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Fiscal Policy Shock Impacts and Tehran Stock Exchange Yield

Mohammad Kazem Naziri[1], Fereshte Ebrahimi[2*]

[1]Faculty Member of Economics and Social Sciences, Bu-Ali Sina University, Hamedan, Iran,
[2]M.S. Economic Development and Planning, Bu-Ali Sina University, Hamedan, Iran.
***Corresponding Author**

Abstract: *This paper evaluated the effect of the shocks of fiscal policies and macroeconomic variables on Iranian stock exchange during 1996-2010. Vector Auto-regression (VAR) was used for experimental tests. This paper evaluated the effect of different economic shocks on the price index of Tehran Stock Exchange (TSH) over time usinginstantaneous response functions and analysis of variance(ANOVA) of prediction error. In addition, the effect of the variations of variables on stock pricewas studied. Data was analyzed using Eviews and Stata.the paper result show that expect of inflation rate that has a negative effect on stock price index, all variable have positive effect impact on this index.*

Key words*: Fiscal Policies Shock, Instantaneous Response Functions, TehranStock Exchange, Variance of Prediction Error, Vector Auto-Regression*

1. INTRODUCTION

Stock exchange is an official incorporated capital market where companies share, government bond or reputable private corporates bond are sold and purchased under specific regulations and terms. Stock exchange is characterized by legal support of the owners of savings and dead capitals, and legal requirements for capital applicants. In one view, it serves as the center for collecting the savings and liquidity of private sector for financing long-term investment projects. In another view, it is an official and reliable authority where the owners of dead savings can use it as a suitable and secure place to search investment opportunities in order to use their surplus funds in corporates or to obtain specific and guaranteed profit by purchasing government bond and/or reputable corporates bond (Bloorian, 1992; p.3). Capital market is an important economic part of any country. Economic growth can trigger the development and flourish of capital market. On the other hand, it is impossible to achieve desired economic growth and development without efficient financial authorities and appropriate equipping of financial resources. To this end, efficient financial systems can better allocate resources, and finally, promote economic growth through acquiring information about investment opportunities, aggregating and equipping savings, supervising investments and corporate governance practices, facilitating the exchange and distribution of goods and services and risk management; all lead to decreased deal costs and the acquisition and analysis of information. Moreover, more efficient financial systems decrease foreign financing barriers and promote investment and economic growth by the facilitated access of production and industrial units to foreign capitals (Dadgar and Nazari, 2009).

Fiscal policy shocks, impacts on stock market

In his general balanced approach in financing sector, Tobin (1969) highlights the role of return on capital as the mediator of the actual and financial parts of economy. In other words, he gives importance to both money growth and deficit as the influential factors of stock market yield(Patelis et al, 1997). Generally, in investors' view, remarkable deficit has a negative effect on stocks and bond prices because it increases interest rates and this, in turn, decreases occupational capital costs as well as consuming costs and finally

decreases actual economic practices. They affect financial markets by decreasing assets price and families' wealth and increasing borrowing. Increased interest rates and weak economic practices may result in more critical imbalance and creation of a loop (Nikiforos et al, 2009). In this way, if government expenditures exceedgovernment incomes, it will experience deficit and interest rates will increase. The increased interest rate pressurizes other economic areas including stock market.

Fiscal policy can affect stock market yield. Keynesian-based fiscal policies (supporting aggregate demand) increase stock prices (Chatziantoniou et al, 2013). Barro argues that fiscal policy does not affect stock market at all. Some other studies on fiscal policies and stock market yield, e.g. Rezesy (2005) and Ewing (1998), attribute the non-efficiency of stock market to deficit. In a series of papers, Darrat (1987, 1988, 1990) evaluated stock market efficiency under the effects of fiscal policies and concluded that deficit affects stock market. However, there are other studies in this field e.g. the studies of Afonso and Sousa (2011, 2012) and Angello and Sousa (2010) and Jansen et al (2008).

Background

In a study titled "effect of fiscal policy shocks on Iranian economic growth", Delangizan et al (2012) evaluated the asymmetric effects of government fiscal policy shocks along with liquidity growth on economic growth during 1959-2009 using Sheng Chen specified model. They used Hodrick-Prescott filter to extract positive and negative fiscal policy shocks. According to their results, government fiscal policy shocks go with asymmetric effects only in the field of civil budget. In a paper titled "fiscal policies, housing and stock price" Afonso et al (2009) made a slight change on Gali et al study and analyzed the effect of fiscal policies on economic practices emphasizing assets market and the extent to which fiscal policy shocks affect stock and housing prices. They provided their results using VAR model and showed that fiscal policy shocks had a negligible effect on stock and house prices in The U.S. and Germany. Both expenditure and income shocks had a remarkable effect on the assets market of England while only income shocks increased stock and house prices in Italy. It should be noted that government fiscal policy shocks have asymmetric effect on other GDP components.

In a paper titled "fiscal policy and stock market yield based on The U.S. observations" Nikiforos et al (2009) evaluated the sensitivity of stock market to fiscal policy using the monthly data from 1968:1 to 2005:12. The empirical findings of their study, derived from Arch model, showed that past deficits have had a significant negative effect on stock market yield.

In a study titled "response of stock market to monetary and fiscal policy shocks" Chatziantoniou et al (2013) evaluated monetary and fiscal policy shocks on the stock market yield of Germany, England and The U.S. using a structural VAR model and seasonal data of 1991: 1-2010:4. The variables of the used VAR model were economic practices index, GDP and consumer price index, government expenditures (proxy for fiscal policy), money supply (M1) (proxy for monetary policy) and interbank interest rate. According to evidences, both monetary and fiscal policies affect, directly or indirectly, stock market. Most importantly, there are evidences indicating the importance of the interaction of both policies in explaining exchange changes.

Methodology

According to above discussions, the aim of this study is to evaluate the effect of fiscal policy and macroeconomic variable shocks on stock price index in TSE during 1996-2010. This study is performed using VAR, instantaneous response functions and ANOVA. This study was performed in all active industries listed in TES and the study time scope is the first season of 1996 to the last season of 2010 i.e. a 15-year duration. Considering theoretical and empirical backgrounds, this section presents the adopted model and introduces variables.

Model and variables

To realize study objectives, the independent variables of the considered model are current expenditures (Mj) and civil expenditures (Mo), as fiscal policy shock, interest rate (IR) and inflation rate (INF) which

can be computed from consumer price index. The dependent variable of model is total exchange price index (TEPIX) which is derived from the following relation:
TEPIX= (current value of issued stocks/base value of issued stocks)×100
The following model is estimated using VAR approach in order to evaluate the long-term relationship between total exchange price index and explanatory variable.
Ltepix =f (lmj,lmo,lir,linf)

Results

According to above discussions, VAR was used to estimate the relationships of this study. This model is one of the best fit models of econometrics realizing the study objective to a large extent. In this model, each variable is fitted on its lagged values and on other variables lagged values.
In the process of VAR model estimation, the stationary of variables should be first assessed and the number of optimal lags should be determined.

Stationary test (unit-root)

Augmented Dickey-Fuller test was used to test variables stationary. According to results, all variables are stationary at a confidence level of 95%.

Table 1: Dickey-Fuller test for variables level using Stata

variable	intercept	Trend	Test statistics	Level 1%	Level 5%	Level 10%
LTEPIX	yes	yes	-7.59	-4.12	-3.48	-3.17
LMj	yes	no		-3.57	-2.92	-2.59
LMO	no	no	-5.87	-2.60	-1.94	-1.61
LIR	no	no	-1.94	-2.60	-1.92	-1.60
LINF	yes	no	-4.61	-3.55	-2.91	-2.59

Estimation of model using VAR

After studying variables stationary, the number of optimal lags should be modeled following the initial estimation of model in order to determine the optimal lag of model for evaluating the long-term relationship between variables. The following criteria are used to select the optimal lag: Akaike information criterion (AIC), Schwarz information criterion (SC) and Hannan- Quinn Information criterion (HQC). Considering the limited time scope of our study and the prominence of AIC to other criteria in smaller samples AIC was used in this study. Table 2 shows the statistics of the abovementioned criteria.

Table 2: determination of the optimal lag of model using Eviews

lag duration	HQ	AIC	SBC
0	-0.37	-0.43	-0.28
1	-4.24	-4.52	-3.79
2	-4.89	-5.39	-4.08
3	-4.89	-5.63	-3.73
4	-5.51	-6.47	-3.99

Considering Eviews data, the optimal lag of this model is 1.
During data interpretation, it should be noted that in the estimation of equation system the coefficients of model parameters are not as important as single equation methods. Therefore, the estimated results could not be analyzed with a high reliability. Thus, response functions and variance analysis are used to analyze results.

Response functions (impact and response)

The following plot shows the response of TEPIX in the first model to an impulse to TEPIX and other variables during 10 periods. This plot shows the effect of a sudden shock generated in each variable with a size of a standard deviation on TEPIX in next periods.

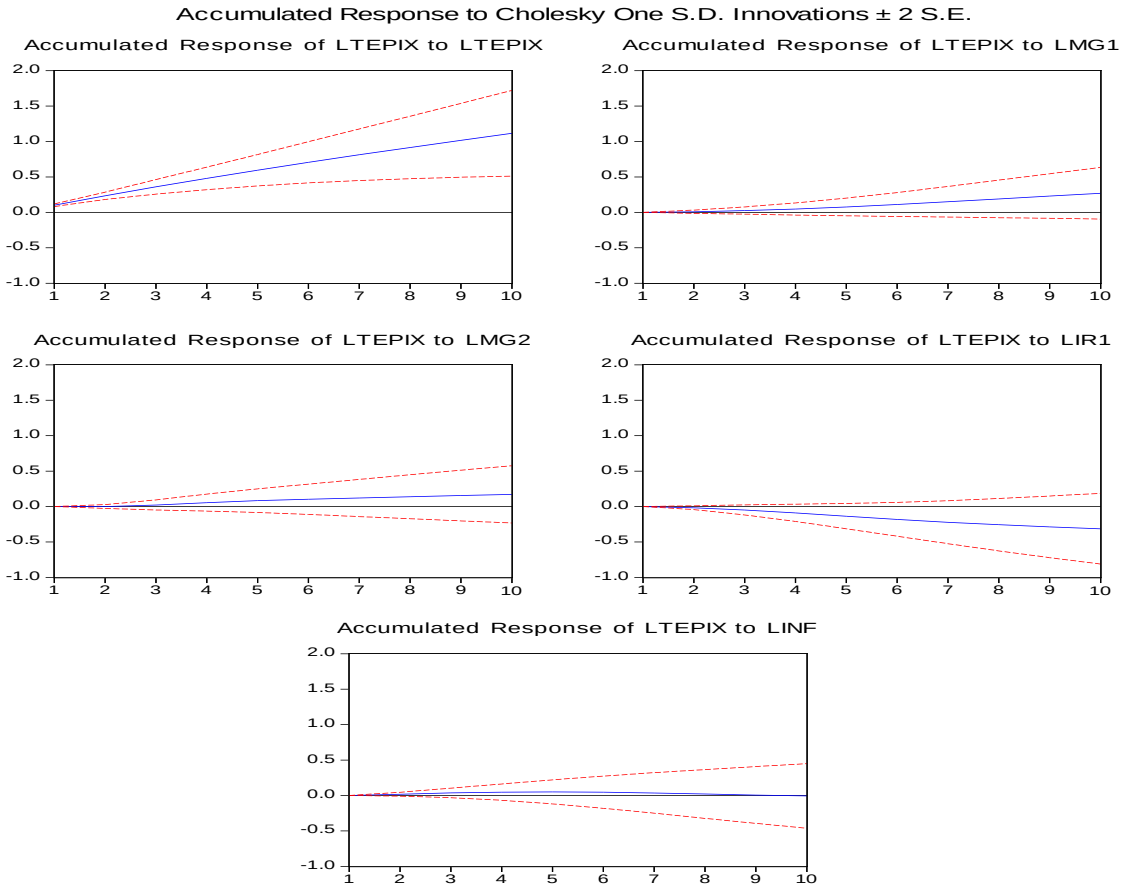

Figure 1: The effect of a shock with a size of a standard deviation in each variable on TEPIX

According to the plot, the effects of shocks are not disappeared within a 10-month period. The imposed shock is positive and has a divergent trend due to current and civil expenditures. Inflation rate shock is negligible but positive. Interest rate shock is negative and has a divergent trend.

ANOVA of prediction error

ANOVA of prediction error shows the percent of changes in the target variable induced by its own impulses as well as the impulses of other variables available in system in different times. In other words, ANOVA serves as a tool determining the contribution of the instability of each variable against imposed impulses to the other variables of the model. According to table 3, prediction error was 0.1% in the first period. It increased to 0.16% and finally to 0.38%. The second column of this table shows that during the first period, 100% of changes to stock price is induced by the variable itself. In the second period, it decreased to 97.58% and the remained part is induced by other variables. This table shows 10 periods in which the main portion, i.e. 80% of instabilities of TEPIX is induced by the TEPIX itself followed by inflation rate, interest rate, current expenditures and civil expenditures.

Table 3: variance of the logarithm of price index using Eviews

period	S.E	LTEPIX	LMJ	LMO	LIR	LINF
1	0.100	100.00	0.0000	0.0000	0.0000	0.0000
2	0.168	97.58	0.1714	8.9147	0.0485	2.238
3	0.215	93.32	0.8372	1.9105	0.0719	4.853

4	0.252	90.83	1.348	2.4628	0.5522	6.768
5	0.284	88.65	2.0981	2.8952	1.057	8.682
6	0.310	86.38	2.9410	2.8203	1.579	10.436
7	0.330	84.63	2.9282	2.7306	2.287	11.525
8	0.352	83.20	4.7586	2.6892	3.295	11.928
9	0.370	83.02	5.9523	2.6325	4.266	12.122
10	0.388	82.90	6.0443	2.5903	7.6609	12.289

Conclusion

The aim of this study was to determine the effect of fiscal and macroeconomic variables shocks on stock market. Attempts were done to evaluate the effect of each shock imposed to stock market using available statistics in Iran and VAR model. To this end, Augmented Dickey-Fuller test was used to test model variables. According to the results of this test, all variables were stationary. In the next step, AIC, SBC and HQ criteria were used to determine optimal lags. Finally, VAR model was used to evaluate the short-term mechanisms. The effect of variables shocks on TEPIX was studied using instantaneous response functions and ANOVA. The results of instantaneous response functions show that all variables, except inflation rate with a negative effect on TEPIX, have a positive effect on it. ANOVA results show that in short-term inflation rate has the maximum contribution to the change of TEPIX followed by civil expenditures, current expenditures and interest rate, with negligible changes. In long-term, however, in addition to inflation rate, interest rate has the maximum contribution to the justification of the changes of TEPIX. The final result of this model is that the financial variables used in this study had a positive effect of TSE both in long-term and short-term.

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