The Relationship between Gold and Oil Prices with Major Financial Variables in Iran

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ABSTRACT: Gold and oil are common effective factors, which it causes that price of the essential commodities often move in the same direction. Using monthly data from March 2002 to March 2010, the present study investigates the correlation between gold and oil prices with financial variables (price index of the consumed goods and services, index of stock prices, index of housing prices and exchange rates). The Granger block causality has been used to investigate the relationship. The results indicate that oil and gold prices are considered as block causality of financial variables.

Keywords: Oil and Gold Prices, Financial Economic, Portfolio Theory, Granger Block Causality.

INTRODUCTION

Investors are always looking for the maximum possible return on investment; therefore, they always search information that helps them to make decision for allocating funds and selecting suitable markets for investment. In one hand, economic politician and authorities should analyze data to make suitable decisions and enrich the country's capital market as an important economic foundation. Economic data is effective and important data that understanding its impact on capital market has been considered by researchers, investors and governments because capital market is an important part of financial system in every country that plays an important role to guide savings toward profitable purposes.

Theoretical Foundations

A fundamental principle in investment and financial management is the balance between the expected relative change in price (yield) and uncertainty of return (risk). It means that it is expected that a portfolio with higher performance and efficiency than other portfolios is more dangerous or so-called more risky in some ways. Therefore, investors attempt to invest their savings in a place with the highest efficiency in a certain level of risk (Bayrami, 2011). According the theory of portfolio, asset owners attempt to choose the combination of their financial assets with the same rate of return for all. As a result, the combination (portfolio) should be in equilibrium. In this way, increasing efficiency of an asset such as land or gold, compared to other assets, will confuse portfolio balance and alternating other assets. As by increasing demand for assets, their prices will be directly increased, while price of other assets will be decreased (Miller, K. & Show Fang, 2001). In fact, there may be high correlation between assets, which it is known as Spillover Effects in the literature. The relationship has a critical importance in the composition of individuals’ portfolio; in other words, free conversion of assets to each other and transfers between portfolio items can be a factor to allocate resources of an investor optimally. Maintaining a set of assets with opposite fluctuation is a suitable tool to reduce risk of small and short-term fluctuations in price or yield of assets. As a result, fluctuations in one half of a basket may compensate its other half (Zare’a, 2005).

The purpose of creating asset basket is to divide investment risk among several assets, so profits of an asset can compensate loss of other assets. Diversifying portfolio is very important that investors pay attention it. This means that asset basket does not include solely an asset because price of different assets does not move exactly in same direction. Portfolio
theory suggests that efficient asset basket will be selected by taking into account its effective factors. Some financial assets such as bank deposits have stable and risk-free return; others have uncertain efficiency with risk such as securities, currencies etc. Since people maintain different combinations in their asset basket including cash, shares, bank deposits, bonds, gold and currency, changes in money supply, exchange rates, interest rates and inflation rates affect people demand to keep each component including demand for shares that in turn, affect stock price (Karimzadeh, 2006). As a result, investor tends to maintain various assets because such diversifying will reduce risk of portfolio. Similarly, many investors who purchase foreign assets with internal asset, they will avoid risk of internal market (Siklos & N.g, 2007).

Research History

Foreign Studies

In a study, Chortareas et al (2008) examined stock prices, exchange and oil rates, evidence of oil-exporting countries in the Middle East by considering market variables, exchange rate for every dollar as domestic currency, consuming price index and OPEC basket oil price S & p 500 for four countries the Middle East (Egypt, Kuwait, Oman and Saudi Arabia) using measures of Johansson-Joselius and VECM. The results showed a long-term equilibrium relationship between stock prices and price of oil in every country and oil price has a long-term positive effect on the stock price.

Sadorsky et al (2010) examined oil price, exchange rate and emerging stock market as an autoregressive model. In the study, variables of global oil production, oil price, real truly activities in global economy, exchange rates, interest rates and stock prices as monthly data for period of 01/1998-12/2008. The results show a tendency to positive shock in oil prices or lower price of stock market and exchange rate.

In an article, Degiannakis et al (2011) examined dynamic relationship between stock market and oil price among oil exporting and importing countries by considering two variables of oil prices and stock prices for three oil exporting countries (Canada, Mexico and Brazil) and three oil importing countries (United States of America, Germany and the Netherlands) using DSS-GARCH model. The results show that non-economic crisis cause a strong negative relation between oil prices and stock markets, in one hand, and economic crisis cause a strong positive correlation between oil prices and stock markets, in the other hand. In an article, Samantha and Zadeh (2011) examined common movements of oil, gold, dollar and stock by taking into account variables of global oil prices, global price of gold, real exchange rate and stock prices using daily data from January 1989 to September 2009 and VARMA model. The results show that there is possibility of change in all variables that don’t move simultaneously. It seems that movements of stock prices and gold prices be separately, while oil prices and exchange rates affect each other.

Local Studies

Slamlooian and Zare’a (2006) examined the effect of macroeconomic variables and finance alternative on stock price using methods of Pesaran et al for co-integration analysis using a model to explain the distributed delays and using pricing model of Lucas investment funds and impact of variables affecting stock price index at the stock exchange during the third quarter 1993 to first quarter 2003. The used explanatory variables in this paper are industrial production, ratio of prices inside and outside, volume of money and price of oil as main macroeconomic variables and foreign currency, gold coin prices and housing prices are considered as main alternative assets. The results show long-run equilibrium relationship between stock price index and the considered variables. Evaluating short and long-term show that variable of price index, price of oil, housing price index and price of gold coin has a positive impact on exchange rate and monetary variables have a negative impact on stock price index. The results also show non-impact of industrial production on behavior of stock prices in Iran. In addition, estimating error correction model suggests that about half of imbalance will be adjusted in each period.

In an article, Samadi et al (2007) examined the effect of the stock exchange with stock prices of global oil and gold prices (modeling and forecasting) and taking into account variables of stock price index, global oil prices and the global price of gold using monthly data during 1997-2006 and Econometric models of Generalized Autoregressive Conditional Heteroskedasticity (GARCH) as well as using Fair and Shiller (1990). They demonstrated that global oil prices as a powerful exogenous variable can affect macroeconomic variables such as stock price index and impact on global price of gold on Tehran Stock Exchange is more than index of stock prices. It shows negative effect of oil prices on stock price.

In a study, Keshavarz Haddad and Ma’anavi (2008) evaluated the correlation between stock market and currency in Iran with emphasis on the impact of oil impulses and using autoregressive operation and the introduced Granger causality test method by Toda and Yamamoto (1995) and using daily data from March 27, 1999 to October 17, 2006 in Iran both normal and critical states in terms of conditions prevailing in capital market. Under normal conditions and during upward in oil prices, results show the impact of oil impulses on stock price and transfer them to currency market. Also during downward in oil prices, as well as during periods that much control over exchange rate is applied, there is no direct
relationship between equity markets and currency. In critical conditions, communication channels between markets will be completely destroyed.

**Introduction on the Research Variables and Methods**

**Statistical data and introduction on variables**

Access to reliable statistics and data is main part to estimate a model. The used statistics in the study have been collected from the Central Bank of Iran, Tehran Stock Exchange and Gold Website as monthly.

1. **Exchange rate** (exch): rate of currency is a number that shows money value of a country with other countries. In this research, currency rate at informal market has been used to coordinate currency rate with other economic variables. Statistics of the variable have been also extracted from information bank of time series, section of financial properties in rate of currency equality.
2. **Oil Price** (oil): it shows Iran’s heavy raw petroleum. Statistics reference is Organization of Exporting Petroleum Countries (OPEC) and prices are barrel-US.
3. **The index of price of consuming goods and services** (cpi): This index is a criterion to measure changes in prices of consumable fixed and certain goods and services for urban households that is an index to measure inflation rate and purchase power of a country’s money.
4. **Interest rate**: order state of interest rate in economy of Iran, by considering available conditions, has become one of main economic tools to stimulate real section of economy. In the other hand, formal and informal interest rates as well as considerable gap between them in the market has caused negative consequences. Due to lack of informal interest rate, index of housing rent in urban regions, which it is one of the listed groups in goods basket of consumer, is considered as the best alternative for interest rate accordance with theory in Iran.
5. Gold price: to compute price every ounce of 17 carat gold at global market, we should multiple price of one ounce gold in price of dollar and then divide it on 9.57 (Gold website).
6. **Index of stocks’ price** (stock): this variable is price index of Tehran Exchange Papers. Monthly statistics of the index have been achieved from Organization of Tehran Exchange Papers.
7. **METHODOLOGY**

One of methods to examine casual relations between variables is to use test of a variable pause in another variable equation. In a two-equation model with P pause, if all coefficients are values with zero interruption {Yt}, then {Yt} is not Granger causality variable such as {Zt}. In other words, if {Yt} cannot increase prediction power {Zt}, in this case, {Yt} is not Granger causality of {Zt}. If all variables in a VAR model be viable, direct method in Granger causality test is to use F standard statistic for establishing test conditions.

It is necessary to mention that Granger causality test is quite different from exogenous test. Accordingly, to prove exogenous {Zt}, we should make it clear that the variable has no effectiveness from simultaneous values of {Yt}, while Granger causality test examines the impact of past values {Yt} on present values {Zt}. In other words, Granger causality test review whether the values of past and present {Yt} can enhance accuracy of the projected quantities of future {Zt}. By considering the difference between causality and exogenous, generality of multivariate Granger causality test can be named a block exogenous test because generally Granger causality test investigates whether pauses of a variable such as wt are Granger causality of other variables in system. For example, in a three-variable model with variables of wt, zt and yt, the test indicates whether wt pauses are Granger causality of variables zt or yt? Block exogenous test indicates that coefficients of all wt pauses in equations zt and yt are zero. The inter-equation limitation can be tested using likelihood ratio test. The statistic of likelihood ratio test has distribution x^2 and degree of freedom p^2 (Anders, 2009).
The results of the model variables’ reliability

Table 1. Results of ADF test on logarithm of variables.

<table>
<thead>
<tr>
<th>Variable</th>
<th>No process</th>
<th>With process</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Statistics</td>
<td>Critical value</td>
</tr>
<tr>
<td>Lcpi</td>
<td>0.79</td>
<td>-2.89</td>
</tr>
<tr>
<td>Loil</td>
<td>-1.88</td>
<td>-2.89</td>
</tr>
<tr>
<td>Lgold</td>
<td>-0.02</td>
<td>-2.89</td>
</tr>
<tr>
<td>lhouse</td>
<td>-0.48</td>
<td>-2.89</td>
</tr>
<tr>
<td>lstock</td>
<td>-1.42</td>
<td>-2.89</td>
</tr>
<tr>
<td>lexch</td>
<td>0.42</td>
<td>-2.89</td>
</tr>
</tbody>
</table>

As Table 1 shows, the results of ADF test for price of gold (Lgold) has a viable process because the generalized absolute statistics of Dickey-Fuller (ADF) is greater than the critical value, and for the rest variables (lcpi, loil, lhouse, lstock, lexch) with intercept and process indicates that absolute of the calculated statistic is less than critical value. Therefore, it can be concluded that the variables are non-viable.

The results of block Granger causality

Given the likelihood test probability is less than 5% and here, H0 implies no causality block, it can be said that prices of oil and gold are block causality of the above-mentioned financial variables.

Table 2. Block Granger causality test in auto regression.

<table>
<thead>
<tr>
<th></th>
<th>lcpi</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>loil</td>
<td></td>
<td>lr test of block non-causality, CHSQ(2) = 22.1577[.000]</td>
</tr>
<tr>
<td>lgold</td>
<td></td>
<td>lstock</td>
</tr>
<tr>
<td>LQ test of block non-causality, CHSQ(2) = 20.1972[.000]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>loil</td>
<td></td>
<td>lhouse</td>
</tr>
<tr>
<td>lgold</td>
<td></td>
<td>lexch</td>
</tr>
<tr>
<td>LQ test of block non-causality, CHSQ(2) = 16.2170[.000]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>loil</td>
<td></td>
<td>lexch</td>
</tr>
<tr>
<td>lgold</td>
<td></td>
<td>LR test of block non-causality, CHSQ(2) = 6.3832[.041]</td>
</tr>
</tbody>
</table>

CONCLUSION

This paper examines the relationship between gold and oil prices with important financial variables in Iran and uses block causality method to examine the relationships between variables. The results show The logarithm of prices of oil and gold is block Granger causality of financial variables (inflation, housing, stock and exchange rates). This emphasizes on key role of oil and gold to access economic growth and development. Meanwhile, stock market, foreign exchange market, housing market and product market (oil and gold) are linked with together. At the current conditions, financial markets linked to each other and information can be released quickly. Any changes in a market will quickly spread to other markets and arbitrage opportunity can cause to equality price of financial assets in all markets.
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