THE EFFECTS OF GOLD PRICE AND OIL PRICE ON STOCK RETURNS OF THE BANKS IN IRAN

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Abstract:
The aim of this study is to investigate the response of bank stock returns to world prices of oil and gold. Thus, our study is about seven banks in Iran, and data are selected as seasonal data for the period 2008 to 2012. Considering the nature of data, panel data method is used for the data analysis. The results show that the world oil price, with a lag, has had a significant positive effect, and the gold price has had a significant negative impact on stock return of the banks. Further results suggest that, exchange rate and interest rate have a negative impact, and inflation and gross domestic product (GDP) have a positive impact on the bank stock returns.

Keywords: stock return, stock exchange, panel data

I. INTRODUCTION

One of the most important economic and capital sectors of each country is the capital market. In this regard, the stock exchange is the most important symbol of the capital market. This market, on the one hand affects the financial support of economic units, and on the other hand, it is involved in the economy by attraction of savings and their flow towards productive investments. Investors are considered as the main characters in the stock market who seek to maximize returns from their investment, and investment in stocks is considered as one of their investment options. Several factors affect the investment returns that macroeconomic variables are the most important. The aim of the present study is an attempt to examine the impact of variables such as oil and gold price on stock returns of banks listed on stock market.

II. LITERATURE REVIEW

Using Fama’s model, Madsen (2002) investigated the relationship between stock returns and macroeconomic variables for members of the Organization for Economic Cooperation and Development (OECD) for the period 1962-1995. In the Fama’s model variables that affect stock returns include growth rate of national income, first-order difference of interest rate, liquidity growth rate and inflation rate. By estimating this model for OECD countries, Madsen concludes that the inflation and interest rates negatively influence on the stock returns, and liquidity and the growth rate of national income have a positive impact on stock returns.

Akar (2011), by using monthly data for the period 1990 to 2010, and utilizing the DCC-GARCH (1,1) model investigated the relationship between stock returns, gold, and foreign currency in Turkey. The results indicated the conditional correlation between price return of the assets varies over the time. The relationship between gold and stock in Turkey from 1990 to the
first quarter of 2001 was positive with correlation coefficients of 0.03 and then it became negative, and the amount of the negative relation shows an increase.

Gulnar, Muradglu and Kivilcine Metin (1996), investigated the long-run relationship of stock price index of Istanbul stock exchange with the parameters including interest rate, exchange rate (U.S. dollar), inflation, and money supply for the period 1986-1993 as a monthly data in Turkey economy. Implementation of Engel Granger and Johansson methods implies that the stock price index is in positive relation with money supply, but its relation to exchange rates, interest rates, and inflation is negative.

Anthony and Kwame (2008), examined how macroeconomic indicators influence on the performance of stock markets of the Ghana stock exchange. For this purpose, they utilized the quarterly time series data between 1991 and 2005. Their findings indicated that lending rates from deposit banks adversely affect the performance of the stock market and especially operates as a deterrent to business growth in Ghana. Inflation rate has also had a negative impact on stock market performance.

Robert Gay (2008), investigated time-series relationship between stock market exchange price and some certain macroeconomic variables including, exchange rate and oil price for Brazil, Russia, India, and China. He concluded that there is no significant relationship between exchange rate and oil price with stock market exchange price, and mentioned this may be due to the influence of other domestic and international macroeconomic factors (such as production, inflation, interest rates, and trade balance) on stock market returns, which requires further investigation.

Christopher Gan et al (2006), assessed the interactions between New Zealand stock index and macroeconomic variables including inflation rate, exchange rate, gross domestic product (GDP), money supply, long-term interest rates, short-term interest rates, and retail oil price for monthly data from January 1990 until January 2003 via the co-integration test. Johansen co-integration test results showed that there is a long-run relationship between New Zealand share price index and the examined economic variables. The results of Granger causality test also showed that the index of stock prices of New Zealand is not a Granger causality for the changes in economic variables. The reason lies in the smaller stock market of New Zealand compared with the developed countries.

III. THE MODEL AND RESEARCH METHOD

The pattern consists of bank stock returns as the dependent variable and crude oil price, gold price, exchange rate, interest rate, inflation, and GDP as explanatory variables. The selected banks in this study are chosen by considering the following restrictions:

1) At least since the beginning of 2008 they are listed in the stock exchange.
2) Their activity has not been stopped and they continued their work continuously until 2012.
3) The required data of banks are available in this investigation.

Given above-mentioned circumstances, among the banks in Tehran stock exchange, seven banks including EN Bank, Parsian, Tejarat, Sina, Saderat, Karafarin, and Mellat were selected as samples in this study.

According to the type of applied data which are panel data, at the first step it is necessary to determine whether the model is pooling or panel (by using F-Limer test), in the next step if the model is panel we need to determine if the model must be estimated via fixed effects method or
random effects model which is characterized by the Hausman test. Eviews 7 software is used for this purpose.

IV. ESTIMATION OF THE MODEL
First, stationary tests are done to avoid spurious regressions. Since the data are panel, we used Levin-Lin-Chu test.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Inflation</th>
<th>Currency</th>
<th>Interest</th>
<th>Gdp</th>
<th>Gold</th>
<th>Oil</th>
<th>Stock Returns</th>
<th>Variable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test statistic</td>
<td>-0.49</td>
<td>1.27</td>
<td>-0.76</td>
<td>-2.08</td>
<td>-1.47</td>
<td>-0.27</td>
<td>-6.83</td>
<td>statistic</td>
</tr>
<tr>
<td>Prob.</td>
<td>0.00</td>
<td>0.89</td>
<td>0.22</td>
<td>0.98</td>
<td>0.05</td>
<td>0.38</td>
<td>0.00</td>
<td>Prob.</td>
</tr>
</tbody>
</table>

Source: Researcher’s Calculations
Results for stationary test of variables show that the stock return, the price of gold, and inflation variables are durable at the significance level of 5%, and all other variables are indurable. Before estimation of regression, the variables must become durable to avoid spurious regression. For this purpose, a subtraction of variables is used, where world oil price, exchange rate, and interest rate variables became durable by one difference, and the GDP variable became durable by two differences (Table 2). In the unit-root test, null hypothesis is the existence of a unit-root, and “one” is the lack of unit-root.

So, the model we examined in this study is as follows:

\[ Return_{it} = \alpha_i + \beta_1 brent_t(-1) + \beta_2 gold_t + \beta_3 exchange rate_t(-1) + \beta_4 inflation_t + \beta_5 gdp_t(-2) + \beta_6 interest rate_{it}(-1) + \varepsilon_{it} \]

In which \( Return_{it} \) is the stock return of bank \( i \) at time \( t \), \( brent_t \) is the world oil price at time \( t \), \( gold_t \) is the international price of gold at time \( t \), \( exchange rate_t \) is exchange rate at time \( t \), \( inflation_t \) is inflation rate at time \( t \), \( gdp_t \) is gross domestic product (GDP) at time \( t \), and \( interest rate_{it} \) is interest rate of bank \( i \) at time \( t \).

In the second step, we need to determine if our model is pooling or panel; hence, F-Limer test was used in which the hypothesis testing is as follows:
The results for the studied model are as follows:

### Table 3: Results of F-limer test

<table>
<thead>
<tr>
<th>Probability</th>
<th>Statistic</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.89</td>
<td>0.36</td>
<td>Cross-section F</td>
</tr>
<tr>
<td>0.87</td>
<td>2.42</td>
<td>Cross-section Chi-square</td>
</tr>
</tbody>
</table>

Source: Researcher’s Calculations

According to the above table, the null hypothesis inferring the pool model is accepted; this means that all sections are homogeneous and have the same intercepts. Since, cross-sections in this study are the selected banks; it can be argued that there is not much difference between the banks and stock returns of all banks show similar responses to changes in the independent variables.

The third step is to perform the homoskedasticity test. To determine the existence of heteroskedasticity between cross-sections, LM statistic is used.

\[
LM = \left( \frac{T}{2} \right) \sum \left( \frac{S_i^2}{S^2} - 1 \right)^2 \sim \chi_n^2
\]

where T is the number of time-series years, and \( S^2 \) is the variance of overall estimation of the model. The obtained statistic is equal to 5.15 where is larger than that of the table value which is 2.17. Consequently, the model is suffering heteroskedasticity. In such a situation, application of the Generalized Least Squares (GLS) is suggested as an efficient technique.

In the fourth step, we examine the autocorrelation. For this purpose, residuals of the final model are regressed on themselves. In this regression, the null hypothesis is for the lack of autocorrelation in the residuals where by the obtained results, the null hypothesis and the lack of autocorrelations is approved.

### Table 4: Evaluation of the autocorrelation

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>Std. Error</th>
<th>t-Statistic</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>RESID02(-1)</td>
<td>-0.054695</td>
<td>0.093133</td>
<td>-0.587270</td>
<td>0.7582</td>
</tr>
<tr>
<td>Coefficient of determination</td>
<td>R-squared</td>
<td>0.001462</td>
<td>Adjusted R-squared</td>
<td>0.001462</td>
</tr>
<tr>
<td>Durbin–Watson statistic</td>
<td></td>
<td></td>
<td>D.W=2.046106</td>
<td></td>
</tr>
</tbody>
</table>

Source: Researcher’s Calculations

Finally, normality test by using Jarque–Bera statistic is performed in which the null hypothesis is the normality of error distribution.
Table 5: Normality test

| Source: Researcher’s Calculations |

The probability of Jarque–Bera statistic (0.09) implies the normality of the distribution of the error term in the studied model.

IV. FINAL ESTIMATION OF THE MODEL:

According to the conducted tests and since the heteroskedasticity was confirmed, GLS technique is employed to surmount the obstacle. Therefore the final model estimation is as follows:

Table 6: Final model estimation

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>Std. Error</th>
<th>t-Statistic</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>33.35442</td>
<td>4.447796</td>
<td>7.499091</td>
<td>0.0000</td>
</tr>
<tr>
<td>DBRENT</td>
<td>0.279421</td>
<td>0.051614</td>
<td>5.413654</td>
<td>0.0000</td>
</tr>
<tr>
<td>GOLD</td>
<td>-0.040498</td>
<td>0.006178</td>
<td>-6.554966</td>
<td>0.0000</td>
</tr>
<tr>
<td>DEXCHANGE</td>
<td>-48.54445</td>
<td>12.76323</td>
<td>-3.803462</td>
<td>0.0002</td>
</tr>
<tr>
<td>INFLATION</td>
<td>1.248009</td>
<td>0.230884</td>
<td>5.405354</td>
<td>0.0000</td>
</tr>
<tr>
<td>DDGDP</td>
<td>0.165929</td>
<td>0.086400</td>
<td>1.920463</td>
<td>0.0574</td>
</tr>
<tr>
<td>DINTEREST</td>
<td>-2.712747</td>
<td>0.607217</td>
<td>-4.467511</td>
<td>0.0000</td>
</tr>
<tr>
<td>Coefficient of determination</td>
<td>R-squared</td>
<td>0.309968</td>
<td>Adjusted R-squared</td>
<td>0.222187</td>
</tr>
<tr>
<td>Durbin–Watson statistic</td>
<td></td>
<td>D.W=2.178861</td>
<td></td>
<td></td>
</tr>
<tr>
<td>F statistic</td>
<td>F=3.856558</td>
<td></td>
<td>prob(F-statistic)=0.000066</td>
<td></td>
</tr>
</tbody>
</table>
Source: Researcher’s Calculations

The determination coefficient $R^2$ as a criterion for the goodness of regression fit is equal to 0.30. This means that about 30% of changes in stock returns of the banks listed in stock exchange are explained by independent variables. F-Test assesses the total significance level of the estimated regression line. F-statistic and its probability, is 0.0000066 and which is less than 0.05, indicating the significance of the total model. It is worthy to note that world oil price with a season of lag, has a significantly positive effect on bank stock returns, and the extent of this impact is the 0.27% increase in bank stock returns, for one dollar increase in the world price of a barrel of oil. Gold price also has a significant negative impact on stock returns of banks. Thus, a one-dollar increase of the gold price per ounce leads to a 0.04 percent decline of the bank stock returns. About the other variables used in this study it can be said that exchange and interest rates have negative impact, and inflation and GDP have positive significant impact on bank stock returns of the banks listed in the securities.

V. CONCLUSION

In this study, regarding the importance of the stock market, we examined the impact of world oil and gold prices on the stock returns of the banks listed in the securities, using econometric analysis of panel data and the seasonal data for the period 2008 to 2012. We came to the conclusion that a significant positive relationship exists between the world oil prices and bank stock returns, and also gold prices has a significant negative impact on stock returns of banks.

References: