

Examination of the Relationship between Macro economic Variables and Stock Return of Companies Listed in Tehran Stock Exchange (Case Study of Basic Metals Industry)

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ABSTRACT

The present study examined the relationship between macroeconomic variables and stock return of companies listed in Tehran Stock Exchange, case study of basic metals industry. To investigate this relationship, the variables of price (of oil), exchange rate, inflation rate and the rate of banking facilities were considered as macroeconomic variables. The relationship between macroeconomic variables with stock return was examined using the data of 19 companies available in basic metal industry between the years 2006 to 2011 and by using multivariable regression models based on combined data. The findings suggest that there is a positive and significant relationship between the variables of exchange rate and bank facilities rate with stock return in basic metals industry. This is while, a significant and negative relationship was found between the variables of inflation rate and oil price with stock return in basic metals industry.

KEYWORDS: Macroeconomic Variables, Inflation Rate, Exchange Rate, Oil Price, Stock Returns and the Rate of Banking Facilities

1. INTRODUCTION

Each investor to invest, considers some of the factors among which the return on investment is of great importance. Return on stock is affected by several factors, including the impact of macroeconomic variables such as inflation rate, exchange rates banking facilities rate and oil price.

This study tried to form an approach that uses a series of macro-economic data in this field. Therefore, by taking into account the major role of the government in managing the economy and decision makings and severe effectiveness of state policies on stock market, we can conclude that the study of the impact of macro-economic factors such as inflation, banking facilities, exchange rate and oil prices on stock output, can open a new way of understanding in this regard, so that investors and shareholders be able to predict the effects of macroeconomic decisions on changes in the index and stock prices, and hence predict stock return.

In general, this research seeks to answer the question that if there is significant relationship between macroeconomic variables and stocks return of available companies in basic metals group or not? And in this regard, we face the key question as follows: Are the rate of inflation, the rate of bank loans, oil prices and exchange rate related with stocks returns in available companies in the basic metals group? And what is the direction of this relationship?

1-1- Stocks Return

Researchers are looking for features in companies that can determine the increase or change in the future value of the companies, and by determining investment strategies based on them, accurately choose companies that will have the expected future return in order to invest optimally [1]. The goal of investors in investment is to earn profit and ultimately to maximize their wealth. To realize this, investors invest in the assets that have high return and a relatively low risk. If the return rate of an asset is more than its expected rate of return, the value of that asset will be more and the wealth will increase. The term, rate of return (price gains) is to describe the rate of increase or decrease in investment in the period of maintaining the assets [2].

1-2-General periods of economy

The economy in any society is subject to constant and different changes. In the short run there are changes in independent factors such as consumption level, capital and export and so on and in the long run there are changes in fundamental factors such as technological level or production function and in general changes in the fundamentals that cause movement and evolution in the countries' economy.

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By these evolutions and changes, imbalances in the form of fluctuations i.e. recession and the boom and crisis in the short-term and growth and development in the long-term are achieved. Statistical observations and economic investigations suggest that the economy of many countries, particularly industrialized countries continuously grow, but this growth is not steady and uninterrupted. In fact, businesses sometimes boom and grow and on the other times they stop and face recession and stagnancy and sometimes crisis replace them and these fluctuations are repeated during time frequently and under a special pattern.

Different statistical and economic studies suggest that these economic changes and developments have continued in the past, especially during the nineteenth century and until the First World War, in capitalism, under the order and certain mechanisms, and had a path of discontinuous development. This change was shaped in the form of "business cycles" or "general economic times" boom and bust, respectively, 8-year-old and known as "Juglar periods", 4-year-old known as "Kichin periods" and the 25-year-old known as "Kondratieff periods".

The goal of discussing business cycles is that, the economic and financial experts believe that by knowing about this cycle and that in what stage is the economy of the country, we can make an appropriate decision about macro investment and buying and selling securities.

1-3- macroeconomic variables

One of the major and economically effective markets of any country is financial markets. The stock market as a center for collecting savings and cash of the private sector is an important component of the financial markets. Now, the study of the impact of macroeconomic variables on stock markets is one of the topics of interest to academics and investors. In general, it is believed that stock prices are determined by some macroeconomic variables such as inflation, exchange rates, oil prices and the rate of banking facilities. Several studies have been done to assess the impact of economic forces on stock returns in different countries. Of the most important of these studies, is the use of Arbitrage Pricing Theory by Ross [3], Chen et al.,[4] to describe the impact of some of macroeconomic variables on stock returns in the United States. Their findings showed that industrial productions, changes in the risk premium and changes in the cycle structure had positive relationship with the expected stock return. This was while the relationship between the rate of inflation (expected) and unforeseen (unexpected), with the expected stock return was significantly negative [4].

Securities Kist, is a kist of assets that the investor maintains it with different combinations of various financial assets. Because people maintain different combinations of cash, stocks, bank deposits, debt securities, gold and foreign exchange in their financial assets basket, changes in the monetary, exchange rate, inflation and interest rates, affect the demand of people to hold each of the mentioned assets and also the demand for stocks and this matter in turn affects the share price. The basic model of securities Kist was introduced in 1950 [5], the mentioned model was set as of the basis of modern theory of securities Kist. Prior to this, investors were familiar with the concepts of risk and return, and knew that diversity is appropriate and should not put all eggs in one basket; but often could not measure it. Based on the theory of "Mean-variance" Markowitz [5] investors should be looking for a securities kist that is effective on the front line (effective front line is a line that is tangent to the set of investment opportunities so that it include the highest return for the least risk). A basket of securities is effective only when there are no other basket with higher expected return and lower standard deviation or with higher expected return but the same standard deviation or with the same expected return but lower standard deviation compared to the first basket. Sharp in 1964 and LinetNerin 1965, based on work by Markowitz [5], believed that there are two types of securities risk. The first type is of features of a company which are called special or systematic risk (beta factor) and the second type is related to the whole market and is called unsystematic risk. This theory is known as the capital asset pricing model. The basic hypothesis in this famous model is that changes in any of the securities are largely due to the market factors. This hypothesis makes this possibility that, instead of all the factors specific to each type of securities, only one factor as the market factor be used. Diversified investment in securities Kist removes non-systematic risk and only systemic risk remains. Ross in 1976, offered Arbitrage Pricing Theory as the replacement for capital asset pricing model [3]. Capital assets pricing model, starts its process by this point that how investors can create an "efficient investment Kist" However, arbitrage pricing theory looks at risk issue and its measurement from a completely different perspective and is not looking for efficient investment Kist, but it is based on the belief that stock prices are adjusted as shareholders are seeking arbitrage profits. When arbitrage profits go away, it is said that stock prices are in a state of equilibrium and can be valid. The main issues of arbitrage pricing theory are diagnosis of effective factors and differentiation of predicted changes from unforeseen changes in the sensitivity measurement [6]. The mentioned model unlike the capital asset pricing model makes it possible to use more than a systemic risk factor. Arbitrage pricing theory, knows real return of securities as a function of economic variables. In general, it is believed that stock prices are determined by some macroeconomic variables such as interest rates, exchange rates, inflation rates. The definition of market performance in this theory is the absence of arbitrage opportunities. Supporters of arbitrage pricing theory suggest that the model has two major advantages toward the capital assets pricing model. The first is that arbitrage pricing theory present assumptions about investor preferences for risk and return that some claim that it has lower limits. Second, they believe that this economic model can show stock returns in different countries. Arbitrage pricing theory was used by Ross [3] and Chen et al.,[4] to describe the impact of some of macroeconomic variables on stock returns in the capital markets of America. Their findings showed that industrial productions, changes in the risk premium, changes in the cycle structure had

positive relationship with the expected stock returns. This was while the relationship between anticipated and unanticipated inflation rate, with expected stock returns was significantly negative. Ross [3] and Chen et al.,[4] believed that the reality is in five economic factors and different stocks have different sensitivity toward these five systematic factors and these factors constitute a main part of the origin of the Kist of stock risk. In their view, these five factors are: changes in the anticipated rate of inflation, unexpected changes in inflation, unexpected changes in industrial productions, unexpected changes in the return to differential usance between saving bonds, junk bonds and preferred bonds (bonds risk premium) and unexpected changes in return to differential usance between long-term and short-term saving bonds. The first three factors affect the liquiditys of the economic entity, and finally, on stock return and its growth and other two factors also affect the discount rate, or in other words affect stock valuation[4].

1-3-1- Oil prices and its impact on stock returns

One of the result that fluctuations in export earnings (particularly oil) leaves in the country, is the Dutch disease. In fact economic boom due to increased exports in the short term may face failure in stimulation of the development for a variety of reasons this phenomenon is called Dutch disease. The country economy, by export boom and creating surplus of the balance of payments can enhance social welfare or because of the increase of import prices and increase of inflation, export decreases and it leads to low rates of growth and rising unemployment [7].

Dutch disease models usually focus on how of allocating resources between different sectors of the economy and it investigates how of reallocating production factors after positive economic shocks. These shocks may be due to the growing prices of the goods of the developed sector or due to the focus on the growth in the volume of exports of this sector. These shocks have two effects. The first effect is known as the effect of famous factors mobility. This means that due to boom in the oil sector, productivity of factors in the sector increases. Because of the increase of productivity of production factors in this sector, production factors come down to this sector from other economic sectors. The second effect which has more importance, and affect stock return, is the effect of costs. Growth of oil revenues in oil-exporting countries increases the demand for the whole economy. Higher real income cause growth in oil costs in all the goods that is called cost effectiveness.

Oil in Iran's economy had mostly the cost effect, which means that almost no significant production chain exists between this sector and other economy sectors of the country. This caused the oil boom has no direct significant impact on the promotion of technological level of other sectors. When oil price change the earning out of oil export will change. Therefore, government revenue which is mainly due to oil revenues, will suffer from instability. No government is able to eliminate this instability. The only thing that can be done is to manage this instability in a proper manner. The structure of our economy is such that there is not much relationship between the oil sector and other sectors of production and if there is, it is poor. But from a financial point of view the relationship between oil revenues and other economic sectors is strong. This phenomenon leads to lack of balance in our economy that still continues. Although oil prices increase cause increase in gross national production (including oil revenues) for oil-exporting countries, but should bear in mind that the final consumer of oil products and derivatives, are mainly in developing countries. Because oil-exporting countries, mostly due to lack of ability and lack of having required technology for processing crude oil, are importer of oil products and derivatives themselves, therefore, increase of oil price cause increase in the cost of products manufactured by industrialized countries and this matter leads to increase in rial value of import from developing countries including Iran. Therefore it is expected that the relationship between the increases of oil revenue with stock return be a negative relationship.

1-3-2- Exchange rate and its impact on stock returns

Exchange rate as one of the major economic factors has always been considered by economic and financial community. In fact, this rate reflects the economic conditions of the country and is a contributor in comparison of national economy with the economies of other nations.

About the dynamic relationship between exchange rates and stock prices, there is no consensus yet, so that we can separate two general views from each other in this regard: Dornbusch and Fisher[8], by flow-oriented models assume that the current account and the current balance of the country are two main factor determining exchange rate. According to this model, changes in the exchange rate affect international competition and trade balance and so have impact on the real economic factors such as real production and income and also on future and current liquidity of companies and stock price. According to this model, depreciation of the value of domestic currency(rise in the exchange rate), make local companies more competitive and make their export in an international comparison, cheaper. The increase of advantage of goods manufactured inside the country and consequently export increase also leads to higher incomes, which in turn increases the company's stock price. Therefore, in this model the exchange rate affects stock prices in a positive relationship.

The second perspective is known as the view of stock-oriented models. In this model, it is assumed that capital account, is the determining factor of the exchange rate. These models include portfolio balance model and monetary model. In portfolio model, Branson [9], states that there is a negative relationship between exchange rate and stock price. According to this model, decrease in share price cause reduction in the wealth of domestic investors. This leads to lower demand for money and a lower interest rate. A lower interest rate leads to capital outflow to overseas markets, assuming the

stability of other conditions and decline of domestic currency it cause increase in the exchange rate. Based on the monetary model of Gavin [10] in contrast with the above two models, there is no relationship between exchange rate and stock price. Thus, according to three above theoretic models, as a conclusion we can say that theoretic studies do not offer a specific and certain result in relation with exchange market and stock price. On the other hand, according to Bhattacharya and Mukherjee [11] until 1950s, the risk was considered as a qualitative factor and by Markowitz [5] efforts, risk became quantitative and standard deviation of liquiditys of investment projects in different situations was introduced as the quantity of risk assessment. He assumed that investors are not necessarily looking for maximizing expected return; because if they were looking for maximizing expected return, they would only choose asset which has the most expected return but practically, investors hold a basket of collection of securities and thus people, based on expected return (average return) and standard deviation (square root of variance), compare different investments and choose from among them. Now concerning the point that exchange rate is one of the component accompanied by risk of asset Kist, according to Markowitz model [5], changes in the price of this asset can affect the demand for it and consequently cause a change in stock price. Because for example by declining the exchange rate, the cost of products decreases, and as a result profit margin of per share increases and subsequently the share price of the company will rise. By increasing the companies' share price, the total stock price index also face positive changes.

1-3-3- Rate of bank facilities and its effects on stock returns

Interest in fact is the price of money and the reward that is paid to the donor (or savers) to encourage them to be separated from their cash.

In monetary analysis, interest rate has basic and key role, because it is considered as an essential element in the mechanism of influence of monetary policies.

In analysis of interest rate, the issue of effectiveness of external sector of economy has an essential role; so that in an open economy in which the entry and exit of capital is flowing freely, we can obtain the domestic interest rate by summing up the foreign interest rate with the expected changes in the exchange rate. In advanced economies, which have more complex financial systems, there are different interest rates, but the rate which are usually introduced as index rates include:

- discount rate of Central Bank,
- Rates used in the policies of central bank (mainly in the interbank market)
- Interest rates of treasury bills (government)
- Rates of bank deposits,
- Facility rates,
- Rates of bonds and securities of companies
- Interest rate of money market which usually include short-term interbank and financial institutions rates and rates of secondary markets of government securities.

The relationship between different rates of interest is called the structure of interest rate risk. Type of risk, cash and tax laws all have important role in determining the risk structure. The duration of maturity of a bond, affects the interest rate and the relationship between interest rates with bonds with different deadlines is called interest rate structure [12]. In our country, by pursuing the expanding policy of the central bank, our banks in several stages, reduced the interest rate paid to investors, so that interest rates on bank deposits have been reduced in recent years. This procedure leads to a reduction of attractiveness of money market to investors. Concerning the prospective nature of the stock market, reduction of the risk-free rate of return (bank interest) will increase the intrinsic value of the companies' shares, because as a result of reducing the interest rate, the discount rate will decrease in the flow of valuation. Since interest rate is of effective factors in discovering the daily value of the stock, following its reduction, it is expected to, assuming the stability of other factors, the intrinsic value of stock in valuation models based on discount of future benefits, increases. Thus, the mentioned mechanism, is justifying the increase in the P / E ratio of the average market in the condition of reduction of rate of interest. Thus, the reduction in rate of return in official money market can be considered as one of the factors contributing to the increase of average P / E of stock. From another perspective, if one wants to decide between investing in banks and the stock market, the attentive criterion will be comparison of return. Naturally investors trend toward the stock when there is a significant difference between stock market return and bank return, while the stock market risk (risk premium) is also always considered. In this situation, if our bank increases the interest rates on deposits, the decision to invest in the money market will be more beneficial and few people will be motivated to attend in capital market. Conversely, if our deposit interest rate be reduced, it will be a valuable opportunity to experience investing in various sectors. In this situation, due to the reduced attractiveness of money market, individuals' risk taking will increase and saved cash will decrease which ultimately means more investment in the financial markets and securities. There is a theoretical relationship between interest rates and the value of financial assets; so that lowering of bank interest rates by the Central Bank leads to increase of the attractiveness of financial assets in the stock market and this will cause increase of the attractiveness of the capital market.

1-3-4- Inflation and its effects on stock return

Classical economics scholars knew mild inflation of the effects of economic growth and severe inflation of pressure of demands at full employment of production factors and the impossibility of increasing the supply of goods in stable

conditions. Then the discussion on the possibility of trade - off between inflation and unemployment occurred and its advocate theorists argued that based on statistical evidence, there is the possibility of trade - off and replacement of inflation with unemployment, and in the short term higher percentage of inflation can be tolerated for lower percentage of unemployment in one's own economy, which means getting closer to full employment, greater use of production capacity of society and ultimately increase of the gross domestic products and economic growth. Trade-off of inflation and unemployment which initially was only based on statistical investigations, gradually found economical logic and it was stated that inflation increase on one hand, causes investors to hope toward the future of selling price of manufactured products and also increase of investment, and on the other hand causes the obligatory saving and in a simpler way, provides necessary financial resources in order to increase investment. This analysis and conclusion for third world countries which are often restricted in terms of financial resources for investment, is very important. Because for this reason, in developing countries, the government which is often the supreme power of social groups, can expedite the economic growth of the community with appropriate financial and monetary policies, The government can increase the pressure on a social group for the benefit of another group to a certain extent, provided that it makes sure that this action will accelerate economic growth and increase public welfare. But inflation has obvious negative effects such as decrease in real income of depositors and decrease in personal savings in low-income groups and conversion of immediate consumption into current consumption and increased of extra demand for goods which make the question stem harder than before and bring up the need for more enlightenment in this regard.

In general it can be said that inflation is nothing other than receiving fewer goods for the same money or receiving the same goods for more money. Thus, inflation reduces the value and purchasing power of money. If prices double, the purchasing power of money will become half, and vice versa.

Inflation is defined as, "steady increase in the general level of price and a continuous decline in the purchasing power of money".

1-3-4-1- inflation in Iran

Ali TayebNia about inflation in Iran, states that continuous and rapid growth of prices in Iran economy have been started from the early years 1971s, following the dramatic increase in oil revenues of the country and has quickly become one of the most acute economic-social problems of Iran. Heterogeneous, unhealthy, dependent on a single product economic structure and imbalances of the economy with expansionary monetary and financial policies, restrictions on foreign currency revenues of the imposed war, economic sanctions, increase of the costs of production and ultimately imported inflation caused inflation to continue in the years after the victory of the Islamic revolution and in some years its severity has increased as far as it drew all the attentions to itself as one of the most fundamental problems of the country economy; therefore the investigation of the nature and reasons of inflation in Iran and ways to deal with is of great importance because of not only its economic adverse effects, but also its possible social and political consequences.

According to experts' opinions, Iran inflation is not caused by a lack of simple and temporary balance between supply and demand, but it is a structural and fundamental phenomenon that is rooted in the fundamental imbalances in the economic system and its components.

Thus current policies which are mainly breadwinner of demand setting, lack required efficiency. What is needed in Iran, is conscious effort to improve the economy structure and remove its imbalances and to lay the healthy economical foundation that remedy inflation from its root by increase of domestic production.

In this study the correlation coefficient between short-term stock returns and inflation rate was two percent, which for practical purposes is equal to zero. It means that statistically there is not a significant relationship between the rate of inflation and stock return. In other words, when inflation is relatively high, stock returns will be neither up nor down. Similarly, when inflation is relatively low, stock return will be neither up nor down; on this basis, stock will not be considered as a good inflationary shield in short run. In general, in terms of inflation, nominal corporate profits after a period of time, without accompanying with actual increased profitability, averagely increases. Therefore, an increase in inflation declines the quality of real profit of companies and intrinsic value per share will also be reduced down. On the other hand, with the rise in inflation, the expected interest rates of the investor increase, so the discount rate for liquidity, as well as the lost opportunity of money increases. Thus, it is expected that there be a negative relationship between the inflation rate, price and return of share and consequently the total stock price index.

1.4- Review of previous researches

1-4-1- Review of previous foreign researches

1. The relationship between stock return and rate of inflation as one of major economic variables has been considered by many researchers and so far they have not achieved any certain result concerning it and this is why it is referred to as a puzzle. The basic idea of the relationship between these two variables was first stated by Fisher [6]. He claimed that the nominal interest rate reflects the information about future values of inflation rate. Many researchers after him investigated and tested this hypothesis which was famous as the "Fisher hypothesis". Among the most important of whom we can name Fama (1975), Budakh and Richardson (1993) and Golsak& et al. (2002).

1-4-2- Review of domestic researches

-Tehrani et al.,[1], in a study entitled "examination of the relationship between exchange rate volatilities and stock returns of exporting companies listed in Tehran Stock Exchange" according to an empirical model, investigated the relationship between exchange rate volatilities and stock return. Research sample included 75 exporting companies listed in Tehran Stock Exchange during the 36 monthly period from the beginning of 2007 to 2009. In this study after static investigation of data, research hypotheses were tested by integrated data and multiple regression analysis with software Eviews and panel data model. Results of researchers showed that there is a positive and significant relationship between exchange rate and stock returns. However, the relationship between exchange rate volatilities and stock returns is not a flashback.

- Heydari and Bashiri under the title of "examination of the relationship between uncertainty of real exchange rate and the stock price index at Tehran Stock Exchange: observations based on the model VAR-GARCH" , investigated the relationship between real exchange rate fluctuations and index of share prices in Tehran Stock Exchange during the years 1999 to 2011 using monthly data. To this end, researchers used two variables based on conditional anisotropy variance from the generalized self-regression model. Their results showed that there is negative and significant relationship between uncertainty variable of real exchange rate and stock price index and there is no significant relationship between uncertainty of stock price and exchange rate.

- Pashayi&Omid poor in a study entitled "examination of the effect of inflation rate on real returns of stocks in the Iranian economy," investigated the effect of inflation rate on the real return of shares in the Iranian economy using quarterly data from the years 1990 to 2006. In this study, variables of oil price fluctuations, oil price and exchange rate were considered to be examined as explanatory variables. According to the obtained results, two variables of exchange rate and inflation rate showed to have a negative effect on real return of stock in the long run, while the effect of the variable of fluctuations in oil price and oil price in the short-term and long-term respectively was positive on real return of stocks.

- Tehrani et al.,[1], in a study entitled "examination of the relationship between stock returns and inflation in the Tehran Stock Exchange at the time- different scales using wavelet transform" stated a renewed form of Fischer hypothesis. In this approach, based on multi-scale wavelet method, the relation between stock returns and inflation was analyzed in time series at different scales. On this basis, the studied time series was analyzed in three levels of details and a smooth surface level of wavelet. The results showed a positive relationship between nominal stock returns and inflation is on the two-month and eight-month horizon, while there was a negative relationship shown in the four-month horizon. In addition, in one-month horizon, there was no significant relationship. The researchers concluded that the nominal return results yield the support for the Fisher hypothesis about risky assets in the D2 and S3 domains of wavelet, while stock return in time scales of one month and four months do not provide protection against inflation.

- Montazeri(2008), in a study entitled the "relationship between bank interest rates and their impact on financial markets" investigated the relationship between the mean of interest rates on bank deposits and the average rate of return on salaries of shareholders of companies. The result of correlation coefficient showed no significant relation between these two variables. Also the relationship between expected interest rate of bank facilities and the mean of return rate of salaries of companies' shareholders was investigated by using correlation coefficient and the results showed no significant relationship between them.

- Azizi(2004)in a study entitled "The empirical test of the relationship between inflation and stock returns in the Tehran Stock Exchange," examined the relationship between inflation and stock returns in the Tehran Stock Exchange. To examine this relationship, the researcher used

VAR Granger Causality Model which is one of the conventional methods of econometric in the time period of 1998 to 2003. The findings indicate that inflation rate explains index of cash return and total return (price and cash), but does not explain stock price index. On the other hand, cash returns, total returns and stock price index do not explain inflation.

- Azvaji and Farhadi (2007), in a study entitled "The impact of changes in the real interest rate on the development of the financial sector in the economy of Iran," examined the effect of interest rate changes on the development of the financial sector and concluded that there was significant and reverse relationship between the real interest rate changes of banks and financial sector development. While the increase in the real interest rate in the informal market, leads to a decrease in demand in this market and orientation toward official market (banking system) and the development of financial market in Iran economy.

- Talebnia and Pirdoosti (2007), in a study entitled "The impact of bank interest rate changes on the return of life insurance in the Iran insurance industry" investigated the impact of bank interest rates on return of life insurance in the Iran insurance industry. According to the results, there is a significant relationship between changes in bank interest rate and return of life insurances in Iran insurance industry and also between increase of bank interest rate and incomes out of investment in life insurances premium and by decreasing the bank interest rates, the orientation toward investment in life insurances increases.

-Yahyazadehfard and Samimi(1998), in a study entitled "examination of the relationship between inflation and real return on stock in Iran" examined the relationship between inflation and real stock returns from empirical point of view in the years 1991 to 1996 in monthly, quarterly and yearly basis. As the estimate of regression model by ordinary least squares requires that the subjected variables be stable, in this study, first by unit root test (dickey-fuller test) the stability of above

variables was specified and then the relationship between inflation and the real return on stock was examined both indirectly and directly. The relationship between inflation and real stock return which was examined indirectly (chain effect) quarterly, was not statistically significant but the research result about the relationship between these two above variables which was examined monthly, quarterly and yearly, shows that the relationship between these two variables is positive. In other words, an increase in inflation, the real return on stock has also increased, therefore in Tehran Stock Exchange, during the period 1991 to 1996 stock has had performed as inflationary shield.

1-5- Model Presentation

According to exploratory studies and literature, the conceptual model of the research can be presented as Figure 1 below:

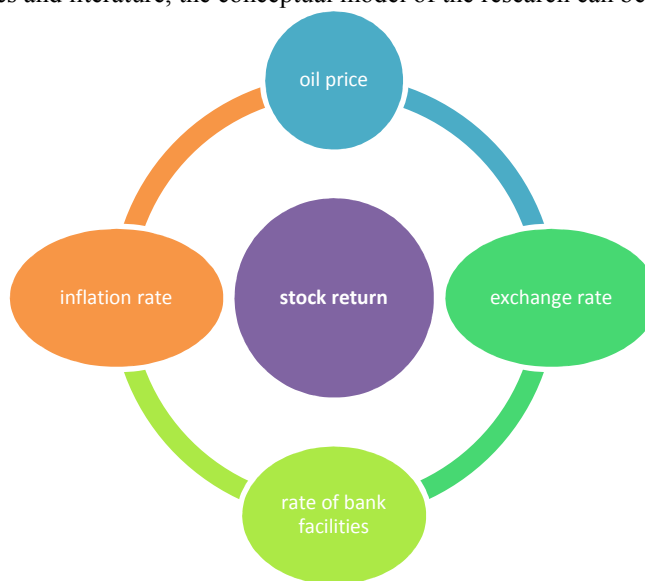


Figure 1. Conceptual model of the effect of macroeconomic variables on stock returns

2- DISCUSSION

In this part, the research questions, hypotheses, research type, research model, population, period, data collection methods, statistical methods were described for data and variable analysis.

2-1- Research questions

With regard to the issue of research, this study includes the following four questions:

1. Is there a significant relationship between annual rate of inflation and the rate of return on share of existing companies in the basic metals group or not? If there is, how is the relationship type?
2. Is there a significant relationship between exchange rate and stock returns of existing companies in basic metals group or not? If there is, how is the relationship type?
3. Is there a significant relationship between price of oil and the stock return of existing companies in basic metals group or not? If there is, how is the relationship type?
4. Is there a significant relationship between rate of bank loans and the stock return of existing companies in basic metals group or not? If there is, how is the relationship type?

2-2 –Hypotheses

First hypothesis: There is a correlation and significant relationship between the annual rate of inflation and the rate of return on stock in existing companies in basic metals group.

The second hypothesis: There is a correlation and a significant relationship the exchange rate and stock returns in existing companies in basic metals group.

The third hypothesis: There is a correlation and significant relationship between the price of oil and the rate of return on stock in existing companies in the basic metals group.

The fourth hypothesis: There is a correlation and significant relationship between the rate of bank loans and the stock return of existing companies in basic metals group.

2-3 Research Type

This study is of fundamental-applied research type, because it expands the sum of knowledge available about the relationship between macroeconomic variables and stock returns and the results can be used to apply more care in decision

making. On the other hand, on the basis of how of collecting data, this study is of descriptive-correlation type. In this study we examine the presence of relationship and correlation between variables by regression. Therefore, this study is considered? Research too. Due to observation and generalization of the results, this study is inductive reasoning.

2.4- The Research Model

To test the hypothesis, the multiple regression model as equation (1) will be used during the test:

Eq (1)

$$SR = C + \beta_1 \text{Log}(OPL) + \beta_2 \text{Log}(EXR) + \beta_3 \text{INFR} + \beta_4 \text{INR} + \varepsilon$$

In which: SR is stock return; OPL is oil price; EXR is exchange rate; INFR is inflation rate; INR is rate of banking facilities.

In the above regression model, in addition to the variable of inflation rate, macroeconomic variables such as oil prices and the exchange rate were used. The regression function of stock returns, include the dependent variable (the variable of stock return at the end of the period), the variable of rate of inflation (calculated from the price index of goods and consumer services), oil price (the price of light oil of Iran) and exchange rate (the exchange rate of US \$ with Rial in unofficial markets) which is used as explanatory variables.

2-5- Statistical Population, time duration and sample size

Statistical population and statistical sample; Existing companies in the group of basic metals.

Time realm: the realm of time of research is between the years 2006 to 2012.

2-6- Method of data collection

To collect information related to the research, we referred to the location of maintenance of financial statements in the stock exchange and required information were collected by investigation of presented financial statements and in some cases, by using CD (including financial statements information and information relating to the process of stock deals of banks listed in stock) or the website of the Central Bank and the Statistical Center of Iran.

2-7- METHOD OF DATA ANALYSIS

First the collected data were saved in the form of database and then by transferring these data to Excel and Stata Softwares, the ground for data analysis will be provided by regression and the obtained results.

2-8- Variables

2-8-1- Dependent variable

The annual stock return: Is referred to the total earnings and benefits allocated to the shares during one year which is consisted of two parts; first, price increase or investment profit increase and second, profit and pay advantages including cash profit and the advantages out of investment increase. To measure this variable, Eq (2) will be used Eq (2)

$$RET_{i,t} = \frac{(1 + \alpha_1 + \alpha_2)P_1 - (P_0 + \alpha_1(1000))}{P_0 + \alpha_1(1000)}$$

So that:

α_1 : The percentage of capital increase out of the receivables and cash contribution; α_2 : The percentage of capital increase out of the reserves; P_1 : The price of shares at the end of the period. P_0 : The price of the shares at the beginning of the period.

2-8-2- Independent variables

- Inflation
- Exchange rate
- Rate of bank facilities
- The price of oil

3- The research findings

In this section, we analyzed the collected data and offered empirical findings of current research. In other words, in this section, it was attempted to use different analytical methods to answer the developed questions or decision making about approving or rejecting the hypothesis of the study so that ultimately, experimental findings related to these tests be presented. In this direction, collected data were first categorized in the form of a database and then, using softwares Estata and Eviews the test of research hypotheses which is multivariable regression based on combined data, was done.

3-1- Descriptive statistics of research

To provide an overview of the major characteristics of variables, in table 1 some of the concepts of descriptive statistics of variables, including mean, standard deviation, minimum, maximum, and the number of observations are presented.

Table 1. Descriptive statistics of research variables

Observation	Maximum	Minimum	Standard deviation	mean	Statistical index	
					variable	
133	6.99	-0.79	0.99	0.34	Return	
133	6.23	5.57	0.19	5.68	Log of oil price	
133	4.28	0.53	0.20	3.96	Log of exchange rate	
133	0.30	0.10	0.06	0.18	Inflation rate	
133	0.21	0.13	0.02	0.16	Rate of bank facilities	

3-2- Hypotheses testing

According to table 2, computational statistics of F is 1.07 and its possibility is 0.38 ($p > 0.05$), in other word, lemon F calculated, is indicator of not rejecting null hypothesis and also of the significance of integrative method in contrast with panel method. Therefore, to examine the research hypotheses, the integrative method was used.

Table 2. The results of tests used for the research model

Result	Probability	Test static	statistical index and result	
			Test type	
Integrative method	0.38	1.07	Lemon F	

3-3- Collinearity Test in the research model

One of the assumptions of the regression which was examined for the fitted model is the assumption of lack of collinearity. One of the assumptions of multivariable regression is that the explanatory variables are not correlated with each other. In most cases, the relationship between the explanatory variables will be non-zero, but often a small degree of correlation between the explanatory variables will not cause so much reduction in the model accuracy. But when the correlation between the explanatory variables is very high (typically greater than 0.5), causes a problem called multicollinearity. One of the most common statistical tests to identify the presence or absence of a collinearity problem is using VIF test. The results of this test for the research model are presented in table 3.

Table 3. The result of VIF test for the research model

1/VIF	VIF	Variable
0.111	8.96	Oil price
0.105	9.51	Exchange rate
0.119	8.37	Inflation rate
0.339	2.94	Rate of bank facilities

As shown in Table 3, the VIF static is less than 10 for all the research variables and this amount indicates that there is not collinearity problem in the research model.

3.4 Test of Data Durability

Just when the research data will face stability problem that they be in the form of time series, or a combination, and also the number of years of research be high. Using nondurable data can lead to false regressions. In the present study, the model data are in combination, and for determining that if they are durable, Levin et al., Boys and Sheen and Fishertests [6] were used. The result of data durability tests for the research variables are presented in table 4.

Table 4. Tests of data durability

Fisher		Boys & Sheen		Levin et al. test		Test statistical index variable
Probability	Test static	Probability	Test static	Probability	Test static	
0.000	80.14	0.000	-3.55	0.000	-14.48	Stock return
0.000	93.59	0.000	-4.24	0.000	-10.56	Oil price
0.000	117.97	0.000	-5.91	0.000	-7.51	Exchange rate
0.009	61.4	0.021	-2.01	0.000	-9.69	Inflation rate
0.008	61.78	0.02	-2.04	0.000	-10.48	Rate of bank facilities

As can be seen in the table above, the presented results for Levin et al., Boys and Sheen and Fisher tests [6] for each of the research variables showed that the null hypothesis based on data durability, is rejected in the error level of 5%. In other words, one can say with 95 percent confidence level that the research variables are durable for the time period of 2008 to 2011.

3.5 Test of Errors independence in the research model

One of the basic assumptions of regression is lack of autocorrelation (Independence of errors) between errors sentences. To detect correlation in this study, Watson camera test was used. Table (5), shows the result of Watson camera test x16 Watson camera test to identify the presence or absence of autocorrelation in the research model. As seen in the mentioned table, Watson camera test output is 2.01 and this amount is between 1.5 to 2.5. This amount of Watson camera test suggests that in the estimated model by using regression based on integrative data, the problem of autocorrelation does not exist.

Table 5.Autocorrelation test for the research model

Result	Test static	Statistical index and Result of test type
Lack of autocorrelation (independence of errors)	2.01	Watson camera

3-6-Test of variance dissimilarity for the research model

One of other basic assumptions of regression is the lack of presence of variance dissimilarity between the error sentences. To detect the variance dissimilarity, in the fitted model (regression model based on combined data) White test was used. Table 6 shows the result of White test to identify the presence or absence of variance dissimilarity in basic metals industry. As shown in the mentioned table, the static of White test is 2.54 and the degree of its probability is 32% which is lower than the error level of 5% and indicates that the null hypothesis based on variance similarity can be rejected. Therefore the research model has the problem of variance dissimilarity.

Table 6.The result of variance dissimilarity test for the research model

Result	Probability	Test static	Statistical index and result Test type
The problem of variance dissimilarity	0.02	2.54	White

As one of the methods of removing the problem of variance dissimilarity is estimation of model by the least generalized squares method, to estimate the equation of the relationship between macroeconomic variables and stock return, GLS method was used. The result of estimation of model after removing the dissimilarity is presented in table 7.

Table 7.The results of estimation of research model based on integrative method

$SR = C + \beta_1 \text{Log}(OPL) + \beta_2 \text{Log}(EXR) + \beta_3 INFR + \beta_4 INR + \varepsilon$				
probability	Static t	Standard error	Coefficient	Statistical index Variable
0.000	8.56	0.77	6.63	Intercept
0.000	-7.77	0.35	-2.78	OPL
0.000	7.03	0.32	2.28	EXR
0.000	-9.5	0.21	-2.03	INFR
0.000	10.36	0.73	7.64	INR
static: 6.009; adjusted determination coefficient: 0.37; F probability: 0.000				

According to the results shown in table 7, the following conclusions can be considered:

* Examination of presented model: Calculated F is greater than the table F and its significance level is less than 5%, then we can say that the fitted model by integrative method is significant with 95 percent confidence. In other words, this model is highly valid. In addition, the adjusted determination coefficient of this model is 37%, this figure shows that 37% of the value of the dependent variable (stock return) are explained by explanatory variables.

*Examination of hypothesis 1: The probability of the variable of oil price is 0.000 and this number is lower than 5% level and indicates that this variable has significant relationship with the dependent variable which is stock return. According to the sign of the coefficient of mentioned variable (-2.78) also we can argue that this variable has a negative relationship with stock return. So that by unit increase of the variable of oil price and by having other conditions constant, stock return will decrease up to 2.78 units. As theoretically expected that there should be a significant relationship between two variables of oil prices and stock return, according to the analysis done, this relationship is also approved empirically. In general, with respect to these two variables (oil price and stock return) we can state that there is a negative and significant relationship

between these two variables in basic metals industry. Therefore, the first research hypothesis that there is a significant relation between oil price and stock return is approved.

Examination of hypothesis 2: Concerning the variable of exchange rate, we can also express that its probability is lower than 5% error level, and this indicates that this variable has significant relationship with the dependent variable which is stock return. According to the sign of the coefficient of mentioned variable (2.28) also it can be argue that this variable has a positive relationship with stock return. So that by increase of a unit in the variable of exchange rate and by having other conditions constant, stock return increases at 2.28 units.. As it was theoretically expected that there should be a significant relationship between two variables of exchange rates and stock return, based on the analysis done, this relationship is also empirically approved. In general, the second hypothesis stating that there is a significant relationship between exchange rate and stock return is approved.

*Examination of hypothesis 3: The probability of inflation rate is 0.000 which is lower than 5% and this indicates that this variable has significant relationship with the dependent variable which is stock return. According to the sign of the coefficient of mentioned variable (-2.03) also it can be argued that this variable has a negative relationship with stock return. So that by increase of a unit in the variable of inflation rate and by having other conditions constant, stock return increases at 2.03 units. As it was theoretically expected that there should be a significant relationship between two variables of inflation rate and stock return, based on the analysis done, this relationship is also empirically approved. In general, about the variables (inflation rate and stock return) we can say that there is a negative and significant relationship between them. Therefore, the third hypothesis stating that there is a significant relationship between inflation rate and stock return is approved.

*Examination of hypothesis 4: Concerning the variable of rate of bank facilities, we can state that its probability is lower than 5% error level and this indicates that this variable has significant relationship with the dependent variable which is stock return. According to the sign of the coefficient of mentioned variable (7.64) also it can be argued that this variable has a positive relationship with stock return. So that by increase of a unit in the variable of rate of bank facilities and by having other conditions constant, stock return increases at 7.64 units.. As it was theoretically expected that there should be a significant relationship between two variables of bank facilities rate and stock return, based on the analysis done, this relationship is also empirically approved. In general, the fourth hypothesis stating that there is a significant relationship between bank facilities rate and stock return is approved.

4. CONCLUSION AND SUGGESTIONS

4.1 Results of the research

The results presented in table 7 shows that there is a significant relationship between macroeconomic variables and stock return rate in the basic metals industry. So that there is a significant and negative relationship between variable of oil price and inflation rate with the variable of stock return and there is a positive and significant relationship between the variables of exchange rate and rate of bank facilities with the variable of stock return. The overall results of the study can be found in table 8.

Table 8.Results of the study

Result	Coefficient	Variable type	Variables
Significant and negative relationship	-2.78	Independent	Oil price
Significant and positive relationship	2.28	Independent	Exchange rate
Significant and negative relationship	-2.03	Independent	Inflation rate
Significant and positive relationship	7.64	Independent	Rate of bank facilities

4-2- Suggestions

According to the results of research and the subject importance, the following suggestions can be offered: Using the extracted regression models from the findings of the study, investors, analysts and other capital market participants can use it to assess the impact of macroeconomic variables on stock returns in the basic metals industry. So that, according to the mentioned relationships based on the findings, decision-makers are able to take more accurate decisions. Considering that there is a significant and negative relationship between inflation and stock return in the basic metals industry, it is recommended to investors, in times of low inflation rates, invest in this industry (albeit with consideration of other factors).

Investors and financial analysts who seek to maximize their wealth, with a better understanding of the Tehran Stock Exchange and the effect of macroeconomic variables (oil price, exchange rate, inflation rate and the rate of banking facilities) on stock return in the basic metals industry, will take the appropriate decision in this market. As the findings show that there is a significant and direct relationship the exchange rate and shares return companies existing in basic metals group. Hence, exchange rate changes can be effective in this group as a risk factor on stock return and thus the value of the company. Concerning this important point, one of the strategies that can be recommended to the investors in this

group is that, the companies the exchanges of which are affected by exchange rate keep in mind that value rate is one of the most important and effective factors on the return of this group of companies. In addition, they should also keep in mind that if the company is an exporting company, with the increase of exchange, it absorbs profit and thus more return.

Due to the significant and negative relationship between oil price and stock return, the existing companies in the basic metals group, financial and economic policymakers are offered to consider this important issue so that through it, the necessary conditions for systemic financial stability in this group will be provided with comprehensive decisions. In addition, the Petroleum Exporting countries like Iran, financing and regulation of government spending (as a financial policy) depends on the amount and price of oil. With rising oil prices, in the absence of efficient financial discipline, liquidity increases and goes down to the markets, such as money market, capital or stock, exchange, gold and housing. In periods of recession or stabilized gold market, exchange and housing, and control of bank interest rate, as a monetary policy tool, liquidity will be sent to the Stock Exchange. According to these factors, analysts and investors in the capital markets are suggested that consider the variable of oil as one of the macroeconomic variables that affect stock return of companies in the basic metals group through which they can make optimized decisions and efficiency. We hope that these decisions will ultimately lead to improved capital markets and also the economy of our dear country Iran.

5- RESOURCES

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