ESTIMATING THE COMMON AND IDIOSYNCRATIC LATENT DYNAMIC FACTORS AFFECTING THE FINANCIAL MARKETS IN IRAN

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Abstract

Financial markets are considered one of the most vital components of any economy that provides immediate access to public capital and makes it available to commercial entities. The policymakers, who are responsible for planning economic development, are required to have sufficient control over this market behavior. The present research aimed at investigating and recognizing the common and idiosyncratic latent factors affecting the capital markets (dollars, coins, housing, and stock market) in Iran in the interval of 2011:03 to 2021:02. The results revealed that the latent common factor has the least impact on the stock market. The latent common factor affects the housing market with a coefficient of 0.73, and the coefficient of this variable was respectively 0.97 and 0.90 for the coin and dollar market, and the greatest effect of the latent common variable on the financial markets is observable in these two markets. On the other hand, the idiosyncratic latent variable has a greater impact on the stock market, but the greatest influence on dollars and coins has been imposed by the latent common factor, namely monetary policies. This result is in line with the results of studies accomplished in recent years in the country.

Keywords: *Stock Market, Gold Market, Housing Market, Markov- switching Dynamic Factor Model, Time-varying parameter Analysis*

1. INTRODUCTION

Financial markets are considered one of the most vital components of any economy that provides immediate access to public capital and makes it available to commercial entities. If we assume that the problems of Iran's international relations (economic and political relationship between Iran and the United States) and Iran's infrastructure issues are frequently solved over time, it is expected the Iranian stock market as an inseparable component of the developing economy will considerably develop as a crucial investment method in the future since it attracts a noticeable percentage of domestic investors' capital. The policymakers, who are responsible for planning economic development, are required to receive the necessary training and have sufficient control over this market behavior. This study can be regarded as the initial stage of further research on stock market behavior. Meanwhile, various social, cultural, and psychological factors affecting the Iranian economy and making people (or the whole society) invest in the stock market instead of gold or housing have never been identified, and further research is required. Therefore, understanding the relationship between macroeconomic variables and financial markets is of special importance since the macroeconomic variables have a systematic impact on financial markets so as the economic forces affect the discount rate and turn macroeconomic variables into a component of high-risk factors in the market through this mechanism (Chen et al., 1986). Arbitrage pricing theory assumes that financial markets can be affected by the behavior of economic structures. There are many channels to investigate the relationship between financial markets and macroeconomic variables. For instance, Friedman (1985) used wealth and substitution effects to measure the relationship between the stock market and money. In addition, three distinct hypotheses, i.e., Frankel's (1976) financial market hypothesis, Dornbusch and Fischer's (1980) good market hypothesis, and Frankel's (1983) financial portfolio balance hypothesis can be used to explain the theoretical relationship between the stock market and the exchange rate. The relationship between the stock market and the macroeconomic

factors and financial markets is one of the key issues in developed and developing economies since the capital market is one of the key barriers to capital accumulation in these countries. Regarding society's orientation towards financial markets in recent years, especially the stock market, most experts believe that the significance of the capital market has increased and will increase. Accordingly, the proper understanding of the relationships and the impact of macroeconomic factors and financial markets on this market, identifying the relation of these markets as well as the common and idiosyncratic factors driving them will help a more precise understanding of these markets as well as the economy of Iran. In addition to deeper perception, it will develop society's macro policies regarding the market's effectiveness. Many types of research have been accomplished in this field nationally and internationally in different countries. In Iran, there have been different researches concerning the influence of macroeconomic factors on capital markets including the housing market, gold market, stock market, and foreign exchange market; but unfortunately, no research has been done on identifying the common and idiosyncratic factors driving these markets.

The value of the Rial is decreasing every year and the investment process (especially in the form of a portfolio) has not yet been updated in Iran. Further, due to the decrease in the value of the Iranian Rial, the real rate of stock return is not profitable and, in most cases, Iranians tend to invest in tangible assets such as gold, real estate, or foreign currency, which satisfy them as a barrier against inflation and provide an acceptable rate of return (except the recent years, of course, that it has not prevented investment in other markets yet). These tangible assets (gold, real estate, and foreign currencies) have tuned into an investment substitution for the stock market. In other words, as previously mentioned, buying stocks, gold, and real estate (such as Real estate investment trusts) which are possible in the American and European stock markets, are not taken into account in the Iranian stock market investment. As a result, each of these markets acts as a financial market, and the performance of each of these markets or their integration affects the others. So, in short, it can be said that the mentioned markets, like housing, enjoy investment demand in addition to consumer demand in Iran, and these goods are considered capital goods in Iran. Therefore, identifying the common and idiosyncratic latent factors affecting these financial markets is of special importance. To do so, recognizing the weight of these common and idiosyncratic latent factors of each market on the financial markets is discussed. Accordingly, the theoretical foundations and empirical literature and the factors affecting the financial markets have been reviewed and the results of model estimation and conclusions are presented as follows:

2. REVIEW OF THEORETICAL LITERATURE AND RESEARCH BACKGROUND

2-1. Theoretical foundations

Every economy has four types of markets: goods market, money market, securities market, and labor market (Wongbangpo & Sharma, 2002). The sum of goods and labor markets is considered the real sector of the economy, and the other two markets form the financial sector of the economy (financial markets). Studying these markets is important at least for two reasons: First, financial markets are affected by the announcement of any event occurred in other markets. Any important situation can change the price of financial assets, especially stocks. In the efficient market hypothesis, Fama states that the price of securities reflects fairly without any bias all the information available in the market (Hendriksen & Van Breda, 1992). Second, according to the Markov Switching portfolio theory, people tend to reduce risk and increase its associated return, and try to form a portfolio including various appropriate investments. So, they may invest in diverse markets. As a result, these markets (i.e., gold, currency, real estate, bonds or bank deposits, etc.) can substitute for each other. According to the Capital Assets Pricing Model (CAPM) proposed by Linter and Sharp (1961), both factors related to economic conditions (systematic risk) and factors related to firm conditions can change stock returns. The capital assets pricing model is a single-factor model. In other words, it includes merely one factor entitled beta as a systematic risk indicator. Because systematic risk is the only risk that remains even after diversification, the modern financial theory focuses on its factors. According to this theory, the long-term return of personal assets reflects the violation of systematic risk factors (i.e., factors derived from changes in economic variables). As previously mentioned, CAMP considers one factor for

pricing securities, but factors other than beta may affect the assets market.

In 1970, emphasizing further factors, Ross presented another model for securities pricing in Arbitrage Pricing Theory (APT). The main purpose of this model was to consider various risk factors to justify the violation of stock returns (Sekhara et al., 2000). The first theory is related to the relationship between inflation and the stock market. Irving Fisher states that the nominal stock return should vary along with the expected inflation rate. Fisher's hypothesis is applicable not only to interest rates but also to any asset. For instance, its application to stock returns means that an increase in the inflation rate enhances nominal stock returns, and investment in the stock market is a hedge for investors' protection against inflation. Although the results of some research accomplished in the world don't correspond to Fisher's hypothesis, the relationship between inflation and return is known as the stock return-inflation puzzle. Inflation is one of the important variables effective in developing systematic risk. The effects of inflation are observed in the optimization of economic enterprises. As the accomplished studies reveal, high inflation causes more inflation and, accordingly, more fluctuations in the markets. This leads to higher returns in the stock market in the later periods and, on the other hand, high inflation decreases long-term investments. In high-inflation economies, banks and financial intermediaries are less willing to lend, which itself causes non-optimal allocation, and, accordingly, the bond market would have less liquidity.

Identifying the relationship between inflation and financial markets is of utmost importance since the high inflation rate makes the financial system inefficient by developing financial uncertainty and friction in the markets and disrupting the allocation of resources. With the increase in purchasing power risk, the slope of the Capital Market Line (CML) and Beta are affected in the capital asset pricing model. On the other hand, the production cost is increased by the increase of inflation, which will lead to the reduction of the company's profitability as well as its risk-taking. The exchange rate is another factor affecting systematic risk since unpredictable changes in exchange rates affect many companies, including those that have relations with the companies of other countries. For instance, loans and payments that must be repaid in foreign currency expose shareholders to exchange rate risk. Whereas the house as an asset constitutes a significant part of the households' wealth, the house and other assets price fluctuation, its role on the business cycles fluctuation as well as its analysis are decisive for establishing the stability of the financial assets price. The increase in financial prices as a result of wealth affects consumption and investment. For example, the increase in wealth as a result of the increase in housing prices will increase consumption as well as the growth of general economic activities. Therefore, the decrease in asset prices, such as stocks and housing, considerably affects wealth, which causes a significant decrease in consumption and investment, and economic activities. So, the relationship between the housing market and the stocks sounds significant. Accordingly, housing yield can be a suitable measure to examine the effect of housing on systematic risk.

The present value model or the discounted cash flow model is the most well-known theory used for stock pricing. This model is well described by Crowder and other scholars. The intrinsic stock price is valued as the present value of the expected dividends and cash flows in the future of the company and the final stock price in the last period of the financial horizon. The intrinsic stock price is simultaneously determined by two components: future cash flows and discount rate. Therefore, the monetary policy can have access to several monetary tools such as open market operations, discount loans, and required reserves through the cash flows of the central bank. Further, it can determine the discount rate and the federal funds rate to influence the financial markets and real economic activities. In general, all the scales of monetary policy can be summarized in two main channels: changes in money value and changes in short-term interest rates. These two scales are often correlated, so an increase in bank reserves imposes downward pressure on the short-term interest rate that clears the reserve market. However, this is true only under conditions of money demand stability. If the money demand increases, an increase in the money supply does not necessarily lead to a decrease in interest rates. Another exception derives from the current zero lower bound interest rate scenario, which rejects further policy interest rate reduction. Hence, it is proposed to examine distinctly the effect of change in money supply and change in interest rate. It is generally believed that expansionary monetary policy, which is considered an increase in money supply or a decrease in

short-term interest rate policy, can increase stock prices by increasing future cash flow and decreasing the discount rate. However, the actual mechanism is so complex. The expansionary monetary policy can affect the stock market positively or negatively. Furthermore, the effects imposed through these two channels can confirm or reject each other. In general, the stock price's reaction to expansionary monetary policy is positive in interest rate reduction. For this reason, the central bank has a long-standing tradition of reducing short-term interest rate policy to improve stock market conditions. More detailed reasons for this positive relationship are represented as follows: First, a lower interest rate is indicative of a lower discount rate, which implies a higher present value of future cash flows and thus a higher stock price, regarding the future cash flows stable. Second, when interest rates decrease, the bank reserves as well as investments in bonds or other earning-related investment sectors become less profitable and less attractive. Financial market participants tend to invest in stocks, which leads to an increase in the demand for stocks and, as a result, stock price increases. Third, companies with high debt on their balance sheets will benefit from lower interest rates which lead to higher net income and stock prices. Moreover, it is less expensive for companies to apply for a new loan to grow their business, which is desirable for the financial condition of the companies and the growth of their stock value. Fourth, by decreasing the interest rates, consumers will be more willing to apply for loans to finance large purchases. This considerably affects special industries such as real estate and automobiles, which increases corporate earnings and stock prices.

However, there are several exceptions, leading to a possible negative relationship between expansionary monetary policy, interest rate reductions, and stock price flows. First, companies suffer damage from interest rate reductions in some industries. For example, a lower interest rate entails a lower net profit margin in the banks. This will cause a reduction in profits and stock prices in the banking industry, which will lead to a negative relationship between expansionary monetary policy, interest rate reduction, and stock prices. Secondly, international capital mainly makes decisions based on the interest rate of the target country. However, lower interest rates are not attractive to international capital and even cause an increase in domestic money liquidity, which is detrimental to the domestic stock market and stock prices. Thirdly, as explained by Cornell (1983), money and stocks are considered two financial assets among the portfolio assets of investors. The interest rate reduction means a lower opportunity cost of saving money in the portfolio, which encourages investors to substitute stocks with money. Less demand for stocks leads to a decrease in stocks price. The above-mentioned positive and negative relationship between interest rate reduction, expansionary monetary policy, and stock prices may eliminate each other. Theoretically, the final relationship can be positive or negative, depending on which force dominates the other. More strangely, expansionary monetary policy in increasing money supply can also have positive or negative effects on stock price movements. The following reasons explain the positive effect of expansionary monetary policy on stock prices when increasing the money supply. First, more money supply allows banks to have more inventory to lend. It makes it easier for consumers to get loans for larger purchases, which helps increase corporate earnings and stock prices. Simultaneously, companies can more easily access loans that boost business development and stock price growth. Second, in the real activity hypothesis proposed by Cornell (1983), one of the responsibilities of the Federal Reserve is to balance money demand and money supply. An increase in the money supply refers to the demand for further money predicted by the Federal Reserve, which is resulted from higher expected future production which increases the company's future income and cash flows and leads to an increase in the stock price. In addition, higher expected future production can significantly improve investor feeling, which is appropriate for stock price growth. Therefore, changes in money supply are indicative of a positive relationship with stock prices. On the other hand, the expansionary monetary policy of an increase in money supply can also have negative effects on stock prices. The stock market could perceive the increase in money supply as a strengthening signal of economic exposure to trouble and that the Federal Reserve is taking measures to support the faltering market, creating a pessimistic sentiment and harming market sentiment and stock performance. Moreover, according to Keynes' price stickiness hypothesis, the increase in money supply will increase the real money. The interest rate should decrease to increase the demand for money as compensation for money market settlement. Whereas there is a possible

positive relationship between interest rates and stock prices (as previously mentioned), the concluded impact of an increase in money supply on stock prices is likely to be negative. Finally, a higher money supply will lead to expected future inflation. Since stock return has a negative relationship with inflation, stock prices will decrease as a result of high inflation. It is not possible to determine the effect of expansionary monetary policy on stock movements due to the mentioned reasons.

Mitchell and Burns (1996) and Radhach and Diebold (1996) presented two key features of business cycles: the co-movement of macroeconomic variables and asymmetries between economic expansions and contractions. Further, the National Bureau of Economic Research (NBER) proposes a rule for finding the periods of business cycles as well as the timing of economic regime shifts in the United States. NBER aims at changing several important variables as well as changing the positive growth to negative one to discover the economic peak time (time of transition from expansion and contraction). The depth of the economic situation is defined exactly as opposed to the mentioned definition. These definitions have been approved by many scholars since the business cycle variation. These two features (co-movement and asymmetry) also correspond to the cycle of financial market fluctuations. The first feature is the co-movement of financial prices in different sectors. Common dynamics in different financial prices can be estimated by using the common latent factor in the moving dynamic factor model that considers the effect on the movement of the entire financial market. The dynamic factor model was proposed by Watson and Stock (1989 and 1991), which successfully measures common factors that estimate co-movement among different variables. The second feature represents the difference in the behavior of financial markets in expansions and contractions. For example, there is a possibility of different growth rates and fluctuations in different regimes of financial markets. However, these linear models cannot measure the dynamic price asymmetry of financial markets. Hamilton (1989) presented the Markov switching model. This type of non-linear structure model was devised to find different regimes and their variation times.

Therefore, dynamic factor and Markov switching models were selected as the main research model to find turning points in financial markets and to study the two inherent features of financial markets, i.e., co-movement and asymmetry. More precisely, one of the main goals of this research is to combine the dynamic factor model with the Markov switching model to create a new structure of financial market indicators for better expression of the movement of financial markets in Iran. The Markov-switching dynamic factor model is performed using Kalman (1960) and Hamilton (1989) filters. In the dynamic factor model, the clusters of different common shifts of financial market indices are considered in expansions and contractions. The Markov-switching model examines asymmetry in financial markets in growth and volatility states and can identify turning points in the market using transition probability in a statistical form.

Radhach and Diebold (1996) presented a Markov-switching dynamic factor model to examine the two mentioned features in one model. Although they did not estimate this model due to the limitations of heavy computer calculations. Yoo and Kim (1995) and Chauvet (1998) developed the Markov-switching dynamic factor model and estimated both common dynamic factors and transition probability simultaneously using the maximum likelihood estimation method. Chauvet's (1998) method is used in this research. Kim and Nelson (1999) presented a summary of the details and their algorithm will be applied as the main reference in this research. The Markov-switching dynamic factor model uses state-space models. State-space models were developed by Kalman (1960) to solve dynamic problems involving unobservable state variables. State-space models consist of two equations: measurement equation and transition equation. Measurement equations represent the relationship between observable variables and unpredictable state variables. The transition equations indicate the dynamic relationships between the state variables and their delays. In these models, the common factor takes into account the upward and downward fluctuations of all financial markets. In other words, financial markets are improved when all markets are simultaneously developing. Conversely, markets fall into recession when all financial markets are simultaneously crashing. If an index is rising and other market indices are falling or stable, that movement is considered an idiosyncratic component of that market (and not an unpredictable common factor).

2-2. Research background

In recent years, many studies have evaluated the relationship between stock index and macroeconomic variables. The relationship between variables such as currency exchange rate, money reserve, industrial production index, gold price, inflation, import, export, interest rate, oil price, gross domestic product, and stock index have been taken into account in these studies. These studies are divided into domestic and foreign research.

2-2-1. Review of domestic research

Mohammadi and Taghavi (1999) examined the relationship between macroeconomic variables such as the house price index, average transportation price index, and exchange rate in the stock market by applying Vector autoregression (VAR). They estimated the impact of these macro indicators on the stock market 13%. Mehran (2007) studied the causal relationship between the Tehran stock market and three economic factors money supply, trade balance, and industrial production. In general, he found a significant relationship between macro variables and the stock market. Abbasian et al. (2008) and Saeidi and Amiri (2011) examined the impact of macroeconomic variables including consumer price index, exchange rate, and crude oil price in the Tehran stock market using the OLS method. Their findings revealed no significant relationship between the stock market, the consumer price index, and the exchange rate, but the crude oil price harms the Tehran stock market. Alavi Rad (2011) investigated the relationship between Tehran Stock Market with the consumer price index, exchange rate, and liquidity by applying the vector autoregression (VAR) method. The results of his research indicated that the impact of macroeconomic variables on the Tehran Stock Exchange is estimated to be 12%. He found that the effect of macroeconomic factors on the Tehran Stock Exchange is not noticeable. According to Darabi and Farhi's (2010) findings, there is no relationship between capital market risk and return with the macroeconomic variables in the Tehran stock exchange. Nasrollahi et al. (2011) examined the relationship between macroeconomic variables and the Tehran Stock Exchange using seasonal data and concluded that the stock market is affected by the past prices of the stock market, exchange rate, and added value of the industry in the short term. Further, it is affected by gold price, consumer price index, consumer products, service index, exchange rate and added value of the industry, and exports in the long term. Bahar Moghadam and Kavehrouei (2013) researched the impact of macroeconomic variables such as gross domestic product and inflation in the Tehran stock market using monthly and daily data. Their findings in the case of seasonal data showed that there is no significant relationship between macroeconomic variables and Tehran Stock Exchange. Shahabadi (2013) revealed that there is no significant relationship between systematic risk in Tehran Stock Exchange and macroeconomic variables, but the relationship between the stock risk and return was reported as positive from 2001 to 2009. Samadi, Bayani, and Ghalandari (2012) studied the relationship between macroeconomic variables and stock returns. The results of their research revealed that there is a weak relationship between macroeconomic variables and stock returns, and economic variables vary from country to country. Khodaparasti (2014) did research on the role of macroeconomic variables in the Iranian stock market in the interval of 2007 to 2011 and the results showed that the exchange rate and industrial index have a greater impact on the stock market in comparison to inflation and liquidity.

2-2-2. Review of related foreign research

Yull (2014) investigated the effect of macroeconomic factors on the stock market in Estonia using seasonal data from 2000 to 2013. The results revealed that the debt-to-GDP ratio, real GDP, as well as German stock index has a positive impact on the Estonia stock market index. Further, the exchange rate, domestic interest rate, expected inflation rate, and the government bonds yield in the Eurozone have a negative relationship with the Estonia stock market index. Haruna Issahaku et.al (2013) examined the correlation between macroeconomic variables and stock market returns in Ghana using ADF (AugmentedDickey–Fuller), PP (Phillip-Peron), and KPSS (Kwiatkowski– Phillips– Schmidt– Shin). Their findings showed that there is a long-term relationship between stock returns and inflation, money supply, and foreign direct investment. Further, a significant relationship was observed between stock returns and macroeconomic variables including interest rates, inflation, and money supply in the short term. In addition, the relationship between stock returns and FDI in the short term was merely

hypothetical. This study also confirmed a dynamic causal relationship between inflation and exchange rates with stock returns. Ifuero Osad Osamwonyi (2012), attempted to establish a relationship between the Dhaka stock market and four macroeconomic variables. The noticeable result of his research is that the Bangladesh stock market was insensitive to information flow concerning the money supply and inflation rate. Laopodis (2013) studied the dynamic relationship between monetary policy and the stock market during three regimes with distinct monetary policies since the 1970s. His research reveals evidence of asymmetric effects of monetary policy on stocks in different monetary policy regimes and stock market conditions. Zhou and Chen (2013) applied the two-state Markov switching model to explain the behavior of crude oil over 26 years and found that the combined probability approach can better represent oil price variations. Balcilar et al. (2015), examined the relationship between US crude oil and stock prices in the stock market using the Markov switching model and monthly data from 1859 to 2013. Regarding the variance-covariance matrix and oil-stock price, they estimated two regimes, one indicating high volatility and the other one indicating low volatility, and found out that the high-volatility regime existed before and after the Great Recession as well as the 1973 oil price crisis. The low-volatility regime often occurs when oil markets relinquish control over international oil companies. Further, they found that a high-volatility regime is likely to occur during the economic recession.

3. RESEARCH MODEL AND METHODOLOGY

The present research attempts to investigate the common and idiosyncratic latent factors of financial markets using the Markov-switching dynamic factor model and to specify which one will have more influence in determining the financial markets' return by comparing these two factors.

The Markov-switching dynamic factor model is used to identify the observable common vector of the variables that evolve over time (y_t) from unobservable dynamic factors (f_t). Unobservable dynamic factors (following self-regression) have conditional averages and volatilities that are a function of a Markov state variable (S_t) to measure asymmetry in financial markets in terms of growth and volatility rate. The St is a random variable with zero and one values and is indicative of the type of regime (expansion and contraction) in the financial markets. In addition, the observable vector of the variables that evolve over time is affected by a vector of idiosyncratic disturbance (e_t) which measure the idiosyncratic characteristics of each market that are considered observable variables specific to each financial market. The latent factors also follow the auto-regression time series process, which can be presented in AR (1) or AR (2) forms. Mathematically, the Markov-switching dynamic factor model can be expressed as follows:

(1) $\Delta Y_t = \gamma \Delta f_t + \Delta e_t$

(2) $\Delta f_t = \mu_{st} + \emptyset \Delta f_{t-1} + w_t, w_t \sim i.i.d.N(0, \sigma^2_{w-S_t})$

(3) $e_t = \varphi(L) e_{t-1} = \epsilon_t, \epsilon_t \sim i.i.d.N(0, \Omega)$

(4) $\mu_{St} = \mu_0 S_t + \mu_1 (1 - S_t), S_t = 0.1$

(5) $\delta^2_{w-S_t} = \sigma^2_{w-0} + \delta^2_{w-1}(1 - S_t), S_t = 0.1$

Where L is the delay operator and Δ=1 - L. Δf_t is it an unobservable common factor obtained from financial markets? γ is the loading factor vector which specifies the share of each financial market. et is the allocation components vector of each financial market that represents the idiosyncratic features of each market and has a normal distribution.

Markov-switching transformations from one state to another one is controlled by the transition probability matrix of $p_{ij}=p(s_t=j|s_{t-1}=i)$ under the condition of $\sum_{j=0}^{1} p_{ij} = 1, i, j = 0.1$. In addition, it is assumed that Δe_t and w_t are reciprocally independent of past and future. $\varphi(L)$ and Ω are assumed as diagonal vectors in the dynamic factor. It is also assumed that the common factor of f_t and idiosyncratic one of e_t are independent of each other in the past and future. The common and idiosyncratic factors distinctly follow their auto-regression process. In dynamic factor models, it is widely accepted that the dynamic factor follows AR (1) variance; but the dynamics of idiosyncratic

factors have different possibilities. The two well-known samples, namely AR (1) and AR (2) will be applied in this research.

4. MODEL ESTIMATION RESULTS

The present research aimed at investigating and recognizing the common and idiosyncratic latent factors affecting the capital markets (dollars, coins, housing, and stock market) in Iran in the interval of 2011:03 to 2021:02. Firstly, the significance of the variables is examined that the related results have been presented in Table 1.

Table 1. Results of significance and non-significance based on Augmented Dickey-Fuller test (Source: research findings)

Variable	Variable symbol	t-statistic	prob	Significance
Dollar return	E	-4.2999891	0.0086	Significant
Stock return	S	-3.749093	0.0072	Significant
Inflation rate	INF	-4.200466	0.0109	Significant
Rental yield	H	-1.237004	0.0020	Significant
Gold (coin) yield	G	-3.606508	0.0104	Significant

In this section, the common and idiosyncratic factors affecting the financial markets are examined. The results are presented as follows:

Table 2: Model estimation results (source: research findings)

Covariance Analysis: Ordinary
Date: 06/21/22 Time: 11:53
Sample: 1959M02 1968M02
Included observations: 109

Correlation / Probability

	E3	F3	Y3
E3	1.000000		

F3	-0.024721	1.000000	
	0.7986	-----	
Y3	0.406103	0.903509	1.000000
	0.0000	0.0000	-----

Covariance Analysis: Ordinary
Date: 06/21/22 Time: 11:54
Sample: 1959M02 1968M02
Included observations: 109

Correlation / Probability

	E4	F4	Y4
E4	1.000000		

F4	0.202233	1.000000	
	0.0350	-----	
Y4	0.405830	0.977136	1.000000
	0.0000	0.0000	-----

Covariance Analysis: Ordinary
Date: 06/21/22 Time: 11:52
Sample: 1959M02 1968M02
Included observations: 109

Correlation / Probability

	E2	F2	Y2
E2	1.000000		

F2	0.113023	1.000000	
	0.2419	-----	
Y2	0.754233	0.737646	1.000000
	0.0000	0.0000	-----

Covariance Analysis: Ordinary
Date: 06/21/22 Time: 11:51
Sample: 1959M02 1968M02
Included observations: 109

Correlation / Probability

	F1	Y1	E1
F1	1.000000		

Y1	-0.080893	1.000000	
	0.4031	-----	
E1	-0.082102	0.999999	1.000000
	0.3960	0.0000	-----

As it is observed in Table 2, the results of model estimation revealed that the latent common factor has the least impact on the stock market. The latent common factor affects the housing market with a coefficient of 0.73, and the coefficient of this variable was respectively 0.97 and 0.90 for the coin and dollar markets the greatest effect of the latent common variable on the financial markets is observable in these two markets.

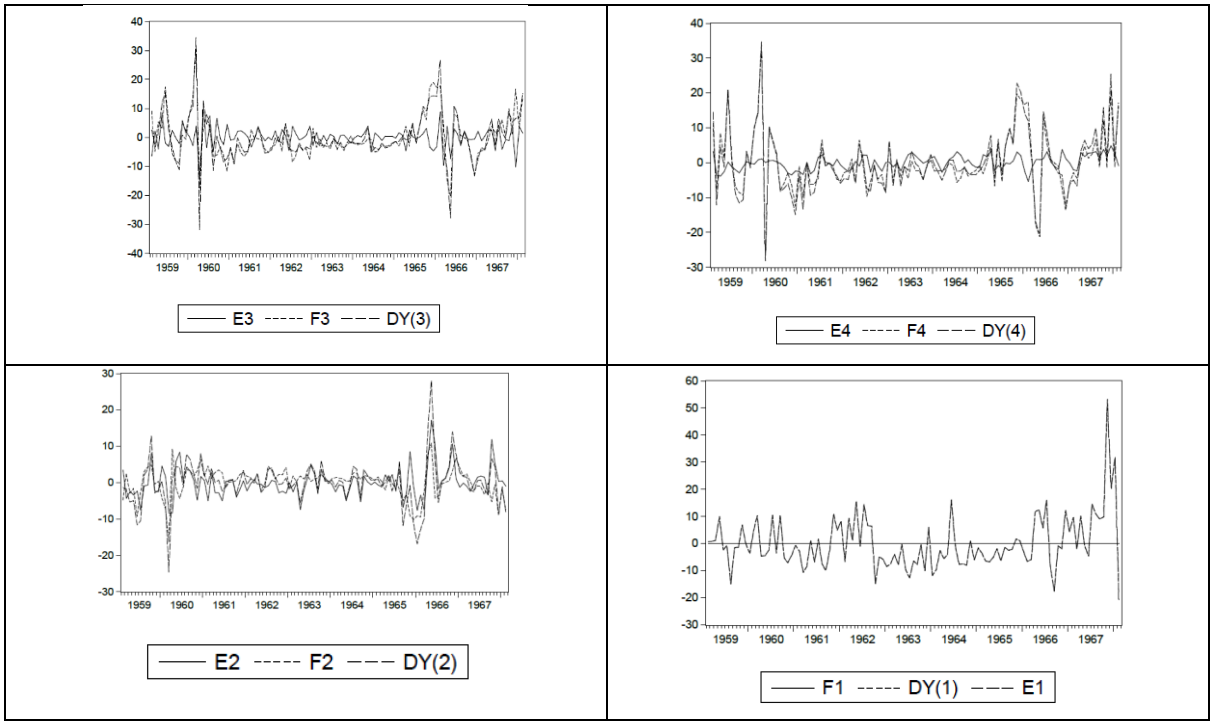

Diagram 1. Impact of common and idiosyncratic latent variables on stock, gold, currency, and housing variables (source: research findings)

On the other hand, as shown in Diagram 1, the idiosyncratic latent variable has a greater impact on the stock market, but the dollar and coins are affected more by the latent common factor, namely monetary policies. This result corresponds to the results of recent studies accomplished in the country. For instance, in recent years, the dollar and coin have increased along with the increase in liquidity, and then housing is increased with a delay. However, the idiosyncratic factors have the greatest impact on the stock market and the liquidity will not necessarily increase or decrease by the application of monetary policies. Stock return is one of the fundamental principles of investment in the stock market and helps investors in financial analysis and forecasts. Stock return is affected by various asset returns, changes in economic and political conditions, risks, factors affecting the assets' future cash flows, factors affecting the behavioral reaction of a wide range of decision-makers, investors' expected rate of return, and many other factors. Theoretically, these factors are divided into two internal and external categories. At the company and industry level, the factors such as financial ratios, profit margins, the results obtained from the study of a firm's financial statements, and the factors affecting expansion and contraction in a particular company or industry are considered internal factors. Accordingly, these factors can be largely controlled by the enterprises' management. However, there are macroeconomic, social, and even political factors that influence the stock price and returns, which are beyond the control of the firms' management and are therefore considered external factors. The inflation rate, interest rate, economic growth rate, tax, subsidy, relevant laws and regulations, liquidity volume, business cycles, alternative investment rate of return, and economic, social, and political policies of the government are considered external factors. The sales price of the firm's products and services is increased in the long term and, as a result, the firm's sales and intrinsic value of its stock will increase without increasing the production or quality of the products. In such conditions, the firms' nominal return is considered a weak indicator for investors. On the other hand, the increase in this rate leads to the supply of raw materials needed for production at a higher price and, accordingly, production with higher costs. Therefore, the amount of the impact of inflation on the stock price depends on the increase in the price of products and services as well as the increase in the price of raw materials and costs, which can entail different consequences depending on the type of industry. On the other hand, with the increase in the general level of prices and the inflation

rate between intervals of investment and exploitation in the market, the income that the investor gets as investment earnings have low purchasing power. As a result, the real return on investment will be lower than the expected return. In addition, an inflationary environment will reduce people's purchasing power as well as the investment opportunities and demand and savings in the stock market and consequently the stock index. Further, it should be noted that the market interest rate would be inevitably increased by the increase in the inflation rate. For this reason, the shareholders' expected rate of return will be positively changed. Accordingly, instability in earnings and returns would be another effect of inflation over the long term. Therefore, the extent of the inflation impact on the dividends paid by companies to shareholders is unclear. So, it can be concluded that the inflation impact on the prices of companies' products and the final effect mediation and generally the stock market over the long term would be unclear. Two factors affect the relationship between inflation and stock returns: supply shocks such as oil price shocks and productivity shocks as well as demand shocks resulting from monetary and fiscal policy shocks. Therefore, it can be said that the relationship between inflation and stock returns depends on the source of inflation. Aggregate demand shocks generally lead to higher inflation and stock prices by increasing the money supply while supply shocks, such as the increase in oil prices, lead to higher inflation and lower stock prices. It is worth mentioning that although inflation negatively affects the stock prices through the increase in production costs, the firms' earnings would be increased and inflation can positively affect the stock price through the earnings future cash flow channel if the inflation and the increase in the price of the products of listed companies are greater than the production costs growth. In such conditions, it is obvious that the outcome of these two opposing effects will determine how inflation affects stock prices and returns depending on the conditions of each industry.

5. CONCLUSION

Financial markets are considered one of the most vital components of any economy that provides immediate access to public capital and makes it available to commercial entities. If we assume that Iran's economic relations with the United State is reinforced and the Iran government can successfully improve its relations with the Western world, it is expected the Iranian stock market as an inseparable component of a developing economy will considerably develop as a crucial investment method in the future since it attracts a noticeable percentage of domestic investors' capital. The policymakers, who are responsible for planning economic development, are required to receive the necessary training and have sufficient control over this market behavior. This study has investigated the common and idiosyncratic latent factors affecting the capital markets in Iran from 2011 to 2021. Four markets of the dollar, coins, housing, and stock exchange can be considered investment markets in Iran. The latent common factor is the factor that affects the mentioned markets commonly. The monetary policies are considered the most important common factor in Iran that create liquidity and affects the financial markets by developing inflation. The monetary policies, government budget deficit, and other factors are regarded as the factors enhancing the liquidity in Iran. The latent common factor has the least influence on the stock market. The results showed that the latent common factor affects the housing market with a coefficient of 0.73, and the coefficient of this variable was respectively 0.97 and 0.90 for the coin and dollar market and the greatest effect of the latent common variable on the financial markets is observable in these two markets. On the other hand, the idiosyncratic latent variable has a greater impact on the stock market, but the greatest influence on dollars and coins has been imposed by the latent common factor, namely monetary policies. This result corresponds to the results of recent studies accomplished in the country. For instance, in recent years, the dollar and coin have increased along with the increase in liquidity, and then housing is increased with a delay. However, the idiosyncratic factors have the greatest impact on the stock market and the liquidity will not necessarily increase or decrease by the application of monetary policies.

REFERENCES

[1] *Abbasian, E., Moradpour Oladi, M., & Abbasiuon, V. (2008). The Impact of Macroeconomic Variables on the Stock Market: Evidence from Tehran Stock Exchange Market. Iranian Journal of Economic Research, 36, 135-*

152.

[2] Alavi Rad, A. (2011). Macroeconomic Variables and Stock Market: Evidence from Iran. International Journal of Economics and Finance Studies, 3, 1-10.

[3] Bahar Moghadam, M., & Kavaruei, T. (2012). The relationship between days and months of the year, macroeconomic variables, and stock returns in the Tehran stock exchange. Shahid Bahonar University of Kerman, Iran.

[4] Breiman, L., & Friedman, J.H. (1985). Estimating transformations for multiple regression and correlation. J Am Stat Assoc, 80, 580–598.

[5] Burns, A. F., & Mitchell, W. C. (1946). Measuring business cycles (No. burn46-1). National bureau of economic research.

[6] Chen, N. F., Roll, R., & Ross, S., (1986). Economic forces and the stock market. Journal of Business, 59, 383 - 403.

[7] Cornell, B. (1983). The MOEY Supply Announcements Puzzle: Review and Stock Returns. Jornal of Financioal Research, 29, 523-535.

[8] Darabi R., & Ali Farahi M. (2010). the impact of macroeconomic variables on risk and total return of stocks, emphasizing the stocks-inflation return model. Azad Islamic University of Tehran of Political Economy, 96, 221-245.

[9] Diebold, F. X., & Rudebusch, G.D. (1996). Measuring Business Cycles: A Modern Perspective. Review of Economics and Statistics, 78, 67-77.

[10] Diebold, F.X., & Rudebusch, G.D. (1996). Measuring Business Cycles: A Modern Perspective. The Review of Economics and Statistics, 78(1), 67-77

[11] Dornbusch, R., & Fischer, S. (1980). Exchange rates and the current account. The American economic review, 70(5), 960-971.

[12] Francis, X. D., & Rudebusch, D. (1996). Measuring Business Cycles: A Modern Perspective. The Review of Economics and Statistics, 78(1), 67-77.

[13] Frankel, J. A. (1979). On the mark: A theory of floating exchange rates based on real interest differentials. The American economic review, 69(4), 610-622.

[14] Hamilton, J. D. (1989). A New Approach to the Economic Analysis of Nonstationary Time Series and the Business Cycle. Econometrica, 57(2), 357-384. http://dx.doi.org/10.2307/1912559

[15] Haruna, I., Yazidu, U., & Paul, B. (2013). Macro-economic Variables and Stock Market Returns in Ghana: Any Causal Link? Asian Economic and Financial Review, 1044-1062.

[16] Hendriksen, E., & Van Breda, M. (1992). Accounting Theory. Fifth Edition ed. The McGraw- Hill.

[17] Hsing, Y. (2014). Impacts of macroeconomic factors on the stock market in Estonia. Journal of Economics and Development Studies, 2(2), 23-31.

[18] Ifuero, O.O., & Esther Ikavbo, E.O. (2012). The Relationship between Macroeconomic Variables and Stock Market Index in Nigeria. J Economics, 3(1), 55-63.

[19] Khodaparasti, R. B. (2014). The Role Of Macroeconomic Variables In The Stock Market In Iran. Polish Journal Of Management Studies, 10(2).

[20] Kim, C., & Nelson, C. (1999). State-Space Models with Regime-Switching: Classical and Gibbs-Sampling Approaches with Applications. MIT Press, Cambridge, Massachusetts.

[21] Laopodis, N. T. (2013). Monetary policy and stock market dynamics across monetary regimes. Journal of International Money and Finance, 33, 381-406.

[22] Marcelle, C. (1998). An Econometric Characterization of Business Cycle Dynamics with Factor Structure and Regime Switching. Symposium on Forecasting and Empirical Methods in Macroeconomics and Finance, 39(4), 969-996

[23] Mehrara, M. (2007). The Relationship between Stock Market and Macroeconomic Variables: a Case Study for Iran. Iranian Economic Review, 12(18), 51-62.

[24] Mohammadi, T., & Taghavi, M. (1999). Survey of Effective Variables on Tehran's Stock Market Price Index. Journal of Planning and Budget, 31-60.

[25] Myung, J.K., & Ji-Sung, Y. (1995). A new index of coincident indicators: A multivariate Markov switching factor model approach. Journal of Monetary Economics, 36(3), 607-630

[26] Nasrollahi, Z., Nasrollahi, K., Mirza Babaei, S.M. (2011). Investigating the relationship between macroeconomic variables and the stock price index in Iran (vector error correction model approach). University of Yazd, Iran. -Ross, S., 1976, The arbitrage theory of capital asset pricing. Journal of Economic Theory, 13(3), 341–360.

[27] Saeedi, P. & Amiri, A. (2010). The investigation of macroeconomic variables' relation with TSE. Economic Modeling Quarterly, 2, 111-130.

[28] Samadi, S., Bayani, O., & Ghalandari, M. (2012). The relationship between macro-economic variables and

stock returns in the Tehran stock exchange. International Journal of Academic Research in Business and Social Sciences, 559-573.

[29] Sekhara, R., Chandra, K., & Radjeswari, A. (2000). Macroeconomic Factors And Stock Prices In India: A Study. capital market conference. Navi Mumbai, 21-22.

[30] Shahabadi A., Naziri M., & Havvaj S. (2013). The impact of macroeconomic variables on systematic risk of Tehran stock exchange. Bu Ali Sina University of Hamadan, Iran.

[31] Stock, J, H., & Watson, M.W. (1991). A Probability Model of the Coincident Economic Indicators, in Leading Economic Indicators: New Approaches and Forecasting Records. eds. K. Lahiri and Moore. Cambridge University.

[32] Stock, J.H., & Watson, M.W. (1989). New Indexes of Coincident and Lending Economic Indicators. NBER

[33] Wongbangpo, P., & Sharma, S.C. (2002). Stock market and macroeconomic fundamental dynamic interaction: ASEAN-5 countries. Journal of Asian Economics, 27-51.

[34] *Zou, W., & Chen, J. (2013). A Markov regime-switching model for crude-oil markets: Comparison of composite likelihood and full likelihood. Canadian Journal of Statistics, 41(2), 353-367.*