession than in periods of prosperity to predict models with financial constraints. The TVTP-MS models' results showed that an expansionary monetary policy (positive changes in real 2M or negative changes in real interest rates) increased the probability of staying in the stock market prosperity regime and reduced the possibility of changing from a prosperity regime to a recession regime. In addition, the expansionary monetary policy alleviated the probability of staying in a recessionary market regime while it could increase the probability of changing from recession to prosperity. The estimation of the models suggested that monetary policymakers should pay attention to the prosperity and recession cycles of the stock market when applying monetary policies because monetary policy exerted different effects on stock returns in different periods of stock market prosperity and recession. In addition, active investors in the stock market pay attention to monetary policy developments when making investment decisions. They should also note that the effect of monetary policy on stock returns depends on whether the stock market is in a state of prosperity or recession. Mahdilo and Asgharpour [19] conducted a study entitled "The mechanism of nonlinear transmission of monetary policy from stock price channel in Iran: A nonlinear approach." To investigate the role of the stock price channel in the money transfer mechanism, the authors built on the nonlinear method, which has a high capacity for including structural change. Gross national product, consumer price index, the volume of the monetary base, and the Tehran stock exchange price index from 1991 to 2016 were used for research data. The share of the stock price channel in the transfer of money to production in the zero regimes (years after 2005) was greater during the eighth and sixteenth seasons than in the one regime (years before 2005). After the sixteenth season, this channel share is larger in the one regime. On the other hand, this channel had very low inflation effects in both regimes. Consequently, proper planning for institutionalization, the enhanced role of the stock market in financing, and increased market effectiveness can improve the monetary policy's effectiveness on production and reduce its inflationary effects. Nasabiyan et al. [27] conducted a study investigating the factors affecting the stock market's performance with an emphasis on monetary policies in selected countries of the Middle East. This study, emphasizing monetary policies, investigated the factors affecting the stock market's performance. A selected number of Middle Eastern countries were studied, including Iran, Kuwait, Qatar, Oman, and Lebanon, from 2006 to 2019. The research results revealed that the growth of liquidity volume positively and significantly affected the volume of transactions in the capital market. However, the real interest rate caused a decrease in the volume of transactions in the stock market. The above results indicate that monetary policies can affect the stock market differently. Mohammadi and Hosseini [24] investigated the effect of monetary policy impulse on the stock price bubble. They stated that the bubble in the financial markets and its possible collapse could cause uncertainty and capital withdrawal from productive markets. Therefore, policymakers seek to plan and implement appropriate policies to deal with the crisis and prevent its negative effects. Similar to other financial markets in other countries, the Iranian stock market is not immune from this phenomenon. This research stimulated the effect of the relative size of the stock price bubble on the effectiveness of the monetary policy in reducing or eliminating the stock price bubble by using TVP-VAR model estimation and extracting instantaneous reaction functions of variables to monetary policy shock using Iran's quarterly data for interest rate, GDP, GDP adjuster, consumer price index, stock price index, and cash interest from April 2003 until december 2019 seasonaly. Based on the results, applying a contractionary monetary policy can effectively reduce the price bubble when the price bubble component is small compared to the fundamental component. When the price bubble component is large, implementing contractionary monetary policy makes the bubble larger. Moreover,

the study found that some variables, such as interest rate, GDP, GDP modifier, dividend, and the fundamental component of stock prices, had a stable behavior pattern over time. However, the stock price and its bubble's reaction to the policy shock have not been stable. In addition, the extent of their negative reaction decreased over time. Their reaction also increased since the first period in the last years of the sample.

## 4 Characterization of the Model and Constituent Variables

The variables that can reflect the behavior of monetary authorities are required to investigate the effects of monetary volatility on the stock price index. In western countries, the interest rate is used as a monetary policy tool. However, the interest rate cannot be employed as a policy tool in Iran due to prohibited usury activities. Each year, the central bank announces the bank interest rate according to the laws of Islam, and the banks pay the interest to investors according to one or more Islamic contracts. However, the interest rate does not hold the capacity to cover immediate effects (shocks) in Iran. In addition, it does not have the necessary efficiency due to the difference in interest rates in different economic sectors. Therefore, most monetary policy changes in Iran are made through changes in the volume of liquidity or the money supply .For this purpose, banks' debt to the central bank is considered a monetary variable that is both part of the monetary foundation and controllable by the central bank. In [13], the legal deposit rate, banks' debt to the bank central bank, and the debt of the non-governmental sector to the banks were included in the model. The variable of the banks' debt to the central bank was observed to have the most significant effect on the stock price index. In our study, the volatility of banks' debt to the central bank is first calculated using the EGARCH model. Subsequently, its effect on the stock price index is investigated. In addition, the variables of exchange rate and housing price index will be included in the model as a symbol of changes in alternative asset stocks. The data have been extracted seasonally from April 2001 to March 2021 from Iran's Central Bank website, the economic indicators section.

The econometric form of the model is as follows:

$$y_t = \psi_0 + \sum_{i=1}^{4} \psi_i y_{t-i} + \varepsilon_t \tag{1}$$

$$y = (LS, UNB, LHOME, LE)$$

Where,

**LS** denotes the logarithm of the stock price index. The stock price index represents the total market index of the Tehran Stock Exchange.

**UNB** is the uncertainty of banks' debt to the central bank. Banks' debt to the central bank (NB) consists of loans and credits granted by the central bank to banks, and its uncertainty will be calculated using the EGARCH model.

**LHOME** represents the logarithm of the housing price index. The rent index of rented housing is used as a symbol of the housing price index.

**LE** expresses the logarithm of the exchange rate in the informal (free) market.

As mentioned, we initially determine monetary uncertainty (uncertainty of banks' debt to the central bank) using the EGARCH model. Afterward, we explain the relationship between the study's variables using the vector auto regression approach. As Nelson [28] proposed, the EGARCH or exponential

GARCH model formulates conditional variances differently. The conditional variance of the exponential GARCH model is calculated as follows:

$$Ln\sigma_t^2 = \omega + \beta Ln\sigma_{t-1}^2 + \gamma \frac{u_{t-1}}{\sqrt{\sigma_{t-1}^2}} + \alpha \left[ \frac{|u_{t-1}|}{\sqrt{\sigma_{t-1}^2}} - \sqrt{\frac{2}{\pi}} \right] \quad (2)$$

This model has some advantages. First, the dependent variable $\sigma_t^2$ is logarithmic in this model; therefore, the coefficients of the variables on the right side can be positive or negative, which will be positive in the state $\sigma_t^2$. Thus, there is no need to apply this restriction that the coefficients must be non-negative. Secondly, shocks are considered in this model if their effect is asymmetric because $\gamma$ is coefficient of $u_{t-1}$ that $u_{t-1}$ can be positive or negative. If $\gamma$ equal to zero, the negative shock's effect is greater than the positive shock's effect. In other words, the positive shocks' effects are equal $\gamma$, and the negative shocks' effects are equal $\gamma + \alpha$ [32].

VAR models are based on empirical relationships that exist between the data. The system of simultaneous equations is considered a summarized form, where each endogenous variable is regressed on its breaks and the breaks of other variables in the system. The VAR model is helpful as it utilizes fewer variables than other econometric models.

The creation of such models is straightforward, and their application requires no prior knowledge of the causal relationships between variables. The VAR model assumes that each variable is influenced by the past of the variable itself as well as the present and the past of other variables in the model. Therefore, unlike structural models, VAR models have no regard as to which variables are considered endogenous or exogenous by theoretical foundations.

## 5 Estimation of the VAR Model and The Analysis of Results

### 5.1. Uncertainty Estimation of Banks' Debt to the Central Bank

The best ARIMA(p,d,q) model should be first selected to estimate the uncertainty. For this purpose, the stationarity of the time series is checked. According to the Dickey-Fuller unit root test results, the time series is not stationary at the 5% level. Therefore, we consider its first-order difference (Table 1).

**Table 1:** The generalized Dickey-Fuller test

| Variable | Test process | Test statistics | critical quantity at the 5% level | status |
|---|---|---|---|---|
| NB | Intercept and no trend | 0.008 | -2.898 | Non-stationary |
| | Intercept and trend | -2.361 | -3.468 | Non-stationary |
| | No intercept and trend | 1.728 | -1.944 | Non-stationary |
| NB(-1) | Intercept and no trend | -6.674 | -2.899 | stationary |
| | Intercept and trend | -6.630 | -3.468 | stationary |
| | No intercept and trend | -6.346 | -1.945 | stationary |

According to the chronogram diagram results, PACF and ACF are outside the average value in Observation 1. Therefore, the time series has AR (1) and MA (1).We estimate the variable using the simple OLS method and the resulting p as the time series break and q as the disturbance sentence break. It is

evident that all components of auto regressions and moving averages are statistically significant (According to the Box-Jenkins method, if they are not significant, the coefficients that are statistically less significant than the remaining variables are removed, and the model is estimated again [8]. Therefore, this estimate can represent the optimal ARIMA, which is ARIMA (1,1,1), for our study. The variance is expected not to be constant during the random process of the desired series and is a function of the behavior of the error sentences. ARCH family models can explain the conditional variance trend according to their past information. In addition, they can be used for time series with volatility and those whose variance changes over time. Notably, uncertainty can be estimated using GARCH methods only when the ARCH effect test confirms the presence of conditional heterogeneity. Therefore, the conditional heterogeneity test of disturbance sentences is examined in this section using the LM-ARCH test.

**Table 2:** LM-ARCH Test Results

| Test statistics | Statistical quantity | Significance |
|---|---|---|
| F statistic | 2.826 | 0.0655 |
| Number of observations × $R^2$ | 5.467 | 0.0650 |

As observed in Table 2, the null hypothesis concerning the homogeneity of the variance of pattern disturbance sentences is rejected with a 90% confidence level. In other words, there is heterogeneity variance for the variable. There are different criteria for choosing the optimal p and q in the EGARCH(p,q) process. This study used Akaike's (AIC) and Schwartz's (SC) criteria, as described in Table 3.

**Table 3:** Choosing the optimal p and q in the EGARCH(p,q) process

| Criterion | (0,1) | (1,0) | (1,1) |
|---|---|---|---|
| **Akaike** | 23.6 | 24.2 | 23.6 |
| **Schwartz Bayesian** | 23.7 | 24.3 | 23.8 |

Ivano and Kilian [14] showed that the Schwartz criterion is the most suitable optimal intercept criterion for models with a sample size of less than 120. At this stage, the optimal EGARCH(p,q) interval is selected according to the minimum value of the Schwartz criterion. According to Table 3, the uncertainty of the time series of banks' debt to the central bank is estimated, considering EGARCH (0,1) as the estimation criterion.

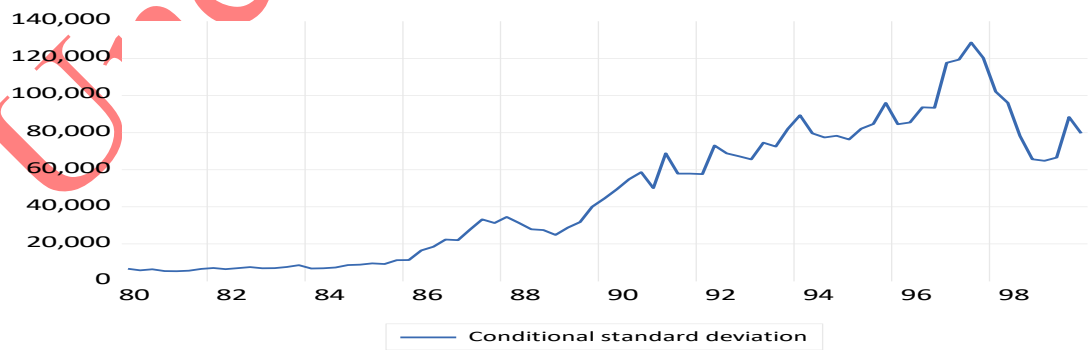



**Fig. 2:** Uncertainty of banks' debt to the central bank

As observed in Fig. 2, the uncertainty of the banks' debt to the central bank does not follow a uniform and invariable trend. In addition, it does not have uniform positive or negative volatility. Additionally, the volatility does not exert the same effect. Below, we analyze the variables used in the research and estimate the model after calculating the uncertainty of banks' debt to the central bank as described above.

## 5.2. Estimation of Vector Autoregression Model

### 5.2.1. Qualitative Statistics of Variables

The descriptive parameters of each variable are separately calculated after collecting the data and calculating the variables used in the research.

Table 4 indicates the statistical description of the variables used in the model for all the observations of this research. These parameters include information related to central indicators such as mean, median, minimum, and maximum, as well as information related to dispersion indicators such as standard deviation, skewness, and kurtosis.

**Table 4:** Descriptive Statistics of Research Variables

| | The logarithm of the stock price index | Uncertainty of banks' debt to the central bank | The logarithm of the housing index | Exchange rate logarithm |
|---|---|---|---|---|
| Mean | 10.32466 | 11.90509 | 4.302704 | 9.937576 |
| median | 10.08107 | 12.68716 | 4.463029 | 9.325333 |
| Maximum | 14.28249 | 14.11051 | 5.38587 | 12.51203 |
| Minimum | 8.116035 | 7.994727 | 3.049273 | 8.986497 |
| The standard deviation | 1.488605 | 2.094314 | 0.594692 | 1.019162 |
| skewness | 0.810896 | -0.64528 | -0.46325 | 0.941717 |
| kurtosis | 3.195597 | 1.841094 | 2.290003 | 2.771382 |
| Total | 825.9725 | 952.4069 | 344.2163 | 795.0061 |
| Total variance | 175.0597 | 346.5059 | 27.93906 | 82.05656 |
| observations | 80 | 80 | 80 | 80 |

Source: Researcher's Findings - Eviews Software

As observed in Table 4, the average stock price index, the uncertainty of banks' debt to the central bank, the housing price index, and the exchange rate values are 10.3, 11.9, 4.3, and 9.9, respectively, and their medians are respectively 10, 12.6, 4.4, and 9.3. These statistics indicate that most of the data related to the variables used in the model are centered on the average. In addition, dispersion indices are a measure to determine the degree of dispersion of data from each other or the degree of dispersion compared to the average. The standard deviation is one of the most critical dispersion indices, which is the ideal condition for introducing the variable into the regression model.

As observed in Table 4, the standard deviation of the variables is not zero, making it an appropriate candidate to be introduced to the regression model. The skewness parameter reveals the degree of asymmetry of the frequency curve of the variable.

If the skewness coefficient is zero, the population is perfectly symmetrical. If the coefficient is positive, there will be skewness to the right; if it is negative, skewness will be leftward. In this regard, the stock price index and the exchange rate variables have a skewness to the right, while the uncertainty of the banks' debt to the central bank and the housing price index have leftward skewness. In addition, the kurtosis of the stock price index distribution is 3.1, roughly equal to the normal distribution, i.e., 3, and the kurtosis of other variables is wider than the normal distribution. Lastly, the number of observations for the mentioned variables equals 80.

### 5.2.2. Stationary Test

Table 5 displays the generalized Dickey-Fuller test for the variables in the model.

**Table 5:** The generalized Dickey-Fuller test

| Variable | Test process | Test statistics | Critical quantity at the 5% level | Status |
|---|---|---|---|---|
| LS | Intercept and no trend | 1.781 | -2.898 | Non-stationary |
| | Intercept and trend | -1.081 | -3.468 | Non-stationary |
| | No intercept and trend | 2.669 | -1.945 | Non-stationary |
| LS(-1) | Intercept and no trend | -6.140 | -2.899 | stationary |
| | Intercept and trend | -6.264 | -3.468 | stationary |
| | No intercept and trend | -5.376 | -1.945 | stationary |
| UNB | Intercept and no trend | -2.071 | -2.900 | Non-stationary |
| | Intercept and trend | -1.877 | -3.471 | Non-stationary |
| | No intercept and trend | 1.196 | -1.945 | Non-stationary |
| UNB(-1) | Intercept and no trend | -3.621 | -2.901 | stationary |
| | Intercept and trend | -4.100 | -3.471 | stationary |
| | No intercept and trend | -2.543 | -1.945 | stationary |
| LHOME | Intercept and no trend | -1.085 | -2.898 | Non-stationary |
| | Intercept and trend | -1.817 | -3.467 | Non-stationary |
| | No intercept and trend | 3.388 | -1.945 | Non-stationary |
| LHOME(-1) | Intercept and no trend | -8.416 | -2.899 | stationary |
| | Intercept and trend | -8.380 | -3.468 | stationary |
| | No intercept and trend | -7.389 | -1.945 | stationary |
| LE | Intercept and no trend | 0.720 | -2.899 | Non-stationary |
| | Intercept and trend | -1.697 | -3.468 | Non-stationary |
| | No intercept and trend | 1.995 | -1.945 | Non-stationary |
| LE(-1) | Intercept and no trend | -5.323 | -2.899 | stationary |
| | Intercept and trend | -5.593 | -3.468 | stationary |
| | No intercept and trend | -4.876 | -1.945 | stationary |

Table 5 demonstrates that all the model variables are stationary in their first-order difference.

### 5.2.3. Vector Error Correction Model

First, the optimal interval of the model variables is checked to estimate the long-term relationship of the investigated variables in the model framework (VAR). Table 6 presents the results of the VAR model's optimal intervals.

**Table 6:** Determining the Interval of the VAR Model

| Lag | Log L | LR | FPE | AIC | SC | HQ |
|---|---|---|---|---|---|---|
| 0 | -224.231 | NA | 0.00477 | 6.00607 | 6.128741 | 6.055095 |
| 1 | 256.4294 | 898.0755 | 2.34e-08 | -6.22183 | -5.60848 | -5.9767 |
| 2 | 292.9273 | 64.35143* | 1.37 e -08* | -6.761244* | -5.657212* | -6.320019* |
| 3 | 301.382 | 14.01703 | 1.68 e -08 | -6.56268 | -4.96797 | -5.92536 |
| 4 | 311.8043 | 16.18195 | 1.98 e -08 | -6.4159 | -4.33051 | -5.58248 |

Based on the test results to determine the optimal interval of the VAR model and the Schwartz criterion, the second interval is chosen as the optimal interval for this model. Tables 7 and 8 show the effect and maximum eigenvalue test results to determine the number of cointegration vectors.

**Table 7:** The Results of the Effect Test to Determine the Number of Co-Accumulated Vectors

| Null hypothesis | The opposite hypothesis | Test statistics | 95 % Confidence level critical value | A significant percentage (prob) |
|---|---|---|---|---|
| r=0 | r≥1 | 59.78176 | 54.07904 | 0.0142 |
| r≤1 | r≥2 | 29.97437 | 35.19275 | 0.164 |
| r≤2 | r≥3 | 15.3033 | 20.26184 | 0.2095 |
| r≤3 | r≥4 | 6.232763 | 9.164546 | 0.1735 |

**Table 8:** The Results of the Maximum Eigenvalue Test to Determine Co-Accumulated Vectors.

| Null hypothesis | The opposite hypothesis | Test statistics | 95 % Confidence level critical value | A significant percentage (prob) |
|---|---|---|---|---|
| r=0 | r=1 | 29.80739 | 28.58808 | 0.0348 |
| r≤1 | r=2 | 14.67107 | 22.29962 | 0.4026 |
| r≤2 | r=3 | 9.070538 | 15.8921 | 0.4263 |
| r≤3 | r=4 | 6.232763 | 9.164546 | 0.1735 |

The null hypothesis is rejected and indicates the relationship of co-accumulation if the test statistic is greater than the critical level value. According to the above two tables, the presence of at most one co-accumulation relationship is confirmed. Therefore, the long-term relationship of model variables is as follows:

$$LS = -6.35 - 0.39\,UNB + 1.92\,LHOME + 1.35\,LE$$

(-6.63) (-3.20) (4.06) (10.71)

As observed, in the long term, the uncertainty of banks' debt to the central bank affects the stock price index in a significant, negative manner, while the housing price index and exchange rate have a positive and significant impact on it.

### 5.2.4 Instantaneous Response Functions

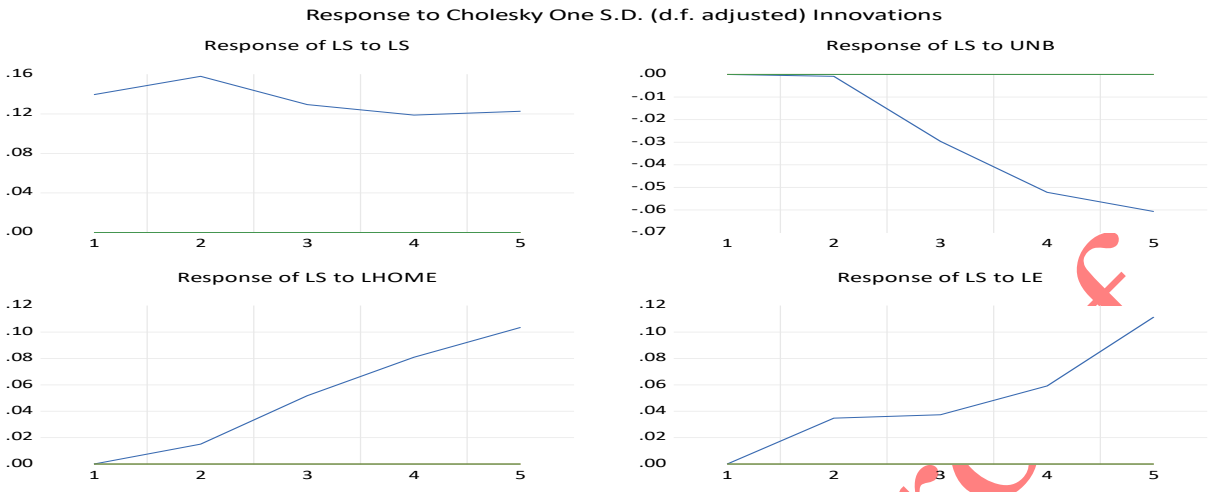



**Fig. 3:** The Instantaneous Reaction of the Stock Price Index Variable to the Shock of Other Variables

Figure 3 illustrates that the shock on the stock price index affects the variable. It has a rising effect until the second period, a decreasing effect from the second to the third period, and an increasing effect on the stock price index until the end. The shock on the uncertainty variable of banks' debt to the central bank has a constant and decreasing effect until the second period. In addition, it always has a decreasing effect on the stock price index from the second period onwards. The shocks in the exchange rate and housing price index in the mentioned period had an increasing effect on the stock price index.

### 5.2.5 Analysis of Variance

**Table 9:** Results of Stock Price Index Variance Analysis

| The period | S.E. | LS | UNB | LHOME | LE |
|---|---|---|---|---|---|
| 1 | 0.14833 | 100 | 0 | 0 | 0 |
| 2 | 0.223986 | 99.44952 | 0.330588 | 0.006886 | 0.213011 |
| 3 | 0.276753 | 96.42799 | 1.08167 | 0.318926 | 2.171413 |
| 4 | 0.326383 | 89.69418 | 1.759917 | 1.252743 | 7.293162 |
| 5 | 0.379658 | 81.05224 | 2.102316 | 2.274214 | 14.57123 |

Over time and with the passage of 5 periods of changes in the stock price index, 81% of the changes are explained by the variable, 2% of these changes by the uncertainty variable of the banks' debt to the central bank, 2% by the housing price index variable, and 15% by the exchange rate variable.

## 6 Conclusion and suggestions

In the current study, to answer the primary research question concerning how monetary policy uncertainty affects the stock market, the researcher investigated the effect of monetary fluctuations on the stock market price index via the VAR from April 2001 to March 2021 seasonally. The variable of banks' debt to the central bank was used to extract the uncertainty index of monetary policy, and the Exponential Generalized AutoRegressive Conditional Heteroscedasticity (EGARCH) variance was built on to

calculate the uncertainty of the said variable. As the asset/equity channel and the portfolio theory constituted a theoretical view of the issue, we added the housing price index and the exchange rate to the model because of their significance in the asset portfolio of individuals. The results of the model estimation are as follows.

In the short term, the shock of the uncertainty of banks' debt to the central bank, as one of the most significant components of the monetary base, had a constant and decreasing effect until the second period. From the second period onwards, it perpetually had a decreasing effect on the stock market price index. Likewise, in the long term, the variable of the uncertainty of banks' debt to the central bank has a negative and significant effect on the stock market price index. In response to the primary research question, it can be mentioned that the monetary policy shock had a negative effect on the stock market price index, suggesting that unanticipated alterations in monetary policy can negatively affect the stock market index. Since the money market is one of the most dynamic economic markets, the inequity in this market is rapidly transferred to other markets, including the stock market, causing instability and uncertainty in these markets. Economic uncertainty pushes liquidity toward real assets, which will distress the balance in the market of the desired assets, increasing the price of real assets such as gold. With the reduction in investment, economic uncertainty removes liquidity from the production sector, which is the responsibility of the stock exchange to finance it. This will decrease production, economic growth, and employment in the future. It can reduce price shocks and instability in the capital market, particularly the stock market, by regulating the amount of liquidity available in the economy in accordance with the country's economic needs and the planned inflation target. The Ministry of Economy and Finance plays a significant role in regulating and guiding money market activities and coordinating monetary policies with the set of macroeconomic policies of the government. This institution coordinates monetary flows with real flows to create stability in the national economy and pave the ground for the effective application of monetary policies, which can set the agenda for making the country's banking network more efficient .The shocks in the housing price index in the stated period had a growing effect on the stock price index. Regarding the positive and significant correlation between the housing price index and the stock market price index, the alterations in the housing price index and the progress in this sector have positive and increasing effects on the stock market index. Such positive effects are attributable to the increase in the amount of liquidity and its fluctuations, which has caused an increase in the housing price index and, subsequently, the stock market index in the investigated period. It must be mentioned that the economic basis of this relationship cannot be acceptable based on the asset portfolio theory and the substitution relationship between these two assets. However, it seems that investment in the housing market has become one of the most profitable investments since the last decade because of the changing attitude of households to the necessity of owning independent houses and the increase in the country's population. Industries related to the housing market, such as cement, lime, plaster, and steel, also play an effective role in the stock market. By monitoring the development of such industries and the increase in expectations of the stock price of this group of companies, we can justify the positive and significant effect of the housing price index on the stock market price index. One reason for the increase in the stock price index is that this asset, similar to other assets such as gold, is prone to market price fluctuations and acts as a shield against inflation. Therefore, based on the discussion above and with some caution, we can acknowledge a positive association between housing prices and the stock price index. According to the findings, the housing price index positively influenced the stock market index, suggesting that the housing market could be used as a mechanism for transferring monetary policies and its fluctuations in order to arrive at an appropriate monetary policy

in light of the optimistic outlook for the elimination of international sanctions .The relationship between the exchange rate and the stock market price index was positive and significant. Put differently, the shocks in the exchange rate in the mentioned period had an increasing effect on the stock price index. The effect of exchange rate changes on performing companies admitted to the stock exchange and the change in their stock value can be seen as the cause of the positive relationship between the exchange rate and the stock price index. The increase in the exchange rate has led to an increase in the foreign currency assets value of companies active in the stock market through an increase in their profits and income, which will lead to a rise in the value of the firms' shares for the shareholders. Likewise, With the period under review seeing an increase in the exchange rate and also the effect of international sanctions, the price of foreign goods has increased in terms of the national currency, causing a decline in demand for foreign goods and, thus, their import. By accepting this scenario, profits for domestic producers will rise as their competitive position improves; together with an increase in the value of their shares, this will boost the total price index of the stock market. On the basis of the results and the fact that the exchange rate had a positive impact on the stock market index, it is recommended that appropriate monetary policies be implemented to stabilize the prices of assets, including stocks so that fluctuations in the exchange rate are kept to a minimum, and the stock market can reap the benefits of the exchange rate's positive impact on the stock market index .The analysis of variance for the dependent variable revealed that monetary policy uncertainty has a dominant effect on the behavior of its next period .Regarding the negative effects of monetary policy uncertainty on the stock market index, changes in the basic banking financial system and the insurance market's growth can be useful in the short term to control stock market fluctuations. The insurance market, as one of the financial sectors of the national economy, has the significant function of providing economic security. Due to the growth of the insurance market on the stock exchange, economic uncertainty will be reduced directly, and with the expansion of investment, it will provide the foundation for increasing economic stability and, consequently, the growth of the capital market. Lastly, since in the model of factors affecting stock prices, the speed of change or the speed of moving towards long-term equilibrium is slow, it is necessary to focus on the detrimental effects of negative shocks on the stock market. The government must exercise extreme caution when determining policies, particularly macroeconomic policies, and avoid adopting hasty and untested policies because, based on the rate of decline in the above model, adopting such policies will have long-term negative effects on the stock market. Increasing the absorption of liquidity in the stock market and paving the way for economic growth and development in the country can be achieved by implementing appropriate diplomatic policies towards international events, controlling the country's risk, and increasing the information transparency of companies active in the stock exchange.



## References

[1] Aligholi, M., The effect of macroeconomic variables on capital structure in Iran's capital market, *Strategic and Macro Policies*, 2018; 6(23): 398-413.

[2] Amiri, H., and Pirdad Biranvand, M., Uncertainty of Iran's economic policies and stock market based on the Markov regime change approach, *Financial Science of Securities Analysis*, 2019; 12(44): 49-67.

[3] Arouri, M., Estay, Ch., Rault, Ch., and Roubaud, D., Economic policy uncertainty and stock markets: Long-run evidence from the US, *Finance Research Letters*, 2016;18(C):136-141.

[4] Awadzi, D. M., and Garr, D. K., The Effect of Macroeconomic Variables on Capital Market Performance: A Case of Ghana Stock Exchange, *International Journal of Business Management and Economic Review*, 2020; 3(5): 44-54.

[5] Badri, A., and Dolo, M., Investigating the impact of macroeconomic variables on stock market performance, *Perspective Journal of Financial Management*, 2016; 6(13): 9-35.

[6] Bank of England, The Transmission Mechanism of Monetary Policy, London: Bank of England, *The Monetary Policy Committee*, 1999.

[7] Bernanke, B., and Gertler, M., Inside the Black Box: The Credit Channel of Monetary Policy Transmission, *Journal of Economic Perspectives*, 1995; 4: 27-48.

[8] Box, G.E.P., Jenkins, G.M., Time Series Analysis, Forecasting and Control, Revised Edition 1976, *Holden-Day, San Francisco*, 1970.

[9] Chiang, T. C., Spillovers of US market volatility and monetary policy uncertainty to global stock markets, *The North American Journal of Economics and Finance*, 2021; 58: 101523.

[10] Dai, Z., and Peng, Y., Economic policy uncertainty and stock market sector time-varying spillover effect: Evidence from China, *The North American Journal of Economics and Finance*, 2022; 62: 101745.

[11] Dodig, A., Relationship between Macroeconomic Indicators and Capital Markets Performance in Selected Southeastern European Countries, *Zagreb International Review of Economics and Business*, 2020; 23(2):55-88.

[12] Fadainejad, M. I., Farahani, R., The effects of macroeconomic variables on the total index of the Tehran Stock Exchange, Financial Economics (Financial Economics and Development), 2017; 11(39): 1-26.

[13] Hassanzadeh, A., Nazarian, R., and Kianvand, M., The effect of monetary policy shocks on stock price index fluctuations in Iran, Journal of Money and Economics, 2011; 9: 1-44.

[14] Ivanov, V., and Kilian, L., A practitioner's guide to lag order selection for VAR impulse response analysis, *Studies in Nonlinear Dynamics and Econometrics*, 2005; 9.

[15] Kim, K., Dollar Exchange Rate and Stock Price: Evidence from Multivariate Cointegration and Error Correction Model, *Review of Financial Economics*, 2003; 12: 301-313.

[16] King, M. R., The Preferences of Institutional Investors for Macroeconomic Policy, *Working Paper Series of London School of Economics*, 2000.

[17] Kuttner, N., and Mosser, P. C., The Monetary Transmission Mechanism: Some Answers and Further Questions, *Economic Policy Review Federal Reserve Bank of New York*, 2002; 8(1):15-26.

[18] Lakdawala, A., The growing impact of US monetary policy on emerging financial markets: Evidence from India, *Journal of International Money and Finance*, 2021; 119: 102478.

[19] Mahdilo, A., and Asgharpour, H., The mechanism of nonlinear transmission of monetary policy from the stock price channel in Iran: a nonlinear approach, *Economic Policy*, 2020; 12(23): 65-98.

[20] Markowitz, H., Portfolio selection, Journal of Finance, 1952; 7: 77–91.

[21] Miller, K., and Show Fang, G., Is There a Long-Run Relationship Between Stock Returns and Monetary Variables: Evidence from an Emerging Market, *Applied Financial Economics*, 2001; 11: 641-649.

[22] Mishkin, F.S., The Transmission Mechanism and the Role of Asset Prices in Monetary Policy, *Journal of Macroeconomics*, 2001; 30:1756 -1791.

[23] Mishkin, S. F., The Channels of Monetary Transmission: Lessons for Monetary Policy, *NBER Working Paper Series*, 1996; 5464.

[24] Mohammadi, T., and Hosseini, S. M., Investigating the effect of monetary policy impulse on the stock price bubble (TVP-VAR model), *Stable Economy*, 2022; 3(1): 1-36.

[25] Montasheri, M., and Farid, D., Fluctuation in capital structure and the role of macroeconomic variables (evidence from companies listed on the Tehran Stock Exchange, *Review of Iranian Economic Issues*, 2019; 6(2): 254-233.

[26] Mousavi Jahormi, Y., and Rostami, N., Investigating the asymmetric effects of monetary policy impulses on the total stock price index in Tehran Stock Exchange, *Financial Knowledge of Securities Analysis*, 2015; 8(26): 62-47.

[27] Nasabiyan, Sh., Rahimi, R., and Kohi, M., Factors affecting stock market performance with an emphasis on monetary policies in selected countries of the Middle East, the 10th International Conference on New Researches in Management, *Economics and Development*, 2021.

[28] Nelson, D. B., Conditional Heteroskedasticity in Asset Returns: A Nee Approach, *Econometrical*, 1991; 59(2): 347-370.

[29] Plakandara, V., Gupta, R., Balcilar, M., aJi, Q., Evolving United States stock market volatility: The role of conventional and unconventional monetary policies, *The North American Journal of Economics and Finance*, 2022, 60, P. 101666.

[30] Rezaei, Gh., Shahrashtani, H., Hejbarkiani, K., and Mehrara, M., The impact of monetary policy on stock market performance and volatility (a comparison between monetary policy tools in Iran), *Economic Modeling Research Quarterly*, 2019; 10(36): 75-126.

[31] Salmani Bishak, Mr., Barghi Oskooee, M., Lak, S., The impact of monetary and financial policy shocks on the Iranian stock market, 2015.

[32] Suri, D., Econometrics with the use of Eviews7, *Culture and Science Publication and Noor Alam Publishing*, 2011.

[33] Wen, F., Shui, A., Cheng, Y., and Gong, X., Monetary policy uncertainty and stock returns in G7 and BRICS countries: A quantile-on-quantile approach, *International Review of Economics & Finance*, 202; 78: 457-482.

[34] Zare, R., Monetary Policy and Stock Market Cycles in Iran, *Scientific Research Quarterly Journal of Quantitative Economics*, 2022; 19(1): 1-27.