

## **THE INVESTIGATION OF THE EFFECTS OF GOLD & OIL WORLD PRICES AND EXCHANGE RATE ON THE TOTAL INDEX OF TEHRAN STOCK EXCHANGE USING ARDL METHOD**

**Ehsan Borna**

*M.A. student , Department of management and Accounting, Aliabad katoul Branch Islamic Azad University, Aliabad katoul, Iran*

**Mansour Garaz, PhD**

*Assistant Professor  
Department of management  
and Accounting, Aliabad katoul Branch,  
Islamic Azad University,  
Aliabad katoul, Iran*

### **Abstract**

The aim of the article is investigating the relation of macroeconomy factors on total index of stock exchange of Tehran. In this research variable of world price of OPEC, gold and exchange rate were applied. Data were analyzed monthly during 2008to2013 using economic method. ARDL results of auto-regression along with distribution pauses of test indicate a long-term relation between the variables mentioned and total stock. The results indicate a positive and meaningful effect in OPEC world price in long-term on index of total stock exchange of Tehran. But world price of gold has had a positive and meaningless on index of total stock. It seems that increase of exchange rate in long-term can increase profit of exported-orientation industries and increase of income and profitability is followed by stock market advancement. Also increase of oil world price in long-term caused advancement of stock market. Estimated coefficient of error correction model also shows a very high short-term adjusting speed towards long-term balance.

**Keywords:** total index of Tehran exchange rate, oil world price, world price of gold, ADRL method

### **1- Introduction**

With the growth of capital, people`s cash in exchange markets, jewelry and so on lead toward capital market and retail activities above are reduced to a great extent. As a result investors in stock exchange try to identify effective factors on stock exchange such as identifying and effect of macro-economic variables on profit of their investments. Also, the index mentioned is recognized as market thermometer among investors at the moment, most institution and private investors in Tehran stock exchange measure market movement in form of periods with total index criterion. Total stock index indicates economic condition of a country. Reduction in public stock price means economic record of a country and its increase means economic advancement. The index is presented and calculated through stock exchange or by institutions which are independent of stock exchange. Factors which are effective on change of price are a lot and identifying them all one by one and the way of their influencing is hard and maybe impossible. In a general classification affective factors on stock price changes are

classified into two factors of internal and external. In this research among external factors, world price of gold, oil price of gold and exchange rate were selected and determining level of influencing on index is investigated. The main aim of the current research is determining the relation between economic external macro-variables and total stock index and determining variables with total index is the main objective of the research. In this study we deal with world price variables of oil, gold and exchange rate during 2008 to 2013 applying econometrics technique called ARDL. First, variables are modified and reliability is estimated and variables are investigated through test of single unit and next through ADRL we analyze it. In the final session the research findings and conclusion are dealt with.

## **2. Previous Studies**

Many studies in developed exchange of the world prove that there is a relation between macro-economy variables and stock index. Belallah and Habiba investigated effect of macro-economy effects on stock exchange price in America and Japan and China (2013). The aim of the research is investigating the relation between macro-economy indices in long-term containing interest rate, fund distribution, industrial production index and stock exchange index in America, Japan and China noticing the recent financial crisis in 2008. The results indicated that in the U.S and China interest rate, index of industrial production and money distribution has a positive effect on stock exchange price. The results in Japan showed that interest rate has a positive and meaningful effect in long-term. Macro-economy variables influence on stock exchange price of America, Japan and China and they can be used as an explanation for predicting stock market return. [2].

Lee and Change conducted an investigation on dynamic relation between oil, gold and financial variables in Japan in 2011. The focus of the article is investigating approach of bounds testing in relations of oil, gold and financial variable prices containing stock price, exchange rate and interest rate. The results showed that in long-term price of gold and stock of Japan has positive and meaningful effects on interest rate of Japan. This means that increase of gold and stock price can intensify expectations of inflation rate increase in long-term which finally causes increase of interest rate in long-term. [5].

The objective of the study is studying influential effects of macro economy factors on return of energy sector in Shanghai stock market (Bing Zhu, 2012) Macro economy variables include inflation rate, money distribution, exchange rate, industrial production, bond, exports, imports and forcing reservations and unemployment rate during 2005. The findings proved that exchange rate, exports, foreign reservation, unemployment rate have a significant effect on return of energy sector. [8].

The study investigates effect of macro-economy variables on fluctuations of stock prices in Ghana. Adam and Tunba (2007). This research dealt with long-term and short-term analysis of stock index and macro-economy variables including direct foreign investment, bond storage rate, index of consuming price and exchange rate, interest rate and inflation.

Commonplace analysis shows evidence supporting a long-term relation between variables during time horizon. More experiments indicate that in short-term inflation rate and exchange rate are important for moving of profit price in Ghana, however effect of interest rate in long-term is meaningful. [6].

In Iran Abbasian et al 2007 investigated effect of macro-economic variables on total index of stock exchange of Tehran during 1998 to 2005 with seasonal data. Macro-economy variables including exchange rate, trading balance, inflation, cash flow and interest rate were applied in this research. After proving significant test of variables, correlation was investigated in order to test long-term relationship between variables and in the end the model was estimated based on vector auto-regression VAR. To analyze short-term relations between variables, two methods of variance decomposition(VDC) and instantaneous response function were used. The result of the estimation shows a long-term balance relation between total exchange index

and macro-economic variables. In short-term using error correction model, a positive relation was found between total exchange index and inflation, while the relation with other variables is negative. [1].

Karimzadeh and Soltani (2010) estimated long-term relation of industry stock price index using ARDL with macro fund variables and monthly method. The variables of the model include financial industry stock price, cash flow, exchange rate and real bank profit rate. The results of the estimation show that there exists a vector correlation between index of financial broking industry stock price in Tehran stock exchange and macro fund variables. The long-term relation estimated showed positive and meaningful effect of cash flow and negative and meaningless negative of real exchange rate and rate of real profit in bank on industry stock price index. [4].

Karimzadeh (2006) investigated long-term relation between index of stock price and macro fund variables using monthly data for period 1989 to 2001 with the approach of selected variables which include stock exchange price index, cash flow, real exchange rate and real profit rate in bank. Long-term relation estimated shows positive effect of cashing meaningfulness and indicates negative effect of real exchange rate and real profit rate in bank on index of stock price. Estimated coefficient is around -0.04 indicating ECM 0.04 in each period. [3].

### **3. Research Hypotheses**

Hypotheses are defined within a main hypothesis and three secondary hypotheses.

Main hypothesis: there is a meaningful relation between oil world price, gold world price, exchange rate and stock exchange of Tehran.

Secondary hypotehsi1: there is a meaningful relation between oil world price and total index of Tehran stock exchange.

Secondary hypothesis2: there is a meaningful relation between gold World price and total index of Tehran stock exchange.

Secondary hypotehsis3: there is a meaningful relation between exchange rate and total index of stock exchange of Tehran.

### **4. Methodology**

To investigate the relation between macro-economy variables with total stock index, econometrics method was used. The pattern is suitable for measuring short-term relation and long-term one of ADRL variables. The first step in the process is to study reliability and auto estimate correlation level of ARDL. In the end, long-term and short-term relation of variables will be studies using ARDL & ECM. Also, to estimate the model software Microsoft4 was used. Following relation was applied to investigate macro-economy variables on total stock index applied.

$$\text{Index} = F(\text{ER}, \text{Oil}, \text{Gold})$$

<b>Abbreviation</b>	<b>research variables</b>
<b>Index</b>	total stock index
<b>ER</b>	exchange rate in free market
<b>Oil</b>	OPEC world price
<b>Gold</b>	gold price per ounce

Total stock index of Tehran changed from 2008 and moreover price return, cash return; divided profit of companies was added to it. In Tehran stock exchange all the stock accepted is in it and we weighted every Company according to its shares. Here is how to calculate it:

$$TEDPIX = \frac{\sum_{i=0}^n p_{it} q_{it}}{RD_t} 100$$

Which are number of company share, t times during i time, and company share price in this relations which was basis of price index and cash return during RDt was Σpioqio during 2008 to 2013.

The research variable data was prepared from statistics published in OPEC international website and also statistic of total index of Tehran exchange was prepared from publication and data of stock company library. To extract data of exchange rate, Tact processor software was used. Data were gathered daily and from Usagold site the turned into monthly data.

**5. Results**

Before estimating the model we dealt with stationary test of variables by Dickey-fuller unit root test. Tables 1 shows the results in first grade difference. It must be mentioned that critical quantitative is 95 percent in significant level.

table 1: The results gained out of doing unit root in first grade difference using ADF

Variable	an intercept but not a trend		an intercept and a linear trend	
	t-statistic	Critical value	t-statistic	Critical value
DLINDEX	-5.4192	-2.9256	-5.3360	-3.5088
DLER	-5.0036	-2.9256	-5.0877	-3.5088
DLOIL	-5.5286	-2.9256	-5.6864	-3.5088
DLGOLD	-7.7111	-2.9256	-7.8826	-3.5088

Source: the research calculations

In table1 unit root test was done on the first grade difference of variables indicating all the variables of total stock index, exchanger rate, OPEC oil world price, gold world price are reliable by one time differentiation. In fact, variables mentioned are correlation, now that they are reliable we can proceed to do the next steps.

This statistics must be compared with critical values boundary presented according to statistic prepared by Pesaran and Sh. [7]. Since critical quantity presented is in level of I(0) = 4/60 I(1) = 3/47 95% confidence , zero hypothesis is F=11 is rejected which is less than statistical quantity and long-term relation is approved. In other words, there is a long-term balance relation between the model variables. After approval of correlation test between the research variables, we will conduct examination to estimate long-term effects by applying Schwarz-Bayesian criterion:

table 2: the result of estimating long-term coefficients using ARDL

Variable	coefficient	T-Ratio	prob
LOIL	1.0157	2.1102	0.04
LER	0.6696	2.9214	0.005
LGOLD	0.2533	0.4914	0.62
C	-1.1047	-0.4241	0.67

Source: the research calculations

The results of the estimating long-term coefficients indicate that all the estimated variables are totally significant except variable of gold world price. Also variables of oil world price had the most positive effect on stock index and exchange rate has a positive effect on total index. In long-term if exchange rate increases to 1% total exchange index will increase to % 0.66. And if world price of OPEC oil increase 1%, totals exchange index will increase to %1.02 indicating high level of sensitivity in stock exchange of OPEC oil world price. In long-term increase of exchange rate can increase demand for share, as a result of increase of savings gained from exports and improving income of companies and profit, because profitability of cash flows in companies becomes export-oriented. As a result total exchange index will increase. Next, in order to know how we can adjust error correction model shows that in each period what percent of production short-term balance gets to ECM. In other words some periods will take so that total index can get back to its long-term process. The results gained out of estimating error correction model are in the following table:

Table3: results of short estimation and equation of error correction

Variable	coefficie nt	T-Ratio	prob
LOIL	0.3419	3.5057	0.001
LER	0.0689	1.8976	0.063
LGOLD	-0.1780	-3.6346	0.001
ECM(-1)	-0.1030	-1.9201	0.06

$$R^2 = 0/46788 \quad , \quad F = (4,53) \quad 11.2106 \quad [0/000]$$

What is important is coefficient related to ECM-1 in error correction model and the coefficient shows adjustment speed. The value must be less than one and negative to show that lack of balance in long-term goes toward balance. Error correction coefficient in this model is -0.1 which is meaningful. In each short-term period 10percent of lack of balance is adjusted in total index and becomes close toward log-term process. In fact, if any shock enters the model, in each period % 10 of imbalance of the previous period is removed. Every factor which causes imbalance can be created in pattern above and can ruin long-term relation. Imbalance will be modified with speed of less than ten periods. Since the research period is monthly, the result is that in each year nearly 120 percent of imbalance of stock exchange index is corrected. Also, logarithm of exchange rate, oil price of OEPC and gold price are meaningful and we can conclude that in short-term variables of oil price and exchange rate with a positive effect and price of gold with a negative effect can influence total index of stock exchange of Tehran. Also recognition coefficient shows that %46 of DW.=1/70 can be explained in changes of stock index by independent variables. Statistic also indicates that there is no correlation in the model and it is meaningful.

## 6. Conclusion

The aim of the research is to explain level and direction of short-term and long-term effects in variables of OPEC oil price, gold price and exchange rate on total index of stock exchange. The investigation can help investors, managers, institutions, governments, policy-makers, financial analyzers and those active in stock market in predicting movement process of index. In this relation first reliability of variables was investigated based on Dickey-fuller single rot test and performed all reliable variables by 1time correlative grade. First, after determining pause, ARDL model was selected as the best model. The test results indicated a long-term relation between variables of OPEC oil and exchange rate of free market with index of total stock and the relation is positive and meaningful. In fact it seems that increase of exchange rate in long-term can increase profitability of export-oriented industries and this is followed by income increase and profitability of stock market. Also increase of world price of oil in long-term caused improvement of stock. But world price of gold has a positive and

meaningless on index of total stock. So a long-term relation is adjusted. The result gained from the first hypothesis shows there is a positive relation between OPEC oil price and index of total stock and shows the approval of the hypothesis and it is meaningful in % 96 confidence level. At the same time, in the second hypothesis presence of a meaningful relation between world gold price and index of total exchange was not approved and it was not meaningful. Test of the third hypothesis shows there is a meaningful relation between exchange rate and index of total exchange. It was meaningful in % 99 level and the hypothesis is accepted.

### **References**

- [1] Abbasian, E. (2007) . Effect of economic variables on total index of stock exchange of Tehran. Chapter of economic researches in Iran. No 36
- [2] Bellalah,Habiba. (2013).Impact of Macroeconomic Factors on Stock Exchange Prices:Evidence from USA Japan and China" Thema Working Paper, Université de Cergy Pontoise, France
- [3] Karimzadeh, M. (2006). Investigating long-term relation of stock price index with macro variable using correlation method in Iran`s economy. Chapter of economic researches in Iran. No 26.
- [4] Karimzadeh, M & Soltani, A. (2010) . Estimating long-term relation of industry stock price index
- [5] Le and chang. (2011).Dynamic relationships between the price of oil, gold and \_nancial variables in Japan: a bounds testing approach" MPRA Paper No. 33030, posted 28.
- [6] Tweneboah.A. (2007).Macroeconomic Factors and Stock Market Movement: Evidence from Ghana " School of Management, University of Leicester, UK
- [7] Pesaran, M.H., Shin Y. and Smith R.J. (2001). Bounds testing approaches to the analysis of level relationships. *Journal of Applied Econometrics* 16: 289-326.
- [8] Zhu, B. (2012).The Effects of Macroeconomic Factors on Stock Return of Energy Sector in Shanghai Stock Market" *International Journal of Scientific and Research Publications*, Volume 2, Issue 11