

## Investigating the effects of liquidity and exchange rate on Tehran Stock Exchange

Younos Vakil Alroaia, Khosro Faghani Makrani and Amir Banagozar\*

*Department of Management and Accounting, Semnan Branch, Islamic Azad University, Semnan, Iran*

### CHRONICLE

#### *Article history:*

Received January 28, 2014

Accepted 20 June 2014

Available online

June 26 2014

#### *Keywords:*

*Tehran Stock Exchange*

*Liquidity*

*Exchange rate*

### ABSTRACT

This paper presents an empirical investigation to study the effects of two macroeconomic factors; namely exchange rate and liquidity on stock index. The proposed study was applied in Iran and on major index of Tehran Stock Exchange over the period 2001-2011. They reported that the currency exchange maintained negative impact on stock exchange for the period of investigation. This is due to the fact that when currency devalued, working capital decreases and firms did not enough money to purchase raw materials, pay wages, etc. In addition, liquidity marinated a direct and positive relationship with exchange index. However, the impact of liquidity seems to be bigger than currency exchange.

© 2014 Growing Science Ltd. All rights reserved.

## 1. Introduction

For years, there were major concern to learn how some macroeconomic factors could influence on stock exchange. Bartram and Bodnar (2012), for instance, investigated the conditional relation between exchange rate exposure and stock returns in emerging and developed markets. They argued that the impact of exchange rate exposure on stock returns was conditional and presented some evidence of a substantial return effect to firm-level currency exposures when conditioning on the exchange rate change. They also explained that the realized return to exposure was directly associated with the size and sign of the exchange rate change, implying fluctuations in exchange rates as a source of time-variation in currency return premia. They reported that foreign exchange rate exposure estimates were economically meaningful, in spite the fact that individual time-series results were noisy and various exposures were not statistically substantial, and that exchange rate exposure played an important role in generating cross-sectional return variation. Finally, they explained that the relationship between exchange rate exposure and stock returns was more consistent with a cash flow impact than a discount rate.

\*Corresponding author.

E-mail addresses: [amir.banagozar@yahoo.com](mailto:amir.banagozar@yahoo.com) (A. Banagozar)

Mahmood et al. (2007) investigated the dynamics relationship between stock prices and economic variables in six Asian-Pacific selected countries of Malaysia, Korea, Thailand, Hong Kong, Japan, and Australia. They applied the monthly data on stock price indices, foreign exchange rates, consumer price index and industrial production index that spans over the period 1993-2002. Their results indicated the existing of a long run equilibrium relationship between and among variables in only four countries, i.e., Japan, Korea, Hong Kong and Australia. As for short run relationship, all countries except for Hong Kong and Thailand indicated some interactions. The Hong Kong represented relationship only between exchange rate and stock price while the Thailand showed substantial interaction only between output and stock prices. A precise estimation of the relationship between the economic variables and stock market behavior helped the investors, both local and foreign, make effective investment decisions. At the same time, for the policy makers, a precise prediction of this kind of relationship helps government agencies in designing policies to encourage more capital inflows into the respective countries' capital market.

Nydahl (1999) investigated the impact of exchange rate fluctuation on a firm's value, the so-called exchange rate exposure, for a sample of Swedish firms. In contrast to previous findings, using U.S. data, the values of Swedish firms, as reflected in the stock price, appeared quite sensitive to movements in the exchange rate. Studying the cross sectional differences in exposure, the estimated exposure was positively and substantially associated with the fractional of total sales made abroad and negatively associated with the use of currency derivatives.

Pan et al. (2007) investigated dynamic linkages between exchange rates and stock prices for several East Asian countries, including Hong Kong, Japan, Korea, Malaysia, Singapore, Taiwan, and Thailand. They reported a significant causal relationship from exchange rates to stock prices for Hong Kong, Japan, Malaysia, and Thailand before the 1997 Asian financial crisis. They also reported a causal relationship from the equity market to the foreign exchange market for Hong Kong, Korea, and Singapore. In addition, while no country indicated a substantial causality from stock prices to exchange rates during the Asian crisis, they reported a causal relationship from exchange rates to stock prices for all countries except Malaysia. Their results were robust with in terms of different testing techniques applied. The results also indicated that the linkages vary across economies with in terms of exchange rate regimes, the trade size, the degree of capital control, and the size of equity market.

Pastor and Stambaugh (2001) investigated whether market-wide liquidity was a state variable important for asset pricing. They reported that expected stock returns were associated with the sensitivities of returns to fluctuations in aggregate liquidity. Salehi and Biglar (2009) tried to find out whether or not the capital-structure decision influences on firms' performance. They used 3 definitions of capital structure in scope of book value to market value and 5 measures for financial performance. They reported that capital structure could influence financial performance. The significance of the influence of capital structure on performance respectively was associated with measures of adjusted value, market value and book value.

Salehi et al. (2011) studied the relationship between stock returns and its liquidity ability in firms listed on Tehran Stock Exchange over the period 2002-2009. They reported that there was a negative correlation between stock returns with its liquidity. Zhao (2010) analyzed the dynamic relationship between Renminbi (RMB) real effective exchange rate and stock price with VAR and multivariate generalized autoregressive conditional heteroskedasticity (GARCH) models. The results indicated that there was not any stable long-term equilibrium relationship between RMB real effective exchange rate and stock price. The study also examined the cross-volatility relationships between foreign exchange and stock markets using likelihood ratio statistic. They reported a bi-direction volatility spillovers effects between the two markets, implying the past innovations in stock market had an impact on future volatility in foreign exchange market, and vice versa.

## 2. The proposed study

This paper presents an empirical investigation to study the effects of two macroeconomic factors; namely exchange rate and liquidity on stock index. The proposed study has been applied in Iran and on major index of Tehran Stock Exchange over the period 2001-2011. Table 1 shows some basic statistics on some three major variables.

**Table 1**

The summary of some basic statistics

Variable Symbol	Stock Exchange	Liquidity	Exchange
	TE	M	EXG
Mean	11495	1361650.39	9580
Median	10227	1098681.95	9226
Max	26962	3522204.1	19148
Min	3348	262789	7994
Standard deviation	6051	966035.76	1993
Skewness	1.096	0.66	3.14
Kurtosis	3.78	2.24	14.5

Based on the results of Table 1, there seems that all data were normally distributed. We first look at the relationship between stock exchange with each independent variables, exchange rate and liquidity. Table 2 shows the result of the effect of exchange rate on stock exchange.

**Table 2**

The summary of the effects of exchange rate on stock exchange

	t-value	df	Prob
Exchange rate	13.97087	4	0.0078

As we can observe from the result of Table 2, t-value is statistically significant and we may confirm the effect of exchange rate on stock exchange. We need to also investigate whether there is any auto-correlation between residuals or not and Table 3 demonstrates the summary of our findings.

**Table 3**

The summary of testing autocorrelation effect

Lags	LM-Stat	Prob
1	11.37416	0.7858
2	14.90327	0.5317
3	26.53560	0.0469
4	19.62244	0.2377
5	15.81224	0.4661
6	17.06878	0.3812
7	28.73844	0.0258
8	25.74984	0.0577
9	9.956095	0.8689
10	39.26712	0.0010
11	28.71015	0.0260
12	19.24906	0.2560

Based on the results of Table 3, we may conclude that there was not any auto-correlation among residuals. In addition, Chi-Square test for these two variables is equal to Chi-Square = 317.6839 with Prob. = 0.5261 and it indicates there was homogeneity of variance. Finally, we need to make sure that all residuals are normally distributed, which is accomplished by Jarque-Bura test summarized in Table 4 as follows,

**Table 4**

The summary of Jarque-Bera test

Component	Jarque-Bera	Df	Prob
1	0.181155	2	0.9134
2	0.569363	2	0.7523
3	6.019354	2	0.0493
4	1.717499	2	0.4237
Common	8.487371	8	0.3874

As we can observe from the results of Table 4, all data are normally distributed. Similarly, we may look at relationship between liquidity and stock exchange in Table 5 as follows,

**Table 5**

The summary of relationship between liquidity and stock exchange

	T	Df	Prob
Liquidity	23.10956	4	0.0001

The results of Table 5 also show that there was a meaningful relationship between liquidity and stock exchange. We need to also find out whether there is any auto-correlation between residuals or not and Table 6 shows the summary of our findings.

**Table 6**

The summary of testing autocorrelation effect

Lags	LM-Stat	Prob
1	11.37416	0.7858
2	14.90327	0.5317
3	26.53560	0.0469
4	19.62244	0.2377
5	15.81224	0.4661
6	17.06878	0.3812
7	28.73844	0.0258
8	25.74984	0.0577
9	9.956095	0.8689
10	39.26712	0.0010
11	28.71015	0.0260
12	19.24906	0.2560

According to the results of Table 6, we may conclude that there was not any auto-correlation among residuals. In addition, Chi-Square test for these two variables is equal to Chi-Square = 317.6839 with Prob. =0.5261 and it indicates there was homogeneity of variance. Finally, we need to make sure that all residuals are normally distributed, which is accomplished by Jarque-Bera test summarized in Table 7 as follows,

**Table 7**

The summary of Jarque-Bera test

Component	Jarque-Bera	Df	Prob
1	0.181155	2	0.9134
2	0.569363	2	0.7523
3	6.019354	2	0.0493
4	1.717499	2	0.4237
Common	8.487371	8	0.3874

The results of Table 7 also indicate that all data were normally distributed. The proposed model of this paper considers the following regression model,

$$TE = \beta_0 + \beta_1 TE_{t-1} + \beta_2 TE_{t-2} + \beta_3 TE_{t-3} + \beta_4 TE_{t-4} + \beta_5 M_{t-1} + \beta_6 M_{t-2} + \beta_7 M_{t-3} + \beta_8 M_{t-4} + \beta_9 EXG_{t-1} + \beta_{10} EXG_{t-2} + \beta_{11} EXG_{t-3} + \beta_{12} EXG_{t-4} + \varepsilon \quad (1)$$

where  $TE$  represents Tehran Exchange index,  $EXG$  states exchange rate and  $M$  represents liquidity. In addition,  $\beta_i$  and  $t$  represent the coefficients, which must be estimated.

### 3. The results

In this section, we present details of our findings on the implementation of regression analyses.

$$TE = 0.616349392646 \times TE(-1) + 0.627023100139 \times TE(-2) - 0.144812837275 \times TE(-3) + 0.00278969717182 \times TE(-4) + 0.0176461318698 \times M(-1) + 0.007126126042 \times M(-2) - 0.0173787434596 \times M(-3) - 0.00181292477214 \times M(-4) + 0.0141827820184 \times EXG(-1) - 1.60938320918 \times EXG(-2) - 0.382187943218 \times EXG(-3) - 5.6732345234 \times EXG(-4) + 57705.8070007 \quad (2)$$

Table 8 summarizes details of our results on Chi-Square test for various variables.

**Table 8**

The summary of Chi-Square test

Dependent variable: TE			
Excluded	Chi-sq	df	Prob.
M	23.10956	4	0.0001
EXG	13.97087	4	0.0074
All	69.12143	12	0.0000
Dependent variable: M			
Excluded	Chi-sq	df	Prob.
TE	8.133553	4	0.0868
EXG	8.274531	4	0.0120
All	25.65884	12	0.0120
Dependent variable: EXG			
Excluded	Chi-sq	df	Prob.
TE	1.718556	4	0.7873
M	6.407537	4	0.6707
All	28.15039	12	0.0053

### 4. Discussion and results

Based on the results of Eq. (2), we may realize that the currency exchange maintained negative impact on stock exchange for the period of investigation. This is due to the fact that when currency devalued, working capital decreases and firms did not enough money to purchase raw materials, pay wages, etc. In addition, liquidity marinated a direct and positive relationship with exchange index. However, the impact of liquidity seems to be bigger than currency exchange. Note that during the years of 2011 to 2012, exchange rate was devalued, significantly and on the contrary, of the results of this study, stock exchange jumped up substantially. The results could be described because many petrochemical firms had the opportunity to purchase the raw materials from the government at low price and sell their product in higher price.

### Acknowledgement

The authors would like to thank the anonymous referees for constructive comments on earlier version of this paper.

### References

- Bartram, S. M., & Bodnar, G. M. (2012). Crossing the lines: The conditional relation between exchange rate exposure and stock returns in emerging and developed markets. *Journal of International Money and Finance*, 31(4), 766-792.

- Mahmood, W., Mansor, W., & Mohd Dinniah, N. (2007). Stock returns and macroeconomic influences: Evidence from the six Asian-Pacific countries. *Financial Economics and Futures Market Research Paper*.
- Nydahl, S. (1999). Exchange rate exposure, foreign involvement and currency hedging of firms: some Swedish evidence. *European Financial Management*, 5(2), 241-257.
- Pan, M. S., Fok, R. C. W., & Liu, Y. A. (2007). Dynamic linkages between exchange rates and stock prices: Evidence from East Asian markets. *International Review of Economics & Finance*, 16(4), 503-520.
- Pastor, L., & Stambaugh, R. F. (2001). *Liquidity risk and expected stock returns* (No. w8462). National Bureau of Economic Research, 642-685.
- Salehi, M., & Biglar, K. (2009). Study of the relationship between capital structure measures and performance: evidence from Iran. *International Journal of Business and Management*, 4(1), 97.
- Salehi, M., Talebnia, G., & Ghorbani, B. (2011). A study of the relationship between liquidity and stock returns of companies listed in Tehran Stock Exchange. *World Applied Sciences Journal*, 12(9), 1403-1408.
- Zhao, H. (2010). Dynamic relationship between exchange rate and stock price: Evidence from China. *Research in International Business and Finance*, 24(2), 103-112.