Iran. Econ. Rev. Vol. 20, No. 2, 2016. pp. 261-276

Exchange Rate Misalignment in Oil Exporting Countries (OPEC): Focusing on Iran

Amir H. Mozayani*[1]
Sanaz Parvizi[2]

Received: 2016/05/21 Accepted: 2016/06/21

Abstract

In this paper, we investigate the existence and the nature of real exchange rate misalignment in Organization of the Petroleum Exporting Countries (OPEC). To do this we estimated a cross country basic real exchange rate determination model for 1990-2012 and extracted historic trend of misalignment. The results imply that all OPEC countries have had misalignment -of different kinds though- in their real exchange rate. In order to ensure the robustness of results, we also focused on historic trend of real exchange rate misalignment in Iran, which was derived by model, and observed considerable consistency with realities of policy making and economic performances in Iran. This indicated the compatibility of the estimation results with countries' actual events.

Keywords: Misalignment, Real Exchange Rate, OPEC Countries, Iran, Oil.
JEL Classification: O24, F31, O57.

1. Introduction

Since the exchange rate links the national economy to the world economy, it is obvious that any country often tries to achieve an equilibrium level of exchange rate or to manage it in a desired band based on its objectives and preferences. Accordingly, well-known views on international macroeconomics express that an equilibrium exchange rate can help authorities to manage current and capital account, domestic inflation, national competitiveness and allocation of resources. Otherwise, a misaligned exchange rate may lead to distortion in balance of payment, relative prices, competitiveness and etc.

Behaviors of countries' foreign exchange markets, especially those of

1. Assistant Professor, Department of Economics, Tarbiat Modares University, Tehran, Iran. (Corresponding Author: mozayani@modares.ac.ir).
2. Department of Economics, Tarbiat Modares University, Tehran, Iran.

developing countries, imply the considerable deviation from equilibrium level of the exchange rate. It seems that economic authorities have acknowledged the disadvantages of misaligned exchange rate in favor of their national preferences. In other words, they are used to manipulate their exchange rate or manage it in certain intervals in order to meet their domestic economic needs. As if they are facing a tradeoff between advantages and disadvantages of disequilibrium exchange rate. For instance, some countries set their exchange rate undervalued to stimulate their current account. This phenomenon is known as "Currency War" and has been recently intensified within the international trade relations. On the other hand, some countries set their exchange rate overvalued to prevent the penetration of global inflation into their domestic economies. This phenomenon (overvaluation) is usually observed in oil exporting countries which are highly relying on their exogenous oil revenues. Apparently, the substantial amount of crude oil revenues and hence considerable foreign exchange reserves has enabled them to stabilize their nominal exchange rate in a certain band and in an overvalued condition.

During last decades, a number of studies have attempted to estimate the equilibrium exchange rate or the deviation from that rate in different countries. For instance, Buchs (2005) showed that the exchange rate in Brazil has been slightly overvalued; or Su, Tsangyao, & Chang (2011) stated that Purchasing Power Parity (PPP) is valid only for some Latin American countries, whereas the majority of the exchange rates in these countries do not follow an equilibrium rule (Giannellis & Koukouritakis, 2013, P. 202). Similarly, some other researchers such as Aflouk, Jeang, & Saadaoui (2010), Vieira and MacDonald (2012) tried to quantify the absolute value of misalignment, in order to understand the nature or historic trend of countries' misalignment.

Review of literature implies frequent studies which calculated exchange rate misalignment in (groups of) countries. Nevertheless, such studies are rarely found for oil exporting countries. However, these countries due to their intrinsic characteristics such as: stabilized foreign exchange regimes, reliance on oil revenues, possession of great amount of foreign reserves can be good cases for study (Dike, 2014 & 2015).

Based on the above mentioned grounds, the main aim of this paper is to provide a quantitative assessment about nature and historic trend of misalignment in foreign exchange markets of oil exporting countries (OPEC[1]). Subsequently, to have a robust and sensible analysis of our results,

1. Algeria, Angola, Ecuador, Iran, Iraq, Kuwait, Libya, Nigeria, Qatar, Saudi Arabia, United Arab Emirates and Venezuela. We excluded Iraq due to lack of data.

we will focus particularly on Iran which has undergone great fluctuations in its foreign exchange market; these include such cases as implementing two separate unification policies in 1993 and 2002, being affected by global society sanctions and etc. In so doing, we estimate a cross country basic real exchange rate[1] determination model for 1990-2012 in order to extract countries' misalignment.

The rest of the paper is organized as follows: Section 2 presents misalignment review of literature while section 3 reports the data and estimation. Section 4 illustrates the empirical evidence for Iran (as one of the OPEC countries) and in the final section conclusion of this study is presented.

2. Review of Literature

2.1 Empirical Background

Since the adoption of floating exchange rate regime in 1970s, investigating the equilibrium exchange rate and its deviation have been subjects of empirical studies. Review of literature implies that these studies can be classified to two main categories. The first category includes those studies focusing on equilibrium exchange rate and its influencing factors or the relevant causal relations; among these studies, one may refer to Iimi (2006), Wang, Hui & Soofi (2007), Musyoki, Pokhariyal & Pundo (2012), Baak (2012) & Palamalai et al. (2014) taking as their subject the equilibrium level of exchange rate in Botswana, china, Kenya, South Korea and India. The second category consists in that group of studies which deal directly with misalignment; this category can be subdivided into three separate branches. The first branch includes studies which have tried to calculate and analyze misalignment within a single country; some instances are Dagdeviren, Binatli and Sohrabji (2012), Panday (2014), Mozayani & Ghornani (2015) who did so for Turkey, Nepal and Iran, respectively. The second branch consists in studies which have tried to study this phenomenon in a cross country scope. These include studies such as: Sallenave (2010), Grossmann & Olrov (2012), Holtemoller & Mallick (2012), Gnimassoun & Mignon (2015), Nouira & Sekkat (2015). In the third branch including Salvatore (2012), Wong Hoch (2011), Ghosh (2013), the nature, causes and consequences of misalignment have been discussed. The implications of literature review can be summarized as follows:

- Huge real exchange rate misalignments are mostly observed in developing countries rather than in developed ones.

1. By choosing real exchange rate, besides the nominal exchange rate, we try to capture the relative price level of countries as well.

- By implementing foreign exchange reforms, most countries would be able to narrow down their misalignment.
- In most cases, exchange rate crisis leads to an undervalued exchange rate misalignment.
- Exchange rate misalignments negatively affect the economic growth and the export.
- Countries' exchange rate regimes have had significant impact on the nature of misalignment (the higher flexibility of the regime, the lower misalignment).
- There is no distinct study engaging directly in exchange rate misalignment in OPEC countries.

2.2 Theoretical Arguments

Review of international finance theories involves a variety of approaches about determinant factors of exchange rate. Hoontrakul (1999) classified them to two main approaches as follows:

A- Traditional Approaches:
  I. Elasticity Approach (Marshall 1923, Lerner,1944)
  II. Purchasing Power Parity (PPP)
  III. Absorption approach (Alexander 1952)

B- Modern Asset Approaches:
  I. Portfolio - Balance Approaches:
    i. Small Country Model, (Kouri,1978)
    ii. Preferred Local Habital Model (Kouri and De Macedo, 1978)
    iii. Uniform Preference Model (Frankel, 1993)
  II. Monetary Approaches:
    i. Mundell– Fleming Model (1963,1962)
    ii. Political Economy Model (Gartner,1993)
    iii. Exchange Rate Bubble (Gartner,1993)
    iv. Overshooting Model (Dornbusch,1976)

Since exchange rate determination models mostly focus on a specific approach for nominal exchange rate, we employed a hybrid model in this study for determining factors which influence the real exchange rate; this model is proposed by Chen & Chou (2015), Coulibaly & Gnimassoun (2013), Couharde et al. (2012) which is inspired from Edwards (1988), Baffes et al. (1999). They derived relevant determinants of the real exchange rate for developing economies which were properly summarized by Coulibaly & Gnimassoun (2013) as follows:

A. Relative Productivity Differentials (PRO): Based on the Balassa–Samuelson effect, a positive productivity shock in the tradable good sector

relative to the non-tradable good sector leads to a wage increase in the former sector; and thus the moving of the workforce towards this sector. Thus, the real exchange rate appreciates through price increase in sheltered sectors since their demands exceed their supplies. The impact on the equilibrium real exchange is then expected to be positive (Coulibaly & Gnimassoun, 2013, 466-67).

B. Terms of Trade (TOT): This factor is measured by the ratio of export prices to import prices. The improvement of the terms of trade leads to an increased production of tradable goods and a reallocation of resources in favor of those sectors. Consequently, the trade balance will be improved through rising exports leading to an appreciation of the equilibrium real exchange rate. At the same time, this process may be accompanied by a substitution between local products—which become more expensive—and imported products, leading therefore to a depreciation of the real exchange rate. Consequently, the impact of the terms-of-trade variable is undefined and depends on the income and substitution effects' magnitude. However, empirical works generally suggest that the income effect dominates the substitution one (Coulibaly & Gnimassoun, 2013, 467).

C. Net Foreign Asset Position (NFA): Basic macroeconomic models predict that debtor countries will need more depreciation of real exchange rate in order to generate the trade surpluses necessary to pay their external liabilities (Lee et al., 2008). Similarly, when countries have relatively high net foreign assets, they can "afford" a higher appreciation of their real exchange rate while remaining solvent even if it is likely to generate current account deficits. So, the expected effect is positive (Coulibaly & Gnimassoun, 2013, 467).

D. Oil Revenues (OR): Basic Theories consider **t**rade openness as of the determinant factors of real exchange rate. If the current account deteriorates, the real exchange rate should depreciate to restore external equilibrium. On the contrary, the equilibrium exchange rate will appreciate when the reduction of tariff leads to a current account improvement. So the response of the real exchange rate is ambiguous and depends on the impact of openness on the current account. But the empirical literature generally found a negative impact (Coulibaly & Gnimassoun, 2013, 467). But as long as oil export revenue, as exogenous variable, has prevailing role in OPEC members trade balance, most studies considered oil revenue as proxy for trade openness in real exchange rate determinant models (MacDonald, 1997) and (Asgharpour et al.,2015). Real increase in oil revenue can improve real exchange rate in oil exporting countries (Amano & Norden, 1998).

E. Government Spending (GOV): If public expenditures are mainly

composed of tradable goods, their increase will lead to the depreciation of the real equilibrium exchange rate. However, it is usually assumed that government spending in developing countries is mainly composed of non-tradable goods. In this case, the increase of public spending leads to a rise in internal prices, which generates the appreciation of the real equilibrium exchange rate. The impact of this variable on the real exchange rate must then be positive (Coulibaly & Gnimassoun, 2013, 467).

Thus, the real exchange rate (RER) can be considered as a function of the following variables stated by mainstream studies such Edwards (1988), Montiel (1999), Terra & Valladares (2010), Schröder (2013), (MacDonald, 1997) and (Asgharpour et al.,2015).

$$\mathrm{RER} = \alpha_0 + \alpha_1.\mathrm{PRO} + \alpha_2.\mathrm{TOT} + \alpha_3.\mathrm{NFA} + \alpha_4.\mathrm{OR} + \alpha_5.\mathrm{GOV} \qquad (1)$$

Equation 1 is the basic stylized model which expresses real exchange rate determinant factors and can be applied for estimation.

3. Data and Estimation

Our study covers a panel of 11 OPEC countries pending on the availability of data for 1990-2012. Our methodology has two main steps for recognizing misalignment in real exchange rate in OPEC countries. The first step is to estimate our basic stylized model (eq.1) including main determinant factors of real exchange rate in order to derive residual for each country. The second step is to extract countries' misalignment values in the way that Holtemöller & Mallick (2012), Terra & Valladares (2010), Dubas (2009), Kemme & Roy (2006) have done it. They considered misalignment as the difference between observed RER and its predicted value. They believed that the residual of basic stylized model estimation can be considered as misalignment. Positive misalignment implies undervaluation and negative misalignment implies overvaluation. Our variables for estimation are:

- Real Exchange Rate (RER): Ratio of the domestic CPI to United States CPI (as world proxy)[1] multiplied by nominal exchange rate (Source: WDI).
- Productivity Differentials (PRO): Labor Productivity as proxy, measured as GDP per Person Employed (Source: Conference board Org[2]).
- Terms of Trade (TOT): Unit Value of Exports divided by Unit Value of Imports indices (Source: UNCTAD).
- Net foreign asset (NFA): Sum of foreign assets held by monetary

1. Bahmani-Oskooee and Kara (2000)
2. https://www.conference-board.org/data/ economydatabase.

authorities and deposit money banks, less their foreign liabilities to GDP (Source: WDI).

- Oil Revenue (OR): Real value of oil exporting revenues (Source: UNCTAD).
- Government spending (GOV): Government consumption as a percent of GDP (Source: UNCTAD).

Before estimating Eq. (1), we have to make sure stationary of variables. We rely on most frequently used panel unit root tests (LLC ،ADF-Fisher ، pp-Fisher). The results are reported in table 1. As can be seen, the null hypothesis of variables for having unit root at 5% is rejected. It means that all variables are stationary and thus there is no need for cointegration tests. Then we apply F & Hausman test in order to understand basic model estimation condition. The results (table 2) show that the proper option for estimation is panel & fixed effects form. The results of estimation are reported in table 3. Table 3 demonstrates that all considered explanatory variables are significant at conventional levels and have expected signs highlighting the relevance of the theoretical model and the estimators (Coulibaly & Gnimassoun, 2013, 468).

Table 1: Unit Root Tests Results

Variable(s)	Levin, Lin & Chu		ADF - Fisher Chi-square		PP - Fisher Chi-square	
	Statistic	Prob	Statistic	Prob	Statistic	Prob
lnRER	-2.44	0.007	35.79	0.03	41.29	0.007
lnTOT	-4.002	0.0000	45.07	0.002	60.94	0.0000
lnNFA	-32.44	0.0000	287.30	0.0000	290.10	0.0000
lnGOV	-3.93	0.0000	48.75	0.0000	42.70	0.005
lnPRO	-3.81	0.0001	58.32	0.0000	48.23	0.001
LnOR	-10.69	0.0000	149.19	0.0000	230.39	0.0000

- "Ln" denotes Neperian Logarithm of variables.

Table 2: F & Hausman Test Results

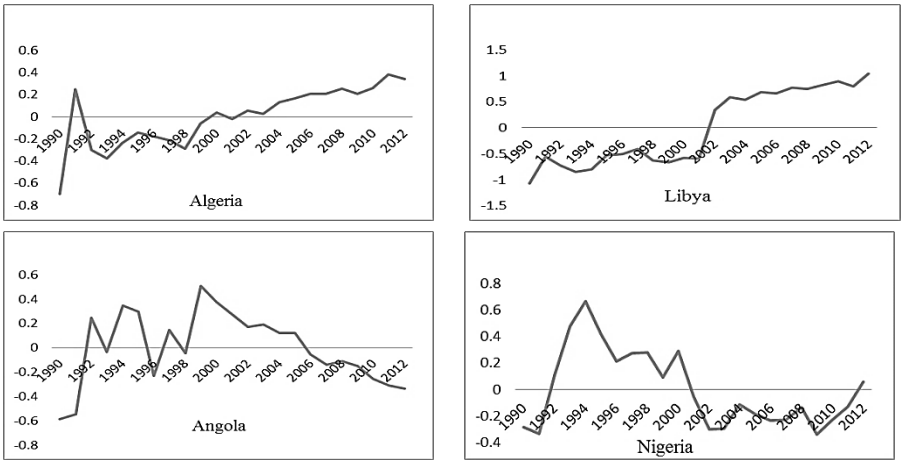
		Statistic	Prob
Effects Test:	Cross-section F	1021.5984	0.0000
Hausman Test:	Cross-section random	16.5047	0.0055

Table 3: Estimation Results

Variable	Coefficient	t-Statistic	Prob
lnPRO	0.65	11.25	0.0000
lnTOT	0.36	11.39	0.0000
lnOR	0.59	21.38	0.0000
lnNFA	0.01	4.44	0.0000
lnGOV	0.38	11.69	0.0000
C	2.31	3.53	0.0005

As predicted in theoretical macroeconomic models, the net foreign asset & productivity position have positive and significant impacts on the real exchange rate. The positive relationship between the terms of trade and real exchange rate indicates that the income effect outweighs the substitution effect. The government spending has also a positive effect on the real exchange rate confirming that in these countries, government spending is mainly composed of non-tradable goods (Coulibaly & Gnimassoun, 2013, 468). Finally Oil Revenue has positive impact on improving real exchange rate as predicted theoretically. With regard to the basic estimated model and according to residuals for each country, misalignment values can be derived separately. Figure 1, 2 show relative situation of real exchange rate misalignments in OPEC countries. Our results confirm the presence – of course of different kinds- of exchange rate misalignments in all OPEC countries. Figure 1 shows that misalignment in United Arab Emirates, Kuwait, Qatar, Angola and Iran fluctuated from positive (undervalued) to negative (overvalued) amount and vice versa. The direction of misalignment in Algeria and Libya changed from negative to positive position. Meanwhile the misalignment in Ecuador and Venezuela has changed from positive to negative position. Also the absolute fluctuation of misalignment in Saudi Arabia, United Arab Emirates, Qatar and Angola were considerable and Kuwait has had minimum deviation real exchange rate among OPEC countries during 1992-2012.

In the following section, for ensuring the robustness of our research through matching the results with actual economic fluctuations of countries, we do a case study on Iran in which the foreign exchange events in this country during the period of study are analyzed.



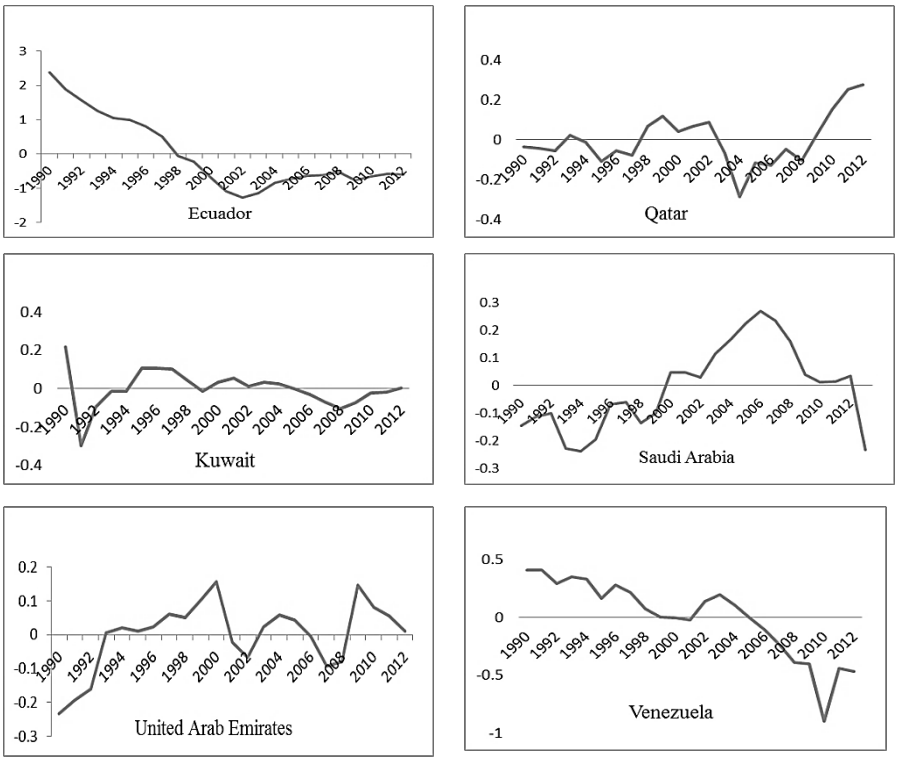


Fig. 1: Real Exchange Rate Misalignment in OPEC Countries

Note: Positive Misalignment implies Undervaluation
Negative Misalignment implies Overvaluation

4. Empirical Evidence for Iran

Since the beginning of 1980s, Iranian authorities have implemented controversial foreign exchange policies. They have been moving between different exchange rate regimes (Sanginabadi & Heidari, 2012). The heavy state control which was in operation till the beginning of 1990s and had given rise to a very active and dynamic black market was gradually replaced by the so called 'unification' policies with clear targets to reduce and eventually eliminate the significant black market premium of the exchange rate and to stabilize the Rial/US$ (Molana & Mozayani, 2006, 321). The first unification policy which was implemented over the 1993-1995 period failed and had to be abandoned (Molana & Mozayani, 2006). In the post-unification period, Iranian authorities tried to control foreign currency demand by applying multiple exchange rates and stabilized nominal official exchange rate and subsequently tried to converge to an equilibrium rate for the second unification policy which started since 2002 and continued successfully till 2011 when Iranian authorities, due to strengthening of international sanctions, had to leave unified system and implemented a seriously state control regime in foreign exchange market.

During 2002-10, authorities via a highly managed exchange rate regime tried to stabilize the nominal exchange rate, despite of the great increase in money supply and the consequent persistent double digit inflation rate (Fig.3). The official statistics imply that during 2001-2010 period, although currency volume and CPI grew up by %986 and %292, nominal exchange rate was allowed to be depreciated only by %30; this led to great over-valuation in foreign exchange market especially after 2006 when this phenomenon was coincided by the jump in global oil price and consequently great increase in Iran substantial crude oil export revenues. It seems that gaining great amount of foreign reserves exogenously enabled Iranian authorities to afford highly managed (and almost fixed) nominal exchange rate regime by injecting considerable amount of foreign reserves to the market. Some studies suggested that the nominal exchange rate[1] at the end of 2010 had been 0.53% over-valued (misaligned) compared to its equilibrium rate (Mozayani & Ghorbani, 2015). It seems that during 2006-2010, the nominal exchange rate in Iran had been stabilized artificially, counter to other macroeconomic fundamentals. This is due to the approach of Iranian authorities which have had a strong preference toward maintaining stable nominal exchange rate.

But by the beginning of 2011, due to great restrictions caused by international sanctions, especially in earning and transmission of foreign reserves, the authorities could no longer continue the nominal exchange rate management policy and exchange rate overshoot beyond its equilibrium level and consequently unified exchange rate system was abandoned once more by imposing great restrictions on domestic foreign currency market.

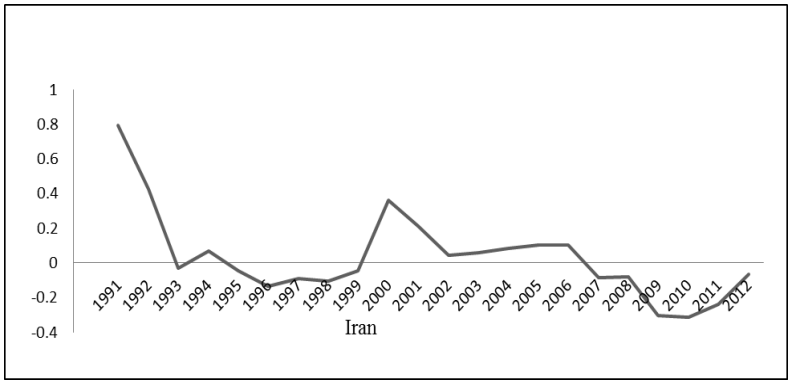


Fig. 2: Real Exchange Rate Misalignment in Iran

1. Nominal Exchange Rate: Number of Iran's national currency (Rial) per each US dollar.

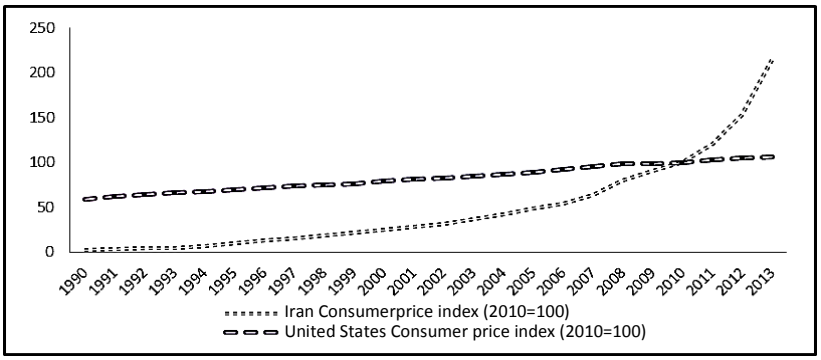


Fig. 3: Relative inflation in Iran

The interpretation of the above-mentioned events can be observed in Iran misalignment trend depicted in figure 2. This figure can be explained as follows:

- 1990-95: Undervaluation of real exchange rate due to great speculative demand and highly active black market which was eliminated by spastic policies after failure of the first unification policy during 1993-5.
- 1996-99: Abandoning unification policy and controlling foreign currency demand and consequently imposing a mild overvaluation to foreign exchange market through multiple exchange rate system.
- 2000-06: Converging multiple rates and starting the second unification policy (2002) and proper performance of unification policy in order to minimize misalignment.
- 2007-2011: Emergence of the new government and lavish injection of foreign reserves into the market in order to stabilize nominal exchange rate despite of growing double-digit inflation rate which led to overvalued real exchange rate.
- 2012: Intensification of international sanctions and inability of government to stabilize nominal exchange rate anymore and the consequent depreciation of nominal exchange rate and the gradual elimination of real exchange rate overvaluation.

5. Conclusion

Behaviors of countries in their foreign exchange markets imply the existence of considerable deviation from the equilibrium level of the exchange rate, known as misalignment, especially in developing countries. During the last decades, a number of studies attempted to estimate the equilibrium level of exchange rate or the deviation of exchange rate from the equilibrium level, which can lead to distortion in balance of payment, relative prices, competitiveness and etc.

The main target of this paper was the investigation of nature and historic

trend of misalignment within foreign exchange markets of oil exporting countries (OPEC). Thus, we estimated a cross country basic real exchange rate determination model for 1990-2012 and extracted countries' misalignment. To sum up, our results showed the presence of real exchange rate misalignments in all OPEC countries, but in different styles. Subsequently, in order to make sure to have robust and sensible results, we focused on Iran economic performance, which has experienced great fluctuations in its foreign exchange market, as case study. We discussed that historic trend of misalignment in Iran can be perfectly explained by its foreign exchange market fluctuations such as: implementing two unification policies, being affected by international sanctions and etc.

References

Aflouk, N., Jeang, S., Mazier, J., & Saadaoui, J. (2010). Exchange Rate Misalignments and International Imbalances: A FEER Approach for Emerging Countries. *International Economics, 124*, 31–74.

Alexander, S. (1952). The Effect of Devaluation on a Trade Balance. *IMF Staff Paper*, Retrieved from http://www.jstor.org/stable/3866218.

Amano, R. A., & Norden, S. V. (1998). Oil Prices and the Rise and Fall of the US Real Exchange Rate. *Journal of International Money and Finance, 17*, 299–316.

Asgharpour, H., Mehdilou, A., & Esmaili, S. M. (2015). Determinants of Real Effective Exchange Rate in Iran using Fuzzy Regression. *Quarterly Journal of Applied Theories of Economics*, *1*(3), 25-56.

Baak, S. J. (2012). Measuring Misalignments in the Korean Exchange Rate. *Japan and the Word Economy, 24*(4), 227-234.

Baffes, J., Elbadawi, I., & O'Connell, S. (1999). *Single-Equation Estimation of the Equilibrium Real Exchange Rate*. Retrieved from https://www.researchgate.net/profile/John_Baffes/publication/23548884_SingleEquation_Estimation_of_the_Equilibrium_Real_Exchange_Rate/links/0deec5331aa5120a2f000000.pdf.

Bahmani-Oskooee, M., & Kara, O. (2000). Exchange Rate Overshooting in Turkey. *Economics Letters, 68*, 83-93.

Buchs, T. (2005). *Equilibrium Real Exchange Rate in Brazil Estimation and Policy Implications*. 9th Meeting of the Latin American and Caribbean Economic Association (LACEA) Conference, San José (Costa Rica), Spain. Retrieved from http://econwpa.repec.org/eps/it/papers/0502/0502013.pdf.

Chen, Sh., & Chou, Y. (2015). Revisiting the Relationship between Exchange Rates and Fundamentals. *Journal of Macroeconomics, 46,* 1–22.

Couharde, C., Coulibaly, I., & Damette, O. (2012). La dynamique d'ajustement des taux de change réels dans la zone franc CFA. *Revue Economique, 63* (3), 545–555.

Coulibaly, I., & Gnimassoun, B. (2013). Optimality of a Monetary Union: New Evidence from Exchange Rate Misalignments in West Africa. *Economic Modeling, 32,* 463–482.

Dagdeviren, S., Binatli, A. O., & Sohrabji, N. (2012). Misalignment under Different Exchange Rate Regimes: The Case of Turkey. *International Economics, 130,* 81-98.

Dike, V. E. (2015). *Why Nations Fail to Develop: The Case of Nigeria*. SAGE Open, October-December: 1-12, DOI: 10.1177/2158244015611714.

----------. (2014). *Leadership and the Nigerian Economy.* SAGE Open, January-March: 1-10, DOI: 10.1177/2158244014523792.

Dornbusch, R. (1976). Expectation and Exchange Rate Dynamic. *Journal of Political Economy, 84* (6), 1161-1176.

Dubas, J. M. (2009). The Importance of the Exchange Rate Regime in Limiting Misalignment. *World Development, 37*(10), 1612–1622.

Edwards, S. (1988). Real and Monetary Determinants of Real Exchange Rate Behavior: Theory and Evidence from Developing Countries. *Journal of Development Economics, 29,* 311-341.

Fleming, J. M. (1962). Domestic Financial Policies under Fixed and under Floating Exchange Rate. *Staff Papers (International Monetary Fund), 9* (3), 369-380.

Frankel, J. (1993). *Monetary and Portfolio-Balance Models of Exchange Rate Determination*. Cambridge: MIT Press.

Gartner, M. (1993). *Macroeconomics under Flexible Exchange Rates*. Manchester: Harvester Wheatsheaf Publication.

Ghosh, A. (2013). Exchange Rate Pass through, Macro Fundamentals and Regime Choice in Latin America. *Journal of Macroeconomics, 35,* 163–171.

Giannellis, N., & Koukouritakis, M. (2013). Exchange Rate Misalignment and Inflation Rate Persistence: Evidence from Latin American Countries. *International Review of Economics and Finance, 25*, 202–218.

Gnimassoun, B. & Mignon, V. (2015). Persistence of Current-account Disequilibria and Real Exchange-rate Misalignments. *Review of International Economics, 23*(1), 137–159.

Grossmann, A., & Olarv, A. G. (2012). Exchange Rate Misalignments in Frequency Domain. *International Review of the Economics & Finance, 24*, 185-199.

Holtemöller, O., & Mallick, S. (2012). Exchange Rate Regime, Real Misalignment and Currency Crises. *Economic Modeling, 34*, 5–14.

Hoontrakul, P. (1999). *Exchange Rate Theory: A Review*. Chulalongkorn University Discussion Paper, Retrieved from http://www.ibrarian.net/navon/paper/_Exchange_Rate_Theory___A_Review_.pdf?paperid=351764.

Iimi, A. (2006). Exchange Rate Misalignment: An Application of the Behavioral Equilibrium Exchange Rate (BEER) to Botswana. *IMF Working Paper, Retrieved from https://www.imf.org/external/pubs/ft/wp/2006/wp06140.pdf.*

Kemme, D. M., & Roy, S. (2006). Real Exchange Rate to Crisis? *Economic Systems, 30*, 207- 230.

Kouri, P. J. K., & de Macedom, J. B. (1978). Exchange Rates and the International Adjustment Process. *Brookings Papers on Economic Activity, 1978* (1), 111-157.

Kouri, P. (1978). The Exchange Rate and the Balance of Payments in the Short Run and in the Long Run: a Monetary Approach. *Scandinavian Journal of Economics, 78* (2), 280-304.

Lee, J., Milesi-Ferretti, G., Ostry, J., Prati, A., & Ricci, L. (2008). Exchange Rate Assessments: CGER methodologies. *IMF Occasional Paper, 261*, Retrieved from https://www.imf.org/external/pubs/nft/op/261/op261.pdf.

Lerner, A. P. (1944). *The Economics of Control: Principles of Welfare Economics*. New York: The Macmillan Company.

Marshall, A. (1923). *Money Credit and Commerce*. London: Macmillan & Co. Ltd.

MacDonald, R. (1997). What Determine Real Exchange Rates? The Long and Short of It. *IMF Working Paper,* 21, Retrieved from http://www.imf.org/external/pubs/ft/wp/wp9721.pdf.

Molana, H., & Mozayani, A. H. (2006). Is Monetary Discipline a Precondition for the Effectiveness of Iran's Export Promotion Policies. *Journal of International Development, 18,* 319–330.

Montiel, P. (1999). *Determinants of the Long-Run Equilibrium Real Exchange Rate: an Analytical Model*. Hinkle, L., Montiel, P. (Eds.), Exchange Rate Misalignment: Concepts and Measurement for Developing Countries. Oxford: Oxford University Press.

Mozayani, A. H., & Ghorbani, S. (2015). Nominal Exchange Rate Misalignment in Iran's economy. *Majles & Rahbord, 22*(82), 199-233.

Mundell, R. A. (1963). Capital Mobility and Stabilization Policy under Fixed and Flexible Exchange Rate. Canadian Journal of Economics and Political Science, 29, 4, 475-485.

Musyoki, D., Pokhariyal, G., & Pundo, M. (2012). Real Exchange Rate Equilibrium and Misalignment in Kenya. *Journal of Business Studies Quarterly, 3(*4), 24-42.

Nouira, R., & Sekkat. Kh. (2015). What Determines the Extent of Real Exchange Rate Misalignment in Developing Countries? *International Economics, 141*, 135–151.

Palamalai, S., Mariappan, K., & Devakumar, C. (2014). On the Temporal Causal Relationship between Macroeconomic Variables: Empirical Evidence from India. *SAGE Open, 4* (1), 1-14.

Panday, A. (2014). Exchange Rate Misalignment in Nepal. *Journal of South Asian Development, 9*(1), 1–25.

Sallenave, A. (2010). Real Exchange Rate Misalignments and Economic Performance for the G20 Countries. *International Economics, 121,* 59–80.

Salvatore, D. (2012). Exchange Rate Misalignments and the Resent International Monetary System. *Journal of Policy Modeling, 34*(4), 594-640.

Sanginabadi, B., & Heidari, H. (2012). The Effects of Exchange Rate Volatility on Economic Growth of Iran. *Actual Problems of Economics, 6,* 430-441.

Schröder, M. (2013). Should Developing Countries Undervalue their Currencies? *Journal of Development Economics, 105*, 140–151.

Su, C. W., Tsangyao, C., & Chang, H. L. (2011). Purchasing Power Parity for Fifteen Latin American Countries: Stationary Tests with a Fourier Function. *International Review of Economics and Finance, 20*, 839–845.

Terra, C., & Valladares, F. (2010). Real Exchange Rate Misalignments. *International Review of Economics and Finance, 19*, 119–144.

Vieira, F. V., & MacDonald, R. (2012). A Panel Data Investigation of Real Exchange Rate Misalignment and Growth. *Econ., 42*(3), 433-456.

Wang, Y., Hui, X. & Soofi, A. (2007). Estimating Renminbi Equilibrium Exchange Rate. *Journal of Policy Modeling, 29*(3), 417–429.

Wong Hoch, T. (2011). The Real Exchange Rate Determination: An Empirical Investigation. *International Review of Economics & Finance, 20* (4), 800–811.