INTERNATIONAL JOURNAL OF ECONOMICS AND FINANCE STUDIES
Vol 4, No 1, 2012 ISSN: 1309-8055 (Online)

LONG RUN AND SHORT RUN EFFECTS OF MONETARY AND EXCHANGE VARIABLES ON STOCK PRICES IN IRAN

Abbas Alavi Rad
Department of Economics, Science and Research Branch, Islamic Azad University, Yazd, Iran
Assistant Professor
Hesabi BLV, Safaieh, Yazd, I.R.Iran
E-mail: alavi_rad@ysrbiau.ac.ir

Mohammad Reza Eslami
Department of Economics, Science and Research Branch, Islamic Azad University, Yazd, Iran
Assistant Professor
Hesabi BLV, Safaieh, Yazd, I.R.Iran
E-mail: drmr_eslami@ysrbiau.ac.ir

Abstract

The movements in the stock prices are an important indicator of the economy. The purpose of this paper was to examine the relationship between Tehran Stock Exchange (TSE) price index and monetary variables in Iran. We have used Autoregressive Distributed Lag (ARDL) approach and Error Correction Model (ECM) to determine the effects of monetary and exchange variables on TSE price index in long run and short run. Quantitative estimates based on the time series monthly data from 2004 to 2009, indicate that liquidity (M2) has a positive effect on TSE price index in long run. But, free market exchange rate (FR) and legal reserves (LR) have a negative effect on TSE price index in long run. On the other hand, monetary and exchange variables have a significant effect on TSE price index in short run. However, the coefficient of the Error Correction Term (ECT) shows that speed of adjustment is slow and the ECM only can explain 69 per cent of fluctuation of TSE price index.

Keywords: *Stock Price Index; Monetary Variables; ARDL Model; ECM*
JEL Classifications: *G10; E51; C22*

1. INTRODUCTION

The history of Iran stock market can be traced back to 1967 (Pre-revolution). There is one stock exchange (Tehran Stock Exchange) operating in Iran. Since 1967, Tehran Stock Exchange (TSE) can be classified, for review, into four stages. The first stage covers the period of time from 1967 to 1978. TSE started in this stage and developing the TSE was not priority for the Iranian authorities. Second stage (1979-1988) started whit the costly eight-year war, 1980-1988, with Iraq. As a result, TSE remained primitive. The ending of the Iran-Iraq war in August 1988 signaled the beginning of a new stage (1989-2004) in the development of TSE. It was successful in increasing listed companies in TSE, but stock market fluctuated in this stage. In the last stage (2005-peresent) listed companies in TSE increased to nearly 445, but, TSE has not improved until now. Generally, stock market in Iran suffered from social, economic and political problems such as economic instability, the trade sanctions, the freezing of Iranian assets that followed and economic isolation from the west.

It is often argue that instability in monetary and exchange policies have a large influence on the stock market. Li *et al*. (2010) empirically examined that how stock prices response to monetary policy shocks. Using structural VAR models, they found that, in Canada, the immediate response of stock prices to a domestic concretionary monetary policy shock is small and the dynamic response is brief, whereas in the United States, the immediate response of stock prices to a similar shock is relatively large and the dynamic response is relatively prolonged. There is little attention to determine long run and short run effects of monetary and exchange variables on stock prices in Iran. Safdari *et al*. (2011) studied the relationship between economic variables and stock market index in Iran. They utilized the VAR model and found that the variables of money supply, interest rate and inflation have a negative effect on total stock market index. Nowadays, it is often argue that fluctuations in monetary and exchange rate policies in Iran have a large influence on the investors' investment decision in TSE. Therefore, this study focuses to detect the effects of only monetary and exchange variables on TSE price index in short run and long run.

The remainder of the paper is organized as follows: Section 2 provides a brief review of literature on the relationship between stock market and monetary variables. The econometric methodology and the data used are presented in section 3. Section 4 provides time series analysis and model estimation and final section offers a summary and the conclusion.

2. REVIEW OF LITERATURE

According to modern quantity theory of Friedman and Schwartz (1963) an exogenous shock that increases the money supply changes the equilibrium position of money with respect to other assets included in the portfolio. As a result, asset holders adjust the proportion of their portfolios taking the form of money balances. This adjustment alters the demand for other assets that compete with money balances such as equity shares. An increase the money supply is expected to generate an excess supply of money balances which leads to an excess demand for shares. In this case, share prices are expected to rise. Many economists examined the effects of money supply (M1 and M2) on stock prices during the last two decades, but, results are mixed.

Rahman and Mustafa (2008) studied the long run and short run dynamic effects of broad money supply (M2) and price of oil on the S&P 500 the using monthly data from January 1974 to April 2006. The results provided support in favor of the three variables being cointegrated. The vector error correction model revealed no causal relationship in the long run although feedback relationships existed in short run. Also, the results indicated that the current volatility of the U.S. stock market was fueled by its past volatility, and negative monetary and oil price shocks initially depressed the U.S. stock market. Ratanapakorn and Sharma (2007) explored positive relationship between stock prices and money supply in U.S. But, Humpe and Macmillan (2009) found negative impact of money supply on NKY225 in Japan.

The theory demonstrates that changes in the exchange rate have an important bearing on a firm's overall profits through firm's foreign operation which results fluctuations in stock prices. Many economists examined the relationship between foreign exchange rate and stock prices during the last two decades. But, results are mixed.

Salifu (2007) examined the foreign exchange exposure of listed companies on the Ghana Stock Exchange over the period 1999 to 2004. Results of this study serve as a useful guide to corporate managers and investors on the degree of foreign exchange exposure and the need to effectively manage firm exposure. Aggarwal (1981) found positive relationship between foreign exchange rate and U.S. stock prices, while, Soenen and Hennigar (1988) detected negative correlation between the two variables.

3. DATA AND METHODOLOGY

3.1. Data

We used monthly data in exploring the relationship between the monetary and exchange variables and Tehran Stock Exchange (TSE) price index. The included variables in this study were liquidity (M2), free market exchange rate (FR), legal reserves (LR) and TSE price index. Its information is according to the time series and duration of this study was in 2004-2009. The main source that is used for the data related to model variables is the Central Bank of Iran (CBI).

3.2. Stationary checks

A number of alternative tests are available for testing whether a series is stationary. Usually augmented Dickey-Fuller (ADF) and Phillips and Perron (1988) tests have been used by researchers. This study used ADF test for finding unit roots in time series. An indication of whether the researcher should supplement ADF tests by also using the adjustments proposed by Phillips and Perron (1988) can be gained by inspection of the diagnostic statistics from the ADF regression (Perman, 1991).

3.3. Model and Estimation Method

To explore relationship between the monetary and exchange variables and TSE price index, we used log-linear equation as follows:

$$\ln SI_t = \alpha_0 + \alpha_1 LnM2_t + \alpha_2 lnFR_t + \alpha_3 \ln LR_t + U_t$$

The description of variables used in this study was given as under:

LSI = Log of TES price index
LM2 = Log of liquidity
LFR = Log of free market exchange rate
LLR = Log of legal reserves

To determine long run and short run effects of monetary and exchange variables on TES price index following econometric model estimated by Autoregressive Distributed Lag (ARDL). It seems that this procedure is appropriate method to

estimate the model. Like the Johansen and Juselius (1990) procedure, the ARDL method estimates the long run effects jointly with the short run effects. Pesaran and Shin (1995a) showed that ARDL modeling for univariate cointegration test for small sample will be the most appropriate.

4. EMPIRICAL RESULTS

4.1. Unit Root Test

The results of the unit root tests are presented in Table 1. The null hypothesis of unit root is not rejected by ADF test and so are the series non-stationary in the level. We conducted the same test on the first difference of these series and found them stationary.

Table 1: Results of Unit Root Test

Series	Order	ADF[1]
LnSI	Level	-2.96
	1st difference	-4.67
LnM_2	Level	-1.57
	1st difference	-12.18
LnFR	Level	-3.04
	1st difference	-9.67
LnLR	Level	-0.82
	1st difference	-10.17

1 Augmented Dickey-Fuller unit root test, denotes significance at 5%

4.2. Autoregressive Distributed Lag (ARDL) Estimates

We propose an ARDL modeling for univariate cointegration test, where the Tehran Stock Exchange (TSE) price index is considered to be the dependent variable and the best lag distribution of the independent variables, liquidity (M2), free market exchange rate (FR) and legal reserves (LR), was modeled.

4.2.1 The Optimal Number of Lags

The *ARDL* model was estimated from a recursive search of the optimal number of lags through the Akaike Information Criterion (AIC) and from the diagnostic statistics. Table 2 presents the *ARDL* estimates.

Table 2
Autoregressive Distributed Lag Estimates
ARDL (1, 4, 5, 4) selected based on Akaike Information Criterion
Dependent variable is LnSI

Regressors	Coefficient	Standard Error	T-Ratio [Prob]
LnSI(-1)	.75987	.051682	14.7030[.000]
LnM2	-.53479	.17294	-3.0923[.003]
LnM2(-1)	.21783	.15847	1.3746[.176]
LnM2(-2)	-.013714	.15973	-.08585[.932]
LnM2(-3)	.45761	.15971	2.8653[.006]
LnM2(-4)	.65059	.17214	3.7795[.000]
LnFR	-1.1148	.37101	-3.0049[.004]
LnFR (-1)	.91237	.47599	1.9168[.061]
LnFR (-2)	-1.0099	.42341	-2.3851[.021]
LnFR (-3)	-1.1306	.42964	-2.6316[.011]
LnFR (-4)	-1.2293	.43131	-2.8503[.006]
LnFR (-5)	.80573	.45766	1.7606[.085]
LnLR	-.092507	.11715	-.78963[.434]
LnLR (-1)	-.095523	.12258	-.77930[.440]
LnLR (-2)	-.18765	.12028	-1.5601[.125]
LnLR (-3)	-.14809	.12209	-1.2130[.231]
LnLR (-4)	-.21669	.10600	-2.0443[.046]
Intercept	26.0005	6.3134	4.1183[.000]
R-Squared	0.96152	R-Bar-Squared	0.94789
S.E. of Regression	0.031002	F-stat. F(17,48)	70.5519[.000]
Mean of Dependent Variable	9.2526	S.D. of Dependent Variable	.13581
Residual Sum of Squares	0.046134	Equation log-likelihood	146.1236
Akaike Info. Criterion	128.1236	Schwarz Bayesian Criterion	108.4167
DW-statistic	1.6947	Durbin's h-statistic	1.3665[.172]

Diagnostic Tests

Test Statistics	LM Version	F Version
A: Serial correlation	CHSQ(12) = 14.734[.246]	F(12,36) = .86222[.590]
B: Functional form	CHSQ(1) = .94973[.330]	F(1,47) = .68620[.412]
C: Normality	CHSQ(2) = 1.4818[.477]	Not applicable
D: Heteroscedasticity	CHSQ(1) = .05221[.819]	F(1,64) = .050674[.823]

Source: Author Calculations by *Microfit* (4.0).
A: Lagrange multiplier test of residual serial correlation.
B: Ramsey's RESET test using the square of the fitted values.
C: Based on a test of skewness and kurtosis of residuals.
D: Based on the regression of squared residuals on squared fitted values.

Given the monthly data available for estimation, we set the maximum lag order of the various variables in the model equal to five. In fact, this is the first stage of an *ARDL* modeling for univariate cointegration test. The results of a few diagnostic tests indicate that there is no error autocorrelation and conditional

heteroskedasticity, and that the errors are normally distributed. This evidence indicates that the relationship between variables is verified.

4.2.2 Estimated Long run Coefficients

The second stage of an *ARDL* modeling for univariate cointegration test is to estimate the long run coefficients of model. Table 3 presents the solved static long run results of the *ARDL* model. The estimated coefficients show that liquidity (M2) has a positive effect on TSE price index in long run. But, free market exchange rate (FR) and legal reserves (LR) have a negative effect on TSE price index in long run, and all the regressors are statistically significant.

Table 3
Estimated long run Coefficients the ARDL Approach
ARDL (1, 4, 5, 4) selected based on Akaike Information Criterion
Dependent variable is LnSI

Regressors	Coefficient	Standard Error	T-Ratio (Prob)
LnM2	3.2380	.60881	5.3185[.000]
LnFR	-11.5216	2.4327	-4.7361[.000]
LnLR	-3.0836	.53379	-5.7768[.000]
Intercept	108.2787	20.0821	5.3918[.000]

Source: Author Calculations by *Microfit* (4.0).

4.2.3 Error Correction Model (ECM)

Now, with the acceptance of long run coefficients of stock price equation, we can estimate short run coefficients. Arising from this is the need to develop an ECM. An ECM has two important parts. A "general-to-simple" methodology is adopted. Thus, an over parameterized error correction model is pursued. The results of this are not reported and using the information criterion as a guide, this estimated equation was reduced to a more preferred specification. The results are presented in table 4.

Table 4
Error Correction Representation for ARDL Model
Dependent variable is Δ LnSI-Preferred Specification

Regressors	Coefficient	Standard Error	T-Ratio [Prob]
Δ LnM2	-.53479	.17294	-3.0923[.003]
Δ LnFR	-1.1148	.37101	-3.0049[.004]
Δ LnLR	-.092507	0.11715	-.78963[.433]
Δ Intercept	26.0005	6.3134	4.1183[.000]
ECT(-1)	-.24013	.051682	-4.6462[.000]
R-Squared	0.69085	R-Bar-Squared	0.58136

S.E. of Regression	0.031002	F-stat. F(14,51)	7.6619[.000]
Mean of Dependent Variable	0.13955	S.D. of Dependent Variable	0.047915
Residual Sum of Squares	0.046134	Equation log-likelihood	146.1236
Akaike Info. Criterion	128.1236	Schwarz Bayesian Criterion	108.4167
DW-statistic	1.6947		

Source: Author Calculations by *Microfit* (4.0).

Estimations show that the coefficients of all the regressors are statistically significant at the 5 per cent level. Only, the coefficient of the legal reserves (LR) is not statistically significant. The results of ECM show that the coefficient of liquidity (-.53) has a negative effect in TSE price index in short run. The coefficient of the error correction term (ECT) is equal to -0.24. According to this estimation, speed of adjustment is slow. In addition, the ECM only can explain 69 per cent of fluctuation of TSE price index.

Finally, recursive estimation using CUSUM and CUSUM square tests found that the parameters remain stable over the entire study period because both of the recursive lines are in the bound. These indications clearly illustrated through Fig. 1 and 2.

Figure 1: Plot of Cumulative sum of Recursive Residuals

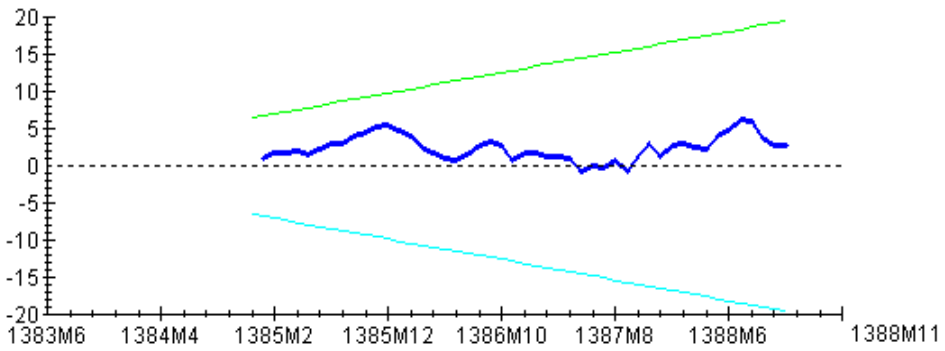
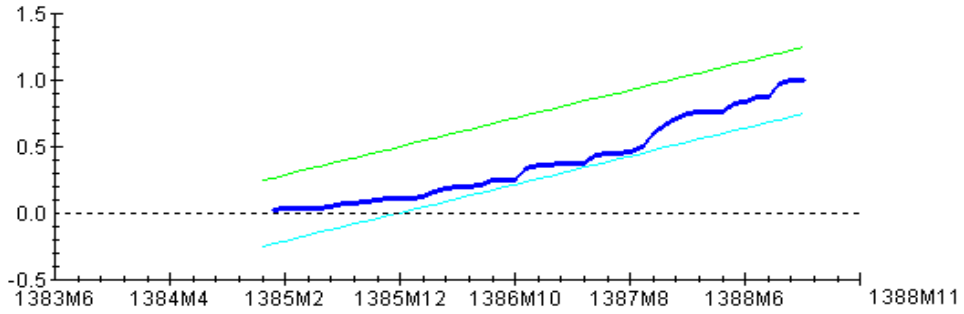


Figure 2: Plot of Cumulative sum of Squares of Recursive Residuals



5. CONCLUSION

This study examined long run and short run relationship between three monetary and exchange variables and stock prices in Tehran Stock Exchange. All the series used in our analysis was found non-stationary at levels but stationary at first difference. ARDL modeling for univariate cointegration test showed that long run relationship between variables is verified. In long run, liquidity (M2) had a positives impact on TSE price index while free market exchange rate and legal reserves affected TSE price index negatively. But in short run, liquidity (M2) had a negatives effect on TSE price index. However, legal reserves showed insignificant negative impact on TSE price index in the short run. In addition, the results of ECM showed that speed of adjustment is slow.

According to the empirical results of this study, the total private sector liquidity (M2), legal reserves and free market exchange rate play an important role on TSE price index in long run. But, Iran has experienced many fluctuations on these variables over the periods of 2009-2012. The provisional profit rates for term investment deposits in private banks and non-bank credit institutions have been changed in two stages from 2009 to 2012. Since 2009, as long as profit rates for deposits in banks of Iran increase, deposits in banks increase too. In addition, since 2011, the gap between official and black market exchange rates started increasingly through time in Iran.

It is clear that central bank of Iran heavily controls by government. On the other hand, government has most roles in the management of monetary and exchange variables. Therefore, it is necessary that the authorities manage liquidity (M2) and

control exchange rate to a stable condition. It seems that stability of monetary and exchange variables can influence on the investors' investment decision in TSE.

BIBLIOGRAPHY

Aggarwal, R., (1981), Exchange Rates and Stock Prices, A Study of the US Capital Markets under Floating Exchange Rates, *Akron Business and Economic Review*, Vol, 12, No.4, pp.7-12.

Dickey, D.A., Fuller,W.A ., (1979), Distribution for Autoregressive Time Series with a Unit Root, *Journal of the American Statistical Association,* Vol, 74, No. 366, pp. 427-431.

Friedman, M., Schwartz, A.J., (1963), Money and Business Cycles, *Review of Economics and Statistics*, Vol, 43, No.1, pp. 32-64.

Johansen, S., Juselius, K., 1990. Maximum Likelihood Estimation and Inference on Cointegration: with Applications to the Demand for Money. *Oxford Bulletin of Economics and Statistics* 52, 169-210.

Li, Y., Iscan, T., Xu, K., (2010), The Impact of Monetary Policy Shocks on Stock Prices: Evidence from Canada and the United States. *Journal of International Money and Finance*, Vol. 29, No.5, pp. 876-896.

Phillips, P.C.B., Perron, P., (1988), Testing for a Unit Root in Time Series Regression. *Biometrika* 75, 335-346.

Perman, R.J., 1991. Cointegration: An Introduction to the Literature. *Journal of Economic Studies* 18, 3-30.

Pesaran, M.H., Shin, Y., (1995a), An Autoregressive Distributed Lag Modeling Approach to Cointegration Analysis. *DAE Working Papers*. No .9514, University of Cambridge.

Pesaran, M.H., Shin, Y., (1995b), Long run Structural Modeling. *DAE Working Paper.* No. 9419. University of Cambridge.

Rahman, M., Mustafa, M., (2008), Influences of Money Supply and Oil Prices on U.S. Stock Market. *North American Journal of Finance and Banking Research*, Vol. 2, No. 2, pp. 1-12.

Ratanapakorn, O., Sharma, S., (2007), Dynamic Analysis between the U.S. Stock Returns and the Macroeconomic Variables. *Applied Financial Economics*, Vol. 17, No.5, pp. 369-377.

Safdari, M., Abouie Mehrizi, M., Elahi, M., (2011), Studying Relationship between Economic Variables on Stock Market Index. *International Research Journal of Finance and Economics*, Vol, 5, No.76, pp. 121-127.

Soenen, R., Hennigar, E.S., (1988), An Analysis of Exchange Rates and Stock Prices. The US Experience between 1980 and 1986. *Akron Business and Economic Review*, Vol. 19, No.4, pp. 71-76.