The relationship between exchange rate fluctuations and stock return in companies admitted to the Tehran Stock Exchange

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Abstract: This research investigates the relationship and exchange rate with stock return in Tehran Stock Exchange companies. The statistical population of this research includes all active stock companies in Tehran Stock Exchange. In this research, the sample is started with the entire statistical society and based on the systematic elimination method, the number of research samples is determined. In order to investigate the research topic, information about 107 companies accepted in Tehran Stock Exchange for the financial years 1389 – 1394 has been used. In terms of purpose, the method of realization in terms of the type of quantitative data, in terms of the type of inductive reasoning, is in terms of the method and the nature of the analytical and correlations, and in terms of the post-implementation time of the event. For data collection, Rahand Novin Software, Central Bank Site, Iranian Center for Statistics, and the hypothesis test were used using the combined method, t and F tests, and the Watson camera. The results of the research show that there is a significant relationship between exchange rate fluctuations and stock returns.

Keywords: Oil price volatility, exchange rate fluctuations, stock returns

Background research

Sadegh Nesab, Shabnam (1393) studied the effects of macroeconomic variables on the growth of liquidity in Iranian economy. The results of the research indicate that in the short run, the growth rate of the exchange rate, inflation rate, interest rate, negative and significant relationship, as well as the growth rate of the budget deficit and the GDP growth rate have a positive and significant relationship with the rate of liquidity growth. But in the long run, inflation rates and interest rates are positively correlated with the growth rate of liquidity.

Fazerane Akbar (1392) examined the relationship between energy consumption and GDP in selected oil importer and exporter countries. The results indicate that there is a positive relationship between energy consumption and domestic production for the eight countries, and there is a negative relationship between energy consumption and domestic production in the two countries, and the relationship between gross domestic product and factors of labor and labor and energy prices for all countries are positive and negative for the population.

Shaki and Tawfiqi (2012) conducted a study entitled "Exchange Rate Fluctuations on Stock Market Returns". The purpose of this study was to determine the relationship between parallel market exchange rate fluctuations and stock market in Iran, and it is concluded that one of the characteristics of developed countries is the presence of efficient financial markets and institutions that play an important role in the economy of these countries. They are also the basis for the economic growth and development of these countries. The results of this test indicate a positive relationship between stock market returns with parallel exchange rate and consumer price index, as well as a negative relationship between oil prices and stock market returns.

Motamedi and Zaraei Nejad (2012) in a paper titled "The Study of the Relationship between Macroeconomic Variables on Stock Price Index in Tehran Stock Exchange" indicates that the financial market consists of the money market and the capital market. The results of this research have shown that there is a relationship between the dependent variable (total stock price index) and the independent variables of the long-term relationship. This relationship is between the stock price index and the exchange rate and positive inflation, and between the stock price index and the bank interest rate is negative.

Mahmoudder et al. (2011) conducted a study entitled "Effect of Real Exchange Rate and Uncertainty on Private Investment in the Agricultural Sector". The purpose of this study is to investigate the factors affecting private investment in agriculture with an emphasis on real exchange rate and uncertainty over the period of 1386-1386. According to the results, the negative effect of the real exchange rate on private investment shows that its effect through increasing the cost of import of capital goods has been overcome by the positive effects of expanding the export of agricultural products. Of course, it should be noted that the impact of concessional credits in the long-term and short-term shows that shortages of finance are still the most important limitation of private investment in the agricultural sector.
Fathi (1998) examined the non-oil export volatility against exchange rate changes. In this study, non-oil exports were a function of the effective exchange rate, GDP, price index of exported goods, wholesale price index and non-oil exports of the previous period. The results show that non-oil export volumes are more than unit exports in terms of exchange rate changes.

Schultz and Yurtzhor (2012) found a negative correlation between industries and total stock market returns with changes in the price of oil (except for the oil and gas industries) in the European region during the period from 1983 to 2007. Kumar Nairian, Sima Nirian and Prasad (2008) studied the relationship between oil prices and exchange rates in a study entitled "Understanding the correlation between oil prices and Fiji Island exchange rates". In this study, the daily data for the period 2000-2006 according to the models (GARCH) and (EGARCH) were used to estimate the effect of oil price and nominal exchange rate. According to the study, a 10 percent increase in oil prices would lead to a 0.2 percent increase in Fiji dollar. In response to these changes, the Fiji Bank raised interest rates, which led to an increase in nominal interest rates in October 2005, and in less than six months in February 2006, the official rate of interest from 25.2 to 25.4 it is arrived.

Another result was the impact of higher oil prices during the same period, an increase in GDP of about 13 percent, and inflation from 3 percent to around 6 percent.

Society and statistical sample of research

The statistical population consists of all elements and individuals who have one or more common attributes on a geographic scale (global or regional) (Hafez Nia and Sarameh, 2002). The statistical population of this research is Tehran Stock Exchange (TSE), which has been active in the stock market since the beginning of 2010-2010. The statistical sample is a limited number of statistical units that represent the main characteristics of society (Azar and Momeni, 2010, p. 5). In this study, for the sample to be an appropriate and homogeneous representative of the statistical population, a random method is used to select the sample.

During the financial years from 2010 to 1394, they have participated in the exchange. Companies are not part of banks, investment companies, brokers, insurance companies and monetary and financial institutions. Because these companies are different in nature from their operations.

The end of their financial year is March of each year and during the aforementioned period they have not changed the financial year.

In each year of study, available information and data will be available at the end of the fiscal year.

After filtering the number of remaining companies, 107 are polled.

Hypothesis

There is a significant relationship between exchange rate fluctuations and stock returns.

Normal test

One of the most important regression assumptions is the normality of the model's remnants. For estimation of the final model of the research, information about independent and dependent variables has been used and then the final regression of the model is estimated. It is necessary to estimate the model, then the values of the dependent variable are estimated for the different values of the independent variable. The difference between the estimated values of the actual values is the remainder of the model. But before estimating the model, it can be ensured by distributing the remaining variables by testing the distribution of the dependent variable.

Using the Kolmogorov test, Smirnov, the assumption of the normality of the dependent variable has been tested. The Kolmogorov, Smirnov test, named after A.Kolomgorov and N.S.Mirnov, in Russian honor, is a simple nonparametric method for determining the coherence of empirical information with selected statistical distributions, and is represented by the abbreviation KS.

The zero assumption and the opposite assumption in this test are written as follows.

The level of significance (sig) for the dependent variables for the research years is greater than 0.05. The assumption zero is rejected when the level of significance is less than 5%. Therefore, the dependent variables have normal distribution in different years.

The normalization of the dependent variable is calculated through the logarithm of the absolute value of the stock return. Then again, using the SPSS software, Kolmogorov and Smirnov tests.

Similarity of variance

The White Test has also been used to investigate the existence or non-existence of the heterogeneity of variance problem. The results of this test show that the probability of the F statistic is smaller than the error level of 5%, so the opposite hypothesis is based on the variance of the variance. In this research, the least common squares (generalized least squares) method have been used to solve the heterogeneity of variance.
Maneuverability test variables

Maneuverability of research variables means that the mean and variance of variables over time and covariance of variables have been constant between different years. Therefore, we used the Levine, Lynn and Chu tests to ensure that the variables are independent and not false, the results of which are presented in the following table. The results show that all variables are mana-level.

**Table 1**

<table>
<thead>
<tr>
<th>Maneuverability Test Variables</th>
<th>Prob.</th>
<th>L.L.C</th>
<th>Variables</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maneuver</td>
<td>0.0045</td>
<td>-2.61515</td>
<td>INTEREST_RATE</td>
</tr>
<tr>
<td>Maneuver</td>
<td>0.0000</td>
<td>-37.8583</td>
<td>IPI</td>
</tr>
<tr>
<td>Maneuver</td>
<td>0.0000</td>
<td>-12.4356</td>
<td>LEV</td>
</tr>
<tr>
<td>Maneuver</td>
<td>0.0000</td>
<td>-16.9739</td>
<td>CPI</td>
</tr>
<tr>
<td>Maneuver</td>
<td>0.0000</td>
<td>-8.0068</td>
<td>SIZE</td>
</tr>
</tbody>
</table>

Hypothesis test

There is a significant relationship between exchange rate fluctuations and stock returns.

H0: There is no significant relationship between exchange rate fluctuations and stock returns.

H0: \( \beta_i = 0 \)

H1: There is a significant relationship between exchange rate fluctuations and stock returns.

H1: \( \beta_i \neq 0 \)

To determine if the use of the panel data method is useful in estimating the model, it is necessary to test the chow test or F and to determine which method (fixed effects or random effects) is more suitable for estimation (diagnosis The constant or randomness of the differences in cross sections is used (Hausman test). The results of these tests are presented in Figure 4-8.

**Table 2**

<table>
<thead>
<tr>
<th>Method</th>
<th>Statistic</th>
<th>Statistic value</th>
<th>P-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chow</td>
<td>F</td>
<td>2.487777</td>
<td>0.0000</td>
</tr>
<tr>
<td>Husman</td>
<td>( \chi^2 )</td>
<td>72.644026</td>
<td>0.0000</td>
</tr>
</tbody>
</table>

According to the results of Chow test and its P-value (0.0000), the test hypothesis was rejected at 95% confidence level, indicating that panel data can be used. Also, according to the results of the Hausman test and its P-value (0.0000) which is less than 0.05, the hypothesis is rejected at the 95% confidence level and the hypothesis is accepted. Therefore, it is necessary to estimate the model using constant effects method.

**Table 3**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>t-Statistic</th>
<th>P-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>V_OFFICIAL_EX_RATE</td>
<td>1.67E-05</td>
<td>3.019282</td>
<td>0.0000</td>
</tr>
<tr>
<td>CPI_1</td>
<td>-0.124281</td>
<td>-2.852817</td>
<td>0.0000</td>
</tr>
<tr>
<td>INTEREST_RATE</td>
<td>0.009162</td>
<td>5.643125</td>
<td>0.0000</td>
</tr>
<tr>
<td>IPI</td>
<td>-0.009987</td>
<td>-7.585953</td>
<td>0.0000</td>
</tr>
<tr>
<td>LEV</td>
<td>-0.237899</td>
<td>-3.204441</td>
<td>0.0000</td>
</tr>
<tr>
<td>SIZE</td>
<td>0.021245</td>
<td>1.189972</td>
<td>0.2346</td>
</tr>
<tr>
<td>C</td>
<td>1.062636</td>
<td>4.463409</td>
<td>0.0000</td>
</tr>
</tbody>
</table>

As shown in Table 4-9, the P-value of the Prob (F-statistic), which indicates the significance of the total regression, is equal to 0.000000, indicating that the model has a significance of 99% confidence level. Also, the camera-Watson test has a high correlation of 1.5 to 2.5, which is appropriate and suggests the acceptability of the assumption of self-correlation. The results of the hypothesis test show that between exchange rate fluctuations and stock returns are correlated and There is significant meaning.
There is a negative and significant relationship between the consumer index and stock returns.
There is a positive and significant relationship between interest rate and stock returns.
There is a negative and significant relationship between industrial production index and stock returns.
There is a negative and significant relationship between corporate leverage and stock returns.
There is a positive and significant relationship between firm size and stock returns.
The corrected determination coefficient shows that about 25.6% of the variations are explained by the independent variables listed in the table above.
According to the coefficients, the estimation model of the second hypothesis can be processed as follows.

**Conclusion**
The results of testing the research hypotheses in the companies in the research sample are as follows:
There is a significant relationship between exchange rate fluctuations and stock returns.
The exchange rate fluctuation affects all important economic variables as a sign of instability and uncertainty. The relationship between stock prices and exchange rates has attracted a lot of attention from economists, international investors and policy makers. The commodity market hypothesis holds that changes in exchange rates affect the competitiveness of multinational corporations, thereby affecting the stock market returns. A devaluation of the national currency will make export commodities cheaper and may increase demand and outsourcing. Therefore, the value of an export firm benefits from a devaluation of its national currency. For an issue, it reduces the appreciation of the national currency, while a devaluation of the national currency increases profits. In addition, stock prices may be affected by exchange rate changes, as such changes will trigger capital flows. In this study, we concluded that there is a significant relationship between exchange rate fluctuations and stock returns.

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