Iran. Econ. Rev. Vol. 23, No. 3, 2019. pp. 659-674

Does Oil Price Asymmetrically Pass-Through Banking Stock Index in Iran?

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Received: January 29, 2018 Accepted: May 1, 2018

Abstract

Using daily data, this study examined asymmetric pass-through of Iran's oil price to banking stock index in Tehran Stock Exchange at different time horizons. Based on the results, the coefficient of long-run pass-through of oil price to banking stock index was estimated to be 0.63. Furthermore, based on the short-term ARDL-CECM models, the relationship between the positive components of the banking stock index and those of oil price was estimated, which was significant and equivalent to 0.44. In another model, the influence of negative components of oil price on banking stock index was estimated to be 0.38. Accordingly, by comparing the coefficients of the analyzed components of the oil variables with the corresponding components of the banking stock index, it was found that the value of these two coefficients was different, which is an evidence for an asymmetric relationship between banking stock index and oil price. In the short-term equation (ECM), the ECT value was significant and equivalent to -0.12 confirming the fact that if a shock upsets the long-term balance of the model variables in the short term, the effect of this index will wear off after about 83 periods.

Keywords: Oil Price, Banking Stock Index, Asymmetric Pass-Through, Hidden Co-Integration, ARDL-CECM Model.
JEL Classification: C32, C52, P28, E59, Q43.

1. Introduction

Examining the effect of oil price on the stock market developments in the oil exporting countries is of significance for several reasons. First, the capital market of these countries is different from that of advanced

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or developing countries as overreliance of the oil exporting countries' economy on oil revenues and the considerable effects of oil shocks on the whole economy of these countries not only influence the efficiency of the stock market, but increase the risk in these markets as well (Ding et al., 2017). The second reason is that a major part of these countries' economies is dependent on oil revenues, and their stock market is, to a large extent, under the influence of political developments (Alavi et al., 2016). On this basis, a large part of the economic literature is allocated to the analysis of the negative effects caused by oil price shocks on the world economy. Therefore, in an oil-dependent economy, oil developments can be an influential factor in different parts of the economy such as the capital market. Accordingly, researchers in different oil exporting countries argue that oil price changes have had a positive effect on the stock market, and the macroeconomic indexes also confirm such a relationship (Komijani et al., 2013; Arouri & Rault, 2011).

In addition, financial and banking sectors are among the economic sectors of countries, in which the occurrence of any shock or crisis has a damaging effect on other economic sections. In line with that, banking sector in Iran's economy has a key role in directing the deposits toward investment considering the inefficiency in its capital market (Rounaghi & NassirZadeh, 2016). Based on this explanation, the basic question is whether the banking industry stock can extensively reflect the performance of the banking sector of the countries. In response to this question, it can be stated that, basically, the overall performance of the banks has a direct effect on the future process of the banks' capital, which is reflected in the market value of the banking stock index. Therefore, analyzing the role of influential factors affecting the price changes in the total stock market or in a part of it (such as different subordinate industries) can not only help to improve modeling banking stock index and, consequently, promote reliability of the predictions based on it, but can also provide investors and economic analysts with a more realistic view.

Accordingly, the question that comes to mind is whether the consequent effects of oil price on supply sector of the economy are higher compared to demand one's or vice versa. Finding the answer to this question requires calculation of the stock market price elasticity of oil price or the pass-through of oil price to the banking stock index. In other words, pass-through of oil price, in fact, refers to a rate in which oil price changes are reflected via different mechanisms on the banking stock index. Based on these concepts and Iran's economic conditions and its dependence on oil price, most of the analyzers and investors in the stock market pay a particular attention to important economic variables such as oil price in order to monitor factors influencing the market and, consequently, carrying out their transactions and making decisions. Thus, the mentioned concepts and concerns point to a need for conducting a study to provide an appropriate response to these questions. Therefore, the present study is an attempt to model pass-through of oil price from banking stock index at different time horizons using the CECM asymmetric model.

2. Literature Review

Theoretically, oil shocks can have an effect on the stock price index from different channels (e.g., supply or demand channel). However, the basic question is "are these channels of influence the same in the oil exporting and importing countries or not? Experimental evidence is indicative of a negative relationship between oil price and the stock index based on the fact that oil price is considered as a risk factor for the stock market. Many researchers including (Huang et al., 2017; Filis, 2010; Chen, 2009; Miller & Ratti, 2009; O'Neill et al., 2008) have collected evidence showing this negative relationship. But with regard to the oil exporting countries, there is a large evidence confirming a direct relationship between oil price shocks and efficiency of the stock market (Luo & Qin, 2017; Singh & Capill, 2016; Raza et al., 2016; Ding et al., 2016; Kang et al., 2015; Broadstock & Filis, 2014; Arouri et al., 2011). Therefore, as it can be observed, the channels of influence of oil price changes on the stock index have been different and require a deeper analysis.

On the other hand, one of the issues related to oil revenues or, in particular, oil revenue shocks is the asymmetry related to the mentioned shocks. In justification for the reasons confirming the existence of these asymmetric effects, it can be argued that generally, when oil price and, consequently, foreign currency incomes increase, the government expenditures (including fixed and variable costs) increase (Komijani et al., 2014). But if the government expenditures are spent in a way that the capital of the private sector (investment into the stock market as the greatest investment alternative in economy) is forced out, the positive effect of increased governmental expenditures is neutralized to a large extent (Choi & Deveruex, 2005). Conversely, during the fall in oil price and foreign currency revenues, considering the existing inflexibility in the fixed expenditures, generally no corresponding decrease happens in the government expenditures because, practically, it is not possible to greatly reduce the expenditures and, under these conditions the share of infrastructure and investment expenses from government budget will be reduced. These reductions, naturally, will directly affect different sections of the economy such as investment, employment, and production. Besides, many of the investment plans will face budget deficit leading, consequently, to a kind of inefficiency in economy (Mehrara, 2008).

In addition, with the increase in oil revenues and injection of currency into the economy, the amount of foreign resources will increase and, consequently, brings inflation about the country. Generally, to limit the increasing inflation, raising the sum of imports, particularly in the case of tradable goods, is one of the ways (Bastianin et al., 2016). With increasing in amounts of imports, most of producing sectors will encounter with an intensively detrimental predicament and be out of the producing cycle. As a result, some part of investments in stock market would be intact, amounts of production would be decreased, and unemployment would be raised. On the contrary, when foreign exchange revenues are reduced, the amounts of imports, some parts of which would be spent in capital goods and producing apparatuses, would be diminished. This process could be culminated in shrinking in investments, productions, and employment as well, with inflation into a bargain. The sectors, which were be out of producing cycle due to a great amounts of consuming goods imports in the period of increasing oil revenues, would not be restored (Le & Chang, 2015). Hence, it should be stated that the effects of oil shocks on producing in Iran’s economy is asymmetric and it seems that in the long-run, detrimental effects of negative oil shocks on producing would be dramatically greater than the positive ones.

Additionally, drawing on the sticky prices theory, which has been the key assumption in the New Keynesian models and is important for understanding the issue of asymmetry particularly in the reaction of important macroeconomic variables to monetary shocks, the issue of asymmetry can be analyzed in the case of different variables of an economy. Stickiness of the prices, which may be downward or upward, means that there is an obstacle to changes in the market prices in reaction to the changing economic conditions, which might be an indication of market inefficiency. In line with that, based on the experimental studies and the existing realities, as the general level of the prices at the global scale increases following an increase in oil price, a kind of downward price stickiness becomes also dominant in the oil markets (Amiri & Nazariyan, 2014). For this reason, oil negative price shocks have a less significant role in reducing market uncertainty. On this basis, the importance of examining the asymmetric effects of oil price on different economic variables will add to the accuracy of the analyses in this regard.

3. Methodology

3.1 CECM

Generally, the asymmetrical effects of an exogenous variable on an endogenous variable mean that the reaction of the dependent variable to a given amount of increase or decrease in the independent variable is not fixed (Honarvar, 2009). Various models have been proposed to model the asymmetrical relations between economic variables. One of these models that is able to model asymmetrical short-term, long-term, and dynamic relationships between the variables is CECM, which is going to be explained.

The Crouching Error Co-integration Model (CECM) which is based on hidden co-integration method was proposed by Granger and Yoon in 2002. They examined the co-integration between the negative and positive integrative combinations of the time series data using the CECM model. Based on this theory, if the combinations of the data related to two time series (positive and negative) have co-integration, these data have a hidden co-integrated relationship. Hidden co-integration is an example of nonlinear co-integration which cannot be examined using the commonly used tests of linear co-integration. The model is as follows:

Assume that x_t and y_t are two time series stochastic variables which have been defined as follows:

$$x_t = x_{t-1} + \varepsilon_t = x_o + \sum_{i=1}^{t} \varepsilon_i \tag{1}$$

$$y_t = y_{t-1} + \eta_t = y_o + \sum_{i=1}^{t} \eta_i \tag{2}$$

In which x_0 and y_0 are the primary values of x_t and y_t, ε_t and η_t are residual and the mean of these two variables are zero, and the co-integration vector of x_t and y_t is linear. When the changes of y_t and x_t are asymmetric, we can have a hidden co-integration between them with a nonlinear vector. Granger and Yoon (2002) defined positive and negative shocks in this equation as follows:

$$\begin{aligned} &\varepsilon_i^+ = Max(\varepsilon_i, o) \quad , \quad \varepsilon_i^- = \min(\varepsilon_i, o) \\ &\eta_i^+ = Max(\eta_i, 0) \quad , \quad \eta_i^- = Min(\eta_i, 0) \\ &\eta_i = \eta_i^+ + \eta_i^- \qquad , \quad \varepsilon_i = \varepsilon_i^+ + \varepsilon_i^- \end{aligned} \tag{3}$$

Thus:

$$\begin{aligned} x_t &= x_{t-1} + \varepsilon_t = x_o + \sum_{i=1}^{t} \varepsilon_i^+ + \sum_{i=1}^{t} \varepsilon_i^- \\ y_t &= y_{t-1} + \eta_t = y_o + \sum_{i=1}^{t} \eta_1^+ + \sum_{i=1}^{t} \eta_i^- \end{aligned} \tag{4}$$

Therefore, based on the above formulas we will have:

$$\begin{aligned} x_t &= x_o + x_t^+ + x_t^- \\ y_t &= y_o + y_t^+ + y_t^- \end{aligned} \tag{5}$$

Then:

$$\begin{aligned} \Delta x_t^+ &= \varepsilon_t^+ \quad , \quad \Delta x_t^- = \varepsilon_t^- \\ \Delta y_t^+ &= \eta_t^+ \quad , \quad \Delta y_t^- = \eta_t^- \end{aligned} \tag{6}$$

There are estimations of the values of first-order differencing of both time series can be observed in the positive and negative changes, for example in $(\Delta x_t^{+}, \Delta x_t^{-})$. The next step involves calculation of the changes of all the variable's positive and negative integrative combinations (e.g., $x_t^{+} = \sum \Delta x_t^{+}, x_t^{-} = \sum \Delta x_t^{-}$). X and y have hidden co-integration when their combination is also co-integrated. It is possible to examine hidden co-integration among all the possible combinations of the positive and negative components of y_t and x_t.

According to Granger and Yoon (2002), we may face with one of the following four cases between

$\{X_t^{+}, Y_t^{+}\}$ *or* $\{X_t^{-}, Y_t^{-}\}$.

a) Neither $\{X_t^{+}, Y_t^{+}\}$ *nor* $\{X_t^{-}, Y_t^{-}\}$ are hidden co-integrated: X and Y are not co-integrated.
b) Either $\{X_t^{+}, Y_t^{+}\}$ *or* $\{X_t^{-}, Y_t^{-}\}$ but not both are hidden co-integrated: X and Y are subject to positive or negative shocks (Asymmetry).
c) Both $\{X_t^{+}, Y_t^{+}\}$ *and* $\{X_t^{-}, Y_t^{-}\}$ are hidden co-integrated, but with different co-integrating vectors: X and Y are asymmetrically co-integrated.
d) Both $\{X_t^{+}, Y_t^{+}\}$ *and* $\{X_t^{-}, Y_t^{-}\}$ are hidden co-integrated with the same co-integrating vectors: X and Y are co-integrated.

CECM model is similar to standard ECM model except in analysis of the price changes with positive and negative components. Observing the standardized ECM if y_t and x_t are co-integrated, the ECM model can explain the exogenous asymmetry with a co-integration vector of (1,β).

$$\begin{aligned} \Delta y_t &= \psi_0 + \psi_1 (y_{t-1} - \beta x_{t-1}) + \sum_{i=1}^{k} \psi_{x_i} \Delta x_{t-i} + \sum_{j=1}^{p} \psi_{y_j} \Delta y_{t-j} + v_t \\ \Delta x_t &= \gamma_o + \gamma_1 (y_{t-1} - \beta x_{t-1}) + \sum_{i=1}^{k} \gamma_{xi} \Delta X_{t-i} + \sum_{j=1}^{p} \gamma_{y-j} \Delta y_{t-j} + \varepsilon_t \end{aligned} \tag{7}$$

3.2 ARDL-CECM

In this part, to estimate short-run, long-run, and dynamic asymmetric relationships between Oil and banking stock index, the combination of CECM and ARDL Model has been applied. To be more precise, at first, the research data have been segregated into positive and negative components based on prerequisites of Crouching Error Correction Model, which was introduced by Granger and Yoon (2002)[1]. In the next stage, according to Pesaran, Shin, and Smith (2001), these components of oil and banking stock index data have been estimated in Form of ARDL model, specified as equation (1) or (2):

$$\Delta LBS^{+} = c_0 + \sum_{d=1}^{h} \alpha_d \ \Delta LBS^{+}_{t-d} + \sum_{e=0}^{i} \beta_e \ \Delta LOIL^{+}_{t-e} + \mu\,(LBS^{+} - c_1 - \lambda\, LOIL^{+}) + \varepsilon_t \quad (8)$$

Or

$$\Delta LBS^{-} = c_2 + \sum_{f=1}^{j} \alpha_f \ \Delta LBS^{-}_{t-f} + \sum_{g=0}^{k} \beta_g \ \Delta LOIL^{-}_{t-g} + \eta\,(LBS^{-} - c_3 - \lambda\, LOIL^{-}) + \varepsilon_t \quad (9)$$

Following which the dependent variables are successively specified as LBS^{+} (positive components of Log of Banking Stock) and LBS^{-} (negative components of Log of Banking Stock); LOIL is log oil price; $(LBS^{+} - c_1 - \lambda\, LOIL^{+})$ and $(LBS^{-} - c_3 - \lambda\, LOIL^{-})$ are, in order, error correction variables with coefficients μ and η, which should be both negative and between zero and one ; “d” and “f” are lag of dependent variables, LBS^{+} or LBS^{-} , and “e” and “g” are lag of LOIL.

4. Empirical Results

4.1 Stationary Tests

In this section, first the variables of the study was introduced and then the stationary test of the research variables was analyzed using Dickey-Fuller and Phillips-Prone tests. The related results are presented in Table 1.

LBSp: The positive components of banking stock index in logarithm.
LBSn: The negative components of banking stock index in logarithm.
LOILp: The positive components of oil price in logarithm.
LOILn: The negative components of oil price in logarithm.

1. To study more, it can be referenced to the research of Honarvar (2009).

dLBSp: BSp in log difference.
dLOILp: OILp in log difference.

Table 1: The Results Related to Stationary Test

Variable	Critical Stat.	Accounting Stat.	Result	Critical Stat.	Accounting Stat.	Result
Dickey-Fuller tests of variables at level				Phillips-Prone tests of variables at level		
LBSp	-1.94	2.05	Non-Stationary	-1.94	4.15	Non-Stationary
LBSn	-1.94	-2.44	Stationary	-1.94	-4.69	Stationary
LOILp	-1.94	2.65	Non-Stationary	-1.94	5.02	Non-Stationary
LOILn	-1.94	-2.50	Stationary	-1.94	-5.10	Stationary
Dickey-Fuller tests of variables at first difference				Phillips-Prone tests of variables at first difference		
dLBSp	-1.94	-19.35	Stationary	-1.94	-26.02	Stationary
dLOILp	-1.94	-19.77	Stationary	-1.94	-22.17	Stationary

The results presented in Table 1 show that the positive components of both variables of the study are non-stationary at level while their negative components are stationary, which is indicative of a asymmetric co-integration relationship between banking stock index and oil price. It shows that even if the short-term relationship between the negative shocks of the mentioned variables is significant, the long-term relationship between them will not make sense scientifically whereas the positive components of oil price and banking stock index are first-order stationary. Therefore, in order to analyzed the possibility or even estimate the hidden co-integration model, ARDL model was used. When using ARDL model, two basic points need to be taken into account; first, there must be one-sided relationship between the dependent and independent variables of the study meaning that the dependent variables must be the effect of the independent variables of the study and not their cause; second, care needs to be taken to make sure that the variables under examination with a degree of non-stationarity of higher than one be modeled together and, more importantly, modeling the variables with a degree of non-stationarity of zero (stationary variables) cannot be model with variables from a higher degree of non-stationarity because in the ARDL model, the short-term, long-term and medium-term relationship between the variables will be focused upon, but variables with a degree of non-stationarity of zero cannot, theoretically, have long-term relationships in such a model.

4.2 Econometric Model

4.2.1 Estimating ARDL Model: Short-term Equation

In this section, the results of estimation of ARDL short-term relationship between the positive components of the banking stock index, it's the negative components, and the negative components of oil price are presented in the framework of two separate models as follows.

$$\begin{array}{llllll} LBSp = 6/02 + 0/097\,LBSp_{t-1} & + 0/033\,LBSp_{t-2} & + 0/068\,LBSp_{t-3} & + 0/437\,LOILp \\ t: \quad (3/91) \quad (4/59) & (1/46) & (3/22) & (14/04) \end{array} \tag{10}$$

$$\begin{array}{llllll} LBSn = 5/29 + 0/096\,LBSn_{t-1} & + 0/03\,LBSn_{t-2} & + 0/066\,LBSn_{t-3} & + 0/378\,LOILn \\ t: \quad (3/43) \quad (4/48) & (1/33) & (3/09) & (2/15) \end{array} \tag{11}$$

Equation (10) shows that, first, the coefficients of this model—except for the coefficient of the second lag of banking stock index—are meaningful at 95% level of significance. Therefore, the rate of short-run pass-through of the positive shocks of oil price to banking stock index is 0.44 meaning that with an increase in oil price, banking stock index will also increase (around 44 percent of the corresponding oil positive shocks will pass-through to the LBSp).

This is also true about equation (11) in a way that the coefficient of the negative components of oil price are meaningful and significant. In the mentioned equation, the coefficient of negative components of oil price was 0.38 confirming a direct relationship between negative components of oil and those of banking stock index meaning that with an increase in negative shocks of oil price, negative shocks of the stock index also increase (but are lower than the effects of pass-through of oil price positive components to banking stock index), which is consistent with the results of estimation in equation (10) because both these relationships point to a direct relationship between oil price and banking stock index.

In equations (10) and (11), by comparing the coefficients of oil variables with the positive and negative components of banking stock index, it can be found that the value of these two coefficients are different revealing an asymmetric relationship between banking stock index and oil price. It is worth noting that the results from the above equations can be relied upon when their diagnostic tests are carried out. The mentioned tests have been presented in the following table for determining the problems of both ARDL models.

Table 2: Diagnostic Tests of ARDL Models

Diagnostic Test	Accounting Stat. of Equation (1)	Accounting Stat. of Equation (1)
$\overline{R}^2$	0.948	0.953
F	87.79 (0.000)	91.42 (0.000)
DW	2.004	1.998
LM	1.266 (0.282)	1.825 (0.161)
Ljung-Box	0.011 (0.918)	0.016 (0.900)
Heteroscedasticity	1.205 (0.274)	0.067 (0.795)

Note: The values in brackets indicate the probability value.

The results presented in the above table indicate that all the coefficients were meaningful at 95% level of significance, and the coefficient of r-squared or coefficient of determination in both models including (10) and (11) is approximately 0.95, which confirms this fact as this value is indicative of the remarkable explanatory power of the model. In fact, in this model, 95% of the changes in the dependent variables can be explained by the independent variables of the model. In addition, the results of F-statistic reveals correctness of the general form of the model, and the Durbin Watson (DW), Breusch–Godfrey's LM test, Ljung-Box statistic, and Heteroscedasticity test shows that there was no evidence of a serial autocorrelation and heterogeneity of variance among the residuals of the mentioned models.

Now, based on the results obtained from equation (10) the existence of co-integration relationship between the variables in this model can be examined using Banerjee-Dolado-Master, BDM, method. The quantity of the *T-student* statistic is calculated as follows for carrying out this test.

$$t = \frac{\sum_{i=1}^{p} \hat{\alpha}_i - 1}{\sum_{i=1}^{p} S\hat{\alpha}_i} = \frac{0.199 - 1}{0.0651034} = -12.304 \tag{12}$$

The calculated statistics for equation (10) based on the above relationship is equal to -12.304. This value is larger than the critical value of the BDM table which is -3.66 in terms of absolute value. Therefore, the null hypothesis in terms of lack of co-integration between the model variables is rejected. Accordingly, the existence of at least one long-term relationship among the variables of equation (10) is confirmed. Furthermore, in line with the equation (11) it should be noticed that due to the degree of non-stationarity of its variables which are zero, estimating a long-term relationship between the variables, theoretically, is impossible.

4.2.2 Estimating ARDL Model: Long-term Equation

The results of short-term dynamic model, and that of Banerjee-Dolado-Master, BDM, test of equation (10) proved that there are a long-term relationship between its variables. In this section, the results of estimating long-term equation of ARDL model are as follows.

$$\begin{aligned} &LBSp = 0/44 + 0/63\,LOILp \\ &t: \quad (4/99) \quad (7/77) \end{aligned} \tag{13}$$

The results of the this equation were compatible with the short-term dynamic model, and it means that the positive components of oil price in long-term has direct and significant relationship with the positive components of banking stock index.

4.2.3 Estimating CECM Model: Mid-term Equation

Given the confirmation of the existence of a sort-term and long-term relationship between the variables of equation (10), examining a dynamic relationship involving both relationships is essential. On this basis, in this section, using ARDL, the short-term deviation of the variables from the balance values, Crouching Error Correct Model, CECM, is estimated. The results from estimation of the Error Correction Model are summarized in the following equation. The results related to this equation are as follows:

$$\begin{aligned} &dLBSp = -0/09\,dLBSp_{t-1} - 0/06\,dLBSp_{t-2} + 0/44\,dLOILp - 0/012\,ECT_{t-1} \\ &t: \quad (-3/10) \quad (-2/95) \quad (14/04) \quad (-6/004) \end{aligned} \tag{14}$$

The results of the above equation were consistent with the short-term dynamic model and the only variable added to the model is the adjusting variable, ECT, whose coefficient is meaningful, significant, and equal to -0.14. The ECT coefficient in this equation shows that if a shock makes the variables of the model lose their long-term balance, the effect of this shock will wear off after 83 working days, which was estimated by reversing the coefficient of ECT. In fact, any factor that causes upsetting of the long-term balance will be neutralized in about three months. Additionally, the coefficient of the variable of the positive components of oil price is equal to 0.43. Similar to the long-term relationship, this variable shows the short-term positive components of the banking stock price elasticity of the oil price changes or is indicative of the rate and speed of pass-through of oil price positive shocks to banking stock index.

5. Conclusion

The results of modeling showed that pass-through of oil price to banking stock index in the short- and long-term was significant and consistent with economic theories. Besides, based on the findings and the theoretical concepts related to CECM, it should be emphasized that pass-through of oil price to banking stock index in the short and long term time horizons has been asymmetric. Thus, the existence of an asymmetric and hidden co-integration between banking stock index and oil price is defensible. Also, based on the presented theoretical concepts, achieving a result that indicates an asymmetric relationship between the research variables was quite expected.

Another interesting finding of the present study was the affectability of banking stock index by oil price changes such that, as inferred from theoretical concepts, this relationship had different degrees of effect in the short and long term. Positivity of this variable's coefficient, which results from the role of this variable as the main variable influencing the major economic variables in the country, also seems quite logical. The next basic achievement in the present study was the separation of the effects of oil price positive and negative shocks on banking stock index; the findings confirmed the significance of this idea. Accordingly, it can be concluded that in confrontation with the oil price positive and negative shocks to banking stock index, separation of these effects had a better effect on the well-fitness and increased power of the models preparing the ground for an increase in the F-statistic, r-squared or coefficient of determination, and other diagnostics statistics. Therefore, based on the findings, it can be claimed that using the main idea of the study has led to an improvement in the results.

References

Alavi, S. E., Moshiri, S., & Sattarifar, M. (2016). An Analysis of the Efficiency of the Monetary and Fiscal Policies in Iran Economy Using IS – MP – AS Model. *Procedia Economics and Finance, 36*, 522-531.

Arouri, M. E. H., & Rault, C. (2011). Oil Prices and Stock Markets in GCC Countries: Empirical Evidence from Panel Analysis. *International Journal of Finance and Economics*, *17*(3), 242-253 .

Arouri, M. E. H., Lahiani, A., & Nguyen, D. Kh. (2011). Return and Volatility Transmission between World Oil Prices and Stock Markets of the GCC Countries. *Economic Modelling*, *28*(4), 1815-1825.

Banerjee, A., Dolado, J. J., & Mester, R. (1993). *Co-integration, Error-correction, and the Econometric Analysis of Non-stationary Data, Advanced Texts in Econometrics*. Oxford: Oxford University Press.

Bastianin, A., Conti, F., & Manera, M. (2016). The Impacts of Oil Price Shocks on Stock Market Volatility: Evidence from the G7 Countries. *Energy Policy, 98*, 160-169.

Broadstock, D. C., & Filis, G. (2014). Oil Price Shocks and Stock Market Returns: New Evidence from the United States and China. *Journal of International Financial Markets, Institutions and Money, 33*, 417-433.

Chen, S. S. (2009). Do Higher Oil Prices Push the Stock Market into Bear Territory? *Energy Economics, 32*(2), 490-495.

Choi, W. G., & Deveruex, M. B. (2005). Asymmetric Effects of Government Spending: Does the Level of Interest Rate Matter? *IMF Working Paper, 05/7*, Retrieved from https://core.ac.uk/download/pdf/7180051.pdf.

Ding, D., Kim, H .G., & Park, S. Y. (2016). Crude Oil and Stock Markets: Causal Relationships in Tails? *Journal of Energy Economics, 59,* 58-69.

Ding, Z., Liu, Z., Zhang, Y., & Long, R. (2017). The Contagion Effect of International Crude Oil Price Fluctuations on Chinese Stock Market Investor Sentiment. *Applied Energy, 187,* 27-36.

Filis, G. (2010). Macro Economy, Stock Market and Oil Prices: Do Meaningful Relationships Exist among their Cyclical Fluctuations? *Energy Economics, 32*(4), 877−886.

Granger, R. F., & Yoon, G. (2002). Hidden Cointegration. *University of Economics, Discussion Paper*, Retrieved from https://cloudfront.escholarship.org/dist/prd/content/qt9qn5f61j/qt9qn5f61j.pdf.

Honarvar, A. (2009). Asymmetry in Retail gasoline and crude oil price movement in the United States: An application of hidden Cointegration technique. *Energy Economics, 31*, 395-402.

Huang, S., An, H., Gao, X., & Sun, X. (2017). Do Oil Price Asymmetric Effects on the Stock Market Persist in Multiple Time Horizons? *Applied Energy, 185*(2), 1799-1808.

Kang, W., Ratti, R. A., & Yoon, K. H. (2015). Time-varying Effect of Oil Market Shocks on the Stock Market. *Journal of Banking & Finance, 61*, S150-S163.

Komijani, A., Naderi, E., & Alikhani, N. G. (2014). A Hybrid Approach for Forecasting of Oil Prices Volatility, OPEC Energy Review. *Organization of the Petroleum Exporting Countries, 38*(3), 323-340.

---------- (2013). The Long-run and Short-run Effects of Crude Oil Price on Methanol Market in Iran. *International Journal of Energy Economics and Policy, 3*(1), 43-50.

Le, T. H., & Chang, Y. (2015). Effects of Oil Price Shocks on the Stock Market Performance: Do Nature of Shocks and Economies Matter? *Energy Economics*, *51*, 261-274.

Luo, X., & Qin, Sh. (2017). Oil Price Uncertainty and Chinese Stock Returns: New Evidence from the Oil Volatility Index. *Finance Research Letters*, *20*, 29-34.

Mehrara, M. (2008). The Asymmetric Relationship between Oil Revenues and Economic Activations: The Case of Oil-Exporting Countries. *Energy Policy, 36*(3), 1164-1168.

Miller, J. I., & Ratti, R. A. (2009). Crude Oil and Stock Markets: Stability, Instability and Bubbles. *Energy Economics, 31*(4), 559−568.

Nazariyan, R., & Amiri, A. (2014). Asymmetry of the Oil Price Pass – Through to Inflation in Iran. *International Journal of Energy Economics and Policy, 4*(3), 457-464.

O'Neill, J. T., Penm, J., & Terrell, D. R. (2008). The Role of Higher Oil Prices: a Case of Major Developed Countries. *Research in Finance, 24*, 287−299.

Pesaran, M. H., Shin, Y., & Smith, R. J. (2001). Bounds Testing Approaches to the Analysis of Level Relationships. *Journal of Applied Econometrics, 16*, 289-326.

Raza, N., Shahzad, S. J. H., Kumar Tiwari, A., & Shahbaz, M. (2016). Asymmetric Impact of Gold, Oil Prices and their Volatilities on Stock Prices of Emerging Markets. *Resources Policy, 49*, 290-301.

Singh, S., & Kapil, R. (2016). Impact of Crude Oil Price and Exchange Rate on Performance of Indian Stock Market. *Asian Journal of Research in Banking and Finance, 6*(2), 17-29.