Measuring the Effects of Monetary Shocks on Superior Industries Index in Capital Market of Iran

Zarifeh Jalili
Phd Student of Economics,
Tarbiat Modares University,
Tehran, Iran

Abbas Assari Arani
Assistant Professor of Economics,
Tarbiat Modares University,
Tehran, Iran

Kazem Yavari
Associate Professor of Economics,
Tarbiat Modares University,
Tehran, Iran

Hassan Heydari
Assistant Professor of Economics,
Tarbiat Modares University,
Tehran, Iran

Abstract

The main purpose of this study is analyzing the effect of monetary policies on stock exchange on selected Top 10 Industries in Iran by using Structural Vector Auto Regressive (SVAR) method and monthly data of 2005-2012. Obtained results using SVAR method show that monetary policy has significant effect on indices of Top 10 industries in the stock market. Moreover, monetary shocks impulse respond function and the impact on index of top industries in stock market are investigated. Obtained results show that monetary shocks have different impacts on different industries. In general, obtained results show that stock market can be considered as one asset market as a channel to transfer effects of monetary policy.

Keywords: Stock market, monetary policy, liquidity, interest rate, loans, structural vector auto regressive (SVAR)

JEL classification: E60, E58

Introduction

Development of capital market and banking system through increase in productive investment opportunities, reduce transaction costs, reduce risks, mobilize savings, increase transparency and facilitate the optimal allocation of resources can lead to boom in production and economic growth. The interdependency between asset price and monetary policy is one of the main issues of financial economics, which has been especially considered after 2008, last financial crisis of the world. Wide range studies are being conducted in field of relationship between behavior of advanced stock market elements and monetary policies, while this issue is remained almost unknown for the emerging markets (Surial, 2002, p.3). Among different aspects of the interdependence, effectiveness of monetary policy shocks on stock efficiency has been almost considered more than other issues in theoretical literature. In Iran, according to emergent of the capital market and on the other hand, because of bank-based nature of financing system of majority of industrial groups, it is necessary to conduct further studies in field of capital market indices, active groups and especially top industries in this market and effects of monetary variables on them in capital market of the country. It should be mentioned that effectiveness of monetary policies and especially liquidity impulses on real part of economics including investment, consumption and production are the most important issues in field of implementing monetary policies and the active and top industries in stock exchange can be the key and important axes in this field. This effect could be created through a process that is called as the

transmission mechanism of monetary policy. In general, transmission mechanism of monetary policy could be classified to 4 main classes including interest rate channel, exchange rate channel, asset price channel and the credit channel. Among the monetary policy transmission channels, asset price channel plays key role. Effects of monetary policy on asset price could be transferred through asset price channel and change in these prices to the economics (Meshkin, 1996, p.7).

Theoretical framework

Over the years and after emergence of financial crisis, effects of monetary policies on financial markets have gained many attentions and its role has become brilliant as a precondition for efficient markets. During recent financial crisis across the world, Central banks have used wide range interferences of monetary policies to create facilities in financial markets (Amador et al, 2013, p.50). Monetary policy refers to a series of policies that follow macroeconomic goals through changing interest rate and volume of money. One of the important discussions in field of implementing monetary policies is its effectiveness. Monetary officials should have exact evaluation of scheduling and effect of monetary policies on the economics to be successful in this important field. Therefore, it is necessary for them to identify mechanism, based on which monetary policy affects economics and macroeconomic variables (Meshkin, 1996, p.1). In this field, the most important affecting channels of monetary policy and transferring its impacts are investigated. The channels are as follows:

Interest rate channel

Interest rate channel is the standard direction of transferring monetary policy in view of Keynesians, so that reduction of real interest rate can reduce capital cost and can increase also investment expenses. As a result, total demand and input (product) is also increased. Expansionary monetary policy that reduces short-term nominal interest rate and increases liquidity in the society can also reduce short-tern real interest rate and this is true under condition of dominance of rational expectations. Lower real interest rates can increase capital of firms, investments of domestic households, consumer durable expenses and capital stock. All mentioned issues can also increase total output (Poddar, Tushar et al, 2006, pp.4-5).

Banks' loan channel

According to bank's loan channel, restrictive monetary policy (such as increase in legal deposits or purchasing commercial banks' reserve asset by central bank) can reduce usable deposits of commercial banks. Moreover, tighter monetary policy can reduce attracting deposits in commercial banks through affecting economic activities. These factors can decrease supply of existing loans, especially allocated credit to small firms. As a result, it can also affect investment activities in opposite direction (Mukherjee et al, 2011, p.5).

Asset price channel

This channel includes 2 channels of exchange rate and equity price channel:

Exchange rate channel

Exchange rate channel has weak cooperation and relationship with other channels. However, placing the exchange rate besides loaning channel can result in expansion of effect of exchange rate on the output. Moreover, exchange rate shows response to changes of short-term rates of government bonds (Ghazanchyan, M, 2014, p.23). However, in countries with flexible exchange rate, exchange rate channel can be a strong mechanism for effects of monetary policy. Moreover, exchange rate can show more transparent sign of monetary conditions in countries that time series statistics of economics are not available easily (Mohanty, M.S, 2014, p.3).

Equity price channel

There are two channels that are related to equity price and are important in the discussion of transmission mechanism of monetary policy. The two channels include Tobin's q theory in field of investment and wealth effect on consumption. Tobin's q theory provides such mechanism to affect monetary policy of economics through affecting corporate asset value. Tobin defines q as market value of corporates that is distributed by replacement cost of capital. If q is in high level, market value of corporates is high compared to replacement cost of capital and the investment equipment and machineries are also cheaper compared to market value of commercial firms. As a result, companies can publish stocks and the price received for it will be higher than machinery and equipment purchased by them. Therefore, capital expenses would be increased, since companies can purchase high volume of investment products through publishing small amount of stock.

Literature review

In this section, the relevant studies in field of effects of monetary policies on stock market are investigated.

Ghosh (2009) has conducted a study in India on investigating the effects of monetary policy on industries of this country using VAR method and has found that different industries show different responses to monetary shocks. Moreover, obtained results from the study showed that response of industries is mainly related to difference in size of industry and its intensity in using the capitals.

Amador et al (2013) have used SVAR model for Euro zone and have conducted a study under the title of can monetary policy determine liquidity of stocks? Obtained results from

the study showed that Expansionary monetary policy of European Central Bank could increase total liquidity of stock market in Germany, France and Italy. Moreover, effect of monetary policy on smaller stock markets has been significantly higher than others and this refers to nonlinear effect of monetary policy on liquidity of stock market (Amador, O et al, 2013).

Krainer (2014) has studied monetary policy and bank credits in Euro Zone and has presented this question that is there any stock market channel or interest rate channel in this field or not? This study used non-nested hypothesis test, Test of omitted variables and Granger causality tests and showed that central bank should try to make monetary policies to achieve the target of economic stability and crediting by banks and consider also changed in stock prices (Krainer, Robert E., 2014, p.284).

Tsai (2014) has investigated effects of monetary policy on stock returns under limited conditions of financing. The research period has been 1999-2007. Obtained results showed that under conditions that comments of Federal Reserve Monetary Committee are announced, stock returns would significantly show response to sudden shocks of monetary policy. The response would be in low level, when no announcement is taken (Tsai, 2014, p.273).

Devtyan, Karen (2016) has conducted a study under the title of distributive effects of conventional and unconventional monetary policies using SVAR test and showed that after financial crisis of 2008, many central banks reduces their policy rates considerably and used Unconventional instruments of monetary policy. Particularly, one of the executive samples of unconventional monetary policies has been purchasing assets by Reserve Federal. The operations changed relative supply of bonds and other assets and as a result, it could affect their prices and the cash flow in economic system.

Gueriny, Pierre and Danilo Leiva-Leonz (2016) have conducted a study under the title of effect of monetary policy on stock returns in industries in the changing world and used Factor-Augmented VAR (FAVAR) method to evaluate effects of unexpected monetary policies on stock returns and showed that there is significant difference among response of different industries on monetary shocks. Moreover, the results of this study showed that to help understanding heterogeneity in response to monetary shocks, industrial interdependence (measured by network criteria) is important.

Keshavarz Haddad and Mahdavi (2005) have also conducted a study under the title of "can stock market in Iran economics be a channel to pass over monetary policy or not". According to this study, through considering use of direct tools of monetary policy, there is no indicator variable in economics of Iran to show changes of monetary policy. Considering the mentioned limitations, the relationship of conditional volatility, the conditional variance of stock returns and conditional vitality of monetary variables is emphasized in this study. The relationship between conditional vitality of variables is also measured using bivariate vector autoregressive (VAR) method. Obtained results from the study showed that stock market in Iran's economics is not a channel for monetary transmission mechanism.

Shahbazi, Rezaei and Abbasi (2012) have also used empirical evidence of Iran and have investigated efficiency of stock market based on monetary policies. The desired data of this study has been related to time period of 1999-2008. Analysis method used in this study has been Autoregressive Distributed Lags (ARDL) method. Obtained results from the study showed that current values of money supply has significant and negative effect on current stock returns and hence, the hypothesis of efficiency of stock market to monetary policies is confirmed.

Methodology

The general and common method to explain the relationship between monetary policy (liquidity impulses) and stock return behavior is to estimate Vector Autoregressive (VAR) model for different monetary indices and stock return. In VAR models, Cholesky decomposition is used to achieve impulse response functions. Cholesky decomposition refers to a causal arrangement. Hence, if the purpose is to investigate effects of more than one shock, it may be unacceptable. In this study, to analyze effects of monetary shocks on stock market, SVAR model is used. The main advantage of SVAR models compared to VAR models, in which identification of structural impulses are implicitly and based on taste, is existence of an economic logic based on economic theories to apply limitations. In this study, to specify the model, SVAR model introduced by Lutkepohl (2005) is used. Accordingly, effect of variables such as real interest rate (r), Facilities granted to the private sector (l), real exchange rate (ex) and liquidity (M2) are investigated using SVAR on efficiency of top 10 industries. In terms of expansion of the subject and in line with facility of comparative issues, this study is focused on effects of liquidity and its impulses. Limitations can be applied in two forms of short-term and long-term. Applying these limitations can be a basis to identify structural shocks.

$$\begin{bmatrix} \varepsilon_{1t}^{r} \\ \varepsilon_{2t}^{l} \\ \varepsilon_{3t}^{ex} \\ \varepsilon_{4t}^{M2} \\ \varepsilon_{5t}^{p...} \end{bmatrix} = \begin{bmatrix} a_{11} & 0 & 0 & 0 & 0 \\ a_{21} & a_{22} & 0 & 0 & 0 \\ 0 & 0 & a_{33} & 0 & 0 \\ a_{41} & a_{42} & a_{43} & a_{44} & a_{45} \\ 0 & 0 & 0 & 0 & a_{65} \end{bmatrix} * \begin{bmatrix} e_{1t}^{r} \\ e_{2t}^{l} \\ e_{3t}^{ex} \\ e_{4t}^{M2} \\ e_{5t}^{p...} \end{bmatrix}$$

In the above matrix, ε_{4t}^{r} refers to shocks of real interest rate of deposits in banking system; ε_{4t}^{f} refers to shocks of granted facilities to the private sector; ε_{4t}^{ex} refers to exchange rate shocks and ε_{4t}^{M2} refers to monetary shocks. In this study, effects of these shocks on indices of top industries of stock exchange are analyzed.

According to these shocks, the impulse respond functions could be obtained and dynamic analysis of economic variables could be done. In other words, for better analysis of impulses of monetary policy through liquidity and analysis of short-term shocks and its relationship with long-term shocks, impulse respond function (IRF) analysis is used.

Model estimations and data analysis

Granger causality test

In line with determining endogeneity of variables, the method selected in this study is Granger Causality Test considered for variables of indices of top 10 industries, liquidity, nominal exchange rate, granted facilities to private sector and real interest rate (table 1). The arrangement of endogeneity of variables based on results of the mentioned test is as follows: P… M2 ex l r

Table 1: Results of Granger Causality Test to determine arrangement of variable endogeniety

Pairwise Granger Causality Tests			
Date: 06/21/15 Time: 15:43			
Sample: 1384M01 1392M12			
Lags: 2			
Null Hypothesis:	Obs	F-Statistic	Prob.
r does not Granger Cause M2	106	0.03546	0.9652
M2 does not Granger Cause r		0.10554	0.8999
L does not Granger Cause M2	106	22.8857	6.E-09
M2 does not Granger Cause L		1.45849	0.2374
P does not Granger Cause M2	106	5.13452	0.0075
M2 does not Granger Cause P		2.23036	0.1128
Ex does not Granger Cause M2	106	3.31110	0.0405
M2 does not Granger Cause Ex		0.79548	0.4542
L does not Granger Cause r	106	0.30970	0.7344
r does not Granger Cause L		1.20615	0.3036
P does not Granger Cause r	106	0.51454	0.5993
r does not Granger Cause P		1.44762	0.2400
EX does not Granger Cause R	106	8.65182	0.0003
R does not Granger Cause EX		3.05201	0.0516
P does not Granger Cause L	106	3.99420	0.0214
L does not Granger Cause P		8.11249	0.0005
EX does not Granger Cause L	106	0.79470	0.4545
L does not Granger Cause EX		1.79528	0.1713
EX does not Granger Cause P	106	3.76076	0.0266
P does not Granger Cause EX		0.70701	0.4955

In other words, index of top 10 industries has had highest endogeniety and after that, liquidity, nominal exchange rate, facilities granted to private sector and real interest rate have possessed next places. Accordingly, in different analyses, the criterion of placement of variables is based on result of Granger causality test.

Variable viability test

To determine variable viability, generalized Dickey-Fuller test is used. Results of the tests are presented in table 2. All variables are unviable in their level, since their probability value is always higher than 0.05 and hence, H0 based on existence of unit root can't be rejected and as a result, all variables have unit root. Secondly, first difference of all variables is viable, since their probability is entirely lower than 0.05 and hence, H0 based on existence of unit root (unviability) is rejected and as a result, all variables are viable in first level. Considering obtained results, it could be demonstrated that the studied variables I (l) are accumulated and they can be estimated and tested in form of VAR model.

Table 2: Results of generalized Dickey-Fuller test

Variable name		Critical values in level:			t-stat	Prob
		10%	5%	1%		
M2	Level	-2.58	-2.89	-3.49	-1.32	0.62
	First order difference	-2.58	-2.89	-3.49	-9.88	0.00
-	Level	-2.58	-2.89	-3.49	1.02	0.99
	First order difference	-2.58	-2.89	-3.49	-5.92	0.00
ex	Level	-2.58	-2.89	-3.49	0.32	0.98
	First order difference	-2.58	-2.89	-3.49	-7.67	0.00
r	Level	-2.58	-2.89	-3.49	1.27	0.99
	First order difference	-2.58	-2.89	-3.49	-7.12	0.00
l	Level	-2.58	-2.89	-3.49	-2.81	0.06
	First order difference	-2.58	-2.89	-3.49	-10.73	0.00

Source: research findings using Eviews software

Short-term SVAR model and effects of monetary shocks on top industries index Determining VAR lag order

To determine lag order in VAR model, different criteria such as likelihood ratio (LR), final prediction error (FPE), Akaike information criterion (AIC), Schwartz information criterion (SC) and Hannan-Quinn information criterion (HQ) are used. In all cases of using the criteria in this study, Akaike criterion is considered as practical criterion. Accordingly, existence of a lag in VAR order is proved based on Akaike criterion, since the highest value of Akaike is equal to 9.62 in terms of absolute value, which can determine VAR order in level of 1 lag (table 3). This test is true for top 10 industries.

Table 3: Assessing and Determining VAR order

Endogenous variables	p…M2 ex l r				
Lag	LR	FPE	AIC	CS	HQ
0	-	0.00	5.22	5.36	5.28
1	1448.72	-4.81	-9.62*	-8.45*	-8.91*
2	67.18*	-5.35*	-9.47	-8.06	-8.89
3	26.34	-0.47	-9.28	-7.24	-8.46
4	26.24	0.76	-9.11	-6.43	-8.03
5	30.52	0.72	-9.03	-5.70	-5.70

Source: research findings using Eviews software

SVAR results and effects of monetary shocks on top industry index

The results related to SVAR model for top 10 industries are presented in table 5 and the summary of the results of presented in table 4.

Table 4: Structural effects of monetary shocks for top 10 exchange industries

Index	Coefficient of effects of liquidity shocks	Coefficients of effects of exchange rate shocks	Coefficients of effects of shocks in granted facilities to private sector	Coefficient of effects of real interest rate shocks in banking system
P_{bank}	0.03	0.001	-0.004	0.05
Pcmn	0.51	0.21	0.02	-2.61
Pcar	4.09	2.05	1.01	0.61
Pmd	0.85	0.18	0.24	0.23
Pchem	0.36	0.11	0.12	-0.54
Pmx	0.59	1.85	0.11	-0.29
Pmetl	0.13	0.11	0.61	-2.19
Pent	0.82	0.23	0.12	-5.32
Poil	1.29	0.17	0.8	-3.85
Pest	2.57	0.35	0.9	-6.39

Source: research findings using Eviews software

In table 4, the indices are as follows: Pbank: index of banks and credit institutes; Pcmn: cement industry index; Pcar: car and assembly industry index; Pmd: multidisciplinary industry index; Pchem: chemicals industry index; Pmx: metal excavation industry; Pmetl: fundamental metals industry index; Pent: enterprise index; Poil: oil product and nuclear fuel industry index; Pest: real estate and mass building industry index.

Table 5: Results of SVAR test

1) Pbank =0.03 M2(-1) +0.001EX (-1)–0.004L (-1)+0.05 R (-1)
2) Pcmn =0.51M2(-1)+0.21EX (-1)+0.02L(-1)-2.61 R (-1)
3) Pcar =4.09M2(-1)+2.05EX (-1)+1.01L(-1)-0.61 R (-1)
4) Pmd =0.85M2(-1)+0.18EX (-1)+0.24L(-1)-0.23 R (-1)
5) Pchem =0.36M2(-1)+0.11EX (-1)+0.12L(-1)-0.54R (-1)
6) Pmx =0.59M2(-1)+1.85EX(-1)+0.11L(-1)-0.29R(-1)
7) Pmetl =0.13M2(-1)+0.11EX(-1)+0.61L(-1)-2.19R(-1)
8) Pent =0.82M2(-1)+0.23EX (-1)+0.12L(-1)-5.32R (-1)
9) Poil =1.29M2(-1)+0.17EX (-1)+0.80L(-1)-3.85R (-1)
10) Pest =2.57M2(-1)+0.35EX(-1)+0.91L(-1)-6.39R (-1)

According to table 4:

- In short-term, expansionary policy can affect index of top 10 industries positively through increasing liquidity (Reduction of legal reserves, injection of high-powered money, reduce the penalty rate of the Central Bank and reduced the documents discount rate by the Central Bank). Hence, Expansionary monetary policy (restrictive) can have positive (negative) effect on index of top 10 industries in terms of liquidity directly and in short-term.

- Expansionary monetary policy (restrictive) in field of facilities granted by banks can empower (weaken) liquidity volume and can have positive (negative) effect in short-term and indirectly on indices of cement, Lime & Plaster, car, multidisciplinary industries, chemical industries, metal extraction, fundamental metals, enterprises, oil products and nuclear fuel and mass building and can also empower direct effect. However, in regard with exchange index of banks and credit institutes, this effect is negative and neutralizes direct effect and the overall effect of outcome of the two effects is not clear and is depended on volume and amount of monetary shocks and granted facilities to private sector (according to results of table 5).
- In short-term, liquidity, exchange nominal rate and facilities granted to private sector can have positive effect on mass building and real estate and real interest rate can have negative effect on the said index. Hence, as coefficient of real interest rate is higher than total coefficient of other variables, it seems that expansionary monetary policy (restrictive) can have positive (negative) effect on mass building and real estate index in short-term.
- In short-term, exchange rates shocks can have negative effects on monetary policy; it means that shocks resulted from exchange rate impulses can lead to turbulence of monetary policy in short-term and such turbulence of monetary policy can lead to higher turbulence in most studied exchange indices through restriction of liquidity.
- In general, liquidity and facilities granted to private sector can have positive effect on total exchange index and also, exchange rate and real interest rate can have negative effect on the said index.
- In short-term, liquidity, exchange rate and real interest rate and facilities granted by banks can have positive effect on index of banks and credit institute group in exchange.
- Liquidity, nominal exchange rate and facilities granted to private sector can have positive effect on car industry and assembly index, cement, lime and plaster industry, multidisciplinary industries, chemicals, enterprises, metal extraction, oil products and nuclear fuel and real estate in short term. Also, real interest rate of deposits has negative effect on the mentioned indices.
- In field of facilities granted by banks, expansionary monetary policy (restrictive) can empower (weaken) volume of money and through this, it can have positive (negative) effect on all exchange indices in short-term.
- In short-term, monetary policy shocks in regard with interest rate in case of expansionary policy (increase in interest rate), it can enhance liquidity status (increase in bank deposits) and as a result, it can improve all studied indices in stock exchange.

As a result, expansionary monetary policy resulted from increase in facilities granted to private sector can empower exchange rate in short-term and through this, it can have positive but small effect on bank and credit institute group index in stock exchange.

Restrictive monetary policy can worsen status of granted facilities to private sector through increasing real interest rate and through this; it can result in a little improvement in index of bank and credit institute group in stock exchange. This shows that banks are not significantly dependent on Revenues from credit facilities.

Testing normality of distribution of residuals of SVAR model

Relevant results of normality of distribution of residuals of SVAR model for top 10 industries in stock market could be interpreted as follows:

a) As probability of chi-square distribution in level of model residuals is more than 0.05, H0 based on no skew in distribution of residuals is related to SVAR model of top 10 industries and distribution of the mentioned residuals has no skewness.

b) As probability of chi-square distribution among 5 variables is higher than 0.05, H0 based on lack of skewness among residuals of vectors studied variables is confirmed and hence, the relevant patterns of top 10 indices have not abnormal skewness.

c) Total distribution of the test based on Jarque-Bera criterion shows that probability related to this distribution among 5 variables is higher than 0.05 and hence, the H0 based on multivariate normal distribution of SVAR model for top 10 industries is confirmed. Hence, the entire model is distributed normally.

Testing lack of inequality of variances among residuals of variables

Obtained results from the Wite Test in regard with inequality of variables of SVAR model for top 10 industries show that (table 6):

a) Probability of distribution of chi-square test with df of 300 is over 0.05 and hence, H0 based on no inequality among residuals of studied patterns is confirmed.

b) Although there is inequality of variances among some residuals of variables, their vector combination has no inequality of variance based on the results in paragraph (a).

Table 6: Results of total correlation of inequality of variances

H0: lack of cross terms		
Df	Chi-square (X2)	Prob
300	434.68	0.1125

Source: research findings using Eviews software

Variance decomposition (VD) of SVAR model for indices of top 10 industries

Obtained results from the test in variance decomposition section show that facilities granted to private sector can have highest effect respectively in field of metal extraction, fundamental metals, entire stock exchange, enterprises and cement. Real interest rate has also showed highest effect during the study respectively in field of bank indices, multidisciplinary industries and chemicals. Liquidity has had the highest effect just in field of oil products index and exchange rate has had the highest effect in field of car industry. Hence, the changes in facilities granted to private sector and real interest rate have been the most important factors affecting top exchange indices (table 7).

Table 7: Summary of the results of variance decomposition of monetary variables in top 10 industries

Monetary variables of stock exchange indices	M2	L	R	Ex
P_{bank}	0.57	0.57	4.70	0.64
P_{cmn}	0.13	1.77	0.59	1.17
P_{car}	0.10	1.45	0.11	3.93
P_{md}	0.04	1.02	2.45	2.18
P_{chem}	0.04	1.02	2.44	2.18
P_{mx}	0.73	5.19	0.96	2.03
P_{metl}	0.01	3.64	3.25	2.89
P_{ent}	0.096	3.09	0.89	0.91
P_{oil}	1.77	0.21	1.39	2.91
P_{est}	0.495	3.46	1.65	0.46

Source: calculations of the suthor derived from Eviews

Impulse respond function analysis of SVAR model for top 10 industries

Impulse respond function (IRF) could be presented structurally for bank and credit institute group index in stock exchange according to the results in table 8 (diagrams 1-24):

Table 8: Results of IRF test for top 10 industries to one standard deviation monetary shock

Variable period	Banks	Car	Multidisciplinary	Chemicals	Metal extraction	Fundamental metals	enterprises	Oil	Real estate	Cement
0	0	0	0	0	0	0	0	0	0	0

1	Positive and Explosive	Positive	Positive	Negative and Explosive	Negative and Explosive	Negative and explosive	Negative	Negative and explosive	Positive	0
2	Negative and explosive	Positive and reductive	Positive and reductive	Negative and reductive	Negative and reductive	Negative and reductive	Negative and reductive	Negative and reductive	Negative and explosive	Negative
3	Positive and reductive	Constant	0	Positive and reductive	Positive and reductive	Negative and reductive	Positive and explosive	Positive and explosive	Negative and reductive	Negative and reductive
4	Positive and reductive	Positive and reductive	0	Negative	Positive and reductive	Negative and reductive	0	Positive and reductive	positive	Negative and reductive
5	0	0	0	Negative and reductive	Negative and reductive	Negative and reductive	0	Negative and reductive	Positive and reductive	0
6	0	0	0	Positive and reductive	Positive and reductive	0	0	Positive and reductive	Negative and reductive	0
7	0	0	0	00	0	0	0	Constant	0	0
8	0	0	0	0	0	0	0	Constant	0	0
9	0	0	0	0	0	0	0	Positive and reductive	0	0
10	0	0	0	0	0	0	0	0	0	0

Source: research findings using Eviews software

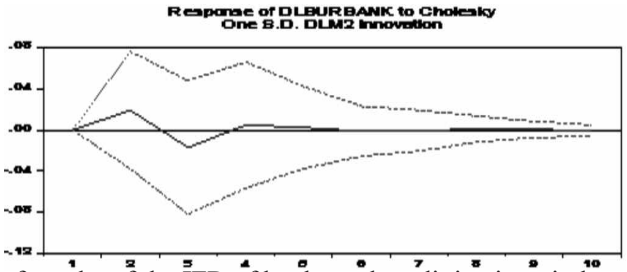

Figure 1: diagram of results of the IFR of banks and credit institute index to monetary shocks

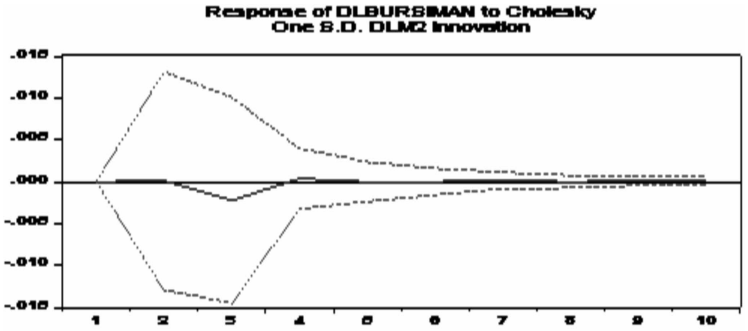

Figure 2: diagram of results of the IFR of cement stock exchange index to monetary shocks

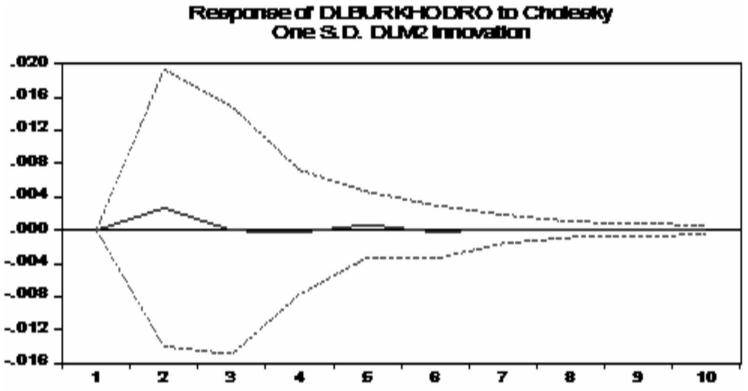

Figure 3: diagram of results of the IFR of car industry stock exchange index to monetary shocks

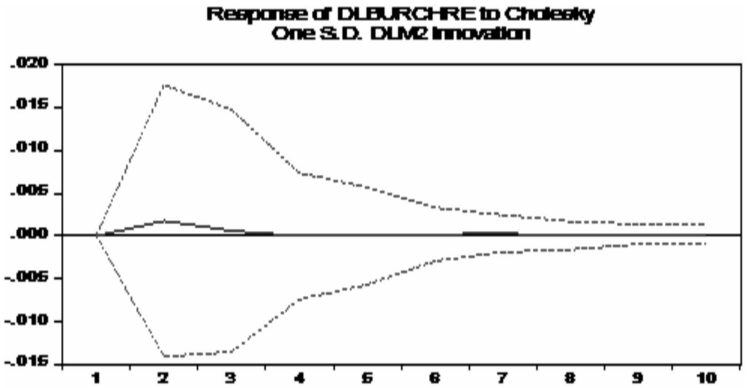

Figure 4: diagram of the IFR results of multidisciplinary industry stock exchange index to monetary shocks

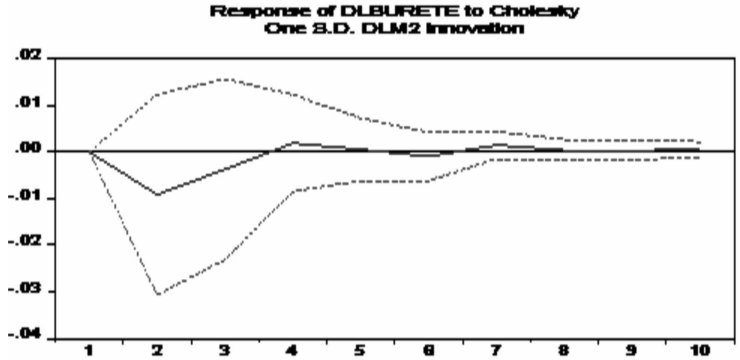

Figure 5: diagram of results of the IFR of metal extraction industry stock exchange index to monetary shocks

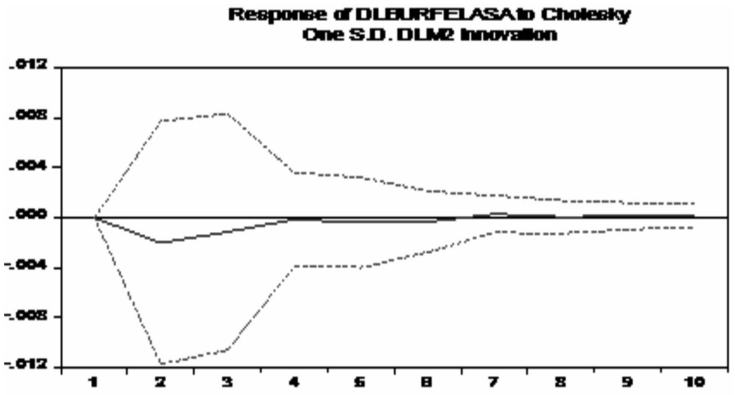

Figure 6: diagram of results of the IFR of fundamental metal industry stock exchange index to monetary shocks

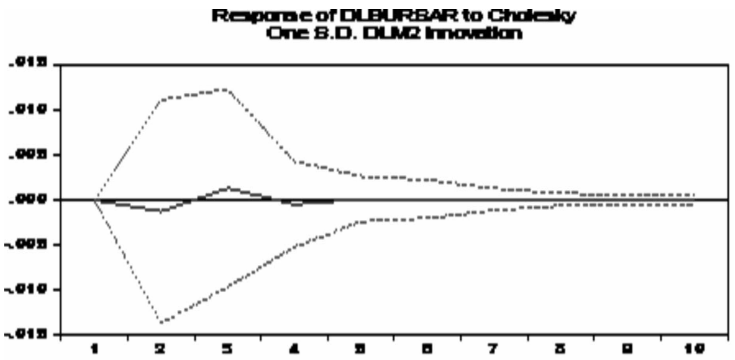

Figure 7: diagram of results of the IFR of enterprises stock exchange index to monetary shocks

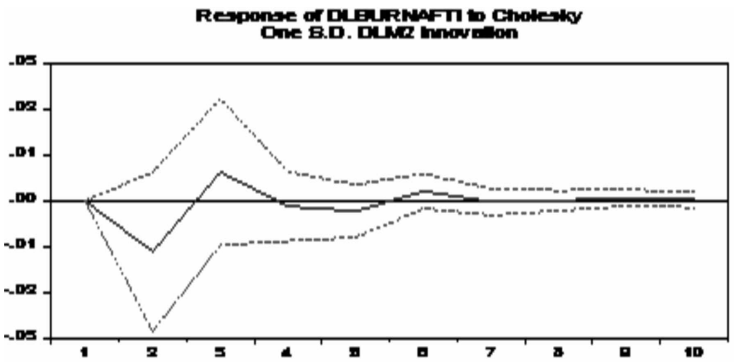

Figure 8: diagram of results of the IFR of oil product stock exchange index to monetary shocks

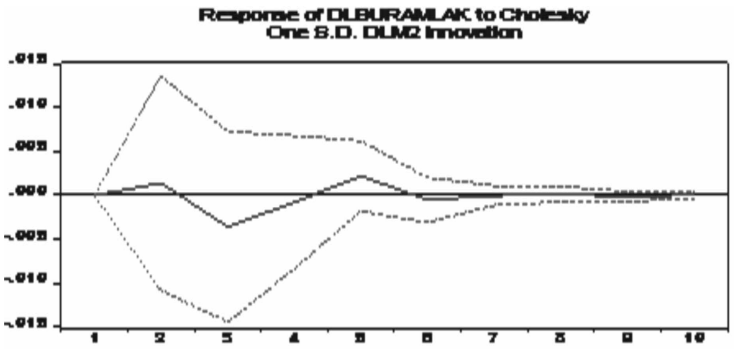

Figure 9: diagram of results of the IFR of real estate stock exchange index to monetary shocks

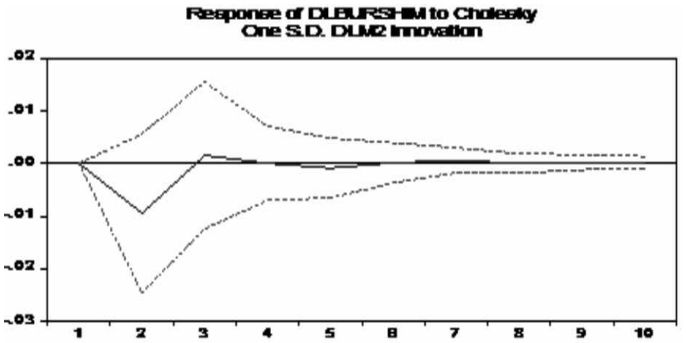

Figure 10: diagram of results of the IFR of chemicals stock exchange index to monetary shocks

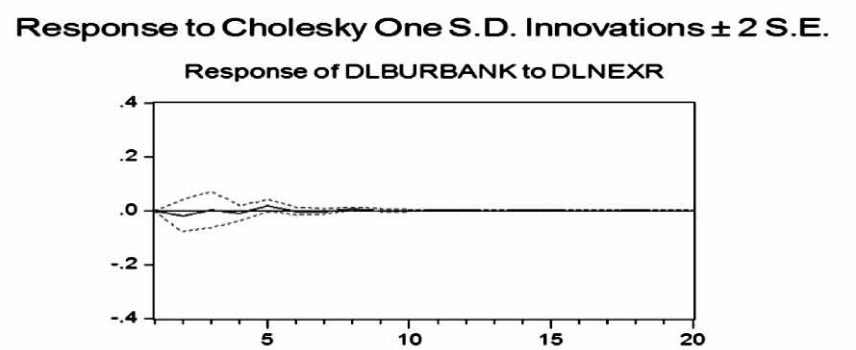

Figure 11: diagram of IFR of banks and credit institute group index in stock exchange to monetary policy shock in terms of exchange rate

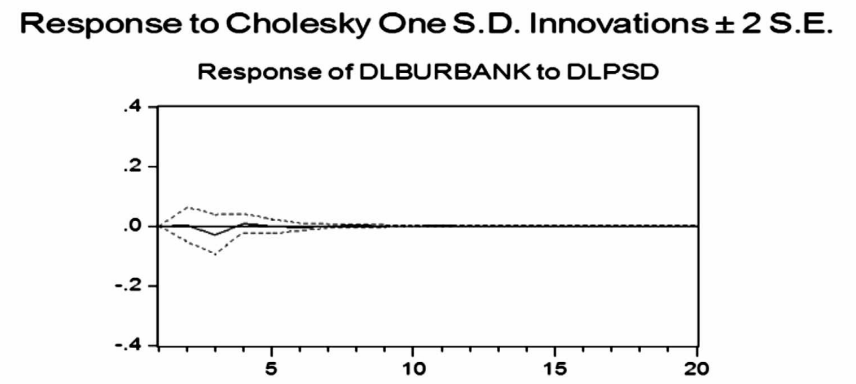

Figure 12: diagram of IFR of banks and credit institute group index in stock exchange to monetary policy shock in terms of grants

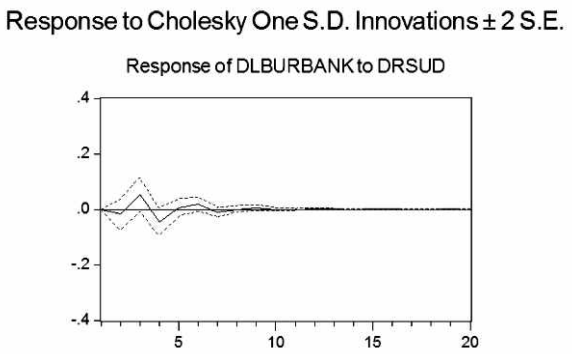

Figure 13: diagram of IFR of banks and credit institute group index in stock exchange to monetary policy shock in terms of real interest rate

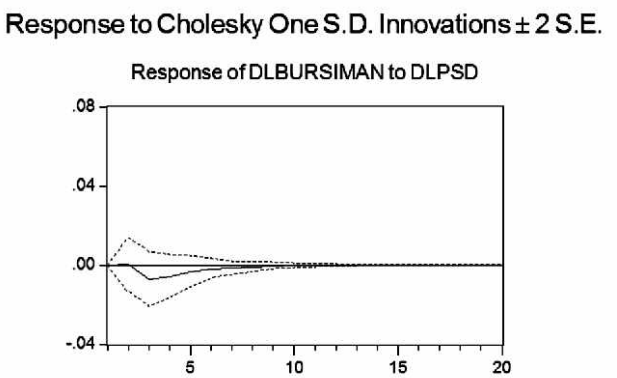

Figure 14: diagram of IFR of cement group index in stock exchange to monetary policy shock in terms of grants

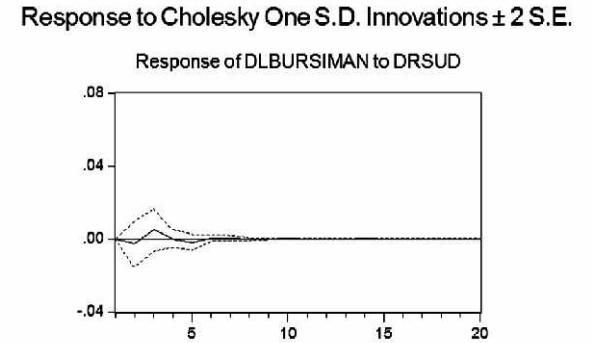

Figure 15: diagram of IFR of cement group index in stock exchange to monetary policy shock in terms of real interest rate

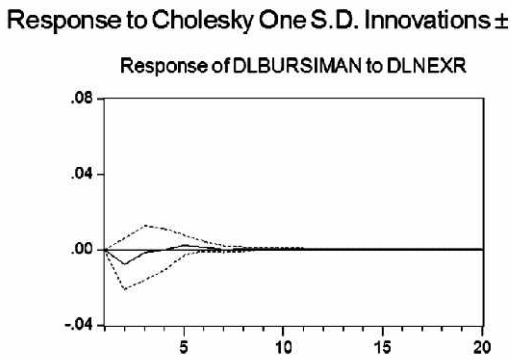

Figure 16: diagram of IFR of cement group index in stock exchange to monetary policy shock in terms of exchange rate

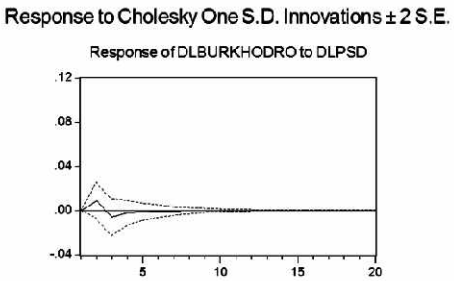

Figure 17: diagram of IFR of car and assembly group index in stock exchange to monetary policy shock in terms of grants

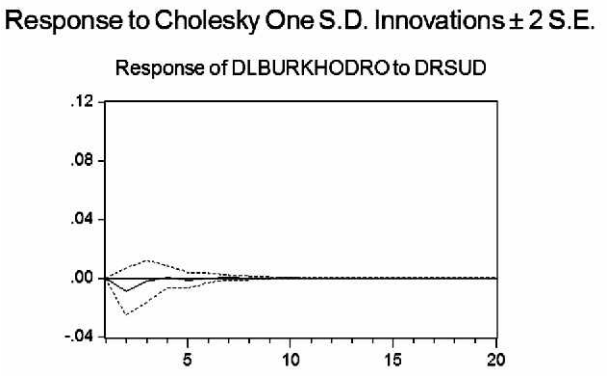

Figure 18: diagram of IFR of car and assembly group index in stock exchange to monetary policy shock in terms of real interest rate

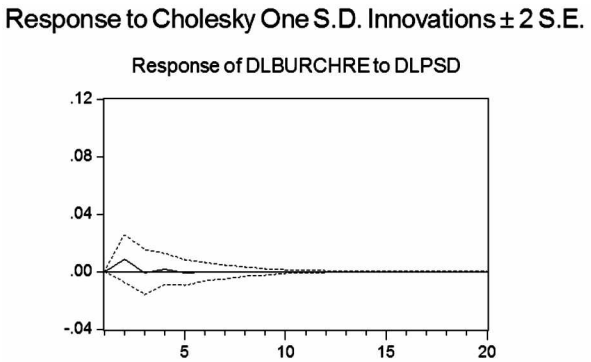

Figure 19: diagram of IFR of multidisciplinary industries group index in stock exchange to monetary policy shock in terms of grants

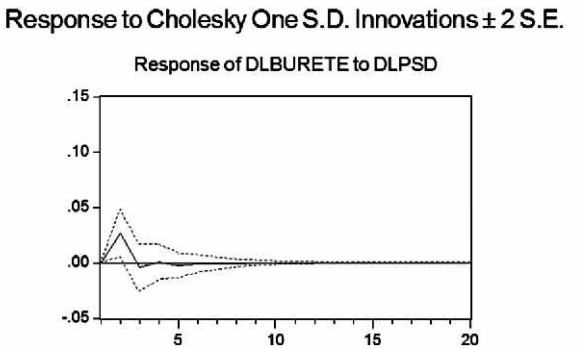

Figure 20: diagram of IFR of metal extraction group index in stock exchange to monetary policy shock in terms of grants

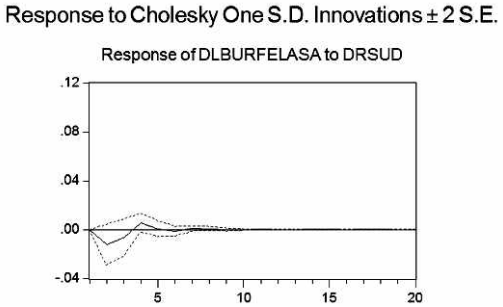

Figure 21: diagram of IFR of fundamental metals group index in stock exchange to monetary policy shock in terms of real interest rate

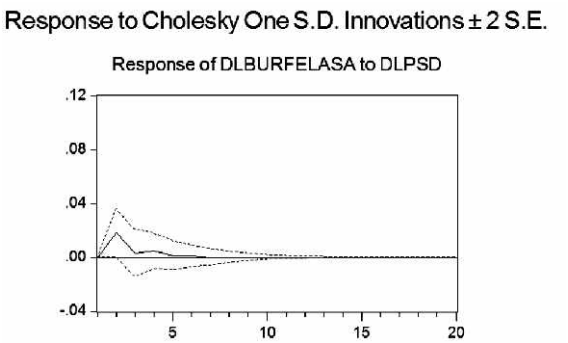

Figure 22: diagram of IFR of fundamental metals group index in stock exchange to monetary policy shock in terms of grants

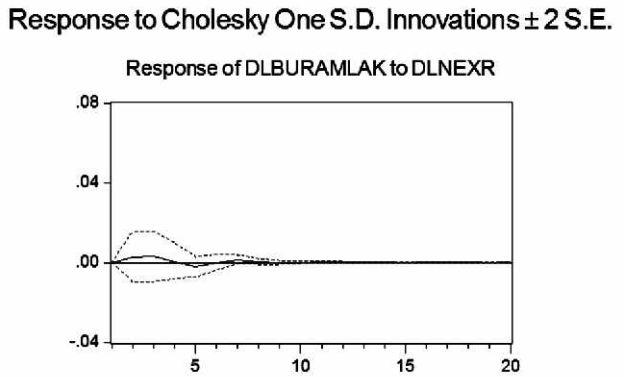

Figure 23: diagram of IFR of mass building and real estate group index in stock exchange to monetary policy shock in terms of exchange rate

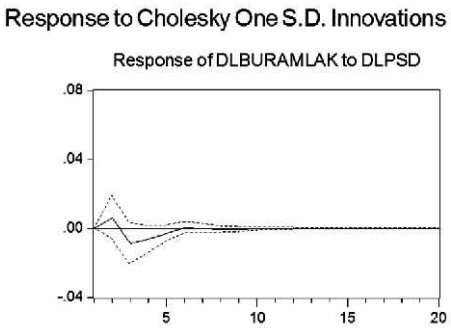

Figure 24: diagram of IFR of mass building and real estate group index in stock exchange to monetary policy shock in terms of grants

Conclusion

The interdependence of asset price and monetary policy is the main issue of financial economics and has gained many attentions especially after the last financial crisis of the world. Among different aspects of the interdependence, effect of monetary policy shocks on efficiency and stock index has been almost considered in theoretical literature more than before. The literature could be divided to two groups:

a) Event studies: these studies are based on descriptive method and can analyze endogenous and unpredictable changes in monetary policy separately.

b) SVAR-based studies, which apply some unique limitations that limit the interaction between economic variables, so that they are not necessarily in consistence with the data and backgrounds. The limitations are also divided to two types as follows:

Limitations that introduce policy index and 2) limitations that specify method of publishing monetary policy shocks.

Empirically, evaluation of effectiveness of monetary policy transmission channels can result in better decision making of Central bank through creation of a suitable insight. Monetary transmission is a process, which can transfer monetary policy measures to economics and is considered as an axial issue in macroeconomics. Structural features of economics and financial markets can affect effectiveness of different channels of monetary policy transmission. According to bank loaning channel, expansionary monetary policy (such as increase in legal reserves or purchase of reserve assets of commercial banks by Central Bank) can reduce usable reserves of commercial banks. Moreover, controlled monetary policies can reduce attraction of deposits in commercial banks through affecting economic activities.

According to the mentioned, it could be claimed that monetary policies can also affect stock market significantly. If monetary policies affect real part of economics and as a result, affect prices, monetary conditions of economics can affect behavior of return of stock exchange. Hence, stock market as capital market plays vital role in transferring effects of monetary policies on different economic sectors.

The common method of making relationship between monetary policy and market behavior is estimation of SVAR model of different monetary indices and stock returns. VAR models present flexible and suitable framework to control the movement direction of monetary policy mechanism. However, the relevant issue of omitted variables can lead to a fundamental bias in VAR estimations in field of monetary policy. In this field, a basic solution is to use SVAR method, which can solve this problem. Sims and Bernanke (1986) have suggested a method to model deviation terms based on economic decompositions to solve this problem. This method is based on estimation of the relations between structural deviations based on an economic model, which is used in this study.

Total distribution of SVAR test based on Jarque-Bera criterion shows that probability related to this distribution among 5 variables is over 0.05 and hence, the H0 based on multivariate normal distribution of SVAR model for top 10 industries is confirmed. As a result, the entire model is distributed normally.

Obtained results from IRF test also show that the shock resulted from monetary policy during first period have no effect on indices of exchange industries; although effects of this shock would be appeared after second period. In this field, effects of monetary shock have been explosive on some indices (chemicals, metal and oil extraction); have been sinus explosive on some indices (bank and credit institute exchange index) and have been negative (enterprises and cement industry) or positive (car, multidisciplinary industries and real-estate) on some others. However, it could be found that among the top 10 industries, the index of banks and credit institutes industries, oil industries, chemical industry and metal industry have been shocked more than other ones. This can be rooted in large portion of oil sector in economics and effect of domestic and foreign fluctuations on it and secondly, the relationship of monetary shocks and banking network resources and thirdly, can be rooted in high dependence of metal extraction on banking resources.

According to obtained results in field of SVAR model, it could be found that shocks can firstly have the most effect on monetary policies belonged to real interest rate and on real estate and mass building index, so that 1% increase in real interest rate has affected the said index more than 6% negatively. Secondly, liquidity shocks have had the most effect on car exchange index and then on real estate and mass building index. Thirdly, exchange rate has shown most effect on car industry. Hence, with 1% increase in exchange rate, car stock exchange index is improved to more than 2%. Fourthly, effects of monetary policies in terms of grants to private sector have had the most effect on car industry, oil and real estate industries.

Obtained results from IRF showed that depending on type of monetary shock, total index of stock exchange and top indices can show different responses, so that relevant shocks of grants to private sector have had the most and the worst effect and monetary shock has had least and shortest effect on the mentioned indices. Relevant investigations of SVAR model show that in short-term, expansionary policy can affect index of top 10 industries positively through increasing liquidity (Reduction of legal reserves, injection of high-powered money, reduce the penalty rate of the Central Bank and reduced the documents discount rate by the Central Bank). Hence, Expansionary monetary policy (restrictive) can have positive (negative) effect on index of top 10 industries in terms of liquidity directly and in short-term. On the other hand, Expansionary monetary policy (restrictive) in field of facilities granted by banks can empower (weaken) liquidity volume and can have positive (negative) effect in short-term and indirectly on indices of cement, Lime & Plaster, car, multidisciplinary industries, chemical industries, metal extraction, fundamental metals, enterprises, oil products and nuclear fuel and mass building and can also empower direct effect. However, in regard with exchange index of banks and credit institutes, this effect is negative and neutralizes direct effect and the overall effect of outcome of the two effects is not clear and is depended on volume and amount of monetary shocks and granted facilities to private sector.

According to the objectives of this study, the hypothesis included: 1) monetary policy can affect efficiency of top 10 industries of Tehran Stock Exchange; 2) effect of monetary policy on stock return of different industries varies depending on type of industry. According to obtained

results, it could be mentioned that firstly, monetary policy (monetary shocks, shocks of grants to private sector and nominal interest rate) can affect different stock exchange indices through creating shocks in nominal exchange rate and real interest rate (by inflation rate). Hence, hypothesis 1 is confirmed. Secondly, monetary policies can affect different indices of stock exchange industries and this effect varies depending on type of industry and hence, hypothesis 2 is also confirmed.

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