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Determinants of the Choice of Exchange Rate Regimes in OIC Countries

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Abstract

Several political and economic factors are involved in choosing exchange rate policy in Organization of Islamic Cooperation (OIC) countries. In the present study, these factors have been investigated with an emphasis on OCA and political economic factors during 1990 -2014. The result shows that OCA and political economic factors as well as tradable sector are influential on exchange rate policy in OIC countries. In a way that oil revenue, financial development, GDP, openness of the economy, economic development and political instability all tend to increase the probability of pegging the exchange rate regimes, whereas an increasing industrial sector and size of the economy lead to a decrease in the probability of pegging the exchange rate regimes. Inflation, democracy, political system, legislative system, and monetary crises had no significant effect on the exchange rate regime. Also, the results show that the democracy and oil revenue had the highest impact on choosing exchange rate regime and financial development and monetary crises risk had the least impact on choosing exchange rate regime.

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1. Introduction

The Bretton Woods Conference which was a gathering of delegates from 44 countries examined the financial affairs especially the importance of creating a sustainable economic atmosphere through adopting a fixed exchange rate regime. However, with mounting inflationary pressures in 1960s, the US officially abandoned dollar pegging to the gold standard in 1973. Since then, many countries including developed ones have abandoned fixed exchange rate regime. Monetary crisis in developing countries such as Mexico (1994), Asian countries (1997), Russia (1997), and Brazil (1999) has triggered issues on optimum exchange rate regime.

Since the collapse of Bretton Woods fixed exchange rate system, economists such as Heller (1978), Holden et al., Dreyer (1978), Bernard and Leblang (1999), Poirson (2004), etc., have investigated the exchange rate regime in countries. Every exchange rate regime has advantages and disadvantages. Country-specific conditions play a crucial role in exchange rate regime adoption in that country. Institutional and economic factors are influential in exchange rate regime choice. In general, countries have a penchant for moving away from fixed exchange rate regime to floating exchange rate regime.

A general criterion for setting an optimum exchange rate regime is economic and financial stability when facing nominal and real shocks. Floating exchange rate systems provide more stability in macroeconomic and financial sectors when facing domestic real shocks and nominal external shocks. Fixed exchange rate system performs better in facing domestic monetary shocks and bringing economic stability, however, insulating properties of exchange rate regimes are affected by structural properties of economy such as openness, capital mobility and flexibility of labor market. In practice, performance assessment of exchange rate regimes and the impacts of these properties on economic stability are rather difficult due to ambiguous effects and simultaneity of domestic and external shocks. Thus, in choosing

exchange rate regime, criteria such as domestic and external stability (low inflation rate), stability of balance of payment, international competition, credibility of monetary policy, and lower transaction costs are considered (Husain, 2006). Exchange rate factors are determined empirically based on models of Optimum Currency Area (OCA). Research by Heller (1978) and Dreyer (1978) revealed the importance of OCA theory in exchange rate regime choice. Subsequent studies such as Melvin (1985), Savvides (1990), etc., expanded the OCA. Recent body of work by Cholin (1998), Edvards (1996), Frieden, Ghezzi, and Stein (2001), and Estien (2005) indicated that political economy wielded a great weight upon exchange rate regime choice in developing countries. In the present study, the determinants of exchange rate policy have been empirically examined using models based on the theory of Optimal Currency Areas (OCA), political economic factors, tradable sectors and currency crisis risk.

2. Literature Review

Rizo (1998) has investigated the factors effective on exchange rate regime choice in developing countries during 1977 -1995 through OCA and Probit analysis. His findings indicated that openness of the economy; per capita, foreign debts, trade openness, budget deficit, and government revenue are effective on exchange rate regime choice. Oliva and Leon (1999) investigated the determinants of exchange rate regime for Chile with a time-series approach. The results show that inflation, domestic monetary fluctuations, balances of payment, foreign reserves, and openness of the economy affected the exchange rate regime choice. Drawing upon ordered Probit regressions, Poirson (2001) examined the exchange rate policies in 93 countries in 1990-1998. His results indicated that political instability was effective on determining exchange rate regime. Countries without political stability are likely to choose a floating exchange rate regime. Also, size of the economy,

inflation, capital mobility, production diversification, adequacy of reserves, and external vulnerability had a significant effect on exchange rate regime, consistent with OCA and political economic predictions.

Frieden, Ghezzi, and Stein (2001) investigated the impact of political economy on exchange rate regime in 26 Latin American countries for the period 1960-1994 through an Ordered Logit approach. The findings indicated that exchange rate regime determination is affected by political and institutional factors, and interest group variables (such as different financial sectors and trade liberalization). They also included new data of political institutions for regression estimation. Their regression used IMF provided detailed data on exchange rate regime and more real trends.

Bleaney and Francisco (2005) studied exchange rate regime choice in developing countries using Probit method for the period 1990-2000, and found that larger population, lower per capita, higher inflation rate, more trade openness, higher financial development, and lower foreign debts increase the probability that a given country chooses a floating exchange rate regime.

Blumberg, Freidan and Stein (2005) tested trade-offs between credit rating and competition, and demonstrated that for gaining credit, a country may adjust the fixed exchange rate regime with zero inflation anchor currency, and it may handle its economy with either fixed or floating exchange rate regime. Fixed exchange rate regime keeps inflation low by restricting domestic prices with respect to tradable global prices and gaining anti-inflationary credit. This causes an increase in real exchange rate. So, it brings some advantages for consumers through increasing purchasing power parity, but for producers of tradable goods, it raises sales prices and increases competition. On the other hand, abandoning fixed exchange rate regime and moving toward more floating regimes raises competition for domestic producers.

Al-Shamari (2007) examined the exchange rate regime determinants in Middle East countries for the period 1990-2004 through Probit approach. He found out that OCA and political economic factors wield impacts on exchange rate regime choice.

Güçlü (2008) investigated exchange rate regime choice in 25 developing countries for the period 1970-2006 through Probit approach. His findings indicated that the level of economic development, inflation rate and political economic factors are effective in determining exchange rate regime, but they found no effect for current budget deficit and openness of the economy on the exchange rate regime.

Kato and Uctum (2008) investigated exchange rate regime choice in an OCA for the period 1990-1999 through panel data approach, and found that exchange rate regime criteria in OCA is different from that in other regions of the world. In regional scale, exchange rate volatility and openness of the economy, and in international level, GDP and inflation wield most effect on exchange rate regime choice.

Daly and Sami (2009) examined the exchange rate regime determinants in MENA (Middle East and North African Countries) with an emphasis upon macroeconomic and structural factors through Ordered Probit approach for the period 1977-2000, the results show that foreign reserves play a decisive role in exchange rate regime of studied countries.

Drawing upon Logit approach, Ondina et al. (2011) examined the exchange rate regime determinants in Latin American countries for 1980-2004 and showed that OCA theory factors were effective on the exchange rate regime choice.

3. Theoretical Framework

Edwards (1996) was first to develop a simple theoretical model for investigating exchange rate regime choice. He built his model upon a target function similar to that by Devarajan and Rodrik (1992) including a real variable of unemployment and a nominal variable of inflation rate. He developed a structural method where devaluation of currency was related to political costs. It was also based on political economy and trade-offs between

credibility and competitiveness. Based on his model, fixed exchange rate regimes are more likely to control inflation rate than floating regimes of exchange rate, but floating regimes are likely to decrease fluctuations in unemployment rate. Consequently, policy-makers would compare two exchange rate regimes based on their preferences and expected costs. Edwards' analysis assumes that government is always free to abandon the pegging policy. He also assumes that fixed exchange rate regime is a pegged regime, but it is adjustable, and like Cooper (1971), he assumes that government would create political costs with abandoning exchange rate pegging.

Cooper (1971) demonstrated that devaluation of currency leads to gradual outbreak of political unrest and collapse of governments. The importance of political costs depends on political characteristics and institutional environment of any given country. When a country is politically instable, a subsequent economic instability might ensue. Findings of research indicated that political instability tends to raise the costs of abandoning the policy of pegging. In OIC countries, there are two extremes: hard-pegged exchange rate regimes (Djibouti) and extreme free float regimes (Yemen and Algeria).

3.1. Exchange rate regime determinants

Bodies of research by Collins (1996), Edwards (1996), Poirson (2001), Freidan, Ghezzi and Stein (2001), Van Hagan and Zhou (2005), etc., indicate that several factors contribute to exchange rate regime choice by the governments. In general, exchange rate regime determinants fall into four categories:

a) OCA factors
b) Monetary crisis risks
c) Political economy; and,
d) Tradable sectors.

3.1.1. OCA criteria

OCA theory maintains that there is no single exchange rate regime for all countries (Mundell, 1961). McKinnon (1963) held that size and openness of the economy is the core of the exchange rate regime choice. Also, fixed exchange rate regime functions better for small countries with open economy than for large ones with closed economy. Other body of research such as Boyer (1978), Henderson (1979), and McKinnon (1981) indicated in the case of monetary shocks (financial and fiscal market fluctuations), fixed exchange rate regime functions better for keeping production stability. In 1980s, literature on OCA perpetuated the importance of credibility of fiscal policy in determining the exchange rate regime. Findings of Barro and Gordon (1983), Melitz (1988), Giavazzi and Giovanni (1989), and Van Hagan (1991) indicated that credibility was achievable through setting exchange rate similar to that of a country with low inflation rate. During the anti-inflationary policies, countries suffering low credibility usually used their Central Bank credibility to stabilize local currencies with respect to more stable currencies.

Based on OCA theory, openness of the economy, economic size, inflation rate, degree of economic development, and degree of financial development are important determinants of exchange rate regime. As stated before, more open economies have higher costs of floating exchange rate regime, and any foreign monetary shocks affect their economy. This indicates why these countries prefer fixed exchange rate regime.

Economic stability is an important goal of the economy. As mentioned before, stabilizing exchange rate with respect to low inflation rate brings credibility advantages. Thus, inflation rate increases political costs of abandoning exchange rate pegging and the probability of abandoning the pegging itself (Friedan, Ghezzi, and Stein, 2001). Exchange rate regime choice is a reflection of the size of economy. Large economy means lower vulnerabilities of a country against foreign shocks (transferring shocks inside

through exchange rate); hence low probability that fixed exchange rate regime is chosen (Heller, 1978). Markets, production factors, and goods are under the impact of degree of economic development; countries with higher degrees of economic development enjoy competent production factors and markets (Holden, Holden and Suzz, 1979). Furthermore, countries with higher degrees of economic development have more sophisticated institutions and are more likely to choose a floating exchange rate regime. Countries with lower degrees of financial development are likely to have a fixed exchange rate regime. This is demonstrated by the lack of a market mechanism to protect banking industries against exchange rate volatility in market transactions. Countries with undeveloped financial system use market tools to lead their monetary policies and are more likely to choose a floating exchange rate regime (Van Hagan and Zhou, 2005).

3.1.2. Risk of currency crisis

Edwards (1996), Poirson (2001), Frieden, Ghezzi, and Stein (2001), Van Hagan and Zhou (2005), etc., have seen the lack of international reserves as proxy for risk of currency crisis. According to OCA, risk of currency crisis is an effective determinant of exchange rate regime. The lack of international reserves decreases the probability of an exchange rate regime. To support pegging the exchange rate regime, international reserves are necessary. Research by Edwards (1996), Poirson (2001), Van Hagan and Zhou (2001), etc., indicate that larger international reserves increase the probability that an exchange rate regime is chosen.

3.1.3. Political economy

3.1.3.1. Political economic factors

Recent economic literature has evaluated the economic, institutional, and political factors as important in determining exchange rate regime. Much of the current literature applies the discussion of standard political economy (trade-offs between credibility and competitiveness) in determining exchange rate regime. A country could gain anti-inflationary credibility through basing their currency on lower-inflation anchor currency. In general, governments attain their anti-inflationary credibility through satisfying electors' (voters') preferences which support low inflation and higher purchasing power. On the other hand, competition is defined as using nominal exchange rate, which is a tool for affecting prices of tradable goods vis-a-vis non-tradable goods, and provides advantages for industries.

Trade-off between credibility and competitiveness depends on current inflation rate in an economy. Pegging exchange rate regime is a good policy for higher-inflation countries to win credibility. It may decrease the inflation rate, mounting pressure on export and import markets, thus raising the real exchange rate, which in turn inflicts damage on tradable sector and push payment balance (Friedan, Ghezzi, and Stein, 2001). For this reason, producers of tradable goods may antagonise pegging inflation rate. Trade-offs between credibility and competitiveness encourage the government to decide according to political economy. Relative advantage of producers of tradable goods is determined by tradable sector, and consumer voters are important in the political economy of exchange rate. Government decides on pegging exchange rate and raising real exchange rate according to political leverage of producers of tradable goods. Given the weight of consumer voters, the government implements the policy of pegging and raising real exchange rate accordingly and as a result, increases the consumer purchasing power.

Before the elections, usually the policy of pegging exchange rate is resumed for the following reasons:

a) Voter structuring supports for anti-inflationary policy;
b) Consumer purchasing power improves along with increase in exchange rate.

These factors force the government to peg exchange rate before the elections.

In empirical studies, political instability of political economy is used to estimate equations. The frequency of government changes and power transitions to opposition parties constitute two indices of political instability. The first criterion has been developed by Cukierman and Tabelini (1992) and the second by Edwards (1996). Meon and Rizzo (1999), Poirson (2001), Edwards (1996), etc., have used these indices.

3.1.3.2. Institutional and political characteristics of OIC countries

Constitutional basis ranges from republic (Algeria) to absolute monarchy (Saudi Arabia and Qatar). In countries such as Djibouti, Iran, Sudan, etc., the president is the head of government. In other countries such as Iraq and Turkey, the prime minister is the head of executive branch. In some others such as Kuwait and Saudi Arabia, the king is highly invested with political power. However, in some countries with absolute monarchy (such as Bahrain, Jordan, Kuwait, etc.) the prime minister is an active executive director. In some others, such as Qatar, Saudi Arabia, and UAE, the king has absolute political power. Most of oil producing countries have monarchical system as their state system. All countries of GCC (Gulf Cooperation Council) have monarchical system and their economies are highly dependent on oil. An important feature of these countries is that there is no sales and income tax levied. Free education, health care, social security services are provided for all citizens. In fact, oil-rich and wealthy Muslim countries with monarchical systems reward their citizens with free social services, and oil-rich and wealthy countries with republic system usually provide free education and health care, but levy different sorts of taxes on the citizens.

3.1.4. Tradable sectors

Majority of OPEC member states have Muslim populations. Because in most OIC countries the state is the owner of the natural resources, most of these countries have large public sectors. The share of oil in exports of OIC countries ranges between zero (Albania) and 95 per cent (Algeria) in 1990-2009. Table 1 shows the relationship between oil exports and exchange rate regime choice. Countries with higher share of oil revenue are given in left side and those with lower oil revenue in the right side of the table.

Table 1: Oil Revenue and Exchange Rate Regime Choice

Country	Exchange rate regime (0 to 7)	Oil exports ratio to total exports	Country	Exchange rate regime (0 to 7)	Oil exports ratio to total exports
Algeria	5.8	95	Sudan	5.5	33
Kuwait	3	92.2	Tunisia	5.6	10.1
Libya	3.13	93.8	Turkey	6	1.1
Saudi Arabia	3.06	89.9	Pakistan	6.3	1.4
Qatar	3.06	89.9	Lebanon	4.5	0.3
Yemen	6	84.4	Jordan	3	0.0
Iran	3.6	83.3	Djibouti	2	0.0
Oman	3	80	Albania	6	0.0
Bahrain	3.07	66	Bosnia	6.1	0.0
Syria	3	64.3	Malaysia	5	0.0
UAE	3	44.4	Maldives	5	0.0
Egypt	4.15	39.3			

Source: Research Results

According to this table, countries with higher oil revenue are likely to fix their exchange rate and those with lower oil revenue prefer floating exchange rate regime. Oil sector affects exchange rate through government interests. Since, it is traded on US dollar base, oil revenue is kept as foreign reserves for

monetary and balance of payment gap. This issue was the real reason behind the fixed exchange rate regime choice by these countries. Industrial sector have a large potential to affect the exchange rate. It is highly dependent on tradable sectors. Producers of industrial sector oppose long-term rising in the exchange rate, preferring more flexible exchange rate regime. The collected data indicated that countries with smaller industrial sector prefer fixed exchange rate regime (Djibouti 17 per cent; Syria 24 per cent; and Jordan 27 per cent). On the contrary, countries with larger industrial sector prefer more floating exchange rate regime (Iran 34 per cent; Algeria 52 per cent; and Yemen 35 per cent). Findings of Nabli, Keller, and Vaganzones (2003) indicated that fixed exchange rate regime in the Middle East leads to overvaluing these countries' currencies according to floating exchange rate regime.

4. Exchange Rate Regime Models Estimation

To investigate the determinants of exchange rate regime, body of research including Collins (1996), Edwards (1996), Poirson (2001), Friedan, Ghezzi, and Stein (2001), Blumberg, Friedan, and Ghezzi (2005), and Al-Shamari (2006) have applied Logit and Probit approaches to the situation. In the present study, we examine the probability of determining an exchange rate regime via an OCA theory, drawing upon theoretical backgrounds and literature of the field. The generic model of the study is as the following:

$$Y_{\mathrm{It}} = Z_{it}{}'\beta + C_{\mathrm{it}}{}'\vartheta + X_{it}{}'\alpha + S_{it}{}'\lambda + \mathrm{u_{it}} \qquad (1)$$

$$i=1,2,\ldots,N \qquad t=1,2,\ldots,T$$

Where i denotes the country and t denotes time. β, ϑ, α and λ denote parameters of the model. The dependent variable Y is the exchange rate of country i and with a fixed exchange rate regime, it will be 1 and with a floating regime it will be zero. Z_{it} denotes OCA factors, i.e., openness of the economy,

inflation, economic size, economic development index, and financial development index. *C* denotes monetary crises risk (measured by international reserves to local currency ratio) and *X* denotes political economic factors. Political economic variables include dictatorship, political system, and legislative and political instability indices. *S* denotes the importance of tradable sector including oil exports and industrial sector and u_{it} is error term.

4.1. Exchange rate regime model and data

The data for present study include data from 49 OIC countries for the period 1990-2014. The number of countries for study is subject to limitations of the data availability. Data for dependent variable came from two sources: Annual Report on Exchange Rate Arrangements and Restrictions and Exchange Rate Regimes Database Constructed by Bubula and Ötker-Robe (2010). The present study use *de facto* Exchange Rate Regime Measure only. Exchange rate arrangements of countries are based on floating or fixed exchange rate regimes.

The studies carried out previously, assign descriptive variables to four groups of OCA factors, monetary risk, political economy, and tradable sectors. OCA descriptive variables include:

a) Openness of the economy; this is measured by exports and imports to GDP ratio. This index is provided by data from World Bank, WDI[1] and Arab Monetary Fund.
b) Inflation; data from World Bank and WDI
c) GDP; the real GDP in 2000 fixed prices provided by World Bank and WDI
d) Index of economic development; taken from indices provided by WDI
e) Degree of financial development; provided by WDI, IMF, and IFS

1. World Development Indicator

Monetary crises risk is determined by the ratio of "international reserves minus gold reserves" divided by money as near-money (quasi-money or *M2*). The data for this variable was provided by IMF's International Financial Statistics. Since *M2* is based on local currency, it was converted to US dollar for each country. The present study uses two tradable sectors (oil exports and industrial sector) which are highly important in OIC countries. The size of oil exports is given by ratio of oil export to total exports of given country, and industrial sector is given as a percent of GDP. Data was provided by World Bank and WDI.

Different sources provided us with political economic factors. Dictatorship index was provided by University of Maryland and George Mason University data pool. This variable is based on democracy index ranging from zero (least democracy) to 9 (highest democracy). Based on methodology used by Friedan et al. (2001) the democracy index lower than 3 gets 1 and higher than 3 gets zero, which was used in the present study as well. Two indices provided by Freedom House for Political Rights and Civil Liberties were also included in the study. Variable for political system of any country was provided by Polity IV data for political system. According to Polity IV database, political system variable is divided into three groups: Systems with an Unelected President, Systems with an Assembly-elected President, and Systems with a Parliamentary Elected Chief Executive. In the present study, we use the dummy variable of political system (zero for first group and 1 for other groups).

Legislative system included election laws of each country. This variable, as well, was provided by Polity IV database. Countries fall to a continuum of 'without legislative system' to 'different types of legislative system.' In the present study, a dummy variable (1 for countries without legislative system or unelected legislative system, and zero for otherwise) was used as a proxy for legislative systems of OIC countries.

Political instability is Kaufmann, Kraay and Mastruzzi (2004) index. Political instability ranged from zero (the least stability) to 100 per cent (the

highest stability). In the present study a dummy variable was used to denote political instability (1 for instability of less than 30 percent, and zero for higher than that). The final function takes the following form:

$$Y_{it} = \alpha_0 + \beta_1 \log(Inf) + \beta_2 EOp + \beta_3 GDP + \beta_3 EDev + \beta_4 FDev + \beta_5 Risk + \beta_6 Indus + \beta_7 Oil + \beta_8 Demo + \beta_9 Polins + \beta_{10} legsys + \beta_{11} polsys + U_{it} \quad (2)$$

Where *i=1,2,…, N* and *t=1,2,…,T*. *i* denotes country and *t* denotes time. Y_{it} is dependent variable for exchange rate regime of country *i* in time *t*, which will be 1 if fixed exchange rate regime is chosen and zero if a floating regime is taken (in model estimation by ordered choice, ordered data provided by IMF was used). In Eq.2, *Inf, EOp, GDP, EDev,* and *FDev* denote inflation rate, openness of the economy, GDP, economic development, and financial development, respectively (OCA theory factors). *Risk* denotes risk of currency crises. *Indus* denotes the share of industrial sector in GDP, and *Oil* denotes oil exports ratio to total exports of a given country (tradable sector). *Demo, Polins, Legsys,* and *Polsys* denote dictatorship, political instability, legislative system and political system (political economic factors) indices, respectively, and U_{it} is the error term. The results of estimation for different conditions were given in Tables 2 through Table 9. Due to the relationship between GDP and economic development and possibility of linearity, two regressions were estimated separately. The results of estimations were given for all different conditions.

Table 2: Results of Estimation of Generic Model in Different Conditions

Variables	Regression (1)	Z-statistics	Marginal Effect	Regression (2)	Z-statistics	Marginal Effect	Regression (3)	Z-statistics	Marginal Effect
Inf	-0.006	-.076	-0.001	-0.002	-0.67	-0.001	-0.003	-0.66	-0.002
EOp	0.005	0.19	0.001	0.009	2.21	0.002	0.004	1.32	0.001
GDP	-7.02e-12	-4.18	-7.02e-12	-	-	-	-3.86e -12	-2.87	3.23e-12
EDev	0.0012	2.67	0.0001	0.0007	1.91	0.0002	-	-	-
FDev	-4.89e-12	-1.87	-4.29e-12	-1.28e-12	-0.14	1.01e-12	-7.62e-12	-2.56	7.23e-12
Risk	2.73e-7	0.98	1.2e-7	1.09e -7	1.87	1.01e-7	3.14e-7	1.89	3.01e-7
Indus	-0.03	-1.45	-0.01	-0.04	-2.98	-0.02	-0.04	-1.99	-0.02
Oil	0.04	1.33	0.02	0.05	2.18	0.03	0.05	1.76	0.02
Demo	0.73	1.67	0.25	-	-	-	-	-	-
Polins	0.07	2.75	0.022	0.03	3.87	0.01	0.06	5.43	0.03
Legsys	0.06	1.71	0.016	-	-	-	-	-	-
Polsys	0.05	1.98	0.018	-	-	-	-	-	-
M. F R^2	0.52			0.44			0.41		
Probe(LR)	0.000			0.000			0.000		

Source: Research Results

Table 2 gives the estimation results of generic model (2) through binary Probit and optimization algorithm of quadratic Hill Climbing for different conditions. In regressions (2) and (3), to carry out a better examination of determinants of exchange rate regime, political economy variables were limited to a single political instability variable. Also, due to the links between GDP and economic development index in second and third regressions, each of these variables was included independently in the model. *LR* and McFadden-R^2 statistics indicated significance of coefficients. In these regressions, dependent variable got 1 (for fixed exchange rate regime) and zero (for floating regime).

Table 3 gives the estimation results of generic model (2) through binary Probit and optimization algorithm of quadratic Hill Climbing by excluding the political factors and tradable sectors. To carry out a better examination of OCA factors, in regressions (4) and (5), political economy and tradable sectors were excluded from the equation. Also, due to the links between GDP and economic development index in second and third regressions, each of these variables was included independently in the model. As seen in the table, with political economic and tradable factors excluded, McFadden-R^2 statistics was decreased significantly. *LR* and McFadden-R^2 statistics indicated significant coefficients. In these regressions, dependent variable got 1 (for fixed exchange rate regime) and zero (for floating regime).

Table 3: Estimation of the Model Excluding Financial and Political Factors

Variable	Regression (4)	Z-statistics	Marginal effect	Regression (5)	Z-statistics	Marginal effect	Regression (6)	Z-statistics	Marginal effect
Inf	0.003	0.88	0.001	0.003	0.76	0.001	0.003	1.21	0.001
EOp	0.001	0.31	0.0006	0.008	2.11	0.0009	0.009	3.89	0.0007
GDP	1.04e -12	-4.89	1.01e -12	-	-	-	-3.61e -12	-3.94	-2.11e -12
EDev	0.0006	4.87	0.0002	0.0005	4.09	0.0001	-	-	-
FDev	5.06e-12	1.58	3.03e-12	3.65e-12	2.11	2.15e-12	5.48e-12	2.11	4.47e-12
Risk	-8.44e-8	-0.41	7.87e-9	-7.03e-8	-1.19	-6.13e-8	-2.63e-8	-0.84	-2.42e-8
M. F R^2	0.36			0.27			0.19		
Prob(R)	0.000			0.000			0.000		

Source: Research Results

Table 4: Estimation of the Model Excluding Political Factors

Variable	Regression (7)	Z-statistics	Marginal effect	Regression (8)	Z-statistics	Marginal effect	Regression (9)	Z-statistics	Marginal effect
Inf	0.003	1.11	0.002	0.002	0.87	0.001	0.02	0.11	0.002
Eop	0.003	0.76	0.001	0.008	4.87	0007	0.08	3.98	0.002
Gdp	-8.62e-12	-4.87	-7.32e-12	-	-	-	-3.21e-12	-4.02	-2.21e-12
Edev	0.0008	4.98	0.0003	0.0003	4.65	0.00007	-	-	-
Fdev	5.11e-12	1.72	4.21e-12	-3.6e-12	-1.43	-2.2e-12	3.99e-12	1.87	2.39e-12
Risk	4.12e-8	-0.96	3.13e-8	-4.11e-8	-0.66	-3.12e-8	-3.99	-0.89	-2.1
Indus	-0.04	-2.97	-0.01	-0.04	-3.87	-0.02	-0.03	-4.23	-0.01
Oil	-0.05	3.12	-0.02	0.05	2.98	0.03	0.05	4.89	0.02
M. F R^2	0.41			0.29			0.25		
Prob(Lr)	0.000			0.000			0.000		

Source: Research Results

Table 4 gives the estimation results of generic model (2) through binary Probit and optimization algorithm of quadratic Hill Climbing with excluding the political economic factors. *LR* and McFadden-R^2 statistics indicated significance and fitness of coefficients. In these regressions, dependent variable got 1 (for fixed exchange rate regime) and zero (for floating regime). It should be noted that Hosmer & Lemeshow (1989) tests of goodness of fit, expectation-prediction evaluation, and *LM* variance heterogeneity were carried out for all estimated regressions. The results indicated goodness of fit and non-existence of variance heterogeneity. The Wald test of significance of coefficients confirmed Z-statistics. Corellogram and normality statistics indicated stationary and normality of error terms. The results of Hosmer & Lemeshow tests were given in Table 5.

Table 5: Results of Hosmer & Lemeshow Test

Regression	H-L Statistics	Probe H-L	LM-Probe
1	12.81	0.11	0.21
2	5.39	0.71	0.23
3	9.14	0.33	0.15
4	11.09	0.09	0.13
5	8.85	0.35	0.17
6	10.90	0.21	0.13
7	15.71	0.05	0.19
8	12.70	0.12	0.26
9	18.04	0.02	0.24

Source: Research Results

Table 6: The Results of Expectation-prediction Evaluation Test

Regression	%Correct	%Incorrect
1	79.78	20.22
2	76.23	23.77
3	76.45	23.55
4	70.05	29.95
5	72.55	27.45
6	72.23	27.77
7	76.34	23.66
8	72.98	27.02
9	67.34	23.66

Source: Research Results

In this section, an estimation of generic model through ordered Probit approach is presented. Table 7 gives the results of estimation of generic model in Eq. 2 using ordered Probit and Berndt-Hall-Hall-Hausman optimization algorithm for first and third regressions using ordered Probit and Newton-Raphson optimization algorithm.

LR and *Pseudo* R^2 statistics indicate significance and fitness of coefficients. In these regressions, dependent variables take values 1 (completely fixed) to 5 (completely floating regime).

Table 8 gives the results of estimation of Eq. 2 generic model excluding political and financial factors using ordered Probit and Berndt-Hall-Hall-Hausman optimization algorithm for first and second regressions and Quadratic Hill Climbing Optimization Algorithm for third regression *LR* and *Pseudo* R^2 statistics indicate significance and fitness of the coefficients.

Table 7: Results of Estimation of Generic Model Ordered Probit

Variables	Regression (1)	Z-statistics	Marginal effect	Regression (2)	Z-statistics	Marginal effect	Regression (3)	Z-statistics	Marginal effect
Inf	0.006	1.11	0.02	0.02	1.32	0.01	0.14	1.23	0.09
Eop	0.02	1.43	0.01	0.04	0.43	0.02	0.03	1.45	0.01
Gdp	3.42e-12	-1.98	2.12e-12	3.32e-12	-1.98	3.12e-12	-2.12e-12	-0.98	-2.23e-12
Edev	7.12e-5	1.29	6.13e-5	0.0001	1.76	0.00004	0.0002	4.11	0.00002
Fdev	5.23e-12	1.11	4.33e-12	5.77e-12	1.43	5.12e-12	1.11e-11	0.98	4.11e-12
Risk	3.99e-8	-0.32	2.29e-8	1.11e-8	2.09	1.11e-7	1.89e-8	1.11	1.23e-9
Indus	-0.04	-2.98	-0.02	-0.03	-2.13	-0.01	-0.05	-2.87	-0.002
Oil	0.08	3.12	0.04	0.06	4.12	0.03	0.08	2.99	0.04
Demo	0.34	0.88	0.12	-	-	-	-	-	-
Polins	0.0005	0.65	0.0001	-	-	-	0.02	1.98	0.01
Legsys	0.05	2.19	0.03	0.03	2.98	0.01	-	-	-
Polsys	0.04	1.45	0.01	-	-	-	-	-	-
Pseudo R^2	0.35			0.32			0.30		
Prob (Lr)	0.000			0.000			0.000		

Source: Research Results

Table 8: Results of Model Estimation Excluding Political and Financial Factors (ordered Probit)

Variables	Regression (5)	Z-statistics	Marginal effect	Regression (6)	Z-statistics	Marginal effect	Regression (7)	Z-statistics	Marginal effect
Inf	0.006	1.98	0.003	0.017	1.87	0.01	0.01	1.98	0.01
Eop	-0.005	0.24	-0.002	0.004	0.76	0.002	0.006	2.23	0.001
Gdp	3.12e-12	-4.95	2.11e-12	-	-	-	2.11e-12	-3.11	1.23e-12
Edev	0.0006	5.56	0.0003	0.0001	6.12	0.0001	-	-	-
Fdev	5.5e-12	2.87	4.23e-12	-1.12e-12	-1.44	1.11e-12	3.11e-12	2.32	2.11e-12
Risk	7.5e-9	-1.98	6.76e-9	3.12e-10	-0.78	2.11e-10	-8.98e-10	-0.39	7.12e-10
Pseudo R^2	0.24			0.21			0.18		
Prob(Lr)	0.000			0.000			0.000		

Source: Research Results

Table 8 gives the results of estimation of Eq. 2 generic model excluding political and financial factors using ordered Probit and Berndt-Hall-Hall-Hausman optimization algorithm for first and second regressions and Quadratic Hill Climbing Optimization Algorithm for third regression. *LR* and *Pseudo* R^2 statistics indicate significance and fitness of the coefficients.

Table 9: Results of Model Estimation Excluding Political Economic Factors (Ordered Probit)

riables	egression (7)	Z-statistics	ginal ect	Regression (8)	Z-statistics	arginal effect	Regression (9)	Z-statistics	Marginal effect
Inf	0.0006	1.98	0.0001	0.008	2.98	0.004	0.009	3.43	0.003
Eop	0.004	1.34	0.001	0.005	3.11	0.001	0.02	4.23	0.004
Gdp	3.12e-12	-1.99	2.11e-12	-	-	-	2.11e-12	1.45	1.23e-12
Edev	0.0005	4.86	0.0002	0.0004	4.90	000.1	-	-	-
Fdev	5.44e-12	1.16	3.12e-12	2.11e-12	1.11	1.11e-12	4.11e-12	0.45	3.45e-12
Risk	6.34e-9	-1.54	.12e-9	3.12e-9	-1.12	1.12e-10	9.12e-9	1.78	1.01e-9
Indus	-0.05	-3.12	-0.04	-0.07	-4.08	-0.05	-0.09	-4.28	-0.007
Oil	0.08	4.12	0.09	0.08	4.34	0.03	0.23	4.34	0.09
Pseudo R^2	0.30			0.25			0.20		
Prob(Lr)	0.000			0.000			0.000		

Source: Research Results

Table 9 gives the results of estimation of generic model of Eq. 2 excluding political economic factors using ordered Probit and Berndt-Hall-Hall-Hausman optimization algorithm. *LR* and *Pseudo* R^2 statistics indicate significance and fitness of the coefficients. *LR* and McFadden-R^2 statistics indicate significance and fitness of coefficients. The Wald test of significance of coefficients confirmed Z-statistics. Corellogram and normality statistics indicate stationary and normality of error terms. The results indicate goodness of fit.

Model estimation results using binary and ordered Probit were given in tables 2 through 9. *LR*, McFadden R-squared, and *Pseudo* R^2 indicate fitness and significance of coefficients in all regressions. Our findings indicate that OCA factors are effective on exchange rate regime of OIC countries. Among political economic factors, the coefficient of political instability has more significance in all regressions. Also, tradable sectors have a significant effect on exchange rate regime choice of OIC countries. Risk of currency crisis coefficient was not statistically significant, and of all political economic factors, only political instability was significant. The general findings are as the followings:

Oil sector (the share of oil revenue in total exports) has a positive significant effect on exchange rate regime choice of OIC countries. In fact, oil revenues raise the probability of choosing a fixed exchange rate regime. It can be said that countries with large oil sector (more powerful countries) are more adept in pegging their exchange rate regime. In fact, oil sector plays an important role in determining exchange rate regime in OIC countries. The preference of fixed exchange rate regime over a floating regime with oil revenue can be attributed to the importance of this sector as a political sector and also the importance of income in fixed money. Indeed, oil sector not only plays a role in determining exchange rate regime, but also it is important in setting the values of exchange rate itself. Given the inelasticity of oil demands,

setting prices in fixed exchange rate regime would benefit these countries. Furthermore, fixed exchange rate regime would bring fixed oil revenue for OIC. As a result, fixed regime would prove optimal policy in oil sector. On the other hand, oil revenue provides an effective income tool for these countries to peg their exchange rate regimes.

The coefficient of inflation is not significant in most modules, which indicates this variable does not have any significant effect on exchange rate regime of OIC countries. If it has significant effect, it will be positive, i.e., rising the inflation rate, the probability of choosing a fixed regime increases. This can be attributed to contradictory effects, that is, higher inflation rates encourage the government to fix the inflation rate to gain credibility and canvassing votes from voters, although it can decrease the fixed inflation rate (Friedan, Ghezzi, and Stein, 2001).

After separating the effects of *GDP* and economic development in different regressions, the coefficient of openness of the economy becomes statistically significant and with positive sign as expected. In fact, more financial openness increases the probability of choosing a fixed exchange rate regime. This finding is consistent with traditional prediction of OCA theory. Usually, in the theory there is a negative relationship between degree of economic openness and flexibility of exchange rate regime. Exchange rate regime fluctuations in an open economy apply changes either in price gaps and relative prices of tradable and non-tradable goods. These changes increase the uncertainty about real output rate of keeping local money (against foreign currency). This uncertainty leads to rise in the currency replacement phenomenon. Thus, the more open any economy, ceteris paribus, the less exchange rate flexibility will be attainable. Because larger countries have more closed economies, the economic openness is accounted for by the country's size, that is, larger size of a country (higher GDP) means more closed economy. When openness is regressed on GDP, coefficient of GDP will be highly significant with negative sign, which can be due to including the openness coefficient, which its significance fades away when real GDP

and economic development variables are included. Poirson (2001), Blumberg, Friedan, and Stein (2005), and Bleany and Francisco (2005) evaluated the coefficient of openness as positive, which is attributed to rise in the costs of floating exchange rate due to financial openness. Therefore, fixed exchange rate regime is a good policy for maintaining production stability (Boyer, 1978; Henderson, 1979; and McKinnon, 1981).

The coefficient of economic size variable is significant with a negative sign. That is, with an increase in economic size, the probability of choosing a fixed exchange rate regime by OIC countries dwindles, since larger economies have less vulnerability against external shocks coming from exchange rate, the necessity of adopting a fixed exchange rate regime decreases. Findings are consistent with OCA theory predictions (Heller, 1978).

Economic development variable coefficient is significant but with a positive sign. This contradicts the predictions made by the theory. Edwards (1996), Blumberg, Friedan, and Stein (2005), and Bleany and Francisco (2005) also found similar results. In fact, with higher economic development, the probability of adopting a fixed exchange rate regime rises. This may be due to the fact that this variable is correlated with other income-related factors in given country. OIC countries have economies with high incomes, average incomes, and lower incomes. Countries with lower incomes usually adopts floating exchange rate regime, and those with higher incomes are likely to choose a fixed regime. So, positive sign of the economic development index is explained. Also, it can be said that in a country with higher incomes, fewer trade barriers would be faced, since these countries enjoy more competent tax levy system and are not dependent much upon tax income. As a result, these countries handle more open economies and avoid the risk inherent in floating exchange rate regime. But OIC countries with higher incomes suffer from a strong tax levying system, and the majority of them have oil revenues, so they

are not dependent much upon tariffs income, and with an open economy, the probability of adopting a fixed exchange rate regime gains momentum.

The coefficient of financial development is not significant in most conditions, and if significant, it is weak and with positive and negative signs. In general, with more developed financial environment, the probability of adopting a fixed exchange rate regime increases. Since the majority of OIC countries are oil exporters, they are likely to maintain their risk and oil revenue under check. Thus, for doing so, they stabilize financial sector. However, in the present study, there is no statistical relationship between financial development and exchange rate regime choice.

The coefficient of industrial sector is statistically significant with expected negative sign. Possibly industrial sector relies mostly on competition in the tradable sector. Industrial producers in OIC countries have organized lobbies to eschew a very valuable exchange rate, and they have achieved this through exchange rate regime. Also, countries with higher exports have adopted floating exchange rate regime to boost their exports and to support their industrial sector.

Of all variables of political factors, only political instability is significant with a positive sign. In fact, countries with political instability tend to choose a fixed exchange rate regime. Since in politically stable countries, an economic disruption would bring forth political implications; the findings of the present study are consistent with theories by Edwards (1996) and Cooper (1971). In fact, political instability increases the political costs of the pegging regime. As a result, highly instable countries avoid these costs through pegging their exchange rate. Also, the coefficient of international reserves is not significant.

In Tables 3, 4, 8, and 9, political factors and tradable sectors are excluded from the model for improved examination. All variables tend to be significant with expected signs, but again, risks of financial markets are not significant. To achieve a better examination, in Tables 4 and 9 political economic factors were excluded from the regression. Our findings indicated that excluding

political variables considerably increase the significance level of oil and tradable sector variables.

5. Conclusion

To investigate the determinants of exchange rate regime in bodies of research provided by Collins (1996), Edwards (1996), Poirson (2001), Friedan, Ghezzi, and Stein (2001), Blumberg, Friedan, and Ghezzi (2005), and Al-Shamari (2006), Logit and Probit approaches were applied. The present study as well investigated the probability of exchange rate regime choice for OIC countries in the period 1990-2014 by examining the theoretical underpinnings and previous body of research carried out using OCA and Probit approaches. The results indicated that OCA factors, tradable sectors and political economy wielded impacts on the exchange rate regime on OIC countries, such that oil revenue, financial development, GDP, openness of economy, economic development, and political instability increase the probability of adoption of a fixed exchange rate regime, and industrial sector and size of the economy decrease the probability. Inflation rate, democracy, political system, legislative system, and monetary crises risk have no significant impact on the exchange rate regime choice of the countries. Also, the results show that the democracy and oil revenue variable have the most impact and financial development and monetary crises risk have the least impact on choosing exchange rate regime, respectively.

References

0 Al-Shammari N., (2007). "Exchange rate policy and international trade", *International Research Journal of Finance and Economics*, 2, 23-66.

0 Bernard, W., and D. Leblang (1999). "Democratic institutions and exchange rate commitments", *International Organization* 53(1): 71-97.

0 Bleaney, F. and M. Fransisco, (2002). "On the existence of mini-max martingale measures," *Math. Finance*, 12 1–21.

0 Blomberg, S., J. Frieden and E. Stein (2005). "Sustaining fixed rates: The Political Economy of Currency Pegs in Latin America", *Journal of Applied Economics*, No. 8

0 Boyer, R. S., (1978). "Optimal foreign exchange market intervention," *Journal of Political Economy*, 86, pp. 1045-55.

0 Collins, S. (1996). "On becoming more flexible: exchange rate regimes in Latin America and the Caribbean," *Journal of Development Economics* 51, 117-38.

0 Cooper, R. (1971). "Currency devaluations in developing countries", *Essays on International Finance*, No. 86, Princeton University.

0 Cukierman, A., S. Edwards, and G. Tabellini, (1992). "Seigniorage and political instability", *American Economic Review* 82, 537-55.

0 Daly, S, and M. Sami, (2009), "Determinants of exchange rate practices in the MENA Countries: Some further preliminary results", *William Davidson Institute Working Paper* Number 952.

0 Deverajan, S. and D. Rodrik (1992*). Do the benefits of fixed exchange rates outweigh their costs? The Franc Zone in Africa.* Goldin and A.L. Winters (eds.), Open economies: Structural adjustment and agriculture, London, Cambridge University press for CEPR.

0 Dreyer, J.S., (1978). "Determinants of exchange-rate regimes for currencies of developing countries: some preliminary results." *World Development*, 6(4): 437-445.

0 Edwards, S., (1996). "The determinants of the choice between fixed and flexible exchange regimes", *National Bureau of Economic Research, WorkingPaper*, 5576.

0 Frieden, J., P. Ghezzi and E. Stein (2001). *Politics and exchange rates: A Cross-Country Approach to Latin America*, J. Frieden and E. Stein, eds., the currency game: Exchange rate politics in Latin America, Baltimore, Johns Hopkins University press.

0 Giavazzi, F., and A. Giovannini (1989). *Limiting exchange rate flexibility: the European monetary system,* Cambridge, Mass: the MIT press.

0 Güçlü, M. (2008). "The determinants of exchange rate regime in emerging market economics", *Working Paper* No: 08 / 06, Department of Economics Ege University.

0 Heller, H Robert,(1978). "Determinants of exchange rate practices," *Journal of Money, Credit and Banking, Blackwell Publishing*, Vol. 10(3), p.p. 308-21, August.

0 Henderson, D. (1979). "Financial policies in open economies," *American Economic Review*, 69, 2.

0 Holden, Paul & Holden, Merle & Suss, Esther C, (1979). "The determinants of exchange rate flexibility: An empirical investigation," *The Review of Economics and Statistics*, MIT Press, Vol. 61(3), Pp.327-33, August.

0 Hosmer, D. W. and S. Lemeshow, (1980). "Goodness-of-fit test for the

multiple logistic regression model", *Communications in Statistics*, A10, 1043Ð1069

0 Hosmer, D. W. and S. Lemeshow, (1989). *Applied¸ logistic regression*, *Wiley*, New York.

0 Husain, A., (2006). "To peg or not to peg: A Template for Assessing the Nobler," *IMF Working Paper No*, 06/54. Washington D. C., International Monetary Fund.

0 IMF (1999). "Exchange rate arrangements and currency convertibility: developments and issues," *World Economic and Finance Surveys*.

0 International Monetary Fund, (2009). Direction of trade statistics (DOTS). Washington D. C. *International Monetary Fund.* www.imfstatistics. org/dot (Accessed November 2, 2009).

0 International Monetary Fund, (2009). *World Economic Outlook Database, October2009.*Washington D.C.

0 Kato, I. and M. Uctum, (2008). "Choice of exchange rate regime and currency," International *Review of Economics and Finance* 17: 436–456.

0 McFadden, D. L., (1974), *Conditional Logit analysis of qualitative choice analysis, in frontiers in econometrics*. Ed. P. Zarembka, 105–142. New York: Academic Press.

0 McKinnon, R., (1963). "Theory of optimum currency area," *American Economic Review*, No. 4, September, pp. 717-725.

0 McKinnon, R., (2000). "Mundell, the Euro and optimum currency areas" *Journal of Policy Modelling*, 22 (3), pp. 311-324.

0 Melitz, J. (1988). *Monetary discipline and cooperation in the European Monetary System: A synthesis*, Giavazzi F, Micossi S. and M. Miller (1988) *the European Monetary System*, Cambridge University press, Cambridge.

0 Melvin, M., (1985). "The choice of an exchange rate system and macroeconomic stability." *Journal of Money, Credit and Banking*, 17(4): 467-478.

0 Mundell, R., (1961). "A theory of optimum currency areas," *American Economic Review*, No. 60: p.p. 657-665.

0 Nabli, M., J. Keller, and M. Veganzones (2003). "Exchange rate management within the Middle East and North Africa Region the cost to manufacturing competitiveness," *World Bank*, Speeches and Presentations by chief economists.

0 Ondinaa, A, P. et al. (2011). *Cuadernos de Economía*, volume 34, (55–61.)

0 Poirson, H. (2001). "How do countries choose their exchange rate regime?" *IMF Working Paper*, NO. 01/46

0 Rizzo, J and M. Meon, (1998). "The economic determinants of the choice of an exchange rate regime: A Probit Analysis", *Economics Letters*, 59, pp. 283-287.

0 Savvides, A., (1990). "Real exchange rate variability and the choice of exchange rate regime by developing countries." *Journal of International Money and* Finance, 9(4): 440-454.

0 Von Hagen, J. and J. Zhou., (2005). "The choice of exchange rate regimes in developing countries: A multinomial panel analysis." *Journal of International Money and Finance*, 26(7): 1071- 1094.