Check the spread of price fluctuations in the gold index with stock price index stock exchange

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ABSTRACT

Presence of the efficient financial markets and institutes is considered as one of the characteristics of the developed countries which play important role in economy of these countries and straighten the economic growth and development of these countries. Tehran stock exchange is able to accelerate movement toward growth and development as the most main pillar of the capital market in country meanwhile equipping and injecting the stagnant savings in country and leading them into production. Since, the present shares value in the stock exchange is affecting by some various factors especially the macro-economical variables, so price fluctuation transmissibility of some macro-economical variables has been studied with stock price index in the present research. For this purpose, VAR method has been used to study the capital market transmissibility from markets of foreign exchange, oil and gold. The research data was collected daily (since March, 2008 until end of August, 20014) and they have been tested using Eviews software. The results of this research revealed the capital market non-transmissibility from gold market.

1. Introduction

Considering the aforementioned issues, it seems necessary to investigate and compare the risk of investment in the gold and the stocks. Therefore, it will be attempted in this study to examine and compare the investment risk in the gold and the stocks using statistical correlation techniques and

This subject has been become more important through progressing the information systems and the more dependence of financial markets on each other. The transmission of the agitation among the financial indexes indicates the information transmission process between the markets.

Considering this matter that the financial markets are related to each other, the created information in a market can affect on other markets. Meanwhile, modeling the returns agitation in the different markets and relations of these markets to each other is accounted as the important subject from academic persons' viewpoint and the financial science suppliers' viewpoint according to its applications in prediction. The investors are always seeking the reduction of risk and increasing the benefit and returns. Thus, for this purpose, to find the shares (stocks) return can affect so much on the investors' more proper decision making. Therefore, this research is going to determine the direction of this relation via studying the effect of economical important macro-variables and shares return, also this research is going to answer this question: Are the economical important macro-variables in relation with stock

exchange market which its agent is stock price index in this research?

Research background:

Moon, et al.(2009), studied the short term overflow effects of return and daily oscillation (swing) in stock between stock markets of America and china.

They studied the information overflow effect using GARCH-M models for s&p500 return and index swing in America and stock market index of Shanghai in China in time return 1999-2007. They found some evidences of swing overflow effects in America stocks market to China stocks market. The accurate investigation about the carried out studies indicates that a model that can investigate the swing between the socks indexes considering memory effect has not been done until present time. So, theoretical progression and subsequently the experimental analysis that was performed in this article, is the first step in this direction.

Aloui, et al.(2009) studied the relationship between swing of crude oil price and stocks markets. The results of their price study indicated that the prices of energy and especially oil affect potentially on the cost.

In this research, two multi variable DCC and GJR-GARCH models and monthly data from 1987 to 2009 were used and the obtained results revealed the asymmetric transmission between oil exporter and importer countries. Also this research indicated that the shocks of oil price supply section do not affect anymore on the relationship between these countries. But the shocks due to the demand (that is change in commercial cycles or war) have more effect on the

countries than the shocks due to (decrease in production supply of OPEC members).

Filis studied the time series delay correlation of these countries and indicated that oil prices apply negative effect on all stock markets neglecting the origin of swing and it is not assured place to prevent from stock market risk during market critical periods.

Ahmadpour (2011), has studied the relationship between cash and future prices of gold coin in Iran stock market. For this purpose, in his research, he studied the type of relationship between two cash and future market of gold coin because it is the only future active contract in the future market.

For this research work, both two variable GARCH approach and Johnsson test were used considering the data identification and price relationship was analyzed in both cash and future markets and finally the presence of a long term relationship between cash and future market prices of gold coin in Iran was obtained and also some evidences were obtained based upon this matter that the future market is leader of the cash market.

Keshavarz Hadad and Abed (2012) studied the subjects that will the global financial crisis transmit to Tehran stock market? In this research, the effect of global crisis transmission from S&P500 international indexes path on total price of Tehran stocks market, indexes of industry and financial mediation and first and second market index of Tehran stocks market are studied applying DFGM transmission test. The results of research indicate that global crisis has transmitted to the total index of Tehran stocks market price. Also, the crisis affected on industry and the first market indexes and had led to decrease in value of these indexes, but it could not affect on the index of financial mediation and second market.

Nikoumaram and Pourzamani(2013) studied the transmissibility of country stocks market. In their research, they investigated the transmissibility of country stocks market from parallel markets and also oil market as independent market using VAR approach. The results of this research confirm the relation of stock market transmissibility effect from the parallel markets of foreign exchange and gold and also oil market.

Statistical community, sampling method, and sample size

Statistical community of the present research is the financial market such as Stock market, oil market and gold market.

The collected data in this research is included daily numerical value of stock market total index and also daily prices of free market dollar, Full Bahare Azadi coin and Texas oil that is from J.A.A Central bank and stock exchange site and Rahavard-e- Novin Software from March, 2009 to August, 2014.

Research hypotheses

Considering the above mentioned questions, the research hypotheses are stated as follows:

Price swing in gold market is transmissible on the price index of stock market

Research methodology and under studied variables

Data collection method was library and inferential study. The theoretical base and the performed studies are used in order to make a model.

First, the data stagnation is studied using generalized Dickey-Fuller test. In the next stage, the relationships between the variables and their effect at considered periods are investigated. After studying stagnation and co-integrating the applied variables in the model, using VAR model, the model is estimated for the considered variables.

The applied variables are including stock price index, exchange rate gold price.

The dynamic relationship between index shocks of sock price and main variables in macro-economic such as exchange rate, gold price was studied and instant response functions technique will be used in order to observe the effects of these shocks.

In the present research, all applied numbers and information are extracted from Islamic republic central bank and OPEC site and stock exchange organization and also using Rahavard-e-Novin software.

Research model and test

For error correction model fitness to estimate VECM model using Johnson test vector the below mentioned steps shall be done.

1- Unit root test for each variable.
2- Ordinary VAR model fitness to determine the optimized delay number.
3- Using Laglen function to determine the optimized delay number.
4- Johnson co-integration test.
5- Variance analysis test.
6- VECM final model fitness.

Unit root test

The unit root of Dickey-FULLER GLS (ERS4) has been used in order to test that do the considered variables have unit root?

To suppose H0 or the same supposition of including unit root can be rejected considering the critical values of supposition. That is index swing of stocks section and exchange rate and prices of oil and gold have not unit root. In the other words , this variable has not 1% unique root even in significant level. Thus, here both series are similar. Therefore, VAR initial model can be performed considering the results of this test.

Determination of optimized delays number

In this section, first the ordinary VAR model should be fitted on the considered variables to determine the optimized delays number. Then, the optimized model delays number can be determined using Laglen function and it can be applied for Johnson co-integration test.

SC and AIC with more ability than other criteria are considered to determine the optimized delays number and the delay is selected according to them.

Final model of vector error correction model

After Johnson co-integration test indicated that there is a co-integration relationship between these variables, the next step for error correction model is that the final model shall be entered into the model despite presence of a long term relationship between the mentioned variables to run the model.

And there is a significant and negative relationship between gold market and capital market. To analyze VECM interaction diagrams after analyzing the final model output indicates the behavior of each variable against the arrived shocks and general conclusion from interpretation of these algorithms can be summarized that the stocks market is affected by swings of exchange, gold market specially the shocks of these markets. In the other words , the shocks of exchange, gold market can create strategic role for some time in the stocks market.

The data and results of under studied stagnancy variables test

In order to evaluate the effect of exchange , gold price swings on total index according to Das study methodology and Anand and Knight's study, First, the st R variables (total index of stocks price) and exR(exchange rate variations) are considered as

$$stR = \ln(st_t) - \ln(st_{t-1})$$
$$exR = \ln(ex_t) - \ln(ex_{t-1})$$
$$oilR = \ln(oil_t) - \ln(oil_{t-1})$$
$$goldR = \ln(gold_t) - \ln(gold_{t-1})$$

Since in evaluation of VAR models, the transactions are evaluated by least squares approach, it is necessary to make sure about stagnancy method and co-integration of the studied variables before evaluation of this model, the results related to the generalized Dickey-Fuller test have been given in table (1).

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Table (1): Results of generalized Dickey-Fuller unit root test

Variables	Dickey-FULLER statistic	Critical vale		Significant level
goldR	-34.06457	1%	-2.567531	**0.0000**
		5%	-1.941175	
		10%	-1.616463	
stR	-12.03415	1%	-2.567537	**0.0000**
		5%	-1.941176	
		10%	-1.616462	

The results of table (1) show that the applied variables (goldR‹stR) all are co-integration of I(0) and stagnant.

On the other hand, Johnson test in tables (2) and (3) indicates presence of co-integration between the pattern variables. On the other hand, this is possible to obtain the long-term equilibrium relationship between price swings of gold and stock market using co-integration approach.

Table (2) - co-integration test based on effect test

Hypothesis	Special values	Effect statistic	Critical values 5%	Significant level
non	o.205188	642.3100	47.85613	0.0001
Maximum one vector	0.195172	436.3145	29.79707	0.0001
Maximum two vectors	0.152744	241.5522	15.49471	0.0001
Maximum three vectors	0.098357	. 92.87250	3.841466	0.0001

Table (3) - Infinite co-integration test (Maximum special value)

Hypothesis	Special values	Maximum numbers	Critical values	Significant level 5%
non	o.205188	205.9955	27.58434	0.0001
Maximum one vector	0.195172	194.7623	21.13162	0.0001
Maximum two vectors	0.152744	148.6797	14.26460	0.0001
Maximum three vectors	0.098357	. 92.87250	3.841466	0.0000

Using the effect test, the results of tables (2 and 3) indicate that in significant level 5% there are three convergence or co-integration vectors between exchange rate, gold price and this subject indicates the presence of long-term relationships between these both variables. Since all considered variables are I (0) and also are co- integrated, thus it is possible to apply them in order to observe the stagnancy condition in VAR evaluated model.

Experimental results:

In this section, co-integrated vectors (and the coefficients relevant to long-term equilibrium equations) are evaluated between the variables, using VAR model coefficients and also using Johnson method, because the present relationship between VAR model and co-integration provides this possibility to obtain co-integration vectors via VAR model coefficients. Therefore, at first, VAR pattern and proper delays number are evaluated and determined in order to make sure that the error sentences related to VECM are white noise and finally are stable. The results related to evaluation of VAR model and optimized delays number are given in table (4).

Table (4) - Determination of the optimized delays number in VAR model

Lag	LogL	LR	FPE	AIC	SC	HQ
0	12060.58	NA	2.27e-17	-26.97222	-26.95076	-26.96402
1	12120.67	119.5103	2.06e-17	-27.07086	-26.96357*	-27.02986*
2	12142.22	42.65712	2.03e-17*	-27.08327*	-26.89015	-27.00947
3	12157.58	30.28006	2.04e-17	-27.08184	-26.80290	-26.97525
4	12165.61	15.75620	2.07e-17	-27.06401	-26.69924	-26.92462
5	12176.47	21.19786	2.10e-17	-27.05250	-26.60190	-26.88031
6	12189.99	26.28049	2.11e-17	-27.04695	-26.51052	-26.84196
7	12203.71	26.56527	2.12e-17	-27.04187	-26.41960	-26.80408
8	12235.14	60.52358*	2.05e-17	-27.07637	-26.36828	-26.80578

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As the above table shows, the optimized delay of VAR model is the variables of goldR and stR of second delay. Therefore, VAR model is estimated again with second delay, and in order to make sure about result stability of the VAR model are estimated , and the stagnancy results of this model have been given in diagram (1).
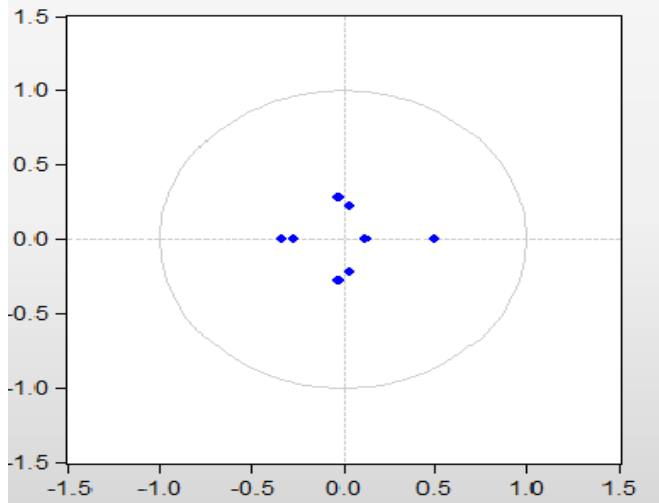

Diagram (1) - specification roots and VAR model stagnancy test

Diagram (1) indicates that VAR model applied with research variables is fully stagnant, because reverse of all polynomial VAR specification roots are less than one and are inside the circle. Considering that all evaluated VAR model specification roots are placed inside the circle, so the evaluated VAR model has necessary stable.

First hypothesis: Price swing is transmissible on price index of capital market in gold market. Considering the results of t statistic VCEM model evaluation relevant to variable coefficient of gold market indicate their significance in the model. Thus, gold independent coefficients up to 2.452598 indicates that there is reversed relationship between gold price and dependent variable of stocks price index, that is if one unit is added to gold price, total index is decreased up to 2.452598.

And the results reveal that the price swings in gold market lead to negative and reversed effect on price index of capital market. Therefore, it can be concluded that swings in gold market is not transmittable on the stocks market.

Table (7): Results of statistical test relevant to the second hypothesis

Statistical test results	Variable coefficient in model	Dependent variable	Independent variable	Description
✗ Research hypothesis reject	2.452598-	Gold price	Total price index of capital market	First hypothesis

Conclusion and discussion

Gold price as an important variable is introducer much international monetary and financial changes, although this role has been diminished somewhat overtime. To explain such relationships is guidance of the policymakers in orientation of monetary and exchange policies. Therefore, gold price will be raised during inflation of currency market turmoil or political instability, that it indicates the persons'

tendency for avoiding from this type of property in their financial basket in order to keep its value. Surely, the motives of speculation in gold market are also one of the reasons that affect on gold demand and for this reason fluctuation in gold market is in reversed relationship with gold price index.

Suggestions

1- It is suggested to evaluate the present research with the aim of matching results with other present specifying models in order to obtain effectiveness rate of each models for the users.

2- Finally, it is suggested to do some measures to make the information of this market more transparent for empowering the price index of stocks market to explain the macro-economic conditions whether in management level or in information mechanisms level.

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