The Impact of Inflation, Bank Interest Rates, Exchange Rates and liquidity Growth Rate on the Earnings Per Share of Oil Industry and the Cement Industry in Tehran Stock Exchange

Alireza Momeni¹,Mohammad Behroozi²,Mansoureh Anbavi³,*

¹ PhD of accounting, Assistant professor of Payam-e Noor University, Tehran
² PhD of educational management, Assistant professor of Bushehr branch, Islamic Azad University, Bushehr,Iran
³ MA student MA student of Department of accounting, Bushehr branch, Islamic Azad University, Bushehr,Iran

ABSTRACT

This study examines the impact of inflation, bank interest rates, exchange rates and liquidity growth rate on the Earnings per share of oil industry and the cement industry in Tehran Stock Exchange for the period 2007 to 2012 is discussed. The statistical model used in this study is a multivariate regression analysis using the combined data. The results show that in the oil industry and the cement industry, between inflation rate, exchange rate, and liquidity growth rate with the earnings per share there is a positive and significant relationship. The results also show that there is a negative and significant relationship between bank interest rates with the earnings per share of oil industry and the cement industry. Then, the result of Wald statistic which shows the overall significance of regression implied that the general rate of inflation, bank interest rates, exchange rates, liquidity growth rate affect earnings per share in the oil products and cement industry.

KEYWORDS

macroeconomic variables, oil industry, earnings per share, return on sales, random regression coefficients of GLS.

INTRODUCTION

Economic circumstances and changes are the factors that have always affected the economy of countries. Finding the effect of economic conditions can be effective in controlling and guidance of the economy of each country. Some influential factors come after the decisions that are made in accordance with the policies and economic goals, such as bank interest rate or exchange rate. There are also some other influential factors that dominate the economy based on a series of decisions, and affect the entire economic body: inflationary economy is one of this kind. The effect these factors have on each part of economy can make people in charge be aware of them to control the direction and outcome of the factors to be targeted to make more informed decisions. Stock Exchange is considered to be one of the bases in each country economy and paying attention to that would be of great importance in boosting economy of each country. Stock Exchange will also be affected by the aforementioned factors and therefore these factors will influence economic conditions. Studying the effects of each of these elements on financial status of companies which are members of stock market can make the managers, investors, government officials and other men operating in the field alert.And making informed decisions by these authorities can naturally be helpful in improving economic conditions. Oil industry is one of the most important industries in every
country particularly Iran and thus understanding factors affecting the growth of this industry is vital. In this study, the effect of inflation, interest rate and bank rate cash earnings per share and return on sales in the companies operating in oil industry are discussed. Several studies have been carried out on the impact of the aforementioned factors on the stock market by many researchers some of which will be presented in continuation.

**REVIEW OF LITERATURE**

Matiur Rahman, Muhammad Mustafa (2008)[14] in their research found that negative shocks from money supply and stock prices make the US stock market suffer from boredom and stagnation. Mahmoud Alam, Ghazi Salah al-Din (2009) [12] examined the reasons for the inefficiency of the market, the relationship between stock prices and interest rates, and stock price changes and interest rate changes through using both time series and panel regressions and concluded that there is a significant negative correlation between interest rates and stock prices. George Filis (2009) [10] in a research found that the consumer price index (CPI0 has a considerable negative impact on Greece's stock market. Maheen Jamil, MrNaeemullah (2010) [13] indicated that the exchange rate has a significant impact on stock market returns and also showed that there is a short-term relationship between two variables. Akingunola et al (2011) [8] examined the impact of interest rates on the capital markets as well as the effect of other macroeconomic variables such as inflation and exchange rates on the stock market. Results from Dickey Fuller test show that the interest rate has a negative effect on the growth of capital markets and the results of regression analysis indicate that a 1% increase in interest rates would be reduced by 44% in the stock price index. But for inflation and exchange rates especially at 5% significance, this relationship is not significant. Taofik Mohammed Ibrahim (2011)[16], showed that there is an evident long-term relationship between stock returns and inflation. Results from short-term model showed that there is also a short-term relationship between stock returns and inflation. Martin Sirucek (2012)[15], in his results of testing confirms the effect of changes in the money supply on the development of stock index and shows that money supply is one of the most important factors of stock blobs. ZahidIrshadYounas-Umar Farooq and AdeelNasir (2013)[17] showed that three currencies dollar, pound sterling and euro will cause fluctuations in the Pakistani stock market and dollar depreciation leads to higher volatility in the market. Hieu Tran (2013)[11] showed that long-term return on equities of banks is very sensitive to changes in interest rates. Ali Falaahati, KiomarsSohaili, FarzadNouri (2010)[4], in an article entitled “The effect of inflation on financial market performance in Iran” investigated the effect of inflation on money and capital markets. The results of the estimated model showed that there is a negative relationship between inflation and money market indicators of financial development and a positive relationship between inflation and stock market development indicators. MeysamMosai, Nader Mehregan, Hossein Amiri (2010)[7], in an article entitled “The relationship between stock market and macroeconomic variables in Iran” examined co-integration and causality between macroeconomic variables and indicators of the stock price. Study is concerned with co-integration and causality between macroeconomic variables and indicators of the stock price. Based on the results of the Granger causality test, stock price index for gross domestic product has no significant effect on macroeconomic variables, while cassava-share effect stock market boom or bust. Seyyed Hossein Sajjadi, Hassan Farazmand, Hashim Ali Sufi (2008)[6], in a study showed that there is relationship between growth rate of the price index and inflation, liquidity growth rate, exchange rate, real interest rates, banking and oil revenue. Said Khodamoradi, Doctor Syed Ahmad Hosseini, Zabihullah David Abadi (2005)[3] found a positive relationship between the delay fluctuations of currency exchange rate and stock returns, and there is an inverse relationship between inflation and stock true returns. Syed Jamaedddin Zonouz Mohseni, Parisa Johari Salmas, Ali Reza Helaali(2011)[3] have found that there is no long-term relationship between the cash bank stock returns.

**VARIABLES AND RESEARCH HYPOTHESES**

In this study, four variables, inflation, bank interest rates, exchange rates and liquidity growth rate were chosen as the independent variable and earnings per share was the dependent variable. Information about inflation was the inflation rate announced by the central bank. Information about interest rates is bank deposit interest rates of investment in a year that is examined by the competent authority designated for state banks. The growth rate of liquidity is the increase in liquidity in the year under study.

All data for each of the independent variables of annual data have been extracted from the site of the Central Bank, economic indicators and stock market. Data related to the dependent variables are extracted from the annual financial statements of companies in the oil industry and cement industry in the related time span.

**RESEARCH HYPOTHESES**

1. There is a significant relationship between inflation and earnings per share.
2. There is a significant relationship between bank interest rates and earnings per share.

3. There is a significant relationship between exchange rates and earnings per share.

4. There is a significant relationship between liquidity and earnings per share growth rate.

**TIME AND SPACE REALM OF RESEARCH**

This study uses data from the 2007 to 2012 interval. Study is done on companies operating in the oil industry and cement industry in Tehran stock exchange. Requirements for companies chosen in these industries are: the financial year should end on 29 Esfand, should no be banks, financial institutions, investment holding, leasing, because of the nature of their activities. The relationship between the variables in this study are different and cannot be generalized to others, and the last stipulation Company’s financial statements should be available.

**MODEL UNDER STUDY**

To assess the impact of inflation, interest rates and bank liquidity on earnings per share and growth rate of sales returns of companies in oil industry, the multiple regression model was used and for regression analysis panel data was used. Regression means return and shows that the value of one variable returns to another variable. The term was first used by Francis Galton in 1877 AD (Azer, Momeni, 1999, pp., 191-190)[1]. The model used in this study is as follows. The model used in the first part of the study is:

\[ \text{EPS} = \alpha + \beta_1 \text{CPI} + \beta_2 \text{IR} + \beta_3 \text{EX} + \beta_4 \text{RCASH} + \text{Et} \]

In this model, EPS represents earnings per share which is net income divided by the weighted average number of the ordinary shares of the company, CPI is inflation symbol, IR is bank interest rate and RCASH is growth rate of liquidity. And all independent variables are entered simultaneously into the model. As previously mentioned, the statistical methods used in this study is panel data approach.

**PANEL DATA APPROACH**

Combined data is a set of data consisting of several sections and a period of time. Section can represent individuals, firms, industries, companies, countries, etc. As synthetic data reflects changes both in time series and changes within each section, it can reflect more information. Most of points that are ignored in time series analysis, or are invisible, are shown in the analysis of combined data. In particular, heterogeneity that is often overlooked in time series analysis and are invisible can be analyzed in the analysis of combined data (Souri, 2013, pp. 766-765)[5].

**A) RESULTS OF HYPOTHESIS TESTING IN OIL INDUSTRY**

Oil industry currently has 6 companies listed on the Stock Exchange. After investigation, five companies were qualified for the study population. According to the panel, the total number of companies is multiplied by the years, so the number of observations in the oil industry is equal to 30.

**A,A) TEST OF STATIONARITY OF VARIABLES**

To check the stability of variables Levin, Lin and Chu test was used. Given the significance of all variables is less than 0.05 indicates that all variables are stationary.

<table>
<thead>
<tr>
<th>Significance</th>
<th>Statistics</th>
<th>Variable</th>
</tr>
</thead>
<tbody>
<tr>
<td>. . . . . . .</td>
<td>227.257</td>
<td>eps</td>
</tr>
<tr>
<td>0.002</td>
<td>3.50671</td>
<td>cpi</td>
</tr>
<tr>
<td>. . . . . . .</td>
<td>. . . . . 8.63895</td>
<td>ir</td>
</tr>
<tr>
<td>. . . . . . .</td>
<td>. . . . . 11.9473</td>
<td>ex</td>
</tr>
<tr>
<td>. . . . . . .</td>
<td>. . . . . 227.257</td>
<td>rcash</td>
</tr>
</tbody>
</table>

**A, B) The results of model selection tests to estimate model**

Chow test results can be seen in Table A,B Given that the significance of the test is less than 0.05, it is clear that panel data method is more suitable for analysis. Given that the Hausman test significance level is greater than 0.05, it is evident that random effects model is more appropriate.

**A,C) TEST RESULTS OF CHOOSING LOGO FOR ASSESSING MODEL**

To test the independence of errors and autocorrelation problem, Woold ridge test is applied. As Table A,C shows the results, significance of the test is approximately 0.05. But we can say that with 90% confidence level data has autocorrelation. To study the problem of in homogeneity of variance Likelihood-ratio test (LR) was used. Test results show that as significance of test is less than 0.05, thus variables have variance in homogeneity.
A,C) The results of Heteroscedasticity test of variance and errors auto-correlation

<table>
<thead>
<tr>
<th>Significance level</th>
<th>Test statistic</th>
<th>Type of test</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.05</td>
<td>39.95</td>
<td>Likelihood-ratio test (LR)</td>
</tr>
<tr>
<td>0.0811</td>
<td>5.384</td>
<td>Woolridge test</td>
</tr>
</tbody>
</table>

A,D) Estimating the model using GLS

Due to simultaneous in homogeneity of variance and autocorrelation, to examine the relationships between dependent and independent variables random regression GLS is used by considering the problem of autocorrelation. Table A,D shows the results of estimating the model coefficients.

Table A,D. The results of model coefficients estimation by GLS method

| Significance (P>|z| of test) | Degrees of randomness | Sensitivity of coefficients | EPS |
|-----------------------------|-----------------------|-----------------------------|-----|
| 0.000                       | -3.52                 | -13.9232                    | CPI |
| 0.000                       | 8.25                  | 0.016                       | IR  |
| 0.000                       | 78.67                 | 45.0073                     | RCASH |

A,E) The results of hypothesis testing in the oil industry

First hypothesis: There is a significant relationship between inflation and profit ratio.

Significance of the relationship between inflation and the interest rate in oil industry equals (0.000). Since this number is less than 0.05, thus H_0 is confirmed and the first hypothesis is approved in a 95% confidence level. Positivity of the sensitivity of coefficients indicates a direct and significant relationship between the two variables. So with rising of inflation, earnings per share of company products in the industry increases too.

Second hypothesis: There is a significant relationship between bank interest rates and earnings per share.

According to the table of results, significance of the relationship between bank interest rates and the interest rate equals (0.000). According to the result, H_0 is confirmed with 90% confidence level. So the second hypothesis is confirmed. Negativity of the sensitivity of the coefficient indicates that the relationship between the two variables is reversed. Therefore, by increase of bank interest rates, earnings ratio of companies in the industry reduces.

Third hypothesis: There is a significant relationship between exchange rates and earnings per share

According to significance results relationship between exchange rates and earnings per share equal to (0.00). This result suggests that H_0 is confirmed. Thus the third hypothesis is confirmed at 95% confidence level. Positivity of sensitivity coefficients indicates a direct relationship between two variables. Thus by increase in the exchange rate, earnings per share increases in the companies in industry.

Fourth hypothesis: There is a significant relationship between liquidity and earnings per share growth rate.

Significance of the relationship between liquidity and earnings per share growth rate is equivalent to (0.00). This result suggests that H_0 is confirmed. Thus the third hypothesis is confirmed at 95% confidence level. Positivity of sensitivity coefficients indicates that there is a direct relationship between two variables. Thus by increase in the rate of growth of liquidity, profitability ratio in the companies in industry increases too.

A,F) Wald statistics analysis

Wald statistics characterizes the significance of overall regression. These statistics make it clear whether all the independent variables affect the dependent variable or not. If the resulting number is less than 0.05 indicates an overall significance of the model. As significance level of Wald statistics in this section is equal to (0.000), we can say that in the oil industry in general, inflation, bank interest rates, exchange rates and, liquidity growth rate have effects on earning per share of the companies listed on the Tehran Stock Exchange.

B) Testing hypothesis in the cement industry

Currently, cement industry has 30 companies listed in the Stock Exchange and after studying, 18 were eligible for the study population. Given that in Panel Data number of firms is multiplied by the number of years, thus the number of observations in basic metals industry is equal to 108.

B,A) Test of stationarity of variables

To check the stationarity of variables Levin, Lin and Chu test has been used. Given the significance of all variables is less than 0.05 indicates that all variables are stationary.
B,A) THE RESULTS OF LEVIN LI & CHOW SIGNIFICANCE TESTS

<table>
<thead>
<tr>
<th>Significance</th>
<th>Statistics</th>
<th>Variable</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.0419</td>
<td>-1.7287</td>
<td>cpi</td>
</tr>
<tr>
<td>. . .</td>
<td>17.2779</td>
<td>ir</td>
</tr>
<tr>
<td>. . .</td>
<td>8.9314</td>
<td>ex</td>
</tr>
<tr>
<td>. . .</td>
<td>-16.7651</td>
<td>rcash</td>
</tr>
</tbody>
</table>

Table B, A. The results of Levin li & chow

REGRESSION MODEL ESTIMATION

To test the independence of errors and autocorrelation problem, Woold ridge test is applied. As Table B,C shows the results, significance of the test is more than 0.05. Thus data does not have autocorrelation problem. To study the problem of in homogeneity of variance Likelihood-ratio test (LR) has been used. Test results show that as significance of test is less than 0.05, thus variables have variance inhomogeneity.

Table B,C. The results of variance Heteroscedasticity and errors autocorrelation

<table>
<thead>
<tr>
<th>Significance level</th>
<th>Test statistic</th>
<th>Type of test</th>
</tr>
</thead>
<tbody>
<tr>
<td>. . . . . .</td>
<td>212.18</td>
<td>Likelihood-ratio test (LR)</td>
</tr>
<tr>
<td>1.000</td>
<td>59.502</td>
<td>Woold ridge test</td>
</tr>
</tbody>
</table>

B,D) MODEL ESTIMATION BY RANDOM COEFFICIENTS REGRESSION TEST

Due to simultaneous in homogeneity of variance and autocorrelation, to examine the relationships between dependent and independent variables random regression GLS is used by considering the problem of autocorrelation. Table B,D shows the results of estimating the model coefficients. When we measure the variables in the regression coefficients in the random effects method and variables have problem of in homogeneity of variance GLS model is used.

Table B,D. The results of coefficients estimation model by GLS method

| Significance (P>|z|)of test | Degrees of randomness | Sensitivity of coefficients | EPS |
|--------------------------|-----------------------|-----------------------------|-----|
| . . . . . . . . . . . . . | 4.13                  | 42.5300                     | CPI |
| 0.006                    | -2.78                 | 193.6935                    | IR  |
| . . . . . . . . . . . . . | 3.49                  | 0.86695                     | EX  |
| 1.001                    | 3.44                  | 34.7293                     | RCASH |

B,E) THE RESULTS OF HYPOTHESIS TESTING IN THE CEMENT INDUSTRY.

FIRST HYPOTHESIS: THERE IS A SIGNIFICANT RELATIONSHIP BETWEEN INFLATION AND PROFIT RATIO.

According to the results of the GLS, the significance of the relationship between inflation and earnings per share equal to (0.000). Since this number is less than 0.95, thus H0 is confirmed and the first hypothesis is approved.

Positivity of the sensitivity of coefficients indicates a direct and significant relationship between the two variables.

So with rising of inflation, earnings per share of company in the cement industry increases.

SECOND HYPOTHESIS: THERE IS A SIGNIFICANT RELATIONSHIP BETWEEN BANK INTEREST RATES AND EARNINGS PER SHARE.

The results show that the significance of the relationship between bank interest rates and earnings per share equal to (0.006). So given that this number is less than 0.05, thus H0 is confirmed. So the second hypothesis is approved at 0.95 level of confidence.Due to the negative sign of the sensitivity coefficients, relationship between the two variables is inverse and significant.Indicating that with an increase in bank interest rates, earnings per share of companies existing in cement industry reduces.

THIRD HYPOTHESIS: THERE IS A SIGNIFICANT RELATIONSHIP BETWEEN EXCHANGE RATES AND EARNINGS PER SHARE

According to significance results relationship between exchange rates and earnings per share equal to (0.00).So given that this number is less than 0.05 H0 is confirmed. Thus the third hypothesis is confirmed at 95% confidence level. Positivity of sensitivity coefficients indicates a significant direct relationship between two variables. Thus
by increase in the exchange rate, earnings per share increases in the companies in industry.

**FOURTH HYPOTHESIS: THERE IS A SIGNIFICANT RELATIONSHIP BETWEEN LIQUIDITY AND EARNINGS PER SHARE GROWTH RATE.**

The results show that significance of relationship between the growth rate of cash and dividends per share is equal to (0.001). As this number is less than 0.05 thus $H_0$ is confirmed. Thus the fourth hypothesis is confirmed at 95% confidence level. Positivity of sensitivity coefficients indicates that there is a significant direct relationship between two variables.

**B,F) WALD STATISTICS ANALYSIS**

As mentioned in the previous section, the Wald statistic indicates the significance of the overall regression. Due to the fact that significance of the Wald statistic in this section is equal to (0.0002), states that in general, rate of inflation, bank interest-rate, exchange rate and liquidity growth influence rate in earnings per share of companies in cement industry.

**Conclusion and Analysis of hypotheses**

1. Industries with sales price inflated by inflation or even more than the overall national inflation, are those industries that inflation will make them move in positive direction. One characteristic of these industries is dependence on world market prices for their products, which means increase in product price is less than the cost of production in a country like Iran, which will increase the income of these industries. Oil products and cement industries are of those industries with the characteristics mentioned thus inflation has positive effects on them.

2. People who participate in the stock market generally seek short-term annual returns or long-term vision so invest in these companies. Raise in bank interest rates causes people who are looking for an annual profit not to take any risks and prefer investment in banks to investment in stock market. So caught liquidity in community move quickly towards banks. Banks’ increased interest rates also increases the expected dividend by investors in the stock market and reduces $\frac{P}{F}$, resulting in a drop in the market. So, these cases can be have great influence on stock market.

3. Exchange rate appreciation in industries such as oil industry and the cement industry will have positive effects. Because in these industries companies exchange their foreign exchange earnings to rial. So when currency rises, their monetary exchange earnings increases. This increase in revenue, increases their earnings per share.

**REFERENCES**


[15] **Martin Sirucek (2012)**, The impact of money supply on stock prices and stock bubbles
