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The Survey of Monetary Policies' Effects on the Stock Price and Return

Roya Darabi[1], Mahnaz Rabiei[2], and Mahmood Reza Nikkhah[1]

[1]Accounting Department,
South Tehran Branch, Islamic Azad University,
Tehran, Tehran Province, Iran

[2]Economic Department,
South Tehran Branch, Islamic Azad University,
Tehran, Tehran Province, Iran

ABSTRACT: Stock market has a close relationship with the economical structure of every country and its weakness or strength can be indicative of the country's economical status; therefore, the recognition of the factors affecting it and the amount of this effect can be of a significant value. One of these factors is monetary policy, which is adopted by the central bank, and is the focus of the current study. The current study objective is to investigate the monetary policies effects exerted by the central bank on the stock price and stock returns in the Tehran's stock market during the years from 1999 to 2010. The hypotheses test method in the current study is the linear regression in the form of combinational data time panel, and time series which is conducted by making use of Eviews software. The study results implies that in the firm level, liquidity has a negative and significant relationship with stock returns and it has a positive and significant relationship with the firm stock price at the end of the period. In the market level, unexpected changes in the monetary policies does not show an effect on the stock returns, but the expected changes have a negative and significant relationship with the stock returns. Also, the effect of the monetary policies and the stock returns is asymmetric. Overall, the evidence lends support to the notion that the monetary policy announcements have a significant effect on stock market.

KEYWORDS: Monetary Policies, Stock Returns, Stock Price, Stock Market, Central Bank.

1 INTRODUCTION

Iran's stock market in line with the government's macro-economy policies, after the end of the Imposed War and to attract nation's participation in investing and leading the stagnant and unprolific capitals toward the productive economical activities and to obtain the financial needs of the producing institutions and as a consequence to secure the required commodities for the society, launched its more expanded operation from 1990. Since then, due to the post-war conditions and the changes stemming from the macro-economy variables such as inflation rate and the exchange rate on the stock market, the stock market has been witness to a lot of fluctuations.

In the study of the influencing factors on the market or the market economy, searching for a variable(s) which can account for the economy financial sector relationship with the economy veracious sector, is of a significant value. Monetary and capital markets as the fundamental blocks of the financial body are in charge of securing resources for the economy real sector. Securing resources efficiency allows for the optimum allotment of the sparse resources to the economical operations. Markets consisting of the capital make the loans and the needed financial resources available by providing the possibility of mid-term and long term securities transactions for corporations, institutions and economical organizations on the one hand, and provide the presenters of such resources with suitable return on the other. Therefore, the financial markets are considered as one of the strong levers in the countries' economies and they act in favor of accelerating the economical development specially developing countries.

Corresponding Author: Roya Darabi (royadarabi110@yahoo.com)

As a result, the recognition of the factors affecting this market and the amount of these factors effects is of a great value and owing to this in the recent years numerous researches have been conducted in the current field in which some of the factors have been studied. One of the factors which can be effective in this field is the central bank monetary policy which has been the focus of the researchers' attention and various results have been obtained in each of them.

Generally, the current study objectives are as follows:

- The survey of the monetary policies effects on the stock returns and price and stock price in the firm level.
- The survey of the expected and unexpected monetary policies effects on market return
- The survey of the symmetry and asymmetry of the monetary policies effects on the market return

2 REVIEW OF THE RELATED LITERATURE

Graham [1] showed that the relationship between the stock returns and inflation is instable; i.e. it is positive in some of the periods and negative in others. The results obtained by Lee [2] showed that there is a negative relationship between inflation rate and stock returns, some of the studies also showed that the contracting (expanding) monetary policies reduces (increase) the stock basket including.(e.g. [3]).

Ehermann and Fratzcher [4] introduced some evidence that the stock market reaction relative to the monetary policy is very asymmetric. They divided S&P's 500 shares into several groups based on the firm's financial limitations degree and they found out that the companies with larger financial limitations were influenced significantly by the monetary policies.

By using Markov-Switching Model, Chen [5] studied the monetary policies asymmetric effects on the stock returns. He concluded that in less booming markets and stagnant markets, monetary policies have a greater effect on the stock returns and a contracting monetary policy is more likely to lead the market towards a less booming market.

Farka [6] found out that a strict and unexpected monetary policy has a slighter effect compared to an unexpected easy-going monetary policy.

Dennis Jansen and Chun-Li [7] studied the asymmetry in the monetary policies shocks effects on the stock returns in the booming and stagnant markets in the time span from 1994 to 2005 and they found out that the monetary policies shocking effects on the stock returns in the big stagnant markets is negative and significant from the statistical point of view.

Chaiporn Vithessonthia and Yaowaluk Techarongro wongb [8] found out that the raw change in the repurchase rate has a negative effect on stock returns at the market level. Besides, contrary to the results of numerous studies, they found out that in the market level, expected changes in the discount rate have negative impact on the stock returns and unexpected changes in that have no effect on the stock returns, but in the firm level unexpected changes in the discount rate have no effect on the stock returns.Moreover, stock market reaction to the discount rate is asymmetric. Unexpected changes effects on the redeem rate which is considered as good news has a negative effect on the stock returns.

3 RESEARCH HYPOTHESES

According to the study objective and cited theoretical literature the following hypotheses are compiled:

H1: There is a significant relationship between the liquidity and the firm stock.

H2: There is a significant relationship between the liquidity and stock returns.

H3: There is a significant relationship between the unexpected changes in the monetary policies and the stock returns.

H4: Monetary policies effect on the stock market is asymmetric.

In the present study, liquidity has been a representative of the monetary policy.

4 RESEARCH METHODOLOGY

4.1 RESEARCH DATA AND STUDY POPULATION

The study methodology is of correlational type, in nature, and is functional from the objective point of view. The study data collection is conducted via library method in order for the theoretical discussions to be expressed and also field study (through bourse real information and central bank time series data) has been taken advantage of. The study required data

has been collected from the information resided in the Tehran's stock exchanges market informative site, internal and external articles, library studies in the libraries and universities and the central bank time series data.

The study objective is the survey of monetary policies adopted by the central bank on the stock returns and price of the Tehran's stock exchange market.

During the years between 1999 and 2010, the study samples should possess the following features:

They should be a member in the stock exchange market in the time period, its fiscal year should end in December, they shouldn't be investing companies, the data required for the survey should be existing in them. Based on the above-mentioned limitations, the total numbers of 72 companies, from among all of the study population, were chosen as the study sample.

The data related to the stock price and return, book value relative to the market and Beta risk were extracted from the extant software in the Tehran's stock exchange market and the data related to the liquidity was extracted from the central bank site. As Chaiporn and Yaowaluk [8], due to the lack of predictive rates of monetary policies in Thailand, used vector auto-regression (VAR model) to estimate the expected monetary policy in Thailand and obtained similar results to the time that they used Bloomberg database, in the current study VAR model has been used to predict the monetary policy.

4.2 Data Collection and Analysis Method

At first normality of the dependent variables was analyzed via Jarque-Bera test and in case of abnormality the Box-Cox function and the Jansen transfer function were applied and then the variables durability was tested by applying ADF test. Afterwards, to test the effect of the monetary policy on the stock returns and price in the firm level, first, the data related to the every company's stock returns and price were collected and then the Chow's Forecast Test was utilized to determine the use of the conditional panel or data methods and the following two regression models were applied:

$$Y1=a+\beta 1X1+\varepsilon \quad \text{(EQ1)}$$

$$Y2=a+\beta 1X1+\varepsilon \quad \text{(EQ2)}$$

Where, Y1 denotes the firm stock price, X1 denotes the liquidity in the time t, ε is the error statement, Y2 is the stock returns considering the company's capital, and to survey the two above models, we took advantage of the following tests: F-test to survey the overall significance of models, the use of the Jarque model to test the normality of the residuals obtained from the models estimation, the use of the Durbin-Watson test to study the residuals independence (entering the dependent variable in a delaying manner in case of the autocorrelation existence) and the use of the determination coefficient (R^2) to diagnose that what percent of the dependent variable changes are being accounted for by the dependent variables.

In the next stage to evaluate the expected and unexpected monetary policies effects on stock returns and also to survey the symmetric and asymmetric monetary policies effects on the stock exchange market, the following measures were taken:

In the previous two models we didn't distinguish between the expected and unexpected monetary policies. As several scientists (like Bernanke and Kutner [9] , Chaiporn and Yaowaluk [8] focused on the evaluation of expected and unexpected monetary policies effects, we also used the following model to evaluate the issue in Iran:

$$R_{mt} = \alpha + \beta^{e} \Delta i_t^{e} + \beta^{u} \Delta i_t^{u} + \varepsilon \quad \text{(EQ3)}$$

Where, R_{mt} is the sample companies return balanced average, α is the latitude from the source, ε is the error statement, Δi^{e}_{t} is the expected element of the monetary policy which is obtained from the difference of expected monetary policy in the time t and the real monetary policy in the time (t-1) and Δi^{u}_{t} is the unexpected portion of the monetary policy which is obtained from the difference of real changes in liquidity and expected changes in liquidity (Δi^{e}_{t}).

As several studies found out that the monetary policies effects on the stock market is asymmetric, we also evaluated this issue in the Iran's texture based on the following model:

$$R_{mt} = \propto + \beta_1 \text{risk} + \beta_2 BMV_{i,t} + \beta^{e} \Delta i^{e}_{i.t} * GD_{i,t} + \beta^{u} \Delta i^{u}_{i.t} * BD_{i,t} + \varepsilon \quad \text{(EQ4)}$$

Where, R_{mt} is the balanced average stock returns, α is the latitude from the source, Risk denotes the risk which is excerpted from the balanced average of the firm Beta risk, BMV is the proportion of the book value to the stock market which is entered from the firm proportion balanced average as the control variable, GD is a dummy variable for good news which is given number 1 if the announcement is assumed to provide favorable information for the investors, and otherwise it is given zero.

In the third and fourth models, seasonal time series were used in the firm level.

5 RESEARCH EXPERIMENTAL RESULTS

5.1 DESCRIPTIVE STATISTICS AND DATA TEST

5.1.1 DESCRIPTIVE STATISTICS

In the descriptive statistics, data analysis was performed by making use of central indexes such as average and median and standard deviation dispersion index, skewness and kurtosis.

In table one the results of model 1 and 2 data descriptive statistics results and in table 2 the descriptive statistics results of model 3 and 4 are shown:

Table 1. The study variables descriptive statistics for the model one and two data

Variables	number	Average	median	Std deviation	Skewness	kurtosis	minimum	maximum
Stock returns	831	40.88167	21.63	69.72635	2.265	11.30	-63.29	494.61
Stock price	847	8743.083	5217	92502	3.567	18.637	656	92502
Liquidity	864	887992.8	6062232	709930	0.78567	2.2669	160401	2355889

Table 2. The study variables descriptive statistics for seasonal data in the form of time series

Variables	number	average	median	Std deviation	skew ness	kurtosis	minimum	maximum
Market return	48	11.93958	6.9050	22.94539	3.550	16.97	-10.29	129.100
Market risk	48	1.06248	0.8850	1.373	0.856	3.816	-1.180	5.095
Book value to market	48	0.5196	0.438	0.2497	0.9158	2.7389	0.20	1.12
Expected monetary policy	48	44019.96	30325	38105.9	1.215	3.3413	8209	147384.6
Unexpected monetary policy	48	2263.4	244.57	32514.7	-0.805	6.153	-103261	85638.5
Good news	48	0.5208	1	0.5048	-0.0833	1.0069	0	1
Bad news	48	0.479	0	0.5048	0.0823	1.0069	0	1

5.1.2 DEPENDENT VARIABLES NORMALITY TEST

Since in the current study the normal least squares method has been used in order to estimate the models parameters and this method has been based on this assumption that the study dependent variable is distributed normally, this variable abnormal distribution leads to the violation of the hypotheses in order for the parameters to be estimated, therefore, it is required that the study dependent variable normality be tested. In the current study, this issue has been studied via Jarque-Bera Statistics. The study test results are shown in table 3.

Table 3. The normality test results of the dependent variable distribution

Variable	Jarque-Bera statistics	Significance level
Stock returns	3097.232	0.000000
Stock price	10426.07	0.000000
Market return	491.21	0.000000

The results obtained from Jarque-Bera test are suggestive that none of the study dependent variables enjoy a normal distribution. Therefore, it is necessary to normalize these variables before testing the study hypotheses. In this study, the Box-Cox function and Johnson function were used to normalize the data. The results obtained from Jarque-Bera test after normalizing process are as follows:

Table 4. The results obtained from the dependent variables normality after normalizing process

Variable	Jarque-Bera statistics	Significance level
Stock returns	1.072566	0.584919
Stock price	9.965765	0.006854
Market return	1.109372	0.574253

5.1.3 VARIABLES STATISTICS TEST

If time series variables are not static, a problem known as false regression exposes itself. A time-series variable is static when its average, variance, and autocorrelation coefficient stay constant during the time. In the current study to the test the staticity the aggregate Dicky-Fuller test was used. The study results are presented in tables 5 and 6.

Table 5. The model 1 and 2 data statistic test by utilizing aggregate Dicky-Fuller test

Variable	Pause number	ADF amount	prob
Stock returns	0	262.629	0.00
Stock price	0	208.230	0.0004
liquidity	2	593.668	0.00

Table 6. Time-series stativity test by using aggregate Dicky-Fuller test

Variable	Lag length	Test rank	ADF statistic amount	Critical amount in 5%	prob
Market return	0	Level	-5.47896	-2.9251	0.000
Market risk	0	1st difference	-3.22192	-2.9266	0.0250
Book value to market value	0	Level	-7.76994	-2.9266	0.000
Expected monetary policies	2	Level	-30.2214	-2.9281	0.0001
Unexpected monetary policies	2	Level	-20.0778	-2.92814	0.0001

5.2 HYPOTHESIS TESTING

H1: there is a significant relationship between liquidity and stock price.

According to the Chow test results and P-value in the first model, since P-value is less than 0.05, to estimate the model it is necessary to use the panel data method. Therefore, in these models, in order to determine which method (random effects or constant effects) better suits the estimation, Hussman test was used. In this test, H0 hypothesis is suggestive that there is no relationship between subversion element related to the latitude from the source and explanative variables and they are independent. In Hussman test, if H0 hypothesis is rejected, the constant effects method is used and in case H0 hypothesis is accepted, random effects methods is used.

According to Hussman test results for model one and P-value which is more than 0.05, it is necessary to test the model by making use of random effects.

Table 7. The results obtained from Hussman and Chow test for EQI model

Model	Test type	Test value	Test value amount	Test degree of freedom	P-value
Model 1 (EQ1)	Chaw	F	14.753036	(71,774)	0.00
	Hussman	X^2	1.443055	1	0.2296

The results obtained from this model are presented in table 8:

Table 8. the results obtained from model 1 estimation

Variable	coefficient	t-statistic	p-value
Constant coefficient	0.075825	7.164411	0.00
Liquidity	0.000001	6.641620	0.000
N-Y02(-1)	0.845776	40.68958	0.00

In table 9, a summary of the tests related to the regression assumptions has been given:

Table 9. The models statistics estimation and the test related to the regression assumptions(model 1)

Model	Determination coefficient	F-value		Jarque-Bera value		Durbin-Watson value
	R^2	F	P-value	X^2	P-value	D.W
EQ1	0.7495	1152.3	0.00	0.5924	0.7436	1.8916

To evaluate the models overall significance according to the F-value, probability amount being less than 0.05, the overall models significance is verified with a 95% of confidence. To study the models statistical hypothesis, the results from the Jarquo-Bera test shows that the test related probability is more than 0.05 and therefore the residuals obtained from the model in the 95% confidence level has a normal distribution. The figures related to the determination coefficient show that about 75% of the dependent variable variation (companies 'stock price) is determined via independent variable. In relation to the residues independent test, the results obtained from the Durbin-Watson preliminary test is indicative that the residuals have autocorrelation problem for the removing of which the study dependent variable has been entered into the model in a delaying manner. After the entrance of this variable, the amount of the Durbin-Watson value approaches 2 and the residuals autocorrelation problem has been removed.

H 2: there is a significant relationship between the liquidity and the stock returns.

According to the Chow test and its P-value, combinational data method can be taken advantage of for estimation. The results obtained from the Chow test are shown in table 10.

Table 10. The results obtained from bound F-test for EQ2 model

Model	Test value	Test value amount	Test degree of freedom	P-value
Model 2(EQ2)	F	0.725721	(71,758)	0.9552

In table 11, the results estimated from model 2 are indicated.

Table 11. The results estimated from the model 2 estimation

Variable	coefficient	t-statistic	P-value
Constant coefficient	0.309054	6.537354	0.000
Liquidity	-0.000001	-8.042514	0.000

In table 12, a summary of the test related to the regression assumption has been given:

Table 12. The results obtained from the models estimation and the tests related to the regression assumption

Model	determination coefficient	F-value		Jarque-Bera value		Durbin-Watson value
	R^2	F	P-value	X^2	P-value	D.W
Model 2(EQ2)	0.06847	60.936	0.00	8.9789	0.0112	1.9689

In the evaluation of the models significance, based on this matter that the amount of F-value is less than 0.05, with the confidence of 95%, the significance of all of the models is verified. The figures related to the determination coefficient shows that about 6% of the dependent variable variations (companies' stock returns) are determined by means of independence variable.

H 3: There is a relationship between unexpected change in monetary policy and stock returns.

Because of the correlation between independent variable not being strong (less than 0.7) it can be said that the problem of co-linearity between them has not existed and simultaneous entrance of these variables in the model does not cause the co-linearity.

In table 13, the results obtained from model estimation and in table 14 the results and tests related to the third model regression assumption have been given:

Table 13. The results obtained from the third model hypothesis

Variable	coefficient	t-statistic	p-value
Constant coefficient	0.5018	1.9085	0.0632
Δi^e (-1)	-0.000011	-2.402306	0.0208
Δi^u (-1)	-0.000004	-1.005251	0.3205
AR (1)	0.199476	1.271661	0.2105

Table 14. The results of model estimation values and the tests related to the second hypothesis regression

Model	determination coefficient	F-value		Jarque-Bera value		White value		Durbin-Watson value
	R^2	F	P-value	X^2	P-value	W	P-value	D.W
Model3	0.21036	3.7296	0.018	1.1314	0.5679	0.2535	0.98	1.9962

According to the results of the F-test (0.01827) with the 95% of confidence the overall model is verified. The models determination coefficient is indicative that 21.03 percent of the stock returns variations are accounted for by the variables entered in the model. The results of Jarque-Bera test is suggestive that the residuals obtained from the model estimation in the confidence level of 95% have normal distribution. In relation to the residuals independence test, the preliminary results also are indicative that the residues have autocorrelation problem for the removing of which the first time auto-correlated variable AR(1) has been entered to the model in a way that after entering this variable, the Durbin-Watson value approaches to 2 and the residuals autocorrelation has been resolved. In the assessment of the residuals variance inconsistency, also the white test results (0.9829) are suggestive that the residuals variance is similar.

H 4: the monetary policy effect on the stock market is asymmetric.

The results obtained from the Pierson correlation coefficient shows that the co linearity problem does not exist between variables.

The results obtained from the estimation are shown in table 15, and the results obtained from the regression hypothesis are shown in table16:

Table 15. The results obtained from the fourth hypothesis estimation

Variable	coefficient	t-statistic	p-value
Constant coefficient	0.044127	0.117556	0.9070
risk	-0.028059	-0.213719	0.8319
BMV	1.927302	2.621201	0.0123
Δi^{e} (-1)*GD	-0.000028	-2.928622	0.0056
Δi^{u} (-1)*BD	-0.000019	-3.241069	0.0024
AR (1)	0.066945	0.381042	0.7052

Table 16. The models value estimation results and the tests related to the fourth regression assumption

Model	determination coefficient	F-value		Jarque-Bera value		White value		Durbin-Watson value
	R^2	F	P-value	X^2	P-value	W	P-value	D.W
model 4	0.270072	2.95997	0.02295	1.417353	0.4922	0.4727	0.954	1.9375

The above table's interpretation is as before and for the sake of not being repetitive we withdraw from interpreting them.

6 CONCLUSION

In the presented study, firstly, we dealt with the study of the monetary effect on the stock returns and the stock price in the firm level for 72 companies. The results obtained from model one (table8) shows that there is a positive and significant relationship between the liquidity and the stock price that is to say with an increase in the liquidity, stock price increases accordingly. Therefore, the first hypothesis is accepted and its high determination coefficient (0.74) is suggestive of the strong relationship between price and return. Model 2 results (table 10) also shows that in the firm level there is a negative and significant relationship between liquidity and stock returns, so the second hypothesis was accepted accordingly. One of the reasons for the increase in the stock price can be inflation resulted from the increase in the liquidity which is a cause for the increase in the companies increase in the assets price; therefore the investors, for making decision about investing in the stock market, are advised not to pay attention only to the stock price and consider other factors such as return. From among the reasons which can cause different conclusions about stock returns with the stock price we can refer to this subject that when we face an increase in the liquidity, the reduction in other factors influencing the return calculation has been more than increase in the stock price and this has brought about a decrease in stock returns.

To test the expected and unexpected monetary policy effect on the stock returns and the assessment of the symmetry or the asymmetry of the monetary policies effects on the stock market in Iran, we made use of time series data.

Model 3 results (table 13) showed that unexpected monetary policies have no effect on the stock returns and the stock price and as a result the third hypothesis was rejected in the confidence level of 95%. But, the expected monetary policies have a significant and negative effect on the stock returns of the companies and these two results are consistent and similar to Chaiporn's [8] findings.

So central bank can attract people toward investing in the capital market by using its encouraging policies and the government can make appropriate credit token available for the stock exchange companies by making use of predicted and optimum monetary policies and pave the way for the increase in these companies' price and return.

The results obtained from model 4 (table 15) showed that the effect of monetary policies good and bad news influences the stock market return asymmetrically and the amount of their influence on the stock market return is different from each other. Therefore, the fourth hypothesis is accepted and it can be said that the monetary policy effect on the Iran's stock market is asymmetric and this is consistent with and similar to Chaiporn's [8] study results finding.

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