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S. Evans Osabuohien and
R. Uchenna Efobi

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EDITORIAL NOTE

Five papers make up this issue. The first one, titled **Assessment of Trade Performance of OIC African Members in the Face of Global Economic Crisis** by S. Evans Osabuohien and R. Uchenna Efobi indicates that the 2007/2008 global economic crisis has threatened the economic and financial fabrics of most countries. For instance, FDI inflow as a percentage of GDP in Sub-Saharan Africa (SSA), which increased by over 85% (1995-1999) reduced by 48% in 2008. Similarly, merchandize exports as a percentage of GDP for SSA reduced by 17.9% between 1995 and 2008. This paper investigates the impact of the economic crisis on the trade performance of 25 selected Organisation of Islamic Cooperation (OIC) countries in Africa. Some indicators that formed our main explained variable include trade share in world market, trade per capita, and real growth in trade. In the analysis conducted in this work, we found that trade performance and global economic crises indicators differ markedly across Africa's five sub-regions and the 'heat' of the global economic crises has a significant implication for trade share of Africa's OIC members. Other findings and suggestions on how to improve the trade performance for African countries especially the OIC members are documented in the study.

The second paper, titled **The Sources of Transition Probabilities in Turkish Labour Market: An Empirical Evidence for Overlapping Individual Data, 2007- 2008** by Gülser Pınar Yılmaz Ekşi, Yılmaz Akdi and Afşin Şahin, analyses the state transition probabilities in labour market that has become one of the indicators for evaluating the labour market efficiency. The state transition plays an important role in terms of acquiring knowledge and determination of basic factors in labour market. In this paper, the state transition probabilities are computed by the means of Markov process from the same periods of two year individual panel data, the Turkish quarterly data for 2007 and 2008, which is robust concerning the attrition problem that is mentioned in the literature. As a following stage, multinominal logistic regression model is employed to take the possible dynamics of transition probabilities into account such as: age, gender, urban-rural distinction, education, employment status and occupation. The results indicate that the Turkish labour market have been affected negatively during the global financial and economic crisis.

The third paper, titled **Revenue Efficiency and Returns to Scale in Islamic Banks: Empirical Evidence from Malaysia** by Fadzlan Sufian, Fakarudin Kamarudin and Nor Halida Haziaton Mohd Noor, provides new empirical evidence on the revenue efficiency and returns to scale in the

Malaysian Islamic banking sector. The sample comprised of 17 domestic and foreign Islamic banks during the period of 2006 to 2010. We employ the Data Envelopment Analysis (DEA) method to compute the revenue efficiency levels. The results indicate that the domestic Islamic banks have exhibited lower revenue efficiency levels compared to their foreign bank peers. In essence, revenue efficiency seems to be the main factor influencing domestic and foreign Islamic banks' profit efficiency levels. The empirical findings indicate that the large domestic Islamic banks tend to operate at constant returns to scale (CRS) or decreasing returns to scale (DRS). On the other hand, the small foreign Islamic banks tend to operate at CRS or increasing returns to scale (IRS).

The fourth paper, titled **Empirical Findings on Triplet Deficits Hypothesis: The Case of Turkey** by Ali Şen, Mehmet Şentürk, Canan Sancar and Yusuf Ekrem Akbaş, investigates the concept of triplet deficits in Turkey between 1980 and 2010. "Dolado-Lütkepohl Granger Causality Analysis" was performed in order to determine the direction of the relationship among the variables. In addition, the Vector Autoregressive (VAR), Variance Decomposition and Impulse-Response analysis were performed to determine the degree to which variables affected each other. The study finds that triplet deficit hypothesis was valid in Turkey between 1980 and 2010.

The last and fifth paper, titled **What Prevents Firms from Access to Finance? A Case Study of OIC Countries** by Majid Kermani and Elvin Afandi, inspects micro survey data from a sample of over 13,000 firms from 30 OIC countries. The data is used to address two primary questions: (a) what are the firm-level and country-specific predictors of financing obstacles in the OIC countries, and (b) how similar are those determinants across the least developed countries (LDCs) and developing OIC countries. It is found that the number and firm-specific characteristics that predict financing obstacles are more diverse in the LDCs when compared with the developing OIC countries. Age, size, sectoral origin, export status and ownership status of firms appear to be the most significant determinants of access to finance for firms in LDCs while only a few of these determinants are found to be statistically significant for developing OIC countries when compared to LDCs. The results also suggest that country-level indicators which measure financial infrastructure and economic development are strongly associated with obstacles to financing for firms in both groups of countries.

Assessment of Trade Performance of OIC African Members in the Face of Global Economic Crisis

S. Evans Osabuohien¹ and R. Uchenna Efobi²

The 2007/2008 global economic crisis has threatened the economic and financial fabrics of most countries. For instance, FDI inflow as a percentage of GDP in Sub-Saharan Africa (SSA), which increased by over 85% (1995-1999) reduced by 48% in 2008. Similarly, merchandise exports as a percentage of GDP for SSA reduced by 17.9% between 1995 and 2008. This paper investigates the impact of the economic crisis on the trade performance of 25 selected Organisation of Islamic Countries-OIC in Africa. Some indicators that formed our main explained variable include trade share in world market, trade per capita, and real growth in trade. In the analysis conducted in this work, we found that trade performance and global economic crises indicators differ markedly across Africa's five sub-regions and the 'heat' of the global economic crises has a significant implication for trade share of Africa's OIC members. Other findings and suggestions on how to improve the trade performance for African countries especially the OIC members are documented in the study.

1. Introduction

The effect of the global economic crisis of 2007/2008 on countries economic system is prevalent. This is especially with the consequence of globalisation, which has integrated countries relationships. Some of the effects of the crisis can be seen in the production capacity, income and expenditure, and financial markets of countries (Signorelli, Choudhry and Marelli, 2012). One of the effects of the global economic crisis on African countries, including the Organisation of Islamic Countries-OIC members, is capital flights that results from financial mobility (Kassim, 2012). Another related effect is the fall in commodity prices at the world

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market (African Development Bank and OECD, 2010). The above occurrences have some implications on trade performance of these countries, especially in terms of the share of trade in world market.

The cause of the global economic crisis, which is majorly characterised by price fluctuations across the world, has generated some debates. Some of the causes include the breakdown in stock market and ‘financialisation’ by world opportunists, financial recklessness, among others. This situation is threatening the economic and financial *well-being* of most countries. Though most countries of the world are affected, the effects are not the same; which can be attributed to the differences in countries’ economic framework.

A cursory observation of some trade performance of African countries depicts some interesting trend. For example, the merchandise exports as a percentage of GDP for Sub-Saharan African (SSA) countries, reduced by 17.9% between 1995 and 2008 (World Bank Group, 2010). The main question that looms from this discourse is ‘what is the fate of OIC African members’ trade performance at the global market, in the era of global economic crisis?’ This essentially is the motivating inquiry for this paper. The indicators of trade performance used in this study are as follows: trade share in world market, trade per capita and real growth in trade. The paper is germane given the fact that not much has been done with regards to empirically relating the recent global economic crises to trade performance in Africa; with emphasis on members of OIC.

The research question is tackled by engaging data that was sourced from World Trade Indicators (WTI) of the World Bank Group (2010), for the period 1995 to 2008. Both descriptive and econometric analyses were performed using a panel data framework. Other section of the paper are distributed in this order: background facts on trade outcome in OIC members was presented in the second section; brief review of literature was in the third section, while the formulation of empirical model was in the fourth section; the results and discussions are discussed in the fifth section, while the sixth section concludes the paper.

2. Some Background Facts on Trade Outcome in OIC Members

The Organisation of Islamic Countries (OIC) is said to be the second largest inter-governmental organisation after the United Nations, with a

membership base of 57 countries that cut across over four continents. OIC was established on 25th September 1969, following a decision of the summit at Rabat, Morocco, with 30 founding members (Organisation of Islamic Countries–OIC, 2010).

The present OIC Charter that laid down the objectives and principles of the organisation and the fundamental purpose of strengthening the solidarity and cooperation of Member States was adopted during the 11th Islamic Summit in March 2008, at Dakar, Senegal. Out of the 57 member countries of OIC, 27 are African countries, representing about 47.37%. The trade performance of OIC countries is discussed by focusing on their share in world total trade. The advantage of using trade share as a measure of trade outcome is based on the fact that price fluctuation will not have so much influence. Table 1 shows that the values of trade share in the world market for the 24 OIC members experienced some improvements, with varying magnitudes between 1995 and 2008; only nine of them were in Africa.

Apart from those whose data were not available, many of the OIC members had almost constant values between 1995 and 2008 and three of them experienced deterioration in their trade shares. Out of the 27 OIC African members, far more than half of them had trade shares stagnated between 1995 and 2008, while about three experienced decrease. The stagnation and deterioration experienced might have resulted from the *heat* of the global economic crises as a result of the dwindling global demand for commodities. This is because, with the exception of few, majority of the OIC members especially those in Africa export mainly primary commodities. The above scenario has also been recently mentioned by The Statistical, Economic and Social Research and Training Centre of Islamic Countries (SESRIC) in its 2013 report where many OIC members concentrate on the production and export of primary products. For instance, only ten OIC members accounted for the 81.3%, 76.6%, 75.4% and 68.2% of the agricultural products (See Table AI in the Appendix).

Table 1 : OIC Members Share in Trade and FDI Inflows in the World Market (1995-2008)

SN	Countries	TRDSH (%)		FDI (%)		SN	Countries	TRDSH (%)		FDI (%)	
		1995	2008	1995	2008			1995	2008	1995	2008
1	Afghanistan	na	na	na	na	30	Malaysia	1.36	1.07	1.32	Na
2	Albania	0.01	0.03	0.02	0.06	31	Maldives	0.01	na	0.00	na
3	Algeria	0.18	0.33	Na	na	32	Mali	0.01	0.02	0.04	na
4	Azerbaijan	0.02	0.11	0.10	0.00	33	Mauritania	0.01	0.01	0.00	na
5	Bahrain	0.07	0.09	0.14	0.11	34	Morocco	0.16	0.21	0.03	0.14
6	Bangladesh	0.10	0.11	0.00	0.06	35	Mozambique	0.01	0.02	0.01	0.04
7	Benin	0.01	0.01	0.00	na	36	Niger	0.01	0.01	0.00	na
8	Brunei	na	na	na	na	37	Nigeria	0.20	0.28	0.34	na
9	Burkina Faso	0.01	0.01	na	na	38	Oman	0.09	0.17	0.01	0.18
10	Cameroon	0.03	0.03	0.00	na	39	Pakistan	0.20	0.17	0.23	0.33
11	Chad	0.01	0.01	na	na	40	Palestinian Authority	na	na	na	na
12	Comoros	0.00	0.00	0.00	na	41	Qatar	na	na	na	na
13	Côte d'Ivoire	0.06	0.06	0.07	0.02	42	Saudi Arabia	0.70	1.25	-0.59	na
14	Djibouti	0.00	0.00	0.00	0.02	43	Senegal	0.03	0.03	0.01	na
15	Egypt	0.24	0.40	0.19	na	44	Sierra Leone	0.00	0.00	0.00	na
16	Gabon	0.04	0.03	-1.00	na	45	Somalia	na	na	na	na
17	Gambia	0.00	0.00	0.00	na	46	Sudan	0.02	0.06	na	0.16
18	Guinea	0.01	0.01	0.00	na	47	Suriname	0.01	na	-0.01	-0.01
19	Guinea-Bissau	0.00	0.00	na	na	48	Syria	0.09	0.10	0.03	na
20	Guyana	0.01	0.01	0.02	na	49	Tajikistan	na	na	na	0.02
21	Indonesia	0.86	0.78	1.38	0.50	50	Togo	0.01	0.01	0.01	na
22	Iran	0.27	0.71	0.01	na	51	Tunisia	0.13	0.14	0.08	na
23	Iraq	na	na	na	na	52	Turkey	0.61	1.01	0.28	1.10
24	Jordan	0.07	0.08	0.00	0.02	53	Turkmenistan	na	na	na	na
25	Kazakhstan	0.10	0.33	0.31	0.88	54	Uganda	0.02	0.02	0.04	0.05
26	Kuwait	0.21	0.38	0.00	0.00	55	United Arab Emirates	na	na	na	na
27	Kyrgyzstan	0.01	0.02	0.03	0.01	56	Uzbekistan	0.06	0.05	na	na
28	Lebanon	0.07	0.12	na	0.22	57	Yemen	0.04	0.06	na	na
29	Libya	0.11	0.20	-0.03	na						
	World Average	0.59	0.64	0.68	1.05						

Note: na – Not Available; TRDSH (%) – Trade share of the country expressed a percentage of total world trade; FDI (%) – Net Foreign Direct Investment inflow expressed a percentage of the world FDI inflows; Countries in **bold** are African members. 0.00 values do not mean zero shares but very low as the values were approximated to 2 decimal places.

Source: Authors' compilation from World Bank Group (2010).

A different and vital observation that can be made from Table 1 is that out of the 57 OIC members, only five had trade share values that exceeded the world average of 0.59% and 0.68%, in 1995 and 2008, respectively. Some of the countries that are in this category include; Indonesia, Iran (in 2008), Malaysia, Saudi Arabia and Turkey. Not too surprisingly, none of the 27 African members were in this league. A possible explanation for this is due to the fact that many of these countries have low capacity for production and trade (Peridy and Abedini, 2008; Abedini and Peridy, 2009; Ogunrinola and Osabuohien, 2010). Furthermore, Table 1 reveals that all the African members' trade share in the world market were lower than the world average, all through the period presented.

A similar scenario can be observed for the share of FDI inflow in this region, to the world flows. In Table 1, four OIC Members experienced negative net FDI inflow, while only two (Indonesia and Malaysia) had shares in FDI inflow that were above the world average of 0.68% in 1995. However, in 2008, only Turkey exceeded the global average of 1.05%. This occurrence is likely to be connected with the global economic crisis of 2007 and 2008, which made foreign investors sceptical, especially with regards to investing in developing countries, given uncertainties in their returns on investment.

Some other significant experiences of the foreign exchange market of some African OIC members, presents a further scrutiny. The exchange rates of most of these countries have experienced some extent of depreciation in values, during the period of the crisis. For instance, Comoros depreciated by 45%, Democratic Republic of Congo (2%), Ghana (21%), Nigeria (27%), Seychelles (84%), South Africa (27%), Uganda (22%) and Zambia (43%) (United Nations Conference on Trade and Development-UNCTAD, 2009). These depreciations will have substantial impact on trade, especially with regards to the pricing of export products.

An important inference that can be drawn from the foregoing is that OIC members, especially the African countries, have experienced trade performances that are below expectations. Since most of the OIC members have comparative advantage in the trade of primary products (such as agricultural produce).

3. Brief Review of Literature

The concept of the global economic crisis is not a strange phenomenon. The current global economic crisis, which started full-swing in late 2007, is characterised by some features. These include the crash in world stock markets, the capitulation of some large financial institutions and the laying-off of workers. The crisis is having far-reaching effects on countries across the world (Dirk, 2008; World Bank, 2009; Jimoh, 2010; Osabuohien and Efobi, 2013).

Thurlow *et al.* (2011), in a study that applied the dynamic computable general equilibrium model to decompose impacts and estimate distributional outcomes, observed that in Vietnam; the 2008 commodity crisis increased unemployment and poverty, by favouring labour-intensive exports, especially in agriculture. The authors equally found that the financial crisis plunged more than a million workers into unemployment and about 3 million people were below the US\$2-a-day poverty line. The net effect of the crisis has left Vietnam little changed from a baseline path, in terms of aggregate indicators including the poverty rate.

In a related study, Chor and Manova (2009) investigated the link between credit conditions and export performance, using data that incorporates the global financial crisis period. They found that the financial crisis had severe impact on trade, majorly through adverse credit conditions. Although the conditions were unevenly prominent across industries, but the bulk of effect were on industries that were financially vulnerable, in terms of their dependence on credit (Bricongne *et al.*, 2010).

Macias and Massa (2010) studied the effect of global financial crisis on selected countries, using a panel cointegration approach and found out that the global financial crisis is likely to have an important effect on the growth of Sub Saharan African countries, through the private capital inflow channel. This is somewhat related to Dirk (2008), who pointed out that FDI is a major channel through which the global financial crisis have an effect on African countries. UNCTAD (2009) relates this effect on the fact that during the global financial crisis, the level of FDI in other nations reduced due to two major factors-falls in access to financial resources in the form of poor credit facility and high cost of

finance, as well as decline in profit and poor propensity to invest across the world. These however, have affected trade outcome (Dirk, 2008).

In a more recent study by Signorelli, Choudhry and Marelli (2012), using panel of 86 countries (1980-2005) and random effects technique, examined how global economic crises affects female labour participation and unemployment rates. It was found by the authors that labour markets in countries belonging to different income groups respond differently to the economic crises. Their results conclude that financial crises (measured by banking, currency and debt crises) has negatively and significantly impacted on female participation rates, mainly in high income and upper medium income economies.

Kassim (2012), on the other hand, observed the effect of the global economic crisis on the performance of the stock market integration of Malaysia with United States of America and Japan. The author observed that the economic crisis presents changes in the nature of integration among the markets. The author observed that the markets were shown to be highly integrated at the initial stage of the crisis, but as information became clearer and it is evident that the crisis is prolonged, investors opted for other types of investment rather than the equity markets. This action resulted in an independent performance of the markets.

Despite the far reaching effect of the crisis on many countries around the world, some level of hope is being experienced for OIC countries, as some of its members have shown recovery in 2010; GDP growth increased from 3.13% in 2009 to 5.25% in 2010 (Hzaine, 2012). However, a caution was noted that the OIC Member States in particular, which had recovered from the global recession of 2009 and has witnessed resilience to the crisis, would be hit through trade and financial channels (Hzaine, 2012). The author also noted that Mediterranean and Sub Saharan Africa OIC Countries, that are involved in some form of Preferential Trade Agreements (PTA) with EU countries, are likely to be negatively affected by the sovereign debt crisis in Euro zone; some of the effect include; the reduction of EU imports, the diminution of tourism, financial flows and the drop of the workers' remittances transfers.

4. Formulation of Empirical Model

The empirical analysis of this paper is based on the international trade theory; this theory has the basic maxim that the key factors that can influence international trade include: exchange rate, the level of growth of the domestic economies, among others (Aluko, 2003). The empirical model therefore includes measures of the global financial crisis and other covariates such as exchange rate, real per capita GDP, foreign reserves and Foreign Direct Investment-FDI. The main explained variable is Trade Performance of the selected African OIC member countries. The baseline model is presented in a functional form as:

$$trdout^k = f(rpgdr, exch, lendr, fores, fdi, globdum, U) \quad (1)$$

Equation (1) is restated in an explicit form as:

$$trdout^k_{it} = \beta_{0i} + \beta_1 rpgdr_{it} + \beta_2 exch_{it} + \beta_3 lendr_{it} + \beta_4 fores_{it} + \beta_5 fdi_{it} + \beta_6 globdum_{it} + \varepsilon_{it} \quad (2)$$

Thus, the logarithmic form of the equation can be expressed as:

$$lntrdout^k_{it} = \beta_{0i} + \beta_1 ln rpgdr_{it} + \beta_2 ln exch_{it} + \beta_3 ln lendr_{it} + \beta_4 ln fores_{it} + \beta_5 ln fdi_{it} + \beta_6 ln globdum_{it} + \varepsilon_{it} \quad (3)$$

where:

trdout^k: trade performance. Superscript ‘*k*’ signifies the three indicators of trade performance, namely: trade share in the world market; trade per capita, and real growth rate in trade. The inclusion of the three covariates is with a view to obtain a more robust estimate and arrive at more informed conclusions.

rpgdr: per capita GDP. This is calculated as the real GDP divided by the total population. This measures the productivity of the country and will indicate ability to engage more in trading. A positive relationship is expected with trade performance.

exch: official exchange rate of domestic currency to the USD. As the exchange rate depreciates, it is expected to cause international demand for the country’s export higher, which connotes better trade performance. However, this is dependent on whether the countries involved have satisfied the Marshal-Lerner condition with regards to the elasticity of import and export³.

³The Marshal-Lerner condition in simple terms implies that for a currency devaluation policy to have a significant and positive effect on international trade performance

- lendr*: official lending rate. This is the cost of capital; which implies that a higher lending rate will denote lesser propensity to borrow and invest. This will have effect on productivity and by extension engagement in trading activities. Lending rate is expected to have a negative relationship with trade performance.
- fores*: foreign reserve of the countries in USD (United States Dollars), shows the external credit worthiness. As a result, the external community will be more inclined to do business with a credit worthy country (Akitoby and Stratmann, 2009; Olokoyo, Osabuohien and Salami, 2009). This should have a positive relationship with trade outcome.
- fdi*: measure of foreign direct investment inflow. Most FDIs are multinationals that engage in intensive productive activities, including trade. Hence, an increase in FDI inflow will lead to an increase in trade outcome, *ceteris paribus*.
- globdum*: global economic crisis dummy, defined as the indicator of global economic crisis. Year 2007 and 2008 are represented as 1, and other years, 0. The choice of the period 2007 and 2008 is based on the fact that the *heat* of the current global economic crisis as experienced during these period (Zoellick, 2010).
- β_{0i} : intercept of the model.
- $\beta_{1...5}$: coefficients of the independent variables; it is expected to reflect the sign and magnitude of influence of the individual independent variables on the respective indicators of trade performance.
- it*: individual country and the period identifier (i.e. $i = 25$, $t = 14$, 1995-2008).

The model formulated was first estimated, using the Pooled Ordinary Least Squares (OLS) estimation technique. Then the Fixed Effect-FE and Random Effect-RE techniques were further estimated and were used to observe the relationships between our main variables. We prefer the use of the FE and RE techniques because of the following reasons: it

(especially trade balance); the sum of price elasticity of export and import in absolute terms must be greater than one. Appleyard, Field and Cobb (2010:599) provide useful mathematical derivation).

allows us to observe the changes that occur within different units over time. This approach will also allow for the control of those factors that account for unobserved country heterogeneity. Such heterogeneity is likely to be visible because of the time-invariant national characteristics (such as certain regulations and features of the financial system) and year-specific factors (such as world-wide economic shocks); the estimates from the techniques remain unbiased even when there are obvious missing data for some periods of time across the samples of study. The above are essential considering that there are some missing data for variables that involves developing countries (particularly in Africa) as have been observed by others like Signorelli *et al.*, (2012) and Cissokho *et al.* (2013). The Hausman test was performed to infer, which is more efficient between FE and RE.

5. Results and Discussions

This section presents the empirical results that were obtained from the estimations of the formulated model. STATA 10.1 and E-views 5.1 Software were used for the estimations. We started with the presentation of the summary statistics. Twenty five (25) out of twenty seven (27) OIC African countries were included in our sample. This was informed by data availability. This represents 92.59% of the entire OIC countries in Africa. The selected countries include; Algeria, Benin, Burkina Faso, Cameroon, Chad, Comoros, Djibouti, Egypt, Gabon, Gambia, Guinea, Guinea Bissau, Libya, Mali, Mauritania, Morocco, Mozambique, Niger, Nigeria, Senegal, Sierra Leone, Sudan, Uganda, Togo, and Tunisia.

Summary Statistics of Main Variables

As reported in Table 2, trade share (*trdshare*) has a mean value of 5.5% for OIC African members with a minimum value of 0 and a maximum value of 40%. This is an indication that during the period of study, the average ratio of trade as a share of the world trade is 5.5%, which is quite low. This corroborates with Peridy and Abedini (2008) who noted that most developing countries performed below capacity in trade (car export, for an example). Although the maximum value is 40%, this is traceable to some OIC countries, especially those of the North African region such as Egypt. The average real trade growth (*Trdgrot*) and trade per capita (*Trdcap*) is 6.44% and 507.81 annual growth rate, respectively. The minimum and maximum value of the real trade growth

rate and trade per capita are -58.10 and 62.27 as well as 59.48 and 8751.05, respectively.

The average real per capita GDP (*Rpgdp*) and lending rate (*Lendr*), for the OIC countries are 1207.75 and 17.48%. This is with a minimum and maximum value of 105.16 and 8751.05 for *Rpgdp* and 6% and 51.75% for *Lendr*. The average lending rate for the OIC countries is very high, which can dissuade investment especially domestic small scale investment and if there is somewhat disincentive in investment; local production of output becomes small, which is capable of affecting export adversely.

The average value of foreign reserve (*Foresrv*), foreign direct investment (*fdi*) and exchange rate (*Esch*) is 4324.41, 5.24E+08 and 480.82, respectively. The minimum and maximum values of the variables are 0.31 and 110180.00 for foreign reserve, 4.89E+08 and 1.16E+10 for FDI and 0.58 and 3644.33 for the exchange rate.

Table 2 Summary Statistics of OIC African Members

	<i>Trdshare</i>	<i>Trdgrot</i>	<i>Trdcap</i>	<i>Rpgdp</i>	<i>Lendr</i>	<i>Foresrv</i>	<i>Fdi</i>	<i>Exch</i>
Mean	0.06	6.446	507.81	1207.75	17.48	4324.41	5.24E+08	480.82
Min	0.00	-58.10	58.48	105.157	6	0.31	-4.89E+08	0.58
Max	0.40	62.265	8751.05	9922.301	51.75	110180.00	1.16E+10	3644.33

Source: Authors' computation using STATA 10.1

Correlation Test

As preliminary estimation process, we carried out the correlation matrix. The correlation matrix in Table 3 indicates that the respective measures of trade performance are positively correlated with foreign reserve and FDI. The implication of this is that trade outcome tends to move towards the same direction with them.

Contrariwise, exchange rate exhibits negative relationship with trade outcome indicators: trade share and trade per capita. This is in line with the basic international trade theory. By and large, the coefficient of the

correlation analysis for the regressors, points out that there is no issue of multicollinearity.

Table 3: Correlation Matrix among Variables

	<i>Lntrdsh</i>	<i>Lntrdpc</i>	<i>Trdgrot</i>	<i>lnrpgdp</i>	<i>Lnlenr</i>	<i>lnfores</i>	<i>lnfdi</i>	<i>lnexch</i>
<i>Lntrdsh</i>	1.000							
<i>Lntrdpc</i>	0.639	1.000						
<i>Trdgrot</i>	0.070	0.005	1.000					
<i>lnrpgdp</i>	0.678	0.921	-0.061	1.000				
<i>Lnlenr</i>	-0.421	-0.696	0.018	-0.746	1.000			
<i>lnfores</i>	0.805	0.546	0.010	0.594	-0.550	1.000		
<i>lnfdi</i>	0.702	0.290	0.261	0.293	-0.231	0.646	1.000	
<i>Lnexch</i>	-0.673	-0.577	0.007	-0.543	0.429	-0.646	-0.361	1.000

Source: Authors' Computation using E-views 5.1

Regression Results of the Estimated Model

To obtain the magnitude of the impacts of the chosen explanatory variables on the indicators of trade performance, the study carried out regression analysis using the pooled Ordinary Least Squares (OLS) as baseline and then the Fixed Effect (FE) and Random Effect (RE) estimators, respectively. The results for each of the indicators of trade performance, namely; trade share, trade per capita and real growth in trade, as reported in Tables 4-6, in that order. The tables report estimates obtained using the 25 selected OIC African members, without and with global economic crisis dummy.

As observed from Table 4, foreign reserve was not significant using all the estimators for OIC members, while real per capita GDP was statistically significant. Lending rate had the expected negative sign but was not significant at the usual levels except in the OLS technique. Exchange rate had the expected negative sign which is significant for OIC sampled countries. The statistics in Table 4, which also holds true for Tables 5 and 6; especially the F-statistics and Wald test, show that the respective models had good fit. While the Hausman test points out that efficiency do not permeate.

Table 4: Regression Result for Africa and OIC Members (Dependent Variable: Trade Share)

OIC					
	<i>Without globdum</i>			<i>With globdum</i>	
<i>Estimators</i>	<i>OLS</i>	<i>FE</i>	<i>RE</i>	<i>FE</i>	<i>RE</i>
<i>Lnlenr</i>	1.933 (0.000) ^a	-0.145 (0.260)	-0.067 (0.651)	-0.148 (0.251)	-0.041 (0.794)
<i>Lnforesrv</i>	0.303 (0.000) ^a	-0.012 (0.471)	0.004 (0.837)	-0.010 (0.540)	0.010 (0.598)
<i>Lnfdi</i>	0.221 (0.000) ^a	-0.000 (0.970)	0.011 (0.372)	0.000 (0.985)	0.015 (0.239)
<i>Lnexch</i>	-0.131 (0.007) ^a	-0.162 (0.001) ^a	-0.159 (0.001) ^a	-0.164 (0.001) ^a	-0.163 (0.001) ^a
<i>Lnprgdp</i>	1.008 (0.000) ^a	1.461 (0.000) ^a	1.259 (0.000) ^a	1.486 (0.000) ^a	1.221 (0.000) ^a
<i>Globdum</i>				-0.044 (0.493)	-0.035 (0.653)
<i>Constant</i>	-21.075 (0.000) ^a	-11.745 (0.000) ^a	-11.273 (0.000) ^a	-11.905 (0.000) ^a	-11.198 (0.000) ^a
<i>R²</i>	0.818	0.552	0.543	0.554	0.536
<i>f-stat</i>	120.58 (0.000) ^a	29.86 (0.000) ^a		24.86 (0.000) ^a	
<i>Wald-test</i>			147.76 (0.000) ^a		145.23 (0.000) ^a
<i>Hausman Test</i>					
<i>N</i>	350	350	350	350	350

Note: OLS- Ordinary Least Squares; FE – Fixed Effects; RE- Random Effects; P-values are in parenthesis. Superscript a,b,c indicate significant at 1,5 and 10%, respectively. R² in OLS is the adjusted, while in FE and RE, it is overall

Source: Authors' computation using STATA 10.1.

Using trade per capita as indicator of trade outcome, Table 5 reports that per capita GDP (*Lnprgdp*), foreign reserve (*Lnforesrv*) and FDI inflow (*Lnfdi*), had the expected positive impact on trade per capita. However, at a closer look, one will observe that real per capita GDP was significant for OIC members, for all the estimators. Contrarily, the inflow of FDI was mainly significant for OIC Members, using the respective estimators. This can be explained by the fact that most OIC Members are rich in resource endowment, which attracts FDI and will translate to better trading activities, as most of multinational companies that come with the FDI inflow usually engage in large scale trading. For foreign reserve, it was not significant for OIC Members except for OLS, which appeared inconsistent.

Table 5: Regression Result for Africa and OIC Members
(Dependent Variable: Trade Per Capita)

OIC					
<i>Without Globdum</i>			<i>With Globdum</i>		
<i>Estimators</i>	<i>OLS</i>	<i>FE</i>	<i>RE</i>	<i>FE</i>	<i>RE</i>
<i>Lnlenr</i>	-0.126 (0.321)	-0.027 (0.766)	-0.032 (0.722)	-0.022 (0.805)	-0.026 (0.773)
<i>Lnforesrv</i>	0.045 (0.018) ^b	0.009 (0.430)	0.006 (0.586)	0.011 (0.321)	0.009 (0.424)
<i>Lnfdi</i>	0.016 (0.211)	0.021 (0.007) ^a	0.023 (0.002) ^a	0.020 (0.009) ^a	0.022 (0.003) ^a
<i>Lnexch</i>	-0.068 (0.000) ^a	-0.049 (0.157)	-0.055 (0.044) ^b	-0.053 (0.127)	-0.053 (0.050) ^b
<i>Lnrgdp</i>	0.958 (0.000) ^a	1.410 (0.000) ^a	1.304 (0.000) ^a	1.373 (0.000) ^a	1.281 (0.000) ^a
<i>Globdum</i>				0.066 (0.050) ^c	0.076 (0.089) ^c
<i>Constant</i>	0.358 (0.612)	-3.730 (0.000) ^a	-3.160 (0.000) ^a	-3.492 (0.000) ^a	-2.988 (0.000) ^a
<i>R²</i>	0.915	0.755	0.754	0.759	0.758
<i>f-stat</i>	287.33 (0.000) ^a	74.53 (0.000) ^a		63.02 (0.000) ^a	
<i>Wald-test</i>			471.440 (0.000) ^a		483.230 (0.000) ^a
<i>Hausman Test</i>			6.970 (0.223)		5.820 (0.444)
<i>N</i>	350	350	350	350	350

Note and Source: Same as Table 4

The results in Table 5 indicate that exchange rate and lending rate both met the *a priori* expectation, with regards to inverse relationship with trade outcome, in this case, trade per capita. Be that as it may, the lending rate variable was not significant for OIC Members using the Fixed Effects and random effect models, but the contrary was observed for exchange rate, which was found significant using RE. Again, focusing on the global economic crises dummy, it can be observed that there is a significant and positive relationship between trade per capita and FDI, as well as real per capita GDP variables. However, the exchange rate variables displayed an adverse significant relationship with trade per capita. This underscores the adverse effects of the crises, especially as displayed by currency crash.

Table 6: Regression Result for Africa and OIC Members
(Dependent Variable: Real Growth in Trade)

<i>Estimators</i>	<i>OIC</i>				
	<i>Without Globdum</i>			<i>With Globdum</i>	
	<i>OLS</i>	<i>FE</i>	<i>RE</i>	<i>FE</i>	<i>RE</i>
	-5.202	10.262	-5.202	-10.097	-5.418
<i>Lnlenr</i>	(0.359)	(0.330)	(0.357)	(0.340)	(0.343)
	1.688	1.463	1.688	1.393	1.665
<i>Lnforesrv</i>	(0.051) ^c	(0.265)	(0.049) ^b	(0.295)	(0.054) ^c
	2.258	2.601	2.258	2.622	2.276
<i>Lnfdi</i>	(0.000) ^a	(0.003) ^b	(0.000) ^a	(0.003) ^a	(0.000) ^a
	-0.292	-2.183	-0.292	-2.073	-0.254
<i>Lnexch</i>	(0.721)	(0.595)	(0.721)	(0.616)	(0.759)
	-2.368	2.956	-2.368	4.073	-2.429
<i>Lnrgdp</i>	(0.353)	(0.804)	(0.351)	(0.741)	(0.342)
				2.009	1.505
<i>Globdum</i>				(0.714)	(0.761)
	8.414	-89.663	8.414	-96.426	8.841
<i>Constant</i>	(0.786)	(0.265)	(0.786)	(0.245)	(0.776)
<i>R²</i>	0.119	0.095	0.069	0.096	0.070
	3.430	2.410		2.010	
<i>f-stat</i>	(0.006) ^c	(0.041) ^b		(0.069) ^c	
			17.130		17.100
<i>Wald-test</i>			(0.004) ^a		(0.009) ^a
			4.510		4.570
<i>Hausman Test</i>			(0.479)		(0.600)
<i>N</i>	350	350	350	350	350

Note and Source: Same as Table V

A look at Table 6 shows that real per capita GDP, FDI and foreign reserves, like in other previous discussed trade performance, had the expected positive influence on real growth in trade for OIC members. At any rate, only FDI inflow was significant using the respective estimators, while foreign reserves were mainly significant using Random Effects estimator. The coefficient of other explanatory variables point out that lending rate and exchange rate came out with the expected negative sign but they were not significant at the usual levels. With respect to the global economic crisis dummy, it had the expected positive sign but it was not significant.

The results in Table 6 appear somewhat different, in terms of level of significance, from those in the previous trade performance models (per capita trade and trade share). A possible reason is that the real growth in trade is not a contemporaneous phenomenon. This means that the period may be too short to fully take into cognisance the influence of global economic crises. This is unlike other trade outcome indicators such as

trade per capita and trade share, which can experience changes resulting from global economic crises in a short period of time. This calls for further studies, in the near future, that examines the period of global economic crises on real growth in trade in Africa.

6. Conclusion

Some important debates have stemmed both within and outside the academic circles from global economic crisis. This study observes that not much empirical studies have been done in Africa particularly those that belong to Organisation of Islamic Countries (OIC) with regards to their trade performance. The paper achieved its objective using secondary data from World Trade Indicators of the World Bank Group (2010) for the period 1995-2008 analysed using both descriptive and econometric analyses and hinging on international trade theory.

Based on some indicators of trade performance namely: trade share and real growth in trade, it could be said that for the OIC African members, there is an indication that during the period of study, the average ratio of trade as a share of the world trade is quite lower than the global average. This suggests that the sampled countries performed below capacity in trade. The above implies that the improvement (or deterioration) of trade performance for OIC members in Africa can be trailed to the increase (or decrease) in their economic performance. Therefore, in the face of crisis at the global market, resilience nature of the domestic economy can provide a buffer for them against shocks at the international market. In view of the above, we recommend that harnessing and restructuring of the domestic economic structures, will be a veritable tool in developing trade performance.

Another important finding from the study is the relationship between the inflow of FDI and trade performance of OIC Members in Africa. Given the extent of resource endowment of OIC members, there is the high attraction of FDI, which also portends some challenge in the face of crises. This is because, at the event of crises, there is the possibility of increased outflow of these foreign capitals. This foretells that OIC members need to be committed to improved diversification of their trade basket away from primary resources to manufacturing and services. The relevance of this is that processed, manufactured and service trade tend to be more stable than primary products at the international market. The

connotation of this indicates that trade performance of OIC African members will be enhanced and become more stable when there is ability to diversify towards finished products compared to primary products. This is essential because it will help to stabilise the exchange rate, which is also an important element for enhanced trade performance.

In conclusion, although the global economic crisis appears to have adverse effects on the trade performance of OIC members, it can also create an opportunity for them to reconsider their trade and investment strategies and learn how to cope with a dramatically transforming international financial landscape. For instance, member countries need to enhance intra-regional trade to enhance greater access to their markets.

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Appendix

Table AI: Top OIC Agricultural Producers

Cereals		Fruits		Vegetables		Meat	
(Million tonnes)							
Indonesia	83.4	Indonesia	17.2	Turkey	27.4	Indonesia	3.0
Bangladesh	52.6	Turkey	14.4	Iran	26.0	Pakistan	2.8
Pakistan	36.2	Iran	11.2	Egypt	18.9	Turkey	2.6
Turkey	35.2	Uganda	11.1	Nigeria	11.4	Iran	2.2
Kazakhstan	26.6	Egypt	9.9	Indonesia	10.1	Egypt	2.0
Iran	23.7	Nigeria	9.9	Uzbekistan	8.3	Malaysia	1.7
Nigeria	22.0	Pakistan	6.3	Morocco	5.7	Nigeria	1.5
Egypt	22.0	Cameroon	5.2	Algeria	5.5	Morocco	1.1
Uzbekistan	7.1	Bangladesh	3.7	Pakistan	5.5	Kazakhstan	0.9
Morocco	6.0	Algeria	3.5	Bangladesh	4.2	Uzbekistan	0.9
OIC Total	387.3		120.8		163		27.3

Note: Countries in **bold** are African members

Source: Authors' compilation from The Statistical, Economic and Social Research and Training Centre for Islamic Countries-SESRI (2013).

The Sources of Transition Probabilities in Turkish Labour Market: An Empirical Evidence for Overlapping Individual Data, 2007- 2008

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Analysis of the state transition probabilities in labour market has become one of the indicators for evaluating the labour market efficiency. The state transition plays an important role in terms of acquiring knowledge and determination of basic factors in labour market. In this paper, the state transition probabilities are computed by the means of Markov process from the same periods of two year individual panel data, the Turkish quarterly data for 2007 and 2008, which is robust concerning the attrition problem that is mentioned in the literature. As a following stage, multinomial logistic regression model is employed to take the possible dynamics of transition probabilities into account such as: age, gender, urban-rural distinction, education, employment status and occupation. The results indicate that the Turkish labour market have been affected negatively during the global financial and economic crisis.

1. Introduction

Analysis of the state transitions plays an important role in terms of acquiring knowledge and determination of basic factors in labour markets. Markov models are widely used in literature for calculating transition probabilities concerning different perspectives and countries. A couple of examples are: Huilfeldt (1996) for Czech Republic; Foley (1997) and Grogan (2000) for Russia; Francesconi (1999) for the United States; Hazans, Earnets and Earle (2003) for Lithuania, Estonia and Latvia; Bellman, Estrin and Svejnar (1995) for Germany; Eamets (1999) for Estonia; Nielsen and Risa (2000) for Norway; Christodoulakis and

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Mamatzakis (2010) for Greece; Wolterman (2002) for Brazil concentrate on state transitions. Concerning the case for Turkey, Tansel and Tasçi (2005) provide the determinants of transition probabilities for the period from 2000 to 2001 by using the Household Labour Force Survey (HLFS) panel data and only consider the gender based multinomial logit models.

This paper aims to investigate the labour market transition probabilities by using the sample obtained from the original micro HLFS data span 2007 and 2008 for Turkey. Our research question is whether the state transition probabilities in the Turkish labour market had been affected from the global and financial crisis in 2008. The state transitions in third and fourth quarters of the following two years 2007-2008 can be indicators for realizing the effects of global economic and financial crisis in the labour market.

In order to obtain transition probabilities, Markov models were firstly taken into consideration. As a second step, the multinomial logistic models were applied to examine the dynamics of state transition probabilities. The latter gave us an opportunity to compare the labour market transition behavior.

2. Data and Methodology

2.1. Data

The original micro data set of the Household Labour Force Survey (HLFS) of Turkish Statistical Institute (TurkStat) is used in this study. HLFS provides detailed information about the status of the labour force. The sampling unit of HLFS is household addresses. It has a rotational sampling pattern providing four visits to particular addresses as fifty percent of them overlapping within same periods of following two years as shown in the time framework (see Appendix A-5). Since the sampling unit of HLFS consists of household addresses, there may be a possible attrition problem because of internal migration of individuals which is also stressed by Tunali (2009) for the years 2000-2002.

This paper benefits from the original micro data provided by TurkStat for the expert thesis. The same individuals were taken into account and the data has no existing attrition problem. We processed the micro data set of HLFS carefully by focusing on the same individuals in

overlapping addresses. In order to construct the panel data for the same individuals; the variables such as the same address number, the same household and the same individual order number had been considered. A key is defined for each individual as consisting of the same address number, same household and same individual order number for the overlapping following two year's same periods according to the rotation scheme provided in Appendix-A5. Considering this key number, the validity of the panel data is confirmed by also checking the age and gender of the individuals in the panel data. Consequently, it is become definite that the individuals regarding the HLFS are the same individuals. Therefore we may clearly claim that the attrition problem is solved.

To give more information concerning the data set used in the paper: The number of individuals for the year 2007 and 2008 is 481.605 and 481.154 respectively. We divided the overlapping household, overlapping individual sample within four equal periods. Between 2007 and 2008; the number of the overlapping same individuals is 42.334 for the Period1, 43.212 for the Period2, 43.601 for the Period3 and 45.844 for the Period4. This study is concerned with the overlapping data of individuals owning ages 15 and older. The number of individuals whom are 15 and older is 29.692 for the Period1, 30.405 for the Period2, 31.100 for the Period3 and 32.581 for the Period4 within the years. The reason for considering this age group is that TurkStat's HLFS data compiling methodology covers the population whom are 15 years old and older.

2.2. Methodology

Initially, the Markov chain models are used to determine the transition probabilities among the labour market states where these states are discrete (Searle and Willett, 2001, p. 373). The state transition probabilities are computed by the means of Markov process (assumption of two consecutive period is connected each other by means of state-transition matrices) from the same periods of two year individual panel data after being separated from individual base micro data as periodical three month Period1 (January, February, March), Period2 (April, May, June), Period3 (July, August, September), Period4 (October, November, December).

The balance of labour state transitions are based on the closed system showing the flow of one to another. Three labour market states can be considered such as: Employed (*Emp*), Unemployed (*Une*), Not-in-the-labour force (*Nlf*). The labour market transition probability of the individuals at time t is given by the matrix X_t representing the number of the population in labour market states.

$$X_t = \begin{bmatrix} Emp_t \\ Une_t \\ Nlf_t \end{bmatrix} \quad (1)$$

The matrix for X_{t+1} is represented by (2). The outflows (between different labour market states) are the ones whom transit from one state to other labour states. The inflows (within same labour market states) represent the transitions within the same labour states.

$$X_{t+1} = \begin{bmatrix} Emp - Emp & Une - Emp & Nlf - Emp \\ Emp - Une & Une - Une & Nlf - Une \\ Emp - Nlf & Une - Nlf & Nlf - Nlf \end{bmatrix} X_t \quad (2)$$

Generally the Markov property is written as $\Pr[X_{t+1} = x_i | X_t = x_k] \equiv p_{ik}$ where $p_{ik} \geq 0$ for all i, k and the sum of probabilities is one, $p_{i1} + p_{i2} + \dots + p_{in} = 1$ for each $i = 1, \dots, n$. (Hamilton, 1994, pp. 678-679). They cannot be negative. The term p_{ik} in the specification shows a transition probability and there is a transition of x_i to x_k (see Acemoglu, 2009, p. 538). n -state Markov matrix can be compiled from p_{mn} transition probabilities. The state transition probability of the unemployed person at time t and employed at time $t+1$ is calculated as $p_{Une-Emp} = Une_t - Emp_{t+1} / Une_t$. The general representation is presented in (3) where F_{ik} is the number of transitions in state i at time t who are in state k at time $t+1$. S_i is the total number of individuals whom are in state i at time t .

$$p_{ik} = \frac{F_{ik}}{S_i} \quad i, k = Emp, Une, Nlf \quad (3)$$

The next period X_{t+1} is attached to X_t by the state - transition matrix (STM) which consists of nine potential probabilities. The STM can be expressed by (4).

$$STM = \begin{bmatrix} P_{emp-emp} & P_{emp-une} & P_{emp-nlf} \\ P_{une-emp} & P_{une-une} & P_{une-nlf} \\ P_{nlf-emp} & P_{nlf-une} & P_{nlf-nlf} \end{bmatrix} \quad (4)$$

In this study; state transition probabilities are calculated by taking transitions from t : 2007 to t : 2008. There are nine potential transitions summarized as follows:

- emp-emp*: Employed within the years 2007 and 2008.
- emp-une*: Employed in 2007 but unemployed in 2008.
- emp-nlf*: Employed in 2007 but not in labour force in 2008.
- une-emp*: Unemployed in 2007 but employed in 2008.
- une-une*: Unemployed in 2007 and 2008.
- une-nlf*: Unemployed in 2007 but not in labour force in 2008.
- nlf-emp*: Not in labour force in 2007 but employed in 2008.
- nlf-une*: Not in labour force in 2007 but unemployed in 2008.
- nlf-nlf*: Not in labour force in 2007 and not in labour force in 2008.

As the next step, we used the multinomial logit regression analysis to examine the dynamics affecting the state transitions. The explanatory variables are: age, gender, urban-rural distinction, educational status, employment status, Nomenclature of Territorial Units for Statistics 1 (NUTS) and occupational status. There are also other studies such as Tansel and Tasci (2005) using the similar model and explanatory variables.

We tried several models and identified the most fit one among the alternative models by multinomial logit regression. The state transitions are explained by the related categorical variables and their levels within the labour force. The categorical variables and their levels are as follows: Age groups variable is leveled as 15-24, 25-34, 35-44, 45-54 and 55+; the urban and rural distinction variable; gender variable; Nomenclature of Territorial Units of Statistics Level 1 (*NUTS 1*) variable consisting of the regions in Turkey: Istanbul, Western Marmara,

Aegean, Eastern Marmara, Western Anatolia, Mediterranean, Middle Anatolia, Western Black Sea, Eastern Black Sea, North Eastern Anatolia, Middle East Anatolia, South Eastern Anatolia. The educational status variable is leveled as non-graduate, primary and middle school, high school, vocational high school, two-year university and four-year university and over. The occupational status is taken as professionals, legislators, elementaries, senior officials, technicians and associate professionals, shop sales workers, craft and related trade workers, plant and machine operators and assemblers, skilled agricultural and fishery workers, clerks, service workers. The employment status is classified as regular employee, casual employee, employer, own account worker, and unpaid family worker.

Multinomial logistic regression is a method used when the dependent variable is observed within two, three or multi categories. It is a regression method when the expected value of the dependent variable according to the explanatory variable is obtained as a probability. Normal distribution and continuity assumptions are not necessary. In order to select an appropriate model, a test statistic given in (5) which has a chi-square distribution is used. Rejecting of the null (all the coefficients except for constant are zero) indicated that the model is appropriate. The detailed results will be presented if demanded.

$$D = -2 * \ln \left(\frac{\text{Likelihood function for the null hypothesis}}{\text{Likelihood function for alternative hypothesis}} \right) \quad (5)$$

The dependent variable in equation (6) X is nominal which consists of levels that cannot be ordered in any meaningful way, also known as categorical and more than two categories. X represents transitions from employed to a different labour force state (*emp-une*, *emp-nlf*, *emp-emp*) and transitions from unemployment to another labour force state (*une-emp*, *une-nlf*, *une-une*). And transition from not in labour force to another labour force state (*nlf-emp*, *nlf-une*, *nlf-nlf*).

$$Pr(X_{it+1} = x_j | X_{it} = x_k) = \frac{\exp(\beta'_j Z_i)}{\sum_k \exp(\beta'_k Z_i)} \quad j, k = 1, 2, 3 \quad i = 1, 2, \dots, n \quad (6)$$

Z_{ijk} is for the individual characteristics of the i^{th} individual moving from state k to state j (see also Lauerova and Terrell, 2002). Z vector's

covariates consist of gender, age, urban-rural, periods, education, marital status, occupational status, employment status and NUTS. The estimation results are presented in Table 2a-2c. The probability values for the coefficients in multinomial logistic regression are significant if they are below 0.05. The positive coefficient is significant at 5 percent level indicates that the realization probability of the labour transition is higher or less compared to the reference labour state.

To give an example for interpreting results: Assume that the gender dummy variable goes from zero to one when the other conditions are fixed. The marginal effect of the probability (γ_{ik}) is given by (7) where β_i and β_k are the elements of the coefficient vector β .

$$\gamma_{ik} = P_i \left[\beta_i - \sum_k \beta_k \right] \quad (7)$$

3. Empirical Evidence

3a. Estimation Results for the Transition Probabilities

Table 1a Panel A provides the number of individuals in the labour market transitioning from one state to another for the full sample considering the four different periods. Panel B and C give the results for male and female individuals. Panels D-H take the age groups: 15-24, 25-34, 35-44, 45-54 and 55+ into account. Finally the Panel I and J distinct the sample as urban and rural criteria. In order to calculate the transition probabilities under Markov property by the state transition matrix (STM) we benefit from ‘the number of individuals’ in labour market transitions according to related groups in Table 1a. Then the transition probabilities in Table 1b are calculated. We briefly summarize the main findings in this section. It is interesting to see for the total that the out of labour force state (nlf) in 2007 had preserved its situation in 2008 and has the highest transition probability (Table 1b, Panel A). The outflow is mostly observed among unemployed people. Transition probability from employed to unemployed situation increases within the third and fourth quarters. It can be claimed that the global financial and economic crisis affected employment market negatively. An increase in the transition probability for unemployed to employed individuals is highest in the second quarter can be evaluated by the increase in agricultural employment.

Table 1b, Panel B and C present the labour market transition probabilities according to the gender criteria. Probabilities of being employed from three states (*emp-emp*, *une-emp*, *nlf-emp*) are lower for females compared to males. While the direct flow (inflow) probability of saving the present situation (*emp-emp*, *une-une*) is lower for females compared with the males, *nlf-nlf* inflow is higher for females than males. For males and females, the probability of being employed to unemployed increases by the effect of global economic crisis within the third and fourth quarters. The probability transition from unemployed to employed is higher for males compared with the females. However, during the third and fourth quarters, the probability of being out of labour force (*emp-nlf*) is quiet higher for females compared with males. As a result, we may claim that the risks such as being discouraged and going out of labour force are higher for females and gender differentiation is apparent.

The age groups for 25-34 and 35-44 (see Tables 1b, Panel D through H for the labour market transition probabilities according to the age groups) tend to preserve their current situation of employed and they have high probability of being employed. In all the age groups, the transition probability concerning the current labour situation to other labour situations is highest for the unemployed. The age group 55 and over has a high transition probability of being unemployed to out-of-the labour force. Among the age group of 55 and over, the transition probability of being out-of-the labour force to out-of-labour force is quietly high and the probability of being employed is lowest for all the states.

The transition probabilities concerning the rural-urban distinction are given in the Table 1b, Panel I and J. The *emp-emp* transition is higher in urban than the rural places. The outflow movement from the unemployed was observed highly for both rural and urban places. The probability of being employed (*une-emp*, *nlf-emp*) is lower for urban places compared to the rural places. Concerning the rural places, the probability of being out-of-the labour force to being employed is higher than the urban places. This result is consistent with the argument that the agricultural employment increased during the crisis. Probability of being out-of-the labour force to unemployed is higher for the urban than the rural places. It can be interpreted as most of the people living in rural

places became discouraged to opportunities of finding a job compared with urban places.

3b. Multinomial Logistic Regression Model Estimation Results

Table (2a, 2b, 2c) presents the estimated β coefficients for different transitions. Effects of each independent variable on realization probability of relevant labour market states can be analyzed. While the significantly negative coefficients indicate that the realization probability of the relevant labour transition is lower compared to the reference level; the significantly positive coefficients indicate that the realization probability of the relevant labour transition is higher compared to the reference labour state. The last level of the variable is the reference level which is a benchmark.

In order to evaluate of the results of estimates, we interpret the results of the exponential effects which is the exponential of the beta coefficient $\exp(\beta)$. The odds ratio of the coefficient $\exp(\beta)$ indicates how many times the independent variable's realization probability can be observed higher or lower according to the reference level. (see Ozdamar, 1999).

Table 1a. Transition Number of Individuals

Panel A. Transitions of Individuals by Period, Total									
Periods	<i>emp-emp</i>	<i>emp-une</i>	<i>emp-nlf</i>	<i>une-emp</i>	<i>une-une</i>	<i>une-nlf</i>	<i>nlf-emp</i>	<i>nlf-une</i>	<i>nlf-nlf</i>
Period 1	9 535	466	1 618	504	408	384	1 436	396	14 945
Period 2	10 622	450	1 683	499	278	310	1 686	373	14 504
Period 3	10 751	499	1 699	337	333	491	1 811	418	14 761
Period 4	10 651	560	1 562	586	418	343	1 821	514	16 126
Panel B. Transitions of Individuals by Period, Male									
Periods	<i>emp-emp</i>	<i>emp-une</i>	<i>emp-nlf</i>	<i>une-emp</i>	<i>une-une</i>	<i>une-nlf</i>	<i>nlf-emp</i>	<i>nlf-une</i>	<i>nlf-nlf</i>
Period 1	7 488	385	786	320	407	222	3 575	670	218
Period 2	8 109	374	772	200	406	167	3 498	696	205
Period 3	8 306	419	785	231	384	175	3 506	722	214
Period 4	8 303	461	759	306	495	195	3 944	783	274
Panel C. Transitions of Individuals by Period, Female									
Periods	<i>emp-emp</i>	<i>emp-une</i>	<i>emp-nlf</i>	<i>une-emp</i>	<i>une-une</i>	<i>une-nlf</i>	<i>nlf-emp</i>	<i>nlf-une</i>	<i>nlf-nlf</i>
Period 1	2 047	81	832	88	97	162	11 370	766	178
Period 2	2 513	76	911	78	93	143	11 006	990	168
Period 3	2 445	80	914	102	107	162	11 255	1089	204
Period 4	2 348	99	803	112	91	148	12 182	1 038	240
Panel D. Transitions of Individuals by Age Group, 15 - 24									
Periods	<i>emp-emp</i>	<i>emp-une</i>	<i>emp-nlf</i>	<i>une-emp</i>	<i>une-une</i>	<i>une-nlf</i>	<i>nlf-emp</i>	<i>nlf-une</i>	<i>nlf-nlf</i>
Period 1	1 164	113	285	131	183	120	3 381	435	172
Period 2	1 279	106	284	98	155	112	3 346	510	157
Period 3	1 353	119	364	126	175	132	3 177	548	214
Period 4	1 293	137	260	120	197	105	3 487	478	225
Panel E. Transitions of Individuals by Age Group, 25 - 34									
Periods	<i>emp-emp</i>	<i>emp-une</i>	<i>emp-nlf</i>	<i>une-emp</i>	<i>une-une</i>	<i>une-nlf</i>	<i>nlf-emp</i>	<i>nlf-une</i>	<i>nlf-nlf</i>
Period 1	2 823	162	240	153	168	88	2 392	244	85
Period 2	3 167	155	261	75	172	80	2 201	292	103
Period 3	3 121	176	237	99	159	88	2 208	304	89
Period 4	3 103	194	251	152	169	80	2 469	314	99
Panel F. Transitions of Individuals by Age Group, 35 - 44									
Periods	<i>emp-emp</i>	<i>emp-une</i>	<i>emp-nlf</i>	<i>une-emp</i>	<i>une-une</i>	<i>une-nlf</i>	<i>nlf-emp</i>	<i>nlf-une</i>	<i>nlf-nlf</i>
Period 1	3 024	127	283	87	94	83	2 237	269	66
Period 2	3 150	131	276	66	98	49	2 114	270	43
Period 3	3 160	124	268	63	101	46	2 103	295	49
Period 4	3 331	138	259	81	144	58	2 301	327	89
Panel G. Transitions of Individuals by Age Group, 45 - 54									
Periods	<i>emp-emp</i>	<i>emp-une</i>	<i>emp-nlf</i>	<i>une-emp</i>	<i>une-une</i>	<i>une-nlf</i>	<i>nlf-emp</i>	<i>nlf-une</i>	<i>nlf-nlf</i>
Period 1	1 691	55	386	31	52	67	2 445	247	52
Period 2	1 989	49	388	29	65	45	2 370	255	51
Period 3	2 071	62	361	40	42	53	2 471	281	42
Period 4	1 950	72	357	56	64	73	2 682	318	75
Panel H. Transitions of Individuals by Age Group, 55+									
Periods	<i>emp-emp</i>	<i>emp-une</i>	<i>emp-nlf</i>	<i>une-emp</i>	<i>une-une</i>	<i>une-nlf</i>	<i>nlf-emp</i>	<i>nlf-une</i>	<i>nlf-nlf</i>
Period 1	833	9	424	6	7	26	4 490	241	21
Period 2	1 037	9	474	10	9	24	4 473	359	19
Period 3	1 046	18	469	5	14	18	4 802	383	66
Period 4	974	19	435	9	12	27	5 187	384	26
Panel I. Transitions of Individuals by Rural Urban Distinction, Rural									
Periods	<i>emp-emp</i>	<i>emp-une</i>	<i>emp-nlf</i>	<i>une-emp</i>	<i>une-une</i>	<i>une-nlf</i>	<i>nlf-emp</i>	<i>nlf-une</i>	<i>nlf-nlf</i>
Period 1	3 262	107	817	74	120	89	3 867	689	92
Period 2	3 976	91	802	41	118	53	3 625	864	72
Period 3	4 153	118	832	48	130	56	3 826	898	86
Period 4	3 854	121	791	73	135	69	4 239	872	110
Panel J. Transitions of Individuals by Rural Urban Distinction, Urban									
Periods	<i>emp-emp</i>	<i>emp-une</i>	<i>emp-nlf</i>	<i>une-emp</i>	<i>une-une</i>	<i>une-nlf</i>	<i>nlf-emp</i>	<i>nlf-une</i>	<i>nlf-nlf</i>
Period 1	6 273	359	801	334	384	295	11 078	747	304
Period 2	6 646	359	881	237	381	257	10 879	822	301
Period 3	6 598	381	867	285	361	281	10 935	913	332
Period 4	6 797	439	771	345	451	274	11 887	949	404

Table 1b. Transition Probabilities

Panel A. Transition Probabilities by Period, Total									
Periods	<i>emp-emp</i>	<i>emp-une</i>	<i>emp-nlf</i>	<i>une-emp</i>	<i>une-une</i>	<i>une-nlf</i>	<i>nlf-emp</i>	<i>nlf-une</i>	<i>nlf-nlf</i>
Period 1	82.06	4.01	13.93	38.89	31.48	29.63	8.56	2.36	89.08
Period 2	83.28	3.53	13.19	45.91	25.57	28.52	10.18	2.25	87.57
Period 3	83.03	3.85	13.12	29.03	28.68	42.29	10.66	2.46	86.88
Period 4	83.39	4.38	12.23	43.5	31.03	25.46	9.86	2.78	87.35
Panel B. Transition Probabilities by Period, Male									
Periods	<i>emp-emp</i>	<i>emp-une</i>	<i>emp-nlf</i>	<i>une-emp</i>	<i>une-une</i>	<i>une-nlf</i>	<i>nlf-emp</i>	<i>nlf-une</i>	<i>nlf-nlf</i>
Period 1	86.48	4.45	9.08	33.72	42.89	23.39	80.1	15.01	4.88
Period 2	87.62	4.04	8.34	25.87	52.52	21.6	79.52	15.82	4.66
Period 3	87.34	4.41	8.25	29.24	48.61	22.15	78.93	16.25	4.82
Period 4	87.19	4.84	7.97	30.72	49.7	19.58	78.86	15.66	5.48
Panel C. Transition Probabilities by Period, Female									
Periods	<i>emp-emp</i>	<i>emp-une</i>	<i>emp-nlf</i>	<i>une-emp</i>	<i>une-une</i>	<i>une-nlf</i>	<i>nlf-emp</i>	<i>nlf-une</i>	<i>nlf-nlf</i>
Period 1	69.16	2.74	28.11	25.36	27.95	46.69	92.33	6.22	1.45
Period 2	71.8	2.17	26.03	24.84	29.62	45.54	90.48	8.14	1.38
Period 3	71.1	2.33	26.58	27.49	28.84	43.67	89.7	8.68	1.63
Period 4	72.25	3.05	24.71	31.91	25.93	42.17	90.51	7.71	1.78
Panel D. Transition Probabilities by Age Group, 15 - 24									
Periods	<i>emp-emp</i>	<i>emp-une</i>	<i>emp-nlf</i>	<i>une-emp</i>	<i>une-une</i>	<i>une-nlf</i>	<i>nlf-emp</i>	<i>nlf-une</i>	<i>nlf-nlf</i>
Period 1	74.52	7.23	18.25	30.18	42.17	27.65	84.78	10.91	4.31
Period 2	76.63	6.35	17.02	26.85	42.47	30.68	83.38	12.71	3.91
Period 3	73.69	6.48	19.83	29.1	40.42	30.48	80.65	13.91	5.43
Period 4	76.51	8.11	15.38	28.44	46.68	24.88	83.22	11.41	5.37
Panel E. Transition Probabilities by Age Group, 25 - 34									
Periods	<i>emp-emp</i>	<i>emp-une</i>	<i>emp-nlf</i>	<i>une-emp</i>	<i>une-une</i>	<i>une-nlf</i>	<i>nlf-emp</i>	<i>nlf-une</i>	<i>nlf-nlf</i>
Period 1	87.53	5.02	7.44	37.41	41.08	21.52	87.91	8.97	3.12
Period 2	88.39	4.33	7.28	22.94	52.6	24.46	84.78	11.25	3.97
Period 3	88.31	4.98	6.71	28.61	45.95	25.43	84.89	11.69	3.42
Period 4	87.46	5.47	7.07	37.91	42.14	19.95	85.67	10.9	3.44
Panel F. Transition Probabilities by Age Group, 35 - 44									
Periods	<i>emp-emp</i>	<i>emp-une</i>	<i>emp-nlf</i>	<i>une-emp</i>	<i>une-une</i>	<i>une-nlf</i>	<i>nlf-emp</i>	<i>nlf-une</i>	<i>nlf-nlf</i>
Period 1	88.06	3.7	8.24	32.95	35.61	31.44	86.98	10.46	2.57
Period 2	88.56	3.68	7.76	30.99	46.01	23	87.1	11.12	1.77
Period 3	88.96	3.49	7.55	30	48.1	21.9	85.94	12.06	2
Period 4	89.35	3.7	6.95	28.62	50.88	20.49	84.69	12.04	3.28
Panel G. Transition Probabilities by Age Group, 45 - 54									
Periods	<i>emp-emp</i>	<i>emp-une</i>	<i>emp-nlf</i>	<i>une-emp</i>	<i>une-une</i>	<i>une-nlf</i>	<i>nlf-emp</i>	<i>nlf-une</i>	<i>nlf-nlf</i>
Period 1	79.32	2.58	18.11	20.67	34.67	44.67	89.1	9	1.9
Period 2	81.99	2.02	15.99	20.86	46.76	32.37	88.57	9.53	1.91
Period 3	83.04	2.49	14.47	29.63	31.11	39.26	88.44	10.06	1.5
Period 4	81.97	3.03	15.01	29.02	33.16	37.82	87.22	10.34	2.44
Panel H. Transition Probabilities by Age Group, 55+									
Periods	<i>emp-emp</i>	<i>emp-une</i>	<i>emp-nlf</i>	<i>une-emp</i>	<i>une-une</i>	<i>une-nlf</i>	<i>nlf-emp</i>	<i>nlf-une</i>	<i>nlf-nlf</i>
Period 1	65.8	0.71	33.49	15.38	17.95	66.67	94.49	5.07	0.44
Period 2	68.22	0.59	31.18	23.26	20.93	55.81	92.21	7.4	0.39
Period 3	68.23	1.17	30.59	13.51	37.84	48.65	91.45	7.29	1.26
Period 4	68.21	1.33	30.46	18.75	25	56.25	92.67	6.86	0.46
Panel I. Transition Probabilities by Rural Urban Distinction, Rural									
Periods	<i>emp-emp</i>	<i>emp-une</i>	<i>emp-nlf</i>	<i>une-emp</i>	<i>une-une</i>	<i>une-nlf</i>	<i>nlf-emp</i>	<i>nlf-une</i>	<i>nlf-nlf</i>
Period 1	77.93	2.56	19.52	26.15	42.4	31.45	83.2	14.82	1.98
Period 2	81.66	1.87	16.47	19.34	55.66	25	79.48	18.94	1.58
Period 3	81.38	2.31	16.3	20.51	55.56	23.93	79.54	18.67	1.79
Period 4	80.86	2.54	16.6	26.35	48.74	24.91	81.19	16.7	2.11
Panel J. Transition Probabilities by Rural Urban Distinction, Urban									
Periods	<i>emp-emp</i>	<i>emp-une</i>	<i>emp-nlf</i>	<i>une-emp</i>	<i>une-une</i>	<i>une-nlf</i>	<i>nlf-emp</i>	<i>nlf-une</i>	<i>nlf-nlf</i>
Period 1	84.39	4.83	10.78	32.97	37.91	29.12	91.33	6.16	2.51
Period 2	84.28	4.55	11.17	27.09	43.54	29.37	90.64	6.85	2.51
Period 3	84.09	4.86	11.05	30.74	38.94	30.31	89.78	7.5	2.73
Period 4	84.89	5.48	9.63	32.24	42.15	25.61	89.78	7.17	3.05

Transition probability from employed to unemployed.- The results of the multinominal regression analysis are given in Table 2a, 2b and 2c. The probability of transition from employed to unemployed is higher for males than females. Concerning the age group, the age group of 15+ is more than 55+. The transition is lower for the ones living in rural than the urban.

Concerning the education group; the probability of transition from employed to unemployed is higher for the ones in the elementary school, primary education, secondary school or occupational secondary school group than the four year university graduates. This indicates when the education level of the individuals increases, the probability of transition from employed to unemployed diminishes. For the period distinction, the transition probability is lower in the second and third periods compared with the fourth quarter. The marital status indicates that the transition probability from employed to unemployed is higher for the singles than the married individuals. When we analyze the occupational group distinction, legislators, senior officials and managers, professionals, technicians and associate professionals, clerks, skilled agricultural and fishery workers, have a lower transition probability of being employed to unemployed than the jobs which do not need qualification. Regarding the transition probability from employed to unemployed, regular employee, casual employee, employers and own account workers have a higher transition probability than the unpaid family workers. When we analyze the *NUTS* region distinction, the transition from employed to unemployed is higher for West Black Sea, East Black Sea and Northeast Anatolia regions than the Southeast Anatolia Region.

The transition probability from employed to out-of-labour force.- It is higher for females than the males. This transition probability is lower for the age groups of 15-24, 25-34, 35-44, 45-54 than the age group 55+. This transition probability is lower for the individuals living in rural areas compared with the urban ones. Considering the education group distinction, the transition probability from employed to the out-of-labour force decreases by the education level. The transition probability from employed to out-of-labour force is higher for the first period than the fourth period. Considering the marital status, the transition probability from employed to out-of-labour force is higher for the unmarried than the married ones. Considering the occupation group distinction, the

transition probability from employed to out-of-labour force diminishes according to the reference level. The probability diminishes for the regular workers compared to the irregular workers. The transition probability is higher in Istanbul, Western Marmara, Aegean, Eastern Marmara, Western Anatolia, Mediterranean, Western Black Sea, Eastern Black Sea and North Eastern Anatolia compared with South Eastern Anatolia.

Transition probability from unemployed to employed.- Considering the gender variable, it is higher for the males compared with the females. The probability diminishes when the age group increases. The rural workers have higher probability compared with the urban workers. It is higher for the second period compared with the fourth quarter. The unmarried sample has a lower probability than the married ones. It is interesting to observe that NUTS regional distinction has no effect on the transition probability.

Transition probability from unemployed to out-of-labour force.- This probability is higher for the male compared with the female individuals. It diminishes when the age group increases. The rural workers have lower transition probability compared with the urban workers. The probability diminishes by the education level. Married individuals have higher probability compared with the unmarried ones. The probability is lower compared with the Southeast Anatolia region.

Transition probability from out-of-labour force to employment.- Considering the gender, the transition probability is higher for males compared with females. It is higher for the youth individuals compared with the elders. The sample living in the rural regions has a higher transition probability when it is compared with the urban workers. The probability of finding a job increases by the education level. The third period has a higher probability compared with the fourth period. The unmarried individuals have a lower probability compared with the married ones. Considering the regional distinction, the Southeast Anatolia region has a lower transition probability when it compared with the other regions.

Transition probability from out-of-labour force to unemployed.- The transition probability is higher for males compared with the females. The transition probability diminishes for older age groups. The

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probability diminishes by the education level. The married ones have lower probability compared with the unmarried ones. The South Eastern Anatolia has a higher probability compared with the other regions.

Table 2a. Multinomial Logistic Regression Results

Variables	<i>x: emp-une</i>					<i>x: emp-nlf</i>				
	β	Std Error	Wald	Prob.	exp(β)	β	Std Error	Wald	Prob.	exp(β)
constant	4.709*	0.277	289.834	0.000		0.641*	0.143	20.129	0.000	
[gender=1]	0.152*	0.070	4.776	0.029	1.164	-1.487*	0.038	1,531.899	0.000	0.226
[gender=2]	0(b)					0(b)				
[agegroup=1]	0.816*	0.164	24.689	0.000	2.262	-0.868*	0.064	184.525	0.000	0.420
[agegroup=2]	0.778*	0.152	26.201	0.000	2.176	-1.701*	0.053	1,012.467	0.000	0.183
[agegroup=3]	0.637*	0.151	17.794	0.000	1.891	-1.709*	0.051	1,145.103	0.000	0.181
[agegroup=4]	0.503*	0.156	10.340	0.001	1.653	-0.852*	0.046	345.156	0.000	0.426
[agegroup=5]	0(b)					0(b)				
[urbanrural=1]	0.371*	0.066	32.004	0.000	0.690	-0.399*	0.040	97.363	0.000	0.671
[urbanrural=2]	0(b)					0(b)				
[educgrp=1]	0.227	0.173	1.719	0.190	1.255	0.604*	0.114	28.211	0.000	1.830
[educgrp=2]	0.297*	0.142	4.347	0.037	1.345	0.557*	0.106	27.408	0.000	1.746
[educgrp=3]	0.240	0.148	2.623	0.105	1.271	0.436*	0.112	15.068	0.000	1.547
[educgrp=4]	0.170	0.150	1.287	0.257	1.186	0.308*	0.115	7.180	0.007	1.360
[educgrp=5]	0.033	0.176	0.034	0.853	1.033	0.103	0.128	0.644	0.422	1.109
[educgrp=6]	0(b)					0(b)				
[period1=1]	-0.062	0.067	0.864	0.353	0.940	0.215*	0.042	26.188	0.000	1.240
[period2=2]	0.249*	0.068	13.484	0.000	0.779	0.012	0.042	0.090	0.765	1.013
[period3=3]	0.164*	0.066	6.205	0.013	0.849	-0.027	0.042	0.426	0.514	0.973
[period4=4]	0(b)					0(b)				
[maristat=1]	0.849*	0.071	144.719	0.000	2.338	0.145*	0.048	9.023	0.003	1.156
[maristat=2]	0(b)					0(b)				
[occupation=1]	0.454*	0.130	12.247	0.000	0.635	-0.467*	0.080	33.770	0.000	0.627
[occupation=2]	0.898*	0.189	22.620	0.000	0.407	-0.571*	0.126	20.598	0.000	0.565
[occupation=3]	0.526*	0.129	16.565	0.000	0.591	-0.431*	0.094	21.168	0.000	0.650
[occupation=4]	0.382*	0.123	9.583	0.002	0.683	-0.571*	0.094	37.270	0.000	0.565
[occupation=5]	-0.042	0.087	0.227	0.634	0.959	-0.004	0.062	0.004	0.949	0.996
[occupation=6]	0.633*	0.125	25.453	0.000	0.531	-0.080	0.054	2.188	0.139	0.923
[occupation=7]	0.046	0.076	0.365	0.546	1.047	0.035	0.057	0.382	0.537	1.036
[occupation=8]	-0.051	0.089	0.324	0.569	0.950	-0.177*	0.069	6.477	0.011	0.838
[occupation=9]	0(b)					0(b)				
[empstat=1]	0.813*	0.141	33.076	0.000	2.254	-0.682*	0.056	148.997	0.000	0.506
[empstat=2]	2.061*	0.146	198.348	0.000	7.852	0.538*	0.064	71.155	0.000	1.712
[empstat=3]	0.425*	0.201	4.457	0.035	1.530	-0.420*	0.095	19.627	0.000	0.657
[empstat=4]	0.957*	0.146	42.924	0.000	2.603	0.009	0.049	0.037	0.848	1.009
[empstat=5]	0(b)					0(b)				
[NUTS=1]	0.179	0.109	2.711	0.100	1.196	-0.357*	0.076	22.171	0.000	0.700
[NUTS=2]	-0.254	0.138	3.407	0.065	0.776	-0.624*	0.079	61.657	0.000	0.536
[NUTS=3]	-0.010	0.108	0.008	0.928	0.990	-0.243*	0.066	13.717	0.000	0.784
[NUTS=4]	-0.124	0.119	1.096	0.295	0.883	-0.411*	0.074	30.667	0.000	0.663
[NUTS=5]	-0.135	0.124	1.170	0.279	0.874	-0.452*	0.081	31.356	0.000	0.636
[NUTS=6]	-0.019	0.111	0.031	0.860	0.981	-0.733*	0.070	108.238	0.000	0.480
[NUTS=7]	-0.098	0.149	0.428	0.513	0.907	-0.129	0.085	2.275	0.132	0.879
[NUTS=8]	0.524*	0.132	15.725	0.000	0.592	-1.021*	0.073	195.219	0.000	0.360
[NUTS=9]	0.797*	0.205	15.143	0.000	0.451	-0.908*	0.089	105.230	0.000	0.403
[NUTS=10]	0.342*	0.171	3.996	0.046	0.710	-0.796*	0.089	79.789	0.000	0.451
[NUTS=11]	0.211	0.139	2.285	0.131	1.235	-0.114	0.080	2.016	0.156	0.893
[NUTS=12]	0(b)					0(b)				

* represents the significance at the five percent level. (b) represents the reference level.

Table 2b. Multinomial Logistic Regression Results

Variables	<i>x: une-emp</i>					<i>x: une-nlf</i>				
	β	Std Error	Wald	Prob.	exp(β)	β	Std Error	Wald	Prob.	exp(β)
constant	-0.225	0.323	0.484	0.486		1.770*	0.329	28.877	0.000	
[gender=1]	0.380*	0.092	17.051	0.000	1.462	-1.276*	0.096	176.582	0.000	0.279
[gender=2]	0(b)	.	.	.	.	0(b)	.	.	.	.
[agegroup=1]	0.795*	0.267	8.894	0.003	2.214	-1.099*	0.248	19.647	0.000	0.333
[agegroup=2]	0.396	0.256	2.402	0.121	1.486	-1.586*	0.236	45.134	0.000	0.205
[agegroup=3]	0.244	0.256	0.907	0.341	1.276	-1.566*	0.237	43.744	0.000	0.209
[agegroup=4]	0.080	0.265	0.090	0.764	1.083	-0.735*	0.241	9.315	0.002	0.480
[agegroup=5]	0(b)	.	.	.	.	0(b)	.	.	.	.
[urbanrural=1]	0.437*	0.097	20.359	0.000	1.549	0.229*	0.111	4.273	0.039	1.257
[urbanrural=2]	0(b)	.	.	.	.	0(b)	.	.	.	.
[educgrp=1]	0.066	0.204	0.106	0.745	1.069	1.213*	0.230	27.895	0.000	3.365
[educgrp=2]	0.067	0.150	0.198	0.657	1.069	0.705*	0.184	14.669	0.000	2.024
[educgrp=3]	-0.137	0.167	0.675	0.411	0.872	0.950*	0.195	23.780	0.000	2.586
[educgrp=4]	-0.013	0.168	0.006	0.940	0.987	0.612*	0.201	9.214	0.002	1.843
[educgrp=5]	-0.016	0.201	0.006	0.936	0.984	0.264	0.241	1.196	0.274	1.302
[educgrp=6]	0(b)	.	.	.	.	0(b)	.	.	.	.
[period1=1]	-0.152	0.097	2.453	0.117	0.859	0.194	0.109	3.135	0.077	1.214
[period2=2]	0.280*	0.103	7.378	0.007	1.323	0.296*	0.118	6.293	0.012	1.344
[period3=3]	0.100	0.100	0.998	0.318	1.105	0.223*	0.114	3.830	0.050	1.249
[period4=4]	0(b)	.	.	.	.	0(b)	.	.	.	.
[maristat=1]	-0.654*	0.102	40.822	0.000	0.520	-0.499*	0.115	18.916	0.000	0.607
[maristat=2]	0(b)	.	.	.	.	0(b)	.	.	.	.
[NUTS=1]	0.180	0.152	1.398	0.237	1.197	-0.563*	0.175	10.372	0.001	0.570
[NUTS=2]	-0.123	0.198	0.390	0.532	0.884	-0.693*	0.220	9.965	0.002	0.500
[NUTS=3]	0.132	0.152	0.759	0.384	1.142	-0.298	0.170	3.077	0.079	0.742
[NUTS=4]	0.090	0.165	0.298	0.585	1.094	-0.559*	0.188	8.844	0.003	0.572
[NUTS=5]	0.304	0.170	3.175	0.075	1.355	-0.425*	0.194	4.799	0.028	0.654
[NUTS=6]	-0.215	0.154	1.952	0.162	0.807	-0.669*	0.171	15.262	0.000	0.512
[NUTS=7]	-0.025*	0.215	0.013	0.908	0.976	-0.018	0.224	0.007	0.934	0.982
[NUTS=8]	-0.074	0.172	0.188	0.665	0.928	-0.610*	0.194	9.915	0.002	0.543
[NUTS=9]	-0.116	0.233	0.249	0.618	0.890	-0.890*	0.277	10.328	0.001	0.411
[NUTS=10]	-0.435	0.249	3.057	0.080	0.647	-0.519	0.276	3.526	0.060	0.595
[NUTS=11]	-0.231	0.193	1.437	0.231	0.794	-0.075	0.203	0.136	0.713	0.928
[NUTS=12]	0(b)	.	.	.	.	0(b)	.	.	.	.

* represents the significance at the five percent level. (b) represents the reference level.

Table 2c. Multinomial Logistic Regression Results

Variables	<i>x: nlf-emp</i>					<i>x: nlf-une</i>				
	β	Std Error	Wald	Prob.	exp(β)	β	Std Error	Wald	Prob.	exp(β)
constant	-3.140*	0.113	772.768	0.000		-5.177*	0.200	669.287	0.000	
[gender=1]	1.150*	0.031	1,339.081	0.000	3.158	1.594*	0.060	715.433	0.000	4.922
[gender=2]	0(b)					0(b)				
[agegroup=1]	1.050*	0.051	432.206	0.000	2.858	2.168*	0.133	267.236	0.000	8.737
[agegroup=2]	1.128*	0.049	521.208	0.000	3.088	2.735*	0.128	458.979	0.000	15.413
[agegroup=3]	1.215*	0.048	632.711	0.000	3.370	2.537*	0.131	372.902	0.000	12.648
[agegroup=4]	0.777*	0.046	287.208	0.000	2.175	1.752*	0.129	183.474	0.000	5.767
[agegroup=5]	0(b)					0(b)				
[urbanrural=1]	1.133*	0.029	1,542.933	0.000	3.106	0.076	0.065	1.358	0.244	1.079
[urbanrural=2]	0(b)					0(b)				
[educgrp=1]	-0.810*	0.098	68.566	0.000	0.445	-1.655*	0.155	114.351	0.000	0.191
[educgrp=2]	-0.798*	0.094	72.549	0.000	0.450	-1.350*	0.134	101.623	0.000	0.259
[educgrp=3]	-0.651*	0.102	40.334	0.000	0.522	-0.675*	0.142	22.634	0.000	0.509
[educgrp=4]	-0.633*	0.110	32.879	0.000	0.531	-0.416*	0.150	7.651	0.006	0.660
[educgrp=5]	-0.547*	0.144	14.465	0.000	0.579	-0.210	0.189	1.235	0.267	0.811
[educgrp=6]	0(b)					0(b)				
[period1=1]	-0.176*	0.039	20.386	0.000	0.839	-0.221*	0.071	9.751	0.002	0.802
[period2=2]	0.047	0.038	1.558	0.212	1.048	-0.247*	0.072	11.720	0.001	0.781
[period3=3]	0.114*	0.037	9.516	0.002	1.121	-0.111	0.070	2.539	0.111	0.895
[period4=4]	0(b)					0(b)				
[maristat=1]	-0.204*	0.040	25.447	0.000	0.815	0.485*	0.080	36.475	0.000	1.624
[maristat=2]	0(b)					0(b)				
[NUTS=1]	-0.163*	0.064	6.558	0.010	0.850	-0.209	0.118	3.155	0.076	0.812
[NUTS=2]	0.074	0.075	0.985	0.321	1.077	0.588*	0.127	21.321	0.000	1.801
[NUTS=3]	0.102	0.056	3.363	0.067	1.108	0.119	0.107	1.244	0.265	1.126
[NUTS=4]	0.297*	0.064	21.391	0.000	1.345	0.204	0.121	2.832	0.092	1.226
[NUTS=5]	0.210*	0.067	9.976	0.002	1.234	0.230*	0.121	3.626	0.057	1.258
[NUTS=6]	0.360*	0.059	37.846	0.000	1.434	0.623*	0.106	34.308	0.000	1.865
[NUTS=7]	-0.254*	0.084	9.102	0.003	0.775	-0.228	0.159	2.058	0.151	0.796
[NUTS=8]	0.550*	0.059	86.892	0.000	1.733	0.195	0.124	2.484	0.115	1.215
[NUTS=9]	0.907*	0.076	141.338	0.000	2.476	0.225	0.180	1.562	0.211	1.252
[NUTS=10]	0.642*	0.068	90.387	0.000	1.900	-0.195	0.173	1.268	0.260	0.823
[NUTS=11]	0.053	0.067	0.627	0.428	1.054	0.101	0.134	0.575	0.448	1.107
[NUTS=12]	0(b)					0(b)				

* represents the significance at the five percent level. (b) represents the reference level.

4. Conclusion

The transition probabilities of the labour force are calculated for the HSFL data span from 2007 to 2008. This data gives an opportunity to evaluate the effects of the recent global economic crisis on the labour market in Turkey. Evaluating the number of people who are joining to the labour force after being unemployed for some time, and being employed or not-in-the-labour force are critical. Thus, it plays an essential role to calculate state transition probabilities and evaluate the basic factors affecting. Multinomial logistic regression enabled us to evaluate the transitions of the labour force states by comparing related variables' reference level.

The main results obtained are as follows: (1) When the labour force transition probabilities are considered, the highest transition probability owns to the transition from not-in-the-labour force to not-in-the-labour force. (2) Highest outflow probability is observed for the unemployed. (3) During the economic crisis, the transition from employed to unemployed for the youth and female increased tremendously. Females are not employed adequately, and tend to lose their jobs with respect to males. (4) The probability of being employed in rural areas is lower than the ones living in the urban areas. Probability of transition from the unemployed to the employed is higher in rural areas than the urban. (5) Increasing the education level contributes to the probability of being employed. The low level of education effects the inflow movement of labour force and the duration of job creation. (6) Complementary to this fact, the qualified jobs create easier employment opportunities. (7) Married ones tend to be employed rather than the unmarried ones with regard to the marital status. (8) The effect of the regional distinction on the transitions is significant for the transition from the employed to the unemployed.

Appendix - A1 Definitions of the variables and levels

Gender = 1: Male
Gender = 2: Female
Age Group = 1: 15-24
Age Group = 2: 25-34
Age Group = 3: 35-44
Age Group = 4: 45-54
Age Group = 55+
Urban-rural = 1: Rural
Urban-rural = 2: Urban
Educational Status = 1: Non graduate
Educational Status = 2: Primary and middle school
Educational Status = 3: High school
Educational Status = 4: Vocational high school
Educational Status = 5: Two and three year university
Educational Status = 6: Four year and over university
Period1 = 1: Period 1 (January-February-March)
Period2 = 2: Period 2 (April-May-June)
Period3 = 3: Period 3 (July-August-September)
Period4 = 4: Period 4 (October-November-December)
Marital Status = 1: Non-married
Marital Status = 2: Married
Occupational Group = 1: Legislators, senior officials and managers
Occupational Group = 2: Professionals
Occupational Group = 3: Technicians and associate professionals
Occupational Group = 4: Clerks
Occupational Group = 5: Service workers, shop and market sales workers
Occupational Group = 6: Skilled agricultural and fishery workers
Occupational Group = 7: Craft and related trade workers
Occupational Group = 8: Plant and machine operators and assemblers
Occupational Group = 9: Elementaries
Employment Status = 1: Regular employee
Employment Status = 2: Casual employee
Employment Status = 3: Employer
Employment Status = 4: Own account worker
Employment Status = 5: Unpaid family worker
NUTS = 1: Istanbul
NUTS = 2: Western Marmara
NUTS = 3: Aegean
NUTS = 4: Eastern Marmara
NUTS = 5: Western Anatolia
NUTS = 6: Mediterranean
NUTS = 7: Middle Anatolia
NUTS = 8: Western Black Sea
NUTS = 9: Eastern Black Sea
NUTS = 10: North Eastern Anatolia
NUTS = 11: Middle East Anatolia
NUTS = 12: South Eastern Anatolia

Appendix - A2 Descriptive characteristics of the data for employed individuals in 2007

		Number of Individuals	Marginal Percentage
X	emp-emp	40 486	83.1%
	emp-une	1 876	3.8%
	emp-nlf	6 375	13.1%
Gender	Male	35 940	73.7%
	Female	12 797	26.3%
Age Group	15-24	6 299	12.9%
	25-34	13 387	27.5%
	35-44	14 093	28.9%
	45-54	9 313	19.1%
	55+	5 645	11.6%
Urban-Rural	Rural	18 458	37.9%
	Urban	30 279	62.1%
Education Group	Non-graduate	5 201	10.7%
	primary and middle school	27 527	56.5%
	High School	4 980	10.2%
	Vocational High School	4 908	10.1%
	Two-year or three-year university	2 175	4.5%
	Four-year university and over	3 946	8.1%
Period	Period 1 (January-February-March)	11 320	23.2%
	Period 2 (April-May-June)	12 402	25.4%
	Period 3 (July-August-September)	12 579	25.8%
	Period 4 (October-November-December)	12 436	25.5%
Marital Status	Non- Married	9 591	19.7%
	Married	39 146	80.3%
Occupational Status	Legislators, senior officials and managers	4 481	9.2%
	Professionals,	2 814	5.8%
	Technicians and associate professionals	3 012	6.2%
	Clerks,	2 815	5.8%
	Service workers, shop and market sales workers	5 323	10.9%
Occupational Status	Skilled agricultural and fishery workers	11 546	23.7%
	Craft and related trade workers	6 739	13.8%
	Plant and machine operators and assemblers	5 150	10.6%
	Elementaries	6 857	14.1%
Employment Status	Regular Workers	23 582	48.4%
	Causal Workers	3 487	7.2%
	Employers	2 809	5.8%
	Self-Employed	11 930	24.5%
	Unpaid Family Workers	6 929	14.2%
NUTS	Istanbul	5 613	11.5%
	Western Marmara	3 350	6.9%
	Aegean	8 107	16.6%
	Eastern Marmara	4 829	9.9%
	Western Anatolia	3 686	7.6%
	Mediterranean	5 776	11.9%
	Middle Anatolia	2 181	4.5%
	Western Black Sea	5 453	11.2%
	Eastern Black Sea	2 226	4.6%
	North Eastern Anatolia	2 225	4.6%
	Middle East Anatolia	2 346	4.8%
	South Eastern Anatolia	2 945	6.0%
Total		48 737	100.0%

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Appendix A-3: Descriptive characteristics of the data for unemployed
individuals in 2007

		Number of Individuals	Marginal Percentage
X	une-une	1 354	29.2%
	une-emp	1 959	42.3%
	une-nlf	1 321	28.5%
Gender	Male	3 321	71.7%
	Female	1 313	28.3%
Age group	15-24	1 550	33.4%
	25-34	1 378	29.7%
	35-44	949	20.5%
	45-54	595	12.8%
	55+	162	3.5%
Urban -Rural	Rural	934	20.2%
	Urban	3 700	79.8%
Educational Group	Non-graduate	394	8.5%
	Primary and middle school	2 415	52.1%
	High School	686	14.8%
	Vocational High School	595	12.8%
	Two-year or three-year university	246	5.3%
	Four-year university and over	298	6.4%
Period	Period 1 (January-February-March)	1 216	26.2%
	Period 2 (April-May-June)	1 038	22.4%
	Period 3 (July-August-September)	1 106	23.9%
	Period 4 (October-November-December)	1 274	27.5%
Marital status	Non-Married	2 167	46.8%
	Married	2 467	53.2%
	Istanbul	638	13.8%
	Western Marmara	236	5.1%
	Aegean	668	14.4%
	Eastern Marmara	443	9.6%
	Western Anatolia	419	9.0%
	Mediterranean	585	12.6%
	Middle Anatolia	214	4.6%
	Western Black Sea	368	7.9%
	Eastern Black Sea	142	3.1%
	North Eastern Anatolia	115	2.5%
	Middle East Anatolia	275	5.9%
	South Eastern Anatolia	531	11.5%
Total		4 634	100.0%

Appendix A-4: Descriptive characteristics of the data for not-in-labour force individuals in 2007

		Number of Indiv.	Marginal Percentage
X	nlf-nlf	58 817	87.7%
	nlf-emp	6 576	9.8%
	nlf-une	1 648	2.5%
Gender	Male	17 876	26.7%
	Female	49 165	73.3%
Age group	15-24	15 733	23.5%
	25-34	10 606	15.8%
	35-44	10 020	14.9%
	45-54	11 055	16.5%
	55+	19 627	29.3%
Urban-Rural	Rural	18 641	27.8%
	Urban	48 400	72.2%
Educational group	Non-graduate	19 038	28.4%
	Primary and middle school	37 180	55.5%
	High School	5 693	8.5%
	Vocational High School	3 099	4.6%
	Two-year or three-year university	957	1.4%
	Four-year university and over	1 074	1.6%
Period	Period 1 (January-February-March)	16 369	24.4%
	Period 2 (April-May-June)	16 145	24.1%
	Period 3 (July-August-September)	16 535	24.7%
	Period 4 (October-November-December)	17 992	26.8%
Marital status	Non-Married	21 053	31.4%
	Married	45 988	68.6%
NUTS	Istanbul	8 321	12.4%
	Western Marmara	3 745	5.6%
	Aegean	11 086	16.5%
	Eastern Marmara	6 237	9.3%
	Western Anatolia	5 467	8.2%
	Mediterranean	6 924	10.3%
	Middle Anatolia	3 473	5.2%
	Western Black Sea	5 906	8.8%
	Eastern Black Sea	1 644	2.5%
	North Eastern Anatolia	2 787	4.2%
	Middle East Anatolia	3 948	5.9%
	South Eastern Anatolia	7 503	11.2%
Total		67 041	100.0%

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Appendix A-5 Household rotations by periods and years

ANO SNO	Year																			
	2004				2005				2006				2007				2008			
	Period				Period				Period				Period				Period			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
1	A																			
2	A	A																		
3	B	A	A																	
4	B	B	A	A																
5	A	B	B	A	A															
6	A	A	B	B	A	A														
7	B	A	A	B	B	A	A													
8	B	B	A	A	B	B	A	A												
9		B	B	A	A	B	B	A	A											
10			B	B	A	A	B	B	A	A										
11				B	B	A	A	B	B	A	A									
12					B	B	A	A	B	B	A	A								
13						B	B	A	A	B	B	A	A							
14							B	B	A	A	B	B	A	A						
15								B	B	A	A	B	B	A	A					
16									B	B	A	A	B	B	A	A				
17										B	B	A	A	B	B	A	A			
18											B	B	A	A	B	B	A	A		
19												B	B	A	A	B	B	A	A	
20													B	B	A	A	B	B	A	A
21														B	B	A	A	B	B	A
22															B	B	A	A	B	B
23																B	B	A	A	B
24																	B	B	A	A
25																		B	B	A
26																			B	B
27																				B

Notes: ANO: Subsample number. SNO: Order number. Detailed information will be provided if demanded.

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Revenue Efficiency and Returns to Scale in Islamic Banks: Empirical Evidence from Malaysia

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The paper provides new empirical evidence on the revenue efficiency and returns to scale in the Malaysian Islamic banking sector. The sample comprised of 17 domestic and foreign Islamic banks during the period of 2006 to 2010. We employ the Data Envelopment Analysis (DEA) method to compute the revenue efficiency levels. The results indicate that the domestic Islamic banks have exhibited lower revenue efficiency levels compared to their foreign bank peers. In essence, revenue efficiency seems to be the main factor influencing domestic and foreign Islamic banks' profit efficiency levels. The empirical findings indicate that the large domestic Islamic banks tend to operate at constant returns to scale (CRS) or decreasing returns to scale (DRS). On the other hand, the small foreign Islamic banks tend to operate at CRS or increasing returns to scale (IRS).

1. Introduction

The globalization era has changed the landscape of financial intermediation activities attributed to greater deregulation and liberalization. In a competitive financial landscape, the Islamic banking sector is expanding at a rapid pace. The practice of Islamic banking has now spread worldwide, from Malaysia to Bahrain to Europe and the USA. Global Islamic Finance Forum (2012) reported that the number of Islamic financial institutions increased from 75 in 1975 to more than 600 in 2012, covering more than 75 countries. The total assets of the Islamic

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financial institutions hit US\$1 trillion in 2011, increasing by 150% and are growing at 50% faster than the overall banking sector. According to World Islamic Banking Competitiveness Report (2012; 2013), the Islamic banking assets are forecast to grow beyond the milestone of US\$2 trillion by 2014.

In accordance with its rapid growth rate, it is reasonable to expect that Islamic banks to behave in an efficient manner. Berger and Humphrey (1997) suggest that the efficiency of financial institutions has become an important part of the banking literature since the early 1990s. Berger et al. (1993b) points out that, efficient banks tend to exhibit improvement in profitability levels, could offer better prices and service quality for consumers, and should intermediate greater amounts of funds. In essence, the general concept of efficiency covers three main components, namely cost, revenue, and profit efficiency (Adongo et al. 2005; Bader et al. 2008). However, previous studies have mainly focused on the efficiency of cost, profit, or both cost and profit efficiency (Bader et al. 2008). On the other hand, only a handful of studies provide comprehensive empirical evidence on the three efficiency concepts simultaneously.

By employing the Data Envelopment Analysis (DEA) method, the present paper analyze the cost, revenue, and profit efficiency of the Malaysian Islamic banking sector over the period of 2006 to 2010. The preferred method allows us to distinguish between three different types of efficiency, namely cost, revenue, and profit efficiency. In addition to the DEA method, we also perform a series of parametric (*t*-test) and non-parametric (Mann-Whitney [Wilcoxon] and Kruskal-Wallis) tests to examine whether the domestic and foreign banks are drawn from the same population.

The article begins with a brief overview of the Malaysian Islamic banking sector. This is followed by section 3, where we provide a brief review of related studies. Section 4 provides discussions on the methods employed in the study and variables employed to construct the efficiency frontiers. We present the empirical findings in section 5. The article concludes and provides discussions on the policy implications in section 6.

2. Brief Overview of Islamic Banking in Malaysia

As in other Muslim countries, Malaysia was affected by the Islamic resurgence movements among the intellectuals in the 1970s. There were calls from individuals and certain groups and agencies for the government to establish Islamic banks to cater for the needs of Muslims in Malaysia. During the Bumiputra Economic Congress in 1980, a resolution which required the government to allow the Pilgrimage Board (known as Lembaga Tabung Haji) to establish an Islamic bank for the purpose of collection and investing money owned by Muslims was passed. At the National Seminar in 1981, the Malaysian government was urged to promulgate a special law which allows for the establishment of banks and financial bodies whose operations would be based on Islamic principles (Haron and Azmi, 2009).

In line with these requests, the first Islamic bank was established in 1983. Ten years have to pass before the government allowed other conventional banks to offer Islamic banking services under their existing infrastructure and branches. The move to create the Islamic banking window operations allowed the country to enjoy Islamic banking services at the lowest cost and within the shortest time frame. Today, Malaysia has succeeded in implementing a dual banking system and has emerged as among the first nations to have a full-fledged Islamic banking system operating side-by side with the conventional banking system⁴.

As can be seen from Table 1, as at end-2012, the Malaysian Islamic banking sector comprised of 10 domestic (ECONCAP Islamic Bank Berhad has been merged with Hong Leong Islamic Bank Bhd on November 10, 2011) and six foreign Islamic banks.

⁴ The first country which enjoyed a dual banking system was the United Arab Emirates (UAE) where Dubai Islamic Bank was established in 1973 with a paid capital of US\$14 million (Metwally, 1997).

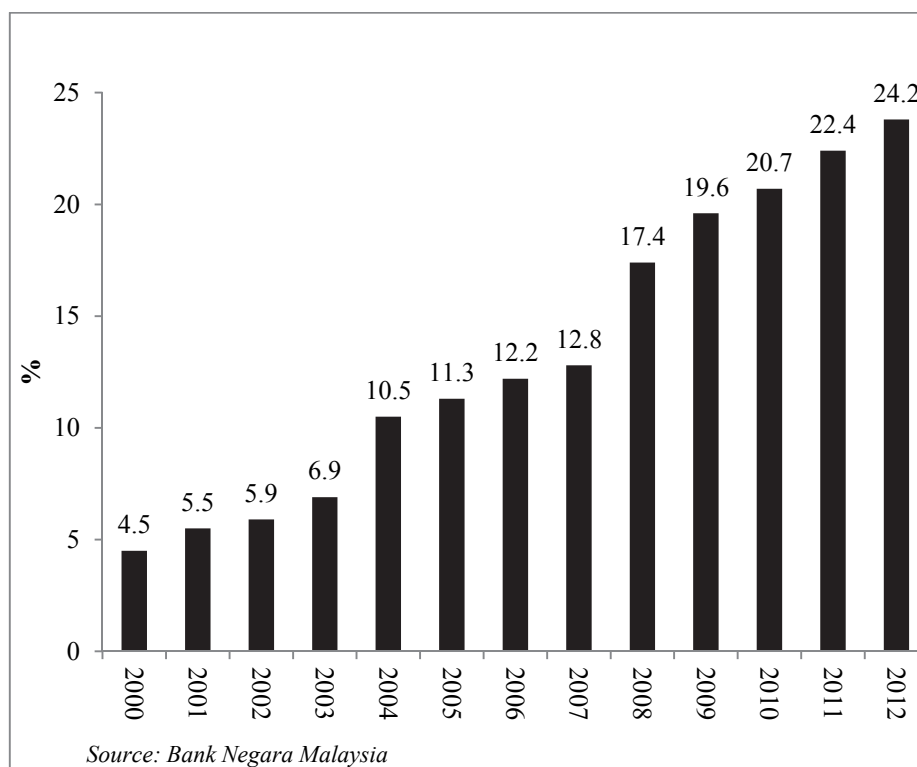
Table 1: Foreign and Domestic Malaysian Islamic Banks

Bank	Ownership	Paid Up Capital
<i>Affin Islamic Bank Bhd</i>	<i>100% Affin Holdings</i>	<i>RM360.0m</i>
<i>Alliance Islamic Bank Bhd</i>	<i>100% Alliance Financial Group</i>	<i>RM300.0m</i>
<i>AmIslamic Bank Bhd</i>	<i>100% AMMB Holdings</i>	<i>RM423.04.m</i>
<i>Bank Islam Malaysia Bhd</i>	<i>51% BIMB Holdings 40% Dubai Investment Group 9% Lembaga Tabung Haji</i>	<i>RM2265.0m</i>
<i>Bank Muamalat Malaysia Bhd</i>	<i>70% DRB Hicom 30% Khazanah Nasional</i>	<i>RM1000.0m</i>
<i>CIMB Islamic Bank Bhd</i>	<i>100% Bumiputra Commerce Holdings</i>	<i>RM880.0m</i>
<i>Hong Leong Islamic Bank Bhd</i>	<i>100% Hong Leong Bank</i>	<i>RM700.0m</i>
<i>Maybank Islamic Bank Bhd</i>	<i>100% Malayan Banking</i>	<i>RM138.0m</i>
<i>Public Islamic Bank Bhd</i>	<i>100% Public Bank</i>	<i>RM200.0m</i>
<i>RHB Islamic Bank Bhd</i>	<i>100% RHB Capital</i>	<i>RM773.0m</i>
<i>Al-Rajhi Banking and Investment Bhd</i>	<i>100% Al-Rajhi Bank, Saudi Arabia</i>	<i>RM1000.0m</i>
<i>Asian Finance Bank Bhd</i>	<i>70% Qatar Islamic Bank 20% RUSD Investment Bank, Saudi Arabia 10% Financial Assets, Bahrain</i>	<i>RM533.0m</i>
<i>HSBC Amanah Malaysia Bhd</i>	<i>100% Hong Kong and Shanghai Banking Corporation</i>	<i>RM50.0m</i>
<i>Kuwait Finance House (Malaysia) Bhd</i>	<i>100% Kuwait Finance House, Kuwait</i>	<i>RM2266.0m</i>
<i>OCBC Al-Amin Bank Bhd</i>	<i>100% OCBC Bank (Malaysia)</i>	<i>RM 85.0m</i>
<i>Standard Chartered Saadiq Bhd</i>	<i>100% Standard Chartered Group</i>	<i>RM103.0m</i>

Source: Bank Negara Malaysia and Banks' Annual Reports**Note:** In italicized are domestic Islamic banks In shaded areas are foreign Islamic banks

Throughout the years, the Malaysian Islamic banking sector has gained its significance and has been on a progressive upward trend. Since 2000, the Malaysian Islamic banking industry has been growing at an average rate of 18.9 per cent per annum in terms of assets. Figure 1 illustrates that the total assets of the Malaysian Islamic banking sector has increased from a mere RM47.1 billion in 2000 to RM469.5 billion in 2012, accounting for 24.2 per cent of the banking system's total assets, while the market share of Islamic deposits and financing stood at 25.6 per cent of the total banking sector's deposits and financing. With the growth in Islamic banking far surpassing the expansion in the banking system's asset base, the Malaysian Islamic banking industry is expected to be able to achieve the government's aspiration of the Islamic banking assets making up 40 per cent of the banking system's total assets by year 2020 from about 24.2 per cent at present.

Figure 1: Islamic Banking Assets as % of Malaysian Banking System
Assets – 2006-2012



3. Literature Review

Despite considerable developments in the Islamic banking sector, there have been relatively limited studies focusing on the efficiency of Islamic banks. So far, there are a fair number of researches that studied banking efficiency in less developed countries (Bader et al. 2008). There are some documented studies that compare the performance of Islamic banks with their conventional counterparts. However, the focus of these studies is on profitability and is constrained by the time span and the number of Islamic banks (Samad and Hassan, 1999; Iqbal, 2001). On the other hand, previous studies investigating the efficiency of Islamic banks focuses on technical, pure technical, and scale efficiency concepts (e.g. Yudistira, 2004), while studies that address the cost, revenue, and profit efficiency of Islamic banks are relatively scarce (Yudistira, 2004; Hassan, 2005; Brown and Skully, 2005).

3.1 Technical, Pure Technical, and Scale Efficiency

The first study that employs the frontier non-parametric approach (DEA) method to assess the efficiency of Islamic banks was conducted by Yudistira (2004). The study discovered new evidence on the performance of 18 Islamic banks over the period 1997-2000 where the Islamic banks suffer slight inefficiencies during the global crisis 1998-1999. Indeed, 1998 and 1999 were the period of turmoil that hit the global economy. The level of inefficiency in 1998 was mainly due to pure technical inefficiency rather than scale inefficiency. Yudistira (2004) suggests that the large Islamic banks have exhibited the highest degree of scale inefficiency. The empirical findings suggest that in most cases the large Islamic banks have exhibited decreasing returns to scale in 1997 and 1998, while most of the large Islamic banks have been operating at constant return to scale in 1999 and 2000.

Hassan and Hussein (2003) examine the efficiency of the Sudanese banking system during the period of 1992 and 2000. They apply a variety of parametric and non-parametric methods to a panel of 17 Sudanese banks. They discover that the Sudanese banking system have exhibited 37% allocative efficiency and 60% technical efficiency, suggesting that the overall cost inefficiency of the Sudanese Islamic banks were mainly due to the technical efficiency (managerially related) rather than allocative efficiency (regulatory).

By employing the DEA method, Sufian (2007) investigates the efficiency of the Malaysian Islamic banking sector. The results from the DEA method suggest that Malaysian Islamic banks efficiency declined in year 2002 to recover slightly in years 2003 and 2004. The domestic Islamic banks were more efficient compared to the foreign Islamic banks albeit marginally. The source of inefficiency of Malaysian Islamic banks in general has been scale, suggesting that Malaysian Islamic banks have been operating at the wrong scale of operations.

In a cross country study, Sufian et al. (2008) analyze the efficiency of Islamic banks in MENA (Middle East and North Africa) and Asian countries. By using the DEA method, they estimate three different types of efficiency measures, namely technical, pure technical, and scale efficiency. The results indicate that pure technical inefficiency outweighs scale inefficiency in the Islamic banks. Although the Islamic banks have been operating at a relatively optimal scale of operations, they were managerially inefficient to exploit their resources to the fullest.

3.2 Cost, Revenue, and Profit Efficiency

The earlier studies performed on the cost and profit efficiency in the conventional banks discovered that revenue efficiency has strong influence on the cost and profit efficiency levels (e.g. Chu and Lim, 1998; Rogers, 1998; Berger and Mester, 2003). Revenue can be defined as how efficiently a bank sells its outputs. Maximum revenue is obtained as a result of producing the output bundle efficiently (Rogers, 1998). In fact, revenue efficiency is decomposed of technical and allocative efficiency which are related to managerial factors and is regularly associated with regulatory factors (Isik and Hassan, 2002). English et al. (1993) posits that in order to ascertain revenue efficiency, banks should focus on both technical efficiency (managerial operating on the production possibilities) and allocative efficiency (bank producing the revenue maximizing mix of outputs based on certain regulations).

Another way to improve revenue efficiency proposed by several studies is for banks to produce higher quality services and charge higher prices and avoid improper choice of inputs and outputs quantities and mispricing of outputs (Rogers, 1998). The revenue inefficiency could be well identified via the profit function because this function combines

both cost and revenue efficiency to evaluate the profit efficiency (Akhavein et al. 1997). Although cost efficiency is high, revenue efficiency would still affect the level of profit efficiency. In essence, revenue efficiency would be the main factor influencing profit efficiency.

The above literature reveals the following research gaps. First, the majority of these studies have mainly concentrated on the conventional banking sectors of the western and developed countries. Second, empirical evidence on the developing countries, particularly the Islamic banking sector, is scarce. Finally, virtually nothing has been published on the cost, revenue, and profit efficiency and its determinants in the Islamic banking sector. Furthermore, if these studies are narrowed down, there is a paucity of studies which examine the revenue efficiency of the domestic and foreign Islamic banks. In the light of these knowledge gaps, the present paper seeks to provide new empirical evidence on the cost, revenue, and profit efficiency and sources of returns to scale in the Malaysian Islamic banking sector.

4. Data and Methodology

The present study gathers data from all Malaysian Islamic banks from 2006 to 2010. The primary source of financial data is the BankScope database produced by the Bureau van Dijk which provides banks' balance sheets and income statements. Data are analyzed for banks which provides Islamic banking products and services under the Islamic Banking Scheme. We collect data from 17 Islamic banking institutions comprising of 11 domestic and six foreign full-fledged Islamic banks (see Table 2).

Table 2: List of Malaysian Islamic Banking Sector during Year 2006-2010

Domestic		Foreign	
No	Bank	No	Bank
1	Affin Islamic Bank Bhd	1	Al Rajhi Banking and Investment Bhd
2	Alliance Islamic Bank Bhd	2	Asian Finance Bank Bhd
3	AmIslamic Bank Bhd	3	HSBC Amanah Malaysia Bhd
4	Bank Islam Malaysia Bhd	4	Kuwait Finance House (Malaysia) Bhd
5	Bank Muamalat Malaysia Bhd	5	OCBC Al-Amin Bank Bhd
6	CIMB Islamic Bank Bhd	6	Standard Chartered Saadiq Bhd
7	EONCAP Islamic Bank Bhd		
8	Hong Leong Islamic Bank Bhd		
9	Maybank Islamic Bhd		
10	Public Islamic Bank Bhd		
11	RHB Islamic Bank Bhd		

Source: Bank Negara Malaysia

4.1 Data Envelopment Analysis

The level of revenue efficiency is measured by using the Data Envelopment Analysis (DEA) method. The DEA method constructs a frontier of the observed input-output ratios by linear programming techniques. The linear substitution is possible between observed input combinations on an isoquant (the same quantity of output is produced while changing the quantities of two or more inputs) that was assumed by the DEA method. Charnes, Cooper and Rhodes (1978) were the first to introduce the term DEA to measure the efficiency of decision making units (DMUs), obtained as a maximum of a ratio of weighted outputs to weighted inputs (hereafter referred to as the CCR model). The more the output produced from given inputs the more efficient is the production.

The CCR model presupposes that there is no significant relationship between the scale of operations and efficiency by assuming constant return to scale (CRS) and it delivers the overall technical efficiency (OTE). The CRS assumption is only justifiable when all DMUs are operating at an optimal scale. However, firms or DMUs in practice may face either economies or diseconomies of scale. Thus, if one makes the CRS assumption when not all DMUs are operating at the optimal scale, the computed measures of OTE will be contaminated with scale inefficiency.

To address this concern, the present study estimates the efficiency scores under the assumption of variable returns to scale (VRS) assumption proposed by Banker, Charnes and Cooper (1984) (hereafter referred to as the BCC model).

The BCC model extended the CCR model by relaxing the CRS assumption and provides the measurement of pure technical efficiency (PTE). PTE measures the efficiency of DMUs without being contaminated by scale effects. Hence, results derived from the VRS assumption provide more reliable information on DMUs efficiency compared to the CRS assumption (Coelli et al. 1998).

The Overall Technical Efficiency (OTE) scores obtained from the CRS DEA can be divided into two components; one is due to scale efficiency (SE) and the other is due to PTE. If there is a difference between the two OTE scores of a DMU (CRS OTE and VRS OTE), then, it indicates that the DMU has scale inefficiency and it could be measured from the difference between the PTE and OTE score (Coelli et al. 1998). Although the SE measure provides information concerning the degree of inefficiency resulting from the failure to operate with CRS, it does not provide information as to whether a DMU is operating in an area of increasing returns to scale (IRS) or decreasing returns to scale (DRS). This may be determined by running additional non-increasing returns to scale (NIRS) constraint imposed on the DEA model. Therefore, the nature of scale inefficiencies, due to either IRS or DRS could be determined by the difference between the NIRS OTE and VRS OTE score if the VRS OTE @ PTE $\neq$ NIRS OTE, then DMU is operating at IRS) and if the VRS OTE @ PTE = NIRS OTE, then DMU is operating at DRS.

The revenue, cost, and profit efficiency models are given in Equations (1) – (3) respectively. As can be seen, the revenue, cost, and profit efficiency scores are bounded within the 0 and 1 range.

Frontier Type	Revenue Efficiency (Eq. 1)	Cost Efficiency (Eq. 2)	Profit Efficiency (Eq. 3)
VRS	$\max \sum_{r=1}^s q_r^o \tilde{y}_{ro}$ subject to $\sum_{j=1}^n \lambda_j x_{ij} \leq \tilde{x}_{io} \quad i = 1, 2, \dots, m,$ $\sum_{j=1}^n \lambda_j y_{rj} \geq \tilde{y}_{ro} \quad r = 1, 2, \dots, s;$ $\lambda_j \tilde{y}_{ro} \geq 0$ $\sum_{j=1}^n \lambda_j = 1$	$\min \sum_{i=1}^m p_i^o \tilde{x}_{io}$ subject to $\sum_{j=1}^n \lambda_j x_{ij} \leq \tilde{x}_{io} \quad i = 1, 2, \dots, m$ $\sum_{j=1}^n \lambda_j y_{rj} \geq y_{ro} \quad r = 1, 2, \dots, s,$ $\lambda_j, \tilde{x}_{io} \geq 0$ $\sum_{j=1}^n \lambda_j = 1$	$\max \sum_{r=1}^s q_r^o \tilde{y}_{ro} - \sum_{i=1}^m p_i^o \tilde{x}_{io}$ subject to $\sum_{j=1}^n \lambda_j x_{ij} \leq \tilde{x}_{io} \quad i = 1, 2, \dots, m;$ $\sum_{j=1}^n \lambda_j y_{rj} \geq \tilde{y}_{ro} \quad r = 1, 2, \dots, s;$ $\tilde{x}_{io} \leq x_{io}, \tilde{y}_{ro} \geq y_{ro}$ $\lambda_j \geq 0$ $\sum_{j=1}^n \lambda_j = 1$

Source: Zhu (2009)

where

s	is output observation
m	is input observation
r	is the s^{th} output
i	is the m^{th} input
q_r^o	is the unit price of output r of DMU0 (DMU0 represents one of the n DMUs)
p_i^o	is the unit price of input i of DMU0
$\tilde{y}_{ro}$	is the r^{th} output that maximize revenue for DMU0
$\tilde{x}_{io}$	is the i^{th} input that minimize cost for DMU0
y_{ro}	is the r^{th} output for DMU0
x_{io}	is the i^{th} input for DMU0
n	is DMU observation
j	is n^{th} DMU
λ_j	is non-negative scalars
y_{rj}	is the s^{th} output for n^{th} DMU
x_{ij}	is the m^{th} input for n^{th} DMU

By calculating the three efficiency measures (e.g. revenue, cost, and profit), we will be able to observe robust results for the domestic and foreign Islamic banks over the period under study. However, the present study will give greater emphasize on revenue efficiency measure compared to cost and profit efficiency measures.

4.2 The Input and Output Variables in DEA

The definition and measurement of bank's inputs and outputs in the banking function remains arguable among researchers (Sufian, 2007) and has always been an arbitrary issue (Ariff and Can, 2008; Berger and Humphrey, 1997). The problem is further compounded by the fact that variable selection is often constrained by the paucity of data. Furthermore, most of financial services are jointly produced and prices of inputs and output are typically assigned to a bundle of financial services. In essence, there is 'no perfect approach' in the selection of bank inputs and outputs variables (Bader et al. 2008).

In essence, there are three main approaches that are widely used in the banking theory literature namely production, intermediation, and value-added approaches (Sealey and Lindley 1977; Frexias and Rochet 1997). The first two approaches apply the traditional microeconomic theory of the firm to banking and differ only in the specification of banking activities. The third approach goes a step further and incorporates some specific activities of banking into the classical theory and thereby modifies it.

The first approach is the production approach which assumes that financial institutions serve as producers of services for account holders, that is, they perform transactions on deposit accounts and process documents such as loans. The second is the intermediation approach which views banks as financial intermediaries whose primary role is to obtain funds from savers and in turn provide loans to others for profit (Chu and Lim, 1998). Under this approach, banks are seen as purchasing labour, materials, and deposits funds that produce outputs such as loans and investments. Finally, the value-added approach identifies those balance sheet categories (assets or liabilities) as outputs that contribute to banks' value added e.g. business associated with the consumption of real resources (Berger et al. 1987). In general, under this approach, deposits and loans are viewed as outputs because they are responsible for the significant proportion of value added.

For the purpose of this study, we chose to follow the intermediation approach for several different reasons. First, the intermediation approach normally includes a large proportion of bank's total costs (see Elyasiani and Mehdian, 1990; Berger and Humphrey, 1991; Avkiran, 1999). Second, the present study attempts to evaluate the efficiency of the banking sector as a whole and not branches of a single bank. Third, Sealey and Lindley (1977) posit that financial institutions normally employ labour, physical capital, and deposits as their inputs to produce earning assets. Finally, the intermediation approach is closely related to main principle of the Islamic financial system, which is based on equity participation e.g. employing funds on the basis of profit and loss sharing. This implies the importance of Islamic banks as an intermediary between savers and borrowers in the financial system.

Furthermore, given the underdevelopment of capital markets, the importance of banks as a financial intermediary is more prevalent in

developing economies like Malaysia. Therefore, it is reasonable to assume that the efficiency of banks in terms of their intermediation functions is crucial as an effective channel for business funding. In this vein, Jaffry et al. (2007) points out that banks play an important economic role in providing financial intermediation by converting deposits into productive investments in developing countries. The banking sector of developing countries have also been shown to perform critical roles in the intermediation process by influencing the level of money stock in the economy with their ability to create deposits (Askari, 1991).

For the purpose of the study, two inputs, two input prices, two outputs, and two output prices variables are chosen. The two input vector variables consist of x_1 : deposits and x_2 : labour. The input prices consist of w_1 : price of deposits and w_2 price of labour. The two output vectors are y_1 : loans and y_2 : income. Meanwhile, two output prices consist of r_1 : price of loans and r_2 : price of investment. The selection of inputs, outputs, inputs prices, and output prices used in this study is being guided by the previous on bank efficiency studies which are summarized in Table 3⁵.

⁵ Some adjustments have to be made to the selection of inputs, outputs, inputs prices, and outputs prices due to the fact that most of the previous studies are performed on the conventional banking sector, while the present study concerns the Islamic banking sector.

Table 3: Summary of Inputs and Outputs on Bank Efficiency Analysis

Study	Inputs (x)	Outputs (y)	Input Prices	Output Prices
Ariff and Can (2008)	1. Deposits 2. Number of employees 3. Physical capital	1. Loans 2. Investments (short and long-term)	1. Price of deposits (interest paid/deposits) 2. Price of labour (personnel expenses/number of employees) 3. Price of physical capital (other operating expenses/physical capital)	1. Price of loans (interest from loans/loans) 2. Price of investments (investments income/investments)
Bader et al. (2008)	1. Labour 2. Fixed assets 3. Total funds	1. Total loans 2. Investments 3. Off-balance sheet items	1. Price of labour (total personnel expenses/total funds) 2. Price of fixed assets (depreciation expenses/fixed assets) 3. Price of funds (interest expenses on deposits and non-deposits funds plus other operating expenses/total funds)	1. Price of loans (interest income/total loans) 2. Price of investments (investments/other earning assets) 3. Price of off-balance sheet items (net commission revenue plus net earning income/off-balance sheet items)
Maudos and Pastor (2003)	1. Deposits and other funding 2. Number of employees 3. Physical capital	1. Loans and other earnings assets 2. Securities	1. Price of deposits (interest paid/deposits and other funding) 2. Price of labour (personnel expenses/number of employees) 3. Price of physical capital (other expenses/physical capital)	1. Price of loans and other earnings assets (interest received and other operating income/loans and other earnings assets) 2. Price of securities (profits from financial operations/securities)
Fare et al. (2004)	1. Labour 2. Capital 3. Non-transaction deposits	1. Securities 2. Real estate loans 3. Commercial and industry loans 4. Personal loans 5. Transaction deposits	1. Price of labour (total salaries and employee benefits/number of full-time equivalent employees) 2. Price of capital (expenses of premises and fixed assets/value of premises and fixed assets) 3. Price of non-transaction deposits (interest expenses on non-transaction account deposits/value of non-transaction account deposits)	1. Price of securities (interest income on securities/securities) 2. Price of real estate loans (interest income on real estate loans/real estate loans) 3. Price of commercial and industry loans (interest income on commercial and industry loans/industry loans) 4. Price of personal loans (interest income on personal loans/personal loans) 5. Price of transaction deposits (interest

				income on transaction deposits/transaction deposits)
Sufian et al. (2012b)	1. Deposits 2. Labour 3. Physical capital	1. Loans 2. Investments 3. Off-balance sheet items	1. Price of deposits (total interest expenses/deposits) 2. Price of labour (personnel expenses/total assets) 3. Price of physical capital (Other operating expenses/fixed assets)	1. Price of loans (interest income on loans and others interest income/loans) 2. Price of investments (other operating income/investments) 3. Price of off-balance sheet items (net fees and commissions/off-balance sheet items)
Devaney and Weber (2002)	1. Labour 2. Physical capital 3. Non-transaction account deposits	1. Real estate loans 2-5. Commercial and industry loans (a, b, c, d) 6. Personal loans 7. Securities 8. Transaction account deposits	1. Price of labour (total salaries and employee benefits/ number of full-time equivalent employees) 2. Price of physical capital (expenses of premises and fixed assets/value of premises and fixed assets) 3. Price of non-transaction account deposits (interest expenses on non-transaction account deposits/value of non-transaction account deposits)	1. Price of real estate (interest income on real estate loans/real estate loans) 2-5. Price of commercial and industry loans a, b, c, d (interest income on commercial and industry loans a, b, c, d/commercial and industry loans a, b, c, d) 6. Price of personal loans (interest income on personal loans/personal loans) 7. Price of securities (interest income on securities/securities) 8. Price of transaction account deposits (interest income on transaction account deposit/transaction account deposits)

Unlike the earlier bank efficiency studies, we assume that Islamic banks collect deposits, employ labour and capital and convert those resources into loans and financing and other earnings. The use of earning assets as an output measure is a novel attempt within the context of this study. We believe that earning assets is a better measurement of output for Islamic banks because only earning assets contributes to Islamic banks' revenue and not its entire financing or loan assets.

The summary of data used to construct the efficiency frontiers are given in Table 4.

Table 4: Descriptive Statistics for Inputs, Inputs Prices, Outputs, and Outputs Prices

Variables	Min (RM mil.)	Max (RM mil.)	Mean (RM mil.)	Std. Dev. (RM mil.)
x_1	41.862	35190.400	9018.061	7555.576
x_2	0.600	431.000	49.027	73.043
w_1	0.001	0.045	0.021	0.007
w_2	0.000	2.272	0.043	0.248
y_1	2.408	33410.200	6074.593	5981.695
y_2	1.650	1855.600	472.455	410.672
r_1	0.006	0.666	0.069	0.069
r_2	0.001	15.161	0.474	1.629

Notes: x_1 : Deposits (deposits and short term funding), x_2 : Labour (personnel expenses), w_1 : Price of deposits (total interest expenses/ deposits), w_2 : Price of labour (personnel expenses/ total assets), y_1 : Loans (net loans and interbank lending), y_2 : Income (gross interest and dividend income), r_1 : Price of loans (interest income on loans and others interest income/ loans), r_2 : Price of income (other operating income/ income)

5. Empirical Results

Before proceeding with the DEA results, as suggested by Cooper et al. (2002), we first test the rule of thumb on the selection of inputs and outputs variables. Since the total number of DMUs (17 banks) in this study is more than the number of input and output variables (2 inputs x 2 outputs @ 3 [2 inputs + 2 outputs]), the selection of variables is valid and allows for the efficiency of DMUs to be measured. By calculating the three efficiency measures (e.g. revenue, cost, and profit), we obtain robust results for both the domestic and foreign Islamic banks. Table 5 illustrates the revenue efficiency estimates along with the cost and profit efficiency measures for both the domestic and foreign Islamic banks.

5.1 Efficiency of Domestic Islamic Banks

Table 5 shows the mean cost, revenue, and profit efficiency for the Malaysian domestic Islamic banks of 74.5%, 71.2%, and 62.5% respectively. In other words, the domestic Malaysian Islamic banks have

been inefficient in producing outputs by using the same inputs (revenue inefficiency) and by not fully using the inputs efficiently to produce the same outputs (cost inefficiency). Banks are said to have slacked if they fail to fully minimize the cost and maximize the revenue (profit inefficiency). The results indicate that the cost, revenue, and profit inefficiency in the Malaysian Islamic banking sector as 25.5%, 28.8%, and 37.5% respectively.

For cost efficiency, the results indicate that on average Malaysian domestic Islamic banks have utilized only 74.5% of the resources or inputs to produce the same level of outputs. In other words, on average, Malaysian domestic Islamic banks have wasted 25.5% of its inputs, or it could have saved 25.5% of its inputs to produce the same level of outputs. It is also worth noting that on average, Malaysian domestic Islamic banks have been more cost efficient in utilizing their inputs compared to their ability to generate revenues and profits. For revenue efficiency, the average Islamic bank could only generate 72.1% of revenues, less than what it was initially expected to generate. Hence, revenue is lost by 28.8%, indicating that the average Islamic bank loses an opportunity to receive 28.8% more revenues given the same amount of resources, or they could have produced 28.8% more outputs given the same level of inputs.

It is apparent that the source of inefficiency in the Malaysian domestic Islamic banks is due to revenue followed by the profit. Similarly, the average Islamic bank could have earned 62.5% of what was available, and lost the opportunity to make 37.5% more profits from the same level of inputs. Even though the cost efficiency is reportedly highest in the domestic Islamic banks, the revenue efficiency is found to be lower, and this led to higher revenue inefficiency. When both efficiency concepts (revenue and cost) are compared, the higher revenue inefficiency seems to have contributed to the higher profit inefficiency levels.

Table 5: Cost, Revenue, and Profit Efficiency of Domestic and Foreign Islamic Banks

Domestic Islamic Banks					Foreign Islamic Banks				
No.	Bank	VRS		No.	Bank	VRS		VRS	VRS
		CE	RE			CE	RE		
1	Affin Islamic Bank Bhd	0.506	0.497	1	Al-Rajhi Banking and investment Bhd	0.855	0.720	0.855	0.634
2	Alliance Islamic Bank Bhd	0.985	0.987	2	Asian Finance Bank Bhd	0.922	1.000	0.922	1.000
3	AmlIslamic Bank Bhd	0.840	0.941	3	HSBC Amanah Malaysia Bhd	0.956	0.935	0.956	0.919
4	Bank Islam Malaysia Bhd	0.697	0.501	4	Kuwait Finance House (Malaysia) Bhd	0.701	0.643	0.701	0.506
5	Bank Muamalat Malaysia Bhd	0.627	0.594	5	OCBC Al-Amin Bank Bhd	0.688	0.767	0.688	0.697
6	CIMB Islamic Bank Bhd	0.632	0.516	6	Standard Chartered Saadiq Bhd	0.670	1.000	0.670	1.000
7	EONCAP Islamic Bank Bhd	0.781	0.782						
8	Hong Leong Islamic Bank Bhd	0.600	0.586						
9	Maybank Islamic Bhd	1.000	1.000						
10	Public Islamic Bank Bhd	0.873	0.807						
11	RHB Islamic Bank Bhd	0.654	0.619						
	Mean	0.745	0.712		Mean	0.799	0.844	0.799	0.793

Note:

CE: Cost Efficiency, RE: Revenue Efficiency, PE: Profit Efficiency

5.2 Efficiency of Foreign Islamic Banks

The empirical findings in Table 5 seem to suggest that Malaysian foreign Islamic banks have exhibited mean cost, revenue, and profit efficiency (inefficiency) of 79.9% (20.1%), 84.4% (15.6%), and 79.3% (20.7%) respectively. Furthermore, it is interesting to note that on average Malaysian foreign Islamic banks have been found to be more efficient compared to their domestic bank peers. For revenue efficiency, we find that the average foreign Islamic bank generates 84.4% of revenues out of the amount of inputs utilized. Hence, the average foreign Islamic bank lost an opportunity to receive 15.6% more revenue, given the same amount of resources.

As for the cost efficiency, the results seem to suggest that the average foreign Islamic bank has utilized only 79.9% of the resources or inputs to produce the same level of outputs. In other words, on average, foreign Islamic banks have wasted 20.1% of its inputs, or it could have saved 20.1% of its inputs to produce the same level of outputs. Therefore, there was substantial room for significant cost savings for the foreign Islamic banks if they employ their inputs more efficiently. Noticeably, the highest level of inefficiency is cost followed by profit. The average foreign Islamic bank could have earned 79.3% of what was available and lost the opportunity to make 20.7% more profits when utilizing the same level of inputs.

In summary, the empirical findings from this study seem to suggest that the foreign Islamic banks have exhibited higher efficiency levels for all three measures (e.g. cost efficiency (84.4% vs. 71.2%), revenue efficiency (79.9% vs. 74.5%), and profit efficiency (79.3% vs. 62.5%). In essence, revenue efficiency seems to play the main factor leading to the lower or higher profit efficiency levels for both the domestic and foreign Islamic banks. Besides, results for the domestic Islamic banks indicate that the level of cost efficiency is higher than profit efficiency due to the lower revenue efficiency level or higher inefficiency from the revenue side. On the other hand, the level of cost efficiency is slightly higher than profit efficiency attributed to the higher revenue efficiency level from the revenue side for the foreign Islamic banks.

5.3 Composition on the Efficiency Frontier in Malaysian Islamic Banks

As stated earlier, a bank could operate at CRS or VRS where CRS signifies that an increase in inputs results in a proportionate increase in outputs and VRS means a rise in inputs results in a disproportionate rise in outputs. Further, a bank operating at VRS could be experiencing either DRS or IRS. DRS indicate that an increase in inputs results in lesser output increases, while IRS means that increase in inputs results in a higher increase in outputs. Table 6 list the Malaysian Islamic banks that form the efficiency frontier. During the period of study, only AmIslamic Bank Bhd and Maybank Islamic Bhd seem to have dominated the efficiency frontier (CRS) compared with other Islamic banks. Interestingly, both AmIslamic Bank and Maybank Islamic are domestic Islamic banks.

In general, the domestic Islamic banks are larger than foreign Islamic banks in terms of total assets. The results indicate that the large Islamic banks (the five largest domestic Islamic banks) tend to operate at CRS or DRS. The findings from this study are similar to the earlier studies by among others McAllister and McManus (1993), Drake (2001), and Yudistira (2004). Among others, the empirical findings clearly indicate that further increase in the size of these banks would only result in a smaller increase of outputs for every proportionate increase in inputs of the large banks, resulting from the fact that they have been operating at DRS.

On the other hand, the empirical findings from this study seem to suggest that the small Islamic banks (the five smallest foreign Islamic banks) tend to operate at CRS or IRS. Among others, the implication is that the smaller foreign Islamic banks, which have been operating at IRS, could achieve significant cost savings and efficiency gains by increasing its scale of operations attributed to the fact that a proportionate increase in inputs would result in more than a proportionate increase in outputs. In other words, substantial gains could be attained from altering the scale via internal growth or through mergers and acquisitions within the foreign Islamic banks. Therefore, banks that experience IRS should either eliminate their scale inefficiency via internal expansion or should become a prime target for acquiring banks because it can create value from underperforming bank and eliminate redundancies and inefficiencies (Evanoff and Israelevich, 1991)

Table 6: Malaysian Islamic Banks on the Efficiency Frontier

Bank	Total Asset (Mil USD)	Year				Count Bank (CRS)
		2011	2010	2009	2008	2007
<i>Maybank Islamic Bhd</i>	13,639	CRS	CRS	CRS	DRS	CRS
<i>CIMB Islamic Bank Bhd</i>	11,687	DRS	DRS	DRS	DRS	IRS
<i>Bank Islam Malaysia Bhd</i>	9,843	DRS	DRS	DRS	DRS	DRS
<i>Public Islamic Bank Bhd</i>	7,673	DRS	DRS	IRS	DRS	IRS
<i>AmIslamic Bank Bhd</i>	6,672	CRS	CRS	CRS	CRS	CRS
<i>Bank Muamalat Malaysia Bhd</i>	6,050	DRS	IRS	DRS	DRS	IRS
<i>RHB Islamic Bank Bhd</i>	4,252	IRS	IRS	DRS	DRS	IRS
<i>Hong Leong Islamic Bank Bhd</i>	3,077	IRS	IRS	DRS	DRS	IRS
<i>Affin Islamic Bank Bhd</i>	2,451	DRS	IRS	DRS	IRS	IRS
<i>Alliance Islamic Bank Bhd</i>	2,057	IRS	IRS	CRS	CRS	IRS
<i>EONCAP Islamic Bank Bhd</i>	2,050	DRS	IRS	DRS	DRS	IRS
<i>Kuwait Finance House (Malaysia) Bhd</i>	3,540	IRS	IRS	DRS	DRS	IRS
<i>HSBC Amanah Malaysia Bhd</i>	2,190	IRS	IRS	CRS	DRS	IRS
<i>Al-Rajhi Banking and Investment Bhd</i>	1,919	IRS	IRS	DRS	DRS	IRS
<i>OCBC Al-Amin Bank Bhd</i>	1,396	IRS	IRS	IRS	IRS	IRS
<i>Standard Chartered Saadiq Bhd</i>	1,320	CRS	IRS	IRS	IRS	IRS
<i>Asian Finance Bank Bhd</i>	727	IRS	IRS	IRS	IRS	CRS
Count Year (CRS)		3	2	4	2	3
						14

Note: CRS: constant returns to scale, DRS: decreasing returns to scale, IRS: increasing returns to scale.
In italicized areas are domestic Islamic banks. In shaded areas are foreign Islamic banks

5.4 Robustness Tests

After examining results derived from the DEA method, the issue of interest now is whether the difference in the cost, revenue, and profit efficiency of the domestic and foreign Islamic banks is statistically significant. Coakes and Steed (2003) suggest that the Mann-Whitney [Wilcoxon] is a relevant test for two independent samples drawn from populations having the same distributions. The most relevant reason is that the data violate the stringent assumptions of the independent group's t -test. In what follows, we perform the non-parametric Mann-Whitney [Wilcoxon] test along with a series of other parametric (t -test) and non-parametric Kruskal-Wallis tests to obtain robust results.

The robustness tests results are given in Table 7. The results from the parametric t -test and non-parametric Mann-Whitney (Wilcoxon) tests suggest that the Malaysian domestic Islamic banks have exhibited a lower mean cost efficiency level compared to their foreign Islamic bank peers ($0.745 < 0.799$). Likewise, the Malaysian domestic Islamic banks have also exhibited a lower mean profit efficiency level compared to their foreign Islamic banks ($0.625 < 0.793$). The results from the parametric t -test are further confirmed by the non-parametric Mann-Whitney [Wilcoxon] and Kruskal-Wallis tests. Similarly, the parametric t -test and non-parametric Mann-Whitney [Wilcoxon] and Kruskal-Wallis tests results indicate that the domestic Islamic banks have exhibited a lower revenue efficiency level compared to their foreign Islamic bank peers ($0.712 < 0.844$).

Based on most of the results in Table 7, we failed to reject the null hypothesis that the domestic and foreign Islamic banks come from the same population and have identical technologies since the revenue efficiency levels of the domestic Islamic banks is lower than the foreign Islamic banks at the 0.01 levels of significance. The clearly indicate that revenue efficiency could significantly influence the profitability of Islamic banks due to lower profit efficiency level. Therefore, within the context of Islamic banks the empirical findings clearly suggest that revenue efficiency represent the most important efficiency measure which could lead to improvement or deterioration in profit efficiency levels.

Table 7: Summary of Parametric and Non-Parametric Tests on Domestic and Foreign Islamic Banks

	Test groups					
	Parametric test		Non-parametric tests			
Individual tests	<i>t</i> -test		Mann-Whitney	Kruskall-Wallis		
			[Wilcoxon Rank-Sum] test	Equality of Populations test		
Hypothesis			MedianDomestic =			
			MedianForeign			
Test statistics	$t(Prb > t)$		$z(Prb > z)$		$X^2(Prb > X^2)$	
	Mean	<i>t</i>	Mean Rank	<i>z</i>	Mean Rank	X^2
Cost Efficiency						
Domestic Islamic banks	0.745	-1.131	41.09	-0.973	41.09	0.947
Foreign Islamic banks	0.799		46.50		46.50	
Revenue Efficiency						
Domestic Islamic banks	0.712	-2.726***	37.49	-2.827***	37.49	7.992***
Foreign Islamic banks	0.844		53.10		53.10	
Profit Efficiency						
Domestic Islamic banks	0.625	-2.551**	38.46	-2.352**	38.46	5.533**
Foreign Islamic banks	0.793		51.32		51.32	

Note: *** and ** indicate significance at the 1% and 5% levels respectively.

6. Conclusions and Policy Implications

The main objective of the present paper is to examine the revenue efficiency and returns to scale in the Malaysian Islamic banking sector over the period of 2006 to 2010. To date, the majority of researchers have focused on the cost and profit efficiency, while only a few have looked on revenue efficiency. Furthermore, most of these studies are carried out on the conventional banking sectors, while empirical evidence on the Islamic banking sectors is relatively scarce. The non-parametric Data Envelopment Analysis (DEA) method is applied to distinguish between three different types of efficiency measures, namely cost, revenue, and profit. Additionally, we perform a series of parametric (t -test) and non-parametric (Mann-Whitney [Wilcoxon] and Kruskal-Wallis) tests to examine whether the domestic and foreign Islamic banks are drawn from the same population.

We find that there is a statistically significant difference between the domestic and foreign Islamic banks' revenue efficiency. The results show that the revenue efficiency of the domestic Islamic banks is relatively lower compared to their foreign peers due to the difference between the cost and profit efficiency levels. The superiority in revenue efficiency of the foreign Islamic banks could be attributed to distinct competitive advantages they pose compared to their domestic Islamic bank peers. It is reasonable to assume that the foreign Islamic banks have the advantage of relatively advanced technologies. In this vein, Havrylchyk (2006) discovered similar findings that foreign banks could produce higher profit due to the modern information technologies and better risk management.

The empirical findings from this study failed to reject the null hypothesis that the domestic Islamic and foreign Islamic banks are derived from the same population and have identical technologies since the revenue efficiency of the domestic Islamic banks is statistically significantly lower compared to the foreign Islamic banks. In other words, the domestic and foreign Islamic banks in Malaysia are not considered as a similar organization because of the different level of the revenue efficiency in both banks that may affect the main objective of the banks to maximize the profit and shareholder wealth. In essence, the empirical findings clearly indicate that better revenue efficiency could

improve the level of profit efficiency and consequently contribute to higher profitability levels in the Malaysian Islamic banking sector.

The analysis on the returns to scale indicates that the large Islamic banks (the five largest domestic Islamic banks) tend to operate at CRS or DRS, while the small Islamic banks (the five smallest foreign Islamic banks) tend to operate at CRS or IRS. Therefore, the foreign Islamic banks that experience IRS should either eliminate their scale inefficiency via internal expansion or should become a prime target for acquiring banks which could eliminate redundancies and inefficiencies within the inefficient banks (Evanoff and Israelvich, 1991). On the other hand, the large domestic Islamic banks which have been operating at DRS are advised not to increase their size or be involved with mergers and acquisitions event because further increase in the size of the bank would only result in a smaller increase of outputs for every proportionate increase in inputs.

The findings of this study are expected to contribute significantly to regulators, policy makers, and bank managers. First, systematic analysis on the sources of revenue efficiency is crucial because revenue efficiency is the most important efficiency concept as lower profit efficiency can be identified from it (Akhavain et al. 1997). Furthermore, since the foreign Islamic banks are more efficient than the domestic Islamic banks, regulators may have to find ways and make decisions to further improve the revenue efficiency in the domestic Islamic banks which could lead to the increase in their profitability levels. To be able to improve the performance of the domestic Islamic banks, regulators may have to employ and exercise the same information technologies, skills, and risk management which have been applied by the foreign Islamic banks.

Second, the results could also provide valuable information and guidance to the managers of the Islamic banks. Islamic banks need to have better understanding the impact of their revenue efficiency levels on their performance. Thus, the domestic and foreign Islamic banks need to consider all the potential technologies which could improve their revenue efficiency since the main motive of bank is to maximise profit and shareholders' value or wealth. Therefore, the present study provide insights to the bank's specific management with regard to attaining optimal utilization of capacities, improvement in managerial expertise,

efficient allocation of scarce resources, and the most productive scale of operations.

Finally, the results of the study may have implications for investors whose main desire is to reap higher profits from their investments. In so doing, they could concentrate mostly on the potential profitability of the banks before making investment decisions. Based on the findings from this study, the revenue efficiency is the main factor that leads to the higher or lower Islamic banks' profitability. The relatively informed investors may have to evaluate the performance of Islamic banks through the results of revenue efficiency. In essence, the findings of this study may assist the investors to plan and strategize their investment portfolio performance given that a wise decision making that investors make today will determine their level of expected returns in the future.

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Empirical Findings on Triplet Deficits Hypothesis: The Case of Turkey

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The aim of this study is to investigate the concept of triplet deficits in Turkey between 1980 and 2010. “Dolado-Lütkepohl Granger Causality Analysis” was performed in order to determine the direction of the relationship among the variables. In addition, the Vector Autoregressive (VAR), Variance Decomposition and Impulse-Response analysis were performed to determine the degree to which variables affected each other. The study finds that triplet deficit hypothesis was valid in Turkey between 1980 and 2010.

1. Introduction

Budget deficits refer to the case when budget balance making up the income-spending balance of countries results in high levels of surplus on the spending side. On the other hand, the existence of a deficit in the current balance consisting of goods, services, income-expense balance and currents is called current deficit. In addition the country’s total investment and savings into this balance leads to the emergence of the concept of triplet deficits (Senturk and Eksi, 2010: 339). In the economic literature, according to the triplet deficit hypothesis explaining the relationship among budget deficits, current deficits and investment-saving gap, there is a positive relationship among those deficits.

High level current deficits accompanied with high level budget deficits in the US economy starting from 1980s brought about the concept of

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“Twin Deficits”. The view claiming the fact that there is a positive relationship between these two deficits called “Twin Deficit Hypothesis”. The economies presenting both fiscal and current deficits are seen to have twin deficit. The U.S. has experienced this case for very long years. Contrary to this, opposite scenarios presenting fiscal and current profit stand for a better financial position. China has always been emphasized as an example of a country presenting long term financial and current profit.

As a prerequisite for mentioning that there is macroeconomic balance in a country, there should be a balance of budget, current and saving-investment. Keeping a balance amongst these three macroeconomic variables is a basic problem not only for developing countries but also for developed countries. The liberalization movements that emerged not only in the Turkish economy after 1980s but also all around the world and that affected the entire world led to the macroeconomic problems because of the current deficit, budget deficit and the inequality in saving-investment.

2. The Emergence of “Triplet Deficits” Concept

The prerequisite for a sustainable economic growth is the control of current deficits and budget deficits. Nevertheless, it is quite difficult for the developed and developing countries to realize this prerequisite. The idea that budget deficits and current deficits are global issues as capital is mobile has gained importance and the concept of twin deficit has been discussed both on a theoretical and a practical basis. The concept of twin deficits, which was much discussed in 1980s but then was suspended for a decade, finally came to the foreground in the financial policy discussions again in 2000s (Yay and Tastan, 2007:88). The relationship between budget deficit and current deficit, which is principally called “Twin Deficit Hypothesis” in the economics literature, is a hypothesis which is discussed by researchers as both bidirectional and unidirectional. While the theoretical and empirical discussions on this hypothesis are going on, the addition and interaction of savings-investment inequality to this deficit creates the triplet deficits concept.

According to Vyshnyak (2000), the mechanism providing the interaction between budget and current deficit operates through foreign exchange market. A country experiencing current deficit most probably chooses

foreign borrowing in order to finance this deficit. This means that a portion of the future income will be transferred abroad. Then, on one hand there is budget deficit due to borrowing and on the other hand fluctuation in the foreign exchange makes the economy fragile. As a matter of fact, an economy using a stable exchange regime and financing the external deficits via borrowing may be exposed to payment schedule crisis with the volatility in the exchange rates. In a smaller and outward oriented economy where there are flexible exchange rates and full capital mobility, an increase of the government expenditures also increases the interest rates in the domestic economy. Due to the fact that the domestic interest rate is higher than the world rate, capital flow speeds up and the value of national currency strengthens. As a result, demand for imported goods that became cheaper because of the exchange rate and export decreases, resulting in a large effect on current deficit.

In order to express the triplet deficits in an equation, we should first of all define what a macroeconomic balance is in an open economy. The concept of Triplet Deficit expresses the related balance of saving-investment deficit, budget deficit and current deficit, which are among the most important macroeconomic growth signals of a country. The equational proof of this economical case is possible with Keynesian spending equation. According to this, the condition of balance in macro economical terms is shown as in the equation of: $Y = C + I + G + XN$ (Danisman, 2009:19).

$$\begin{array}{ll} Y: \text{Gross Domestic Product} & C: \text{Consumption Expenditures} \\ I: \text{Investment Expenditures} & G: \text{Public Expenditures} \\ XN: \text{Net Export} & \\ (S-I) + (T-G) = (X-M) & (1) \end{array}$$

$$\begin{array}{ll} S: \text{Total Domestic Savings} & T: \text{Tax Income} \\ X: \text{Total Export} & M: \text{Total Import} \\ \text{when equation 1 is expressed as below;} & \\ Y = C + I + G + (X - M) & (2) \end{array}$$

In Equation 2, it partially returns the balance of current account when the unrequited transfers are ignored.

$$\text{Balance of Current Accounts; } X - M \quad (3)$$

In outward oriented open economies total savings is equal to the addition of national savings and external savings.

$$S(T) = S(D) + S(F) \quad (4)$$

T: Total

D: Domestic

F: Foreign

National savings are the addition of private sector and public savings in case of a closed economy. External savings are given by equation 3.

$$S(D) = S(P) + S(G) \quad (5)$$

P: Privacy Sector

G: Government Sector

$$S(F) = XN \quad (6)$$

The explanation of private sector and public savings are as follows:

$$S(P) = Y - T - C \quad (7)$$

$$S(G) = T - G \quad (8)$$

To sum up under the light of those data, to write the total savings again;

$$S = (Y - T - C) + (T - G) + (X - M) \quad (9)$$

is obtained as equation.

When this equation is rearranged, we come up with equation number 1.

$$S(P) + S(G) = \text{Current Account Balance} \quad (10) = (1)$$

According to the basic Keynesian model, this equation derived from the balance conditions of goods market in open economies shows that there is a relationship among Domestic Public Savings Balance, Public Budget Balance and Current Account Balance. As can be predicted, it is possible that these three macroeconomic balances result in deficit, surplus or balance.

In this respect, in order to use the concepts of twin and triplet deficits, it is not enough for the accounts to be in debt. They should also affect each other either in a unidirectional or bidirectional manner (Danisman, 2009:20). Accordingly, foreign trade and budget deficits of a country result from investment-saving instability and income increase is also

possible via the multiplier effect of the investments and demand in imported goods rises. As a result, foreign trade deficits emerge. According to twin deficit hypothesis, even if the taxes are lowered, people might make savings by thinking that they are going to pay that and in parallel to this logical relationship, changes in the budget balance are not going to affect foreign trade balance (Celik et al., 2008).

3. Literature Review

There are not many studies in literature conducted on “the Triplet Deficits Hypothesis” but there are different views on twin deficits. Our study will be a pioneering study by adding saving-investment balance to the “twin deficit” model. For instance, in Keynesian Theory and Mundell-Flemming Models it is stressed that there is a relationship between budget and current deficit whereas in Ricardo Equation Theory it is not proposed that there is a relationship between budget and current deficits.

There are two mechanisms underlying the Keynesian point of view. According to the first of these, higher levels of budget deficits increase the interest rates due to growing money demand. According to the second one, budget deficits increasing in parallel to public expenditures also increase the spendable income via multiplier mechanism. As a result, interest rates increase and short term capital movements also speed up. This case leads to an increase in money demand in stable foreign exchange system and slows the export in flexible foreign exchange system by increasing import since the local currency becomes more valuable and therefore imbalances the current account. The increase of spendable income also imbalances the current account by increasing the demand in import goods.

Ay et. al. (2004) tested the relationship between two deficits for the period of 1992 – 2003 using Granger Causality and Regression Analysis. The researchers showed that there is a mutual interaction between budget and current deficits and therefore that the Keynesian Traditional View is also valid for Turkey covering the period studied.

Another study confirming the traditional Keynesian view was done by Sever and Demir (2007). Based on the Turkish experience, the rate of Gross Domestic Product to the public sector borrowing requirement, the interest rate of government debt securities, consumer price index based

real effective exchange rate and the rate of current deficit to Gross Domestic Product were evaluated from 1987 to 2006. According to Granger Causality Test results of this study, the traditional Keynesian point of view is confirmed. Namely, budget deficits increase interest rates; the increased interest rates make the local currency more valuable and as a natural result of this, current deficits emerge.

Vyshnyak (2000), points to the non-productive government expenditures as the reason for the current deficit in Ukraine. As a result of the time series analysis for the USA, Canada, Great Britain and Western Germany, it was put forward that there is an interaction between budget and current deficit.

According to Gok and Altay (2007) who used Johansen co-integration test for the period of 1989-2005, no evidence supporting the twin deficit was found. Yet some statistical evidence in the direction of transfer mechanism forecasted was found by Action-Reaction and Variance Parsing analysis that prove Twin Deficit Hypothesis is true. This is in accordance with the Keynesian Income-Consumption view. In summary, in this study, the twin deficit hypothesis is not valid for the period of 1989-2005 in the Turkish economy in terms of long periods but it is possible to say that it was valid for a short term. The traditional Keynesian approach shows the interaction of budget deficits emerging from the increased public expenditures and decreased taxes on current balance (Erdinc, 2008:212).

Regarding the period of 1996-2006, according to Celik et al. (2008), who carried out panel co-integration analysis on Czech Republic, Brazil, Mexico and Columbia, countries showing similar economic features, in the participants' economies long term foreign trade and budget deficits are co-integrated. Shortly, as far as 6 countries are concerned, the Ricardian Equation Hypothesis was rejected and it was put forward that there had been long term twin deficit relationship for these countries.

Another panel co-integration analysis was carried out by Yilgor (2008) for 29 OECD countries. According to this study, it was found that budget and foreign trade deficits affect each other mutually and that there has been a co-integration in the long term.

Surekci (2011), who analyzed the triplet deficit using Vector

Autoregressive Model, studied Turkey's 1987:1-2007:3 period data. The findings of the study show that the variables that have a causality relationship towards current deficit are real exchange rate noninterest public borrowing and internal growth. The variables mentioned are the causes of current deficit in the meaning of Granger. There was not a relationship discovered from current deficit to these three variables. In this study, the results of variant research of current deficit supported the causality relationship and show that the variables mentioned are effective on current deficit. Variant research and cause-effect functions so that the current deficit might be effective on investment-saving rate.

Finally, in their empirical studies, Zaman and Costa (1990), who studied on high budget and foreign trade deficits for 1980s in the USA, put forward that high budget deficits causes high trade deficits.

4. The Triplet Deficits Problem in Turkey

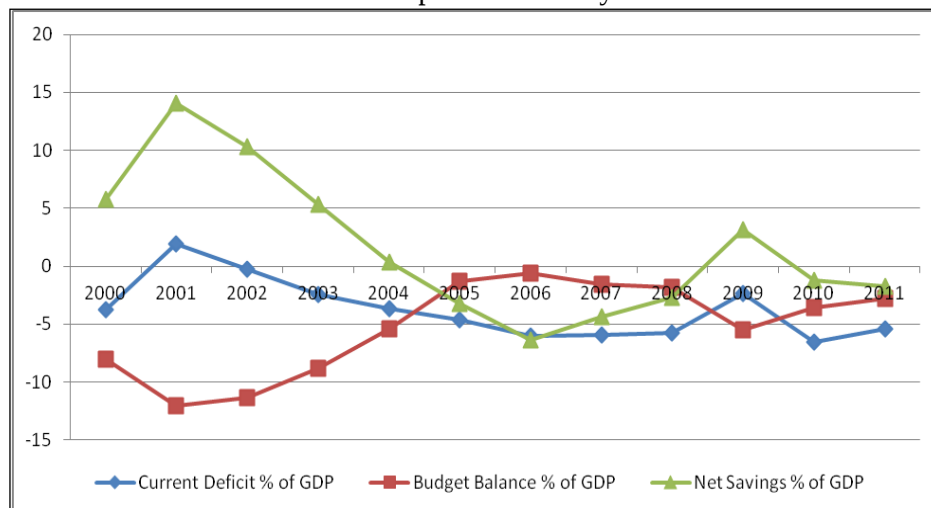
The variables of the "Triplet Deficit" concept - budget deficit, current deficit and saving-investment inequality as well as their interaction – point to macroeconomic instability. In the crisis emerged with the beginning of capital and expansion movements in 1980s in Latin America, Mexico and South Eastern Asia and in 1990s in Turkey, where the liberalization period was completed a bit later than the others, budget and current deficits gained great importance.

A case showing that budget deficits and current deficits have an opposite relationship, which is called twin deviation, can be experienced in some periods and is very common for the recent data of the recent studies. The major reason of this case is the temporary seasonal changes happening in budget sizes, high real interest rates and exchange rates. The situation in the data for the Turkish economy after 2001 also shows a sample of this case (Danisman, 2009:2). When the data of the aforementioned study were taken into consideration, the correlation between saving-investment deficit and current deficit in the period following 2000 made it a must to query the triplet deficit problem in Turkey.

According to Kumcu (2010), the balance of savings is defined as the difference between savings and investments. In an economy, if the savings of a section is less than its investments, then the savings of another section must necessarily be more than its investments. If we

classify the economy into three categories – public, private and foreign – the total of public and private savings balance should be equal to current balance (Kumcu, 2010). Moreover, for a rapid development, the ratio of investments to gross domestic product should increase. Definitions and cause and effect relationships in economics reflects the observations carried out under certain circumstances and environments. One of these observations is that currents are equal to savings deficit. Many of the similar studies were carried out in developed, hard currency countries and in environments where capital moves for financing real sector investments. That current deficit equals to savings deficit does not reflect a general case but a special one. For example, this balance is not valid for Turkey, where there is fluctuation in the currency rate, because the orthodox Money policy that can be summarized as high interest rate for national Money results in opposite to what is expected. Under such conditions, it is better to say that current deficit is equal to production excess (Cansen, 2008).

Figure 1. Budget, Saving-Investment and Current Account Balances
Development in Turkey



Resource: Senturk and Eksi, 2010: 346.

It can be seen in Figure 1, from 2000 to 2010, that budget balance is more volatile when compared to current deficit and saving-investment balance. Besides, the correlation between investment-saving balance and currents is also important. Still, the break in these numbers in 2001 is an important indicator of how crisis damaged the economy. The basic

factor in the decreased current deficit within a year after the 2001 crisis is the increase in foreign capital in Turkey. In 2008, when crisis hit globally, the increase in the foreign trade deficit and current deficit as well as savings-investment deficit draws attention. These two variables even move together. The decreases in the deficits seen in 2009 are the reflections of stagnation and the inactive capacity in the crisis period (Senturk and Eksi, 2010:345-346).

5. Data and Methodology

In this study, in order to test if there is a relationship between private sector annual net saving gap (TA) and consolidated budget deficit (BA) and current deficit (CA), firstly, the stagnation of the series belonging to these three variables was examined. For this aim, ADF, PP and KPSS unit root tests were carried out. After testing the stagnation of these three variables, the variant decomposition results explaining the rate of a variable using another one were obtained by using VAR analysis. Finally, within the VAR model framework, Impulse - Response analysis was used in order to observe the effect of the shocks occurring in the error terms of the series to another series. While testing these relationships, the relevant data from the Turkish Statistical Institute (TUIK) and Central Bank of the Turkish Republic were analyzed by rating them to GDP. TA stands for the rate of collected data to GDP and BA stands for the rate of consolidated budget sums to GDP.

5.1. Unit Root Tests

In this study, in order to test the stagnation of savings deficit, budget deficit and current deficit series ADF, PP and KPSS unit root tests were used.

5.1.1. Phillips Perron Unit Root Tests

The Phillips-Perron test is in the literature as a unit root test completing the ADF test, rather than being an alternative to it. In the ADF test, it is assumed that random error distribution is statistically independent and stable variant. Phillips Perron (1988) offered a new assumption by developing the idea of random error distribution. According to this, the PP approach takes into consideration the unknown types of autocorrelation and the conditionally changing variant case in the error

terms and use a non-parametric correction for serial relationship (Enders, 2004: 251). PP test can be carried out in three different regression model, just as in the ADF model but the most basic model (AR1) for PP test can be defined as below:

$$Y_t = \mu + \phi_1 Y_{t-1} + \varepsilon_t \quad (11)$$

In the PP test, just as in the ADF test, additional regressions are rearranged according to their trend and intercept and only intercept phases. Yet, the critical values to be used in both test will be different. Therefore, the formula for PP test is as follows:

$$Z\alpha = T(\hat{\phi}_1 - 1) - CF \quad (12)$$

The converted format of the T statistics in the PP test is as follows:
In the PP test,

5.1.2. KPSS Unit Root Tests

$$\hat{t}_\alpha = t_\alpha \left(\frac{Y_0}{f_0} \right)^{-1/2} - \frac{T(f_0 - Y_0)(S_0(\hat{\alpha}))}{\alpha f_0^{1/2} S} \quad (13)$$

The purpose in the KPSS test is to stagnate the series by purifying the deterministic trend in the series observed. The unit root hypothesis in the KPSS test is different from the one for ADF and PP. $H=0$ hypothesis shows that the series is stagnated and the alternative hypothesis Shows that there is unit root in the series (Kwiatkowski et.al., 1992:159).

The equation for the test is as follows:

$$Y_t = X_t^1 \delta + U_t \quad (14)$$

x'_t is a stable or stable and trend deterministic component.

Table1. ADF-PP and KPSS unit root test results for TA-BA and CA

(Constant)

Variables	ADF		PP		KPSS	
	Level	1st Difference	Level	1st Difference	Level	1st Difference
TA	-2.537545 (0)	-5.02250(0)	-1.8772 (1)	-5.0225 (0)	0.20923 (3)	0.09384 (0)
BA	-1.888387 (0)	-4.81000(0)	-1.94105 (1)	-4.81000 (0)	0.14050 (3)	0.11573 (0)
CA	-2.537545 (0)	-6.40688(1)	-2.38456 (1)	-21.6073(22)	0.57605 (3)	0.31612 (13)
Critical Values of ADF ve PP Test Statistics					Critical Values of KPSS Test Statistics	
% 1		-3.737853			0.739000	
% 5		-2.991878			0.463000	
% 10		-2.635542			0.347000	

1) The values in brackets show the lag length choosen according to SIC criteria.

2) For PP and KPSS tests, the values in brackets show the bandwidth determined according to Newey-West predictor applied using Bartell Kernel method.

Table 2. ADF-PP and KPSS test results for TA-BA and CA (Trend)

Variables	ADF		PP		KPSS	
	Level	1st Difference	Level	1st Difference	Level	1st Difference
TA	-2.115944 (0)	-4.9829(0)	-2.14084 (1)	-4.98291(0)	0.118506(3)	0.051141(0)
BA	-1.861760 (0)	-4.81876(0)	-1.89644 (1)	-4.81871 (0)	0.138799(3)	0.052221(0)
CA	-4.706059 (0)	-6.24007(1)	-4.70679 (1)	-23.069 (22)	0.14017 (0)	0.32734(12)
Critical Values of ADF ve PP Test Statistics					Critical Values of KPSS Test Statistics	
% 1		-4.394309			0.216000	
% 5		-3.612199			0.146000	
% 10		-3.243079			0.119000	

1) The values in brackets show the lag length choosen according to SIC criteria.

2) For PP and KPSS tests, the values in brackets show the bandwidth determined according to Newey-West predictor applied using Bartell Kernel method.

5.2. Dolado-Lütkepohl Granger Causality Analysis

The main advantage of Causality Test created using the adjusted Wald test by Dolado and Lutkepohl (1996) is that it takes unit root tests into consideration when looking for the causality relationship amongst variables (Booth and Ciner, 2005). If the variables in VAR model are I(1), the χ^2 and F tests result in asymptotic distribution. Especially the Wald test used in Granger Causality Test can lead to non standard distributions in connection with the co-integration features of the system. The zero limitation within co-integrated VAR procedures used in non standard asymptotic features can be related to the singularity in predictors' asymptotic distribution (Lutkepohl and Kratzig, 2004). Dolado-Lütkepohl (1996) overcomes the problems in standart Granger Causality test taking if the variables are unified or co-integrated. This approach depend Wald test application showing asymptotic features on unified/co-integrated VAR coefficients (Ciarreta and Zarraga, 2009). Singularity problem destroys the non singular distribution problem in VAR coefficients with the addition of lag into the optimal delayed limited VAR model. With additional delays to optimal Dolado-Lütkepohl Causality Analysis VAR model, this problem is eliminated. Dolado-Lutkepohl Granger Causality Test consists of two phases. Firstly, VAR (p) model having optimal delay using SBC (Schwarz Bayesian Criterion) is predicted. Then, modified Wald test is done by predicting VAR (p+1).

The most important step in Dolado-Lutkepohl Causality Test is the first step due to the fact that Causality Test is sensitive to the delay number. According to this, VAR (3) model using SBC criterion can be expressed as:

$$\begin{bmatrix} \ln TA_t \\ \ln CA_t \\ \ln BA_t \end{bmatrix} = \begin{bmatrix} \alpha_1 \\ \alpha_2 \\ \alpha_3 \end{bmatrix} + \begin{bmatrix} \beta_{11,1} & \beta_{12,1} & \beta_{13,1} \\ \beta_{21,1} & \beta_{22,1} & \beta_{23,1} \\ \beta_{31,1} & \beta_{32,1} & \beta_{33,1} \end{bmatrix} \begin{bmatrix} \ln TA_{t-1} \\ \ln CA_{t-1} \\ \ln BA_{t-1} \end{bmatrix} + \begin{bmatrix} \beta_{11,2} & \beta_{12,2} & \beta_{13,2} \\ \beta_{21,2} & \beta_{22,2} & \beta_{23,2} \\ \beta_{31,2} & \beta_{32,2} & \beta_{33,2} \end{bmatrix} \begin{bmatrix} \ln TA_{t-2} \\ \ln CA_{t-2} \\ \ln BA_{t-2} \end{bmatrix} + \begin{bmatrix} \varepsilon_{1t} \\ \varepsilon_{2t} \\ \varepsilon_{3t} \end{bmatrix} \quad (15)$$

According to this notation, the zero hypothesis created as $H_0: \beta_{11,1}=0$ is not the reason for current and saving gap and it can be said that $H_0: \beta_{12,1}=0$ is not the reason of saving gap.

Table 3. Dolado-Lütkepohl Granger Causality Test Results

Hypothesis	Delay Length	MWALD	p- value	Hypothesis	Causality
CA→BA	1 (9.416)*	1.504	0.254	✓	Rejected
BA→CA		1.950	0.194	✓	Rejected
TA→BA	1 (9.827)*	4.200	0.019	X	Accepted
BA→TA		4.044	0.002	X	Accepted
TA→CA	1 (9.531)*	9.280	0.001	X	Accepted
CA→TA		10.181	0.001	X	Accepted

* The values in brackets show the least Schwarz criterion for optimal delay length. Asteriks→, means no Granger causality between variables.

According to Dolado-Lutkepohl Granger Casuality Test, there is no causality between current account deficit and budget deficit. Besides this, there is a bi-directional causality between saving gap and current account deficit. The bidirectional causality between saving deficit and current deficit is of great importance. Shortly, saving deficit leads to a decrease in investments via multiplying effect and this leads to current deficit because of weak export. On the other hand, the current deficit in the economy finds a reply from negative savings and put the economy in an infinite loop. Finally, bidirectional causality between saving gap and budget deficit is determined. At this point, economy policies are getting important. As a matter of fact, a life vest such as market variation in export, stimulus facilities, long term and low cost financing options might be needed to be introduced.

5.3. VAR Analysis

The VAR model handles all the economic notions as a whole. To make it clear, econometric variables or notions done using the model discussed are evaluated simultaneously. This model is able to return dynamic relationships without any limitation on the structural model and therefore is used for time series frequently (Keating, 1990:453-454). The VAR model mostly used in economic studies about time series is differentiated from simultaneous equation systems since it doesn't require any internal-external differentiation (Charemza and Derek, 1992:182). Moreover, the presence of delayed values of dependent variables in the VAR models makes it possible to make strong predictions about future (Kumar, et. al. 1995:365).

In the VAR analysis developed by Sims (1980) variables are considered as dependent variables in order. The dependent variable is regressed with an optimal delay length over the delayed values of itself and other variables. In an example with three variables, the VAR system can be shown as below:

$$\Delta BA_t = \alpha_1 + \sum_p^k \beta_{1p} \Delta TA_{t-p} + \sum_p^k \mu_{1p} \Delta CA_{t-p} + \sum_p^k \delta_{1p} \Delta BA_{t-p} + \varepsilon_{1t} \quad (16)$$

$$\Delta CA_t = \alpha_1 + \sum_p^k \delta_{2p} \Delta BA_{t-p} + \sum_p^k \beta_{2p} \Delta TA_{t-p} + \sum_p^k \mu_{2p} \Delta CA_{t-p} + \varepsilon_{2t} \quad (17)$$

$$\Delta TA_t = \alpha_1 + \sum_p^k \mu_{3p} \Delta CA_{t-p} + \sum_p^k \delta_{3p} \Delta BA_{t-p} + \sum_p^k \beta_{3p} \Delta TA_{t-p} + \varepsilon_{3t} \quad (18)$$

In VAR analysis, via variant differentiation of prediction error, it can be diagnosed which variable has the most effect on a variable. Also with cause and effect function, how much the shock applied on a variable has importance on other variables?

The variant differentiation analysis results show parallelism with the Dolado-Lutkepohl Granger Causality Analysis. According to this, other variables do not have a lot of effect on budget deficit. The current deficit has 15% effect on budget deficit and savings deficit has 8% effect. Current deficit results are similar to budget deficit. The effect of budget deficit and savings deficit on current deficit is 21% and 0.1% respectively. Both variables are very important on savings deficit. The effect of budget and current deficits on saving gap is 50% and 32% respectively.

A unit of positive structural shock given to the error term led to double decrease of saving gap collectively. This case, as also can be seen in the variant differentiation analysis, shows that changes in the budget deficit have negative and meaningful effect on saving gap. Moreover, a positive structural shock applied on current deficit increases the saving gap nearly 1.5 times.

Table 4. Variant Differentiation Table for BA-CA and TA

Variance Decomposition of BA				
Period	S.E.	BA	CA	TA
1	2.332716	100.0000	0.000000	0.000000
2	2.959996	93.37807	1.487828	5.134098
3	3.412900	83.02112	7.977792	9.001083
4	3.629293	80.09393	11.03437	8.871701
5	3.730392	78.63851	12.94594	8.415542
6	3.780822	77.36992	14.24311	8.386973
7	3.809513	76.41435	15.26893	8.316724
8	3.827194	75.80108	15.95874	8.240182
9	3.838037	75.45192	16.34639	8.201691
10	3.844081	75.28089	16.54132	8.177783
Variance Decomposition of CA				
Period	S.E.	BA	CA	TA
1	2.510975	14.83049	85.16951	0.000000
2	2.712061	20.17775	79.82165	0.000599
3	2.956404	20.55291	79.36722	0.079875
4	3.057949	21.05645	78.83903	0.104520
5	3.125046	21.16138	78.73829	0.100330
6	3.159478	21.19248	78.70344	0.104082
7	3.179853	21.15629	78.73617	0.107540
8	3.191392	21.12394	78.76851	0.107548
9	3.198166	21.10476	78.78815	0.107093
10	3.202039	21.09706	78.79610	0.106839
Variance Decomposition of TA				
Period	S.E.	BA	CA	TA
1	3.933559	43.99485	39.65712	16.34803
2	5.071178	50.25204	29.77356	19.97440
3	5.715170	51.90564	30.71668	17.37768
4	5.967137	52.57698	31.46212	15.96089
5	6.101157	51.70869	32.75185	15.53946
6	6.173457	50.86220	33.88144	15.25636
7	6.219298	50.27099	34.69650	15.03251
8	6.246978	49.95385	35.13520	14.91095
9	6.262527	49.81008	35.35036	14.83956
10	6.270926	49.73995	35.45983	14.80022
Cholesky Ordering: BA CA TA				

Table 5. Impulse – Response Analysis Results

Response of BA			
Period	BA	CA	TA
1	2.332716	0.000000	0.000000
2	1.655243	-0.361050	-0.670692
3	1.220169	-0.893805	-0.773697
4	0.937860	-0.724001	-0.346589
5	0.627228	-0.590012	0.050325
6	0.341366	-0.484213	0.166713
7	0.172677	-0.424132	0.089834
8	0.115554	-0.348794	-0.004300
9	0.107540	-0.265266	-0.034329
10	0.098793	-0.190774	-0.016588
Response of CA			
Period	BA	CA	TA
1	-0.966986	2.317312	0.000000
2	-0.740991	0.707932	0.006640
3	-0.558803	1.032400	0.083290
4	-0.415463	0.659793	0.052843
5	-0.312412	0.563234	0.004950
6	-0.221126	0.408539	-0.024322
7	-0.153989	0.323980	-0.022001
8	-0.110727	0.247351	-0.008938
9	-0.084736	0.190000	-0.000268
10	-0.066647	0.142640	0.000706
Response of TA			
Period	BA	CA	TA
1	-2.609075	2.477115	1.590444
2	-2.473048	1.233175	1.614705
3	-2.007682	1.541499	0.734380
4	-1.329255	1.081477	-0.083984
5	-0.726060	0.994462	-0.318238
6	-0.369160	0.849213	-0.173241
7	-0.245492	0.712560	0.009257
8	-0.222949	0.539378	0.066587
9	-0.201944	0.390797	0.031703
10	-0.157661	0.283308	-0.012172
Cholesky Ordering: BA CA TA			

6. Conclusion

Two most important accounts of payments statements are current account and capital account. In both of these two accounts, current account makes up the accounts that create instability and the cure for this is capital account. When studied carefully, it can be seen that foreign trade deficit is higher than current deficit in Turkey. Due to the fact that the imports in Turkey are higher than exports, the foreign trade limits are unfavorable. Namely, foreign trade deficits have become inevitable. In addition to this, the handicaps in goods trade are partially eliminated by the opportunities that arise in services trade. Since the difference of income-expense of the main accounts of service trade particularly like workers remittances, tourism and contracting business are mostly in advantage of Turkey, services account surpluses every term. Therefore, current account is lower than foreign trade account.

The high current deficit in Turkey (even though it is lower than foreign trade deficit) weakens the competence power of the Turkish exporters. The comparative disadvantage that emerges in similar countries like China and India in terms of similar import products and market profiles put the local industry into problems and makes it more fragile. In addition, it can be seen in the crisis experiences we have had in our recent history, that the chronic current deficits are financed by the short term portfolio investments and high interests as well as low currency deadlock increased the fragility level of Turkish economy.

What is important at this point is whether the deficit turns into growth or not. Shortly, it is necessary to conduct profit/cost analysis. The same case is also valid for the saving-investment balance. If savings cannot be converted into investments with right policies or if the cost borne does not turn into benefit, it means that the payments balance are floating towards a deficit.

In short, deficit brings deficit. Today, the stable interest and exchange rate policy in Turkey has enabled investors to foresee the future when compared to past and not to avoid investments while it partially stopped the foreign exchange inflows and outflows and get direct investments from foreign investors. The lessons Turkey learned from the older crisis experiences and her success to control the financial market has made it possible for her not to be affected by the 2008 Global crisis. As much as

the others, the latter crisis experience made Turkey the 15th biggest economy in the World and diversified the market structure in the country.

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What Prevents Firms from Access to Finance? A Case Study of OIC Countries

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In this paper, micro survey data from a sample of over 13,000 firms from 30 OIC countries is used to address two primary questions: (a) what are the firm-level and country-specific predictors of financing obstacles in the OIC countries, and (b) how similar are those determinants across the least developed countries (LDCs) and developing OIC countries. It is found that the number and firm-specific characteristics that predict financing obstacles are more diverse in the LDCs when compared with the developing OIC countries. Age, size, sectoral origin, export status and ownership status of firms appear to be the most significant determinants of access to finance for firms in LDCs while only a few of these determinants are found to be statistically significant for developing OIC countries when compared to LDCs. The results also suggest that country-level indicators which measure financial infrastructure and economic development are strongly associated with obstacles to financing for firms in both groups of countries.

1. Introduction

An empirical study conducted by Ayyagari, Demirgüç-Kunt, and Maksimovic (2008) has found that only obstacles related to finance, crime, and political stability are linked directly to the level of growth of firms. Further sensitivity tests used by the authors have revealed that access to finance is the only significant factor affecting the performance of firms. At a macro level, a number of other theoretical and empirical findings within the literature confirm the importance of financial inclusion for long-term economic development. Countries with better financial inclusion grow faster, resulting in lower levels of income inequality and the incidence of poverty. According to Beck, Demirgüç-Kunt, and Levine (2007), almost 30 percent of the cross-country

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variation in changing poverty rates can be explained by variation in financial development.

Furthermore, access to finance remains a key constraint to the growth of the private sector, especially in developing and least developed countries (LDC). The World Bank (2004) indicates a high degree of severity with regard to the financial obstacles faced by poor countries. Lack of Access to finance is disproportionately present for firms in LDCs, with 41 percent of Small and Medium Enterprises (SMEs) in LDCs reporting access to finance as one of the major constraints to their growth and development, as opposed to 30 percent of firms in middle-income countries. The same figure stands at only 15 percent in high-income countries (IFC, 2011). Some empirical studies which suggest positive effects with respect to financial inclusion on firms' growth include those conducted by Demirgüç-Kunt and Maksimovic (1998) and Rajan and Zingales (1998).

In this paper, a firm-level data survey is used to focus on the following questions. First, what are the firm-level and country-specific predictors of financing obstacles in the Organization of Islamic Conference (OIC) countries? Second, how similar are those determinants among the LDCs versus those of the developing countries within the OIC.

The current paper contributes to the existing discussion on financing obstacles in several ways. First, in contrast to previous studies which have focused primarily on all developing countries, the present study focuses on a sub-set of these countries that belongs to a particular grouping, namely, the Islamic countries. This group of countries has a significant share of the population within the developing world and also has its own specificities. For example, 57 member countries of the OIC account for 22.5 percent of the world's population, 7.2 percent of the world's total output, and 25 percent of the global land area (SESRIC, 2011). Nevertheless, the average labor force participation rate in OIC countries is lower than the world average. Only 30 percent of the population in OIC countries had access to financial services in the mid 2000s. This is in contrast with 41 percent in non-OIC developing countries, and 90 percent in developed countries.

Second, the study utilizes a unique firm-level data base which contains responses collected from 13,300 firms. More importantly, the sample selected contains a very high proportion of private firms.

Third, the model uses is a binary probit regression that is estimated for both the least developed and developing OIC countries, and assumes that the determinants of financing obstacles are different for both categories. The present study departs from the existing studies in that the variables with respect to financing obstacles are not homogenous across LDCs and developing OIC countries.

The results suggest that the firm-level characteristics tend to be more diverse and statistically significant in the OIC LDCs when compared with those of the developing countries. For example, older, larger, manufacturing-focused, externally audited and foreign-owned firms report less financing obstacles in LDCs when compared with other OIC countries. The results also suggest that country-level variables such as GDP per capita, private credit and institutional development provide significant forces in explaining obstacles to financing. However, due to multicollinearity and causal relationship, institutional development is found to be economically insignificant when controlled for country-level variables on economic development and financial intermediation.

The rest of the paper is organized as follows. Section II presents the related literature and the background for the study. Section III describes the data and empirical methodology. Section IV presents a statistical summary and descriptive analysis of the raw data. Section V explores firm as well as country-level characteristics that predict financing difficulties in the OIC countries, and finally, Section VI concludes the paper.

2. Literature Review

Financial inclusion is found to be a key determinant of a firm's ability to operate and expand. For example, a recent study conducted by Kinda, Plane and Veganzones-Varoudakis (2011) using a sample of developing countries confirms that satisfactory access to financing is an important factor contributing to the productive performance of an enterprise. In general, better access to financing is associated with the ability of enterprises to finance their expansion projects and to allocate resources

to their most profitable projects (Levine, 2005). In both between and within-country regressions, Carlin, Schaffer and Seabright (2006) find a negative impact with respect to the high cost of financing on a firm's output.

Since the seminal study by Fazzari, Hubbard and Petersen (1988), a number of new methodologies have been suggested, and a large body of empirical literature has emerged through which to analyze the obstacles to financing faced by firms. These works largely appear to focus on the main predictors of financing constraints including (i) country level determinants of financial exclusion, and (ii) firm-level characteristics of financing obstacles.

At the country-level, Demirgüç-Kunt and Maksimovic (1998) found that financing constraints are lower in countries with more efficient legal systems. After controlling for all other variables, the efficiency of a country's legal system appeared to be important predictor of financing constraints of firms. Another study conducted by Beck, Demirgüç-Kunt and Maksimovic (2005) provides a similar conclusion, suggesting that country-level financial and institutional development indicators are very important in overcoming the constraining effect of financing obstacles. According to the Beck, Demirgüç-Kunt, Laeven and Maksimovic (2006), overall institutional development tends to be a prominent country-level predictor of a firm's obstacles to financing.

According to Leaven (2003), financial liberalization relaxes the obstacles to the financing of firms. Combining the responses of firms from 35 developing countries, Clarke, Cull and Pería (2006) found that the participation of foreign banks improves accessibility to external financing for firms. Their results suggest that enterprises face fewer challenges in countries where foreign banks have higher levels of presence. Furthermore, according to Kuntchev, Ramalho, Rodríguez-Meza and Yang (2012), in countries with high private credit to GDP ratios, firms are less likely to be credit constrained.

At the firm-level, characteristics including a firm's size, age, shareholders, legal status, sectoral origin etc. have been commonly used as predictors for constraints to financing (Devereux and Schiantarelli, 1990; Oliner and Rudebusch, 1992; Hoshi, Kashyap, and Scharfstein, 1991). For example, Devereux and Schiantarelli (1990), and Oliner and

Rudebusch (1992) have used age and size as the two main predictors of financing constraints. As well, according to another study, perceived obstacles to financing are higher for small firms than for large firms (Schiffer and Weder, 2001).

Moreover, according to the existing literature, the ownership structure of a firm could be used to explain variances in financing obstacles, and as such, multinational or foreign-owned firms may have easier access to various external (international) sources of financing (Sembenelli and Schiantarelli, 1996; Harrison and McMillan, 2003). The literature also suggests that state-owned firms are expected to report lower financing constraints since in many countries they receive direct budgetary support from the government (Harrison and McMillan, 2003).

The age of the firms was considered another factor through which to distinguish firms which were financially constrained versus those that were not (Oliner and Rudebusch, 1992). Some studies suggest that younger firms are more financially challenged because of information asymmetries associated with creditors' access to relevant information which could help build long-term relationships.

The size of firms appears to be yet another determinant of access to finance, meaning that small and medium sized businesses are more likely to be credit-constrained than are large firms (Kuntchev, Ramalho, Rodríguez-Meza and Yang, 2012). Hallward-Driemeier and Aterido (2007), in particular, find that smaller firms have significantly less access to the financial system and tend to finance a smaller share of their investment through formal credit. This finding is also reflected in a study by Schiffer and Weder (2001), where it was found that smaller firms hold higher perceptions of financing obstacles than do larger firms.

Additionally, whether or not a firm has an affiliation with a business group(s) or if it has a stock market listing is also found to be correlated with its level of financing constraint. According to Hoshi, Kashyap, and Scharfstein (1991), firms that belong to a business group(s) are expected to face lower financing obstacles. The literature underlines the two main reasons of this: (i) business-group affiliation renders firms more likely to have access to the internal cash flows, and (ii) the firms with business-group affiliation are found to have close ties with banks. Furthermore,

firms that are listed on a stock exchange are also expected to face lower financing obstacles due to lower levels of information asymmetries which stem from the listing and reporting requirements of stock exchanges (Oliner and Rudebusch, 1992).

Through a firm-level analysis conducted in a number of developing countries, Dollar, Hallward-Driemeier and Mengistae (2006) explore the link between access to finance and the likelihood of being an exporter. In their study, they find a positive association between a firm's export status and its access to finance.

3. Data and Methodology

3.1. Data

The data source of this study comes from the Enterprise Surveys (ES) conducted by the World Bank. This survey contains the responses of over 130,000 firms in 135 countries, of which 113 of these countries have been surveyed following the standardized methodology. The ES covers a representative sample of non-agricultural, formal, private economies, and examines a variety of topics such as firm characteristics (i.e. a firm's age, size, owner, legal status), access to infrastructure (i.e. electricity, transportation, water), government relations (i.e. regulations, tax administration, corruption, construction permits), labor (i.e. number of temporary employees, permanent jobs), firm performance (i.e. capacity utilization, sales, export), access to finance (i.e. saving accounts, sources of investment financing), and business obstacles (i.e. ranking of the most important 15 obstacles to business).

The standard strata for every economy surveyed are sector of activity, firm size, and geographical location. The primary sampling unit of every ES is the establishment and firm size is stratified into: small (5-19 employees), medium (20 to 99 employees), and large (100 and more employees).

So far, a number of studies have been conducted using this database (see <http://www.enterprisesurveys.org/Research>). Nevertheless, one must be careful when employing and interpreting the results of the ES. First, issues concerning corruption and questionable accounting conducted by firms may produce flawed results with regard to the data, thus possibly leading to misguided interpretations. There is also measurement error

associated with these questions since they are sometimes intentionally underreported due to fears of repercussions and due to the sensitive nature of the question. Second, there is also a coverage bias associated with the survey's data due to either outdated or unclear information obtained from firms. Although the most updated and complete sampling frames were used for each economy, some ineligible elements are practically impossible to identify mechanically due to incomplete or missing fields, outdated firm level information etc.

For this study, 13,300 firms were surveyed in 30 OIC economies between 2006 and 2010. The survey does not cover some of the countries of the Middle East and North Africa (MENA) and the Asian OIC countries due to either a lack of coverage or lack of adherence to the ES standard methodology. Table A.1 in the appendix reports the name of the countries in the sample and the number of firms surveyed in each country. The table also shows the year in which the survey was conducted in each OIC country.

For the sake of the analysis and based on factors such as per capita income, level of human resource development, and degree of economic vulnerability, all OIC countries have been classified into the two groups of either LDCs, or developing OIC countries. Accordingly, the sample included 16 LDCs and 14 developing countries of the OIC.

3.2. Methodology

The methodology of our study has primarily been inspired by a study conducted by Beck, Demirgüç-Kunt, Laeven and Maksimovic (2006). Given that the obstacle of financing is a binary dependent variable, a binary probit maximum likelihood estimation model is used in the study. Alternatively, we could also have used a logit model. It is very difficult to justify the preference of one against the other, given that the two models usually provide very similar results (Greene, 1997). However, one reason for the popularity of probit models over logit models is that the former type of model assumes a normal distribution of error term which is not the case with the latter type of models (Wooldridge, 2002). In general, the model assumes that the firm's underlying response can be described by the following equation:

$$Y_{i,k} = \alpha + F(X'\beta) + C(Z'\gamma) + u$$

where

Y_i - underlying probability that firm i in country k , considers access to finance to be major or very severe.

$F(X'\beta)$ - is the vector of firm-level independent variables.

$C(Z'\gamma)$ - is the vector of country-specific explanatory variables.

u – is a disturbance parameter and it is assumed that the parameter has a normal distribution.

Outcome variable

Using the finance section of the ES questionnaire, it is assumed that the dependent variable reflects the financing obstacles of firms during the fiscal year referenced in each survey. In order to construct a new variable for financing obstacles, the following question on the survey was used: “How problematic is financing for the operation and growth of your business?” Answers vary between 0 (no obstacle), 1 (minor obstacle), 2 (moderate obstacle), 3 (major obstacle), and 4 (very severe obstacle). Based on these answers, the dependent variable, which is a new binary variable, is assigned 1 if a firm considers financing as a “major” or “very severe” obstacle, and 0 otherwise.

Nevertheless, as argued by Beck, Demirgüç-Kunt and Maksimovic (2005), it is possible that while some firms may report financing obstacles, they may not actually be constrained by them, and their perceived exclusion from financing may be largely related to their growth rates, in the sense that firms that report financing obstacles tend to be growth-constrained. Therefore, one must be cautious in interpreting the results and as such, it is suggested that readers not automatically associate perceived financing constraint with the absolute constraint of firms.

Independent Variables

A. Firm-level

Age – the age of firms is measured according to the log of the number of years since the company has been established.

Size – the size of firms is measured by dummy variables indicating whether the firm is small, medium or large. Small firms are characterized by having 5 to 19 employees, medium firms by having 20 to 99 employees, and large enterprises by having over 99 employees. As suggested by Kuntchev, Ramalho, Rodríguez-Meza and Yang (2012), we avoided obtaining a measurement of firm size by their sales volume since sales contain the price effect and cannot be used as a proxy for size in cross country analyses.

Sector – there are two dummy variables generated in order to measure the sectoral origin of firms. The first dummy indicates whether or not the firm belongs within the manufacturing sector (1- yes and 0 - no) while the second variable indicates whether or not the firm is from within the retail trade sector (1 – yes and 0 - no). Other sectors are not included due to the sectoral stratification limitations of the ES.

Ownership – the ownership status of firms is measured by two dummy variables: foreign ownership and government ownership. If the share belonging to the main owner (foreign resident or government) is more 50 percent then it takes the value 1, and 0 otherwise.

Export status – a firm is considered to be an exporter if they sell more than half their products and services in foreign markets. The dummy variable takes 1 if it is mainly an exporter, otherwise it takes 0.

External audit – the external auditing status of a firm is measured by the dummy variable (1 – if yes, 0 – if no), and reflects whether or not a firm was audited in the last year.

Country fixed effects – country dummies are also used to capture unobserved country-specific factors that might drive firms' responses. Since omitted country characteristics might cause error terms to be correlated for firms within countries, clustered error terms are allowed.

B. Country-level

Country-specific variables are useful for providing an understanding of whether or not macro indicators reflecting the financial and institutional development of the countries can explain financing obstacles among the firms. We use a number of variables for country-level financial and institutional development that were also utilized in the previous literature.

GDP per capita – GDP per capital is measured by a log of GDP per capita in current US dollars, and is used as one of the country-specific variables for financing obstacles. The data was obtained from the World Bank's World Development Indicators.

Credit to the private sector – measures the level of financial development in the country. It is stated as a percentage term and is calculated by the ratio of private sector credits to GDP. The source of the data is the International Monetary Fund's (IMF) country statistics.

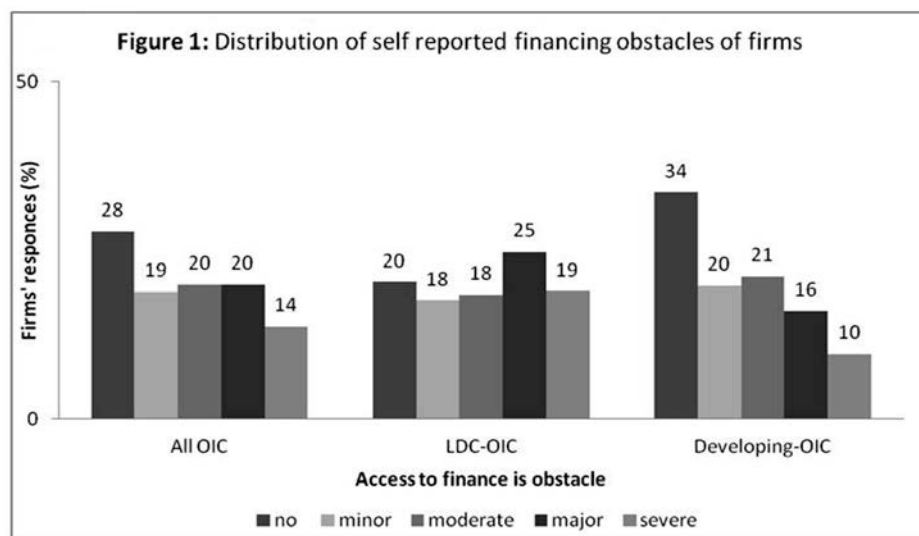
Rule of Law – Reflects the degree to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence. The data was taken from the Worldwide Governance Indicators that was developed by Kaufmann, Kraay and Mastruzzi (2010), and is measured in units ranging from about -2.5 to 2.5, with higher values corresponding to better rule of law.

Regulatory quality - reflects perceptions regarding the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development (Kaufmann, Kraay and Mastruzzi 2010). This variable is measured in units ranging from about -2.5 to 2.5, with higher values corresponding to better quality of regulation.

Aggregate Institutional development – Worldwide Governance Indicators are used as a proxy for overall institutional development in OIC countries. It is used interchangeably with rule of law and regulatory quality in order to estimate the effects of institutions on the financing obstacles experienced by firms.

4. Descriptive Analysis

Figure 1 illustrates the responses of firms with respect to the severity of financing challenges in the countries of OIC. The figure reveals an interesting pattern. On average, access to finance tends to be a major problem for 20 percent of firms, and a very severe challenge for 14 percent of firms in the total sample. When broken down according to development status, the composition of responses changes dramatically. In this case, 44 percent of enterprises in LDCs report access to finance as a major or severe problem. In the developing OIC countries, the number of firms which reported no, minor or moderate financing obstacles are much higher than those which reported major and severe constraints with respect to financing. Generally, in comparison to firms in LDCs, it appears that the distribution of financing obstacles for firms in developing OIC countries is skewed more towards left (ie. less financing constraint).



In Table 1, we report financing obstacles for firms in each of 30 countries. The results of the table indicate that access to finance differs widely across firms in OIC countries. For example, compared to other economies, firms from most of the OIC countries belonging to Sub-Saharan Africa generally report higher levels of financing obstacles. Forty eight percent of firms in Guinea Bissau, and 39 percent of companies in Cameroon and the Ivory Coast report financing obstacles

as being the most severe constraint to their business. In contrast, in countries such as Turkey, Yemen and Indonesia, financing obstacles are found to be lowest among firms, where respectively, 52 percent, 45 percent and 44 percent of firms report that access to finance is not seen as a constraint to their business.

Table 1: Distribution of self-reported financing obstacles of firms, by country

	No	Minor	Moderate	Major	Severe
Afghanistan	26%	19%	19%	22%	14%
Albania	34%	20%	29%	13%	5%
Azerbaijan	32%	18%	22%	22%	6%
Bangladesh	15%	33%	26%	18%	8%
Benin	13%	11%	17%	38%	22%
Burkina Faso	3%	6%	20%	32%	39%
Cameroon	7%	10%	31%	35%	17%
Chad	12%	21%	19%	30%	17%
Gabon	23%	31%	20%	20%	5%
Gambia	30%	14%	15%	28%	13%
Guinea	13%	13%	13%	25%	35%
Guinea Bissau	12%	7%	8%	25%	48%
Indonesia	44%	23%	21%	9%	2%
Ivory Coast	8%	11%	13%	29%	39%
Kazakhstan	29%	17%	22%	14%	17%
Kyrgyz Republic	25%	17%	33%	18%	7%
Mali	24%	16%	14%	36%	11%
Mauritania	22%	15%	18%	18%	27%
Mozambique	28%	10%	11%	25%	26%
Niger	26%	9%	15%	33%	17%
Pakistan	34%	24%	24%	15%	3%
Senegal	27%	12%	13%	21%	27%
Sierra Leone	9%	29%	25%	32%	5%
Suriname	11%	27%	26%	25%	11%
Tajikistan	39%	16%	20%	12%	12%
Togo	19%	14%	15%	26%	26%
Turkey	52%	20%	14%	8%	6%
Uganda	17%	10%	20%	31%	22%
Uzbekistan	30%	19%	27%	18%	7%
Yemen	45%	12%	17%	20%	6%

Table 2 reports the detailed descriptive statistics regarding our control variables with the composition of LDCs and developing OIC countries. The results reveal a number of the strengths of the sample. For example, it is found that approximately 83 percent of the enterprises included in the survey are classified as small or medium sized, while

only 17 percent are classified as large firms. The manufacturing sector accounts for the majority of the sample (57 percent) and is distributed evenly across LDCs and developing OIC countries. Around 9 percent of firms in the sample were found to be exporters while this figure stands at 10 and 8 percent for the LDCs and the developing countries respectively. Nearly 37 percent of enterprises responded that their accounts had been externally audited in the past year. Among all firms in the sample, 8 percent were owned primarily by foreigners, while the majority of foreign shareholders accounted for 10 percent of enterprises in LDCs when compared with 8 percent in developing OIC countries.

Table 2: Detailed Descriptive statistics

Variable	All OIC				Least Developed OIC				Developing OIC			
	Mean	Std. Dev.	Min	Max	Mean	Std. Dev.	Min	Max	Mean	Std. Dev.	Min	Max
Age	18.06	21.54	-194.0	2019.00	17.69	12.15	0.00	173.00	18.36	26.66	-194.0	2019.00
Small	0.53	0.49	0.00	1.00	0.59	0.49	0.00	1.00	0.49	0.50	0.00	1.00
Medium	0.29	0.45	0.00	1.00	0.26	0.44	0.00	1.00	0.31	0.46	0.00	1.00
Large	0.17	0.37	0.00	1.00	0.16	0.36	0.00	1.00	0.18	0.39	0.00	1.00
Manufacture	0.57	0.50	0.00	1.00	0.57	0.50	0.00	1.00	0.56	0.50	0.00	1.00
Retail trade	0.23	0.42	0.00	1.00	0.23	0.42	0.00	1.00	0.24	0.43	0.00	1.00
Export status	0.09	0.29	0.00	1.00	0.10	0.31	0.00	1.00	0.08	0.27	0.00	1.00
External audit	0.37	0.48	0.00	1.00	0.38	0.48	0.00	1.00	0.36	0.48	0.00	1.00
Government owned	0.01	0.09	0.00	1.00	0.00	0.07	0.00	1.00	0.01	0.11	0.00	1.00
Foreign owned	0.08	0.27	0.00	1.00	0.09	0.28	0.00	1.00	0.08	0.27	0.00	1.00
Log (GDP per capita)	7.86	.88	6.54	9.58	7.19	.29	6.53	7.81	8.37	.83	7.07	9.57
Private credit	24.17	11.52	1.50	43.90	21.10	9.87	2.75	34.44	26.56	12.13	1.5	43.9
Institutional development	-4.34	2.63	-10.76	-.42	-4.26	2.09	-8.48	-1.33	-4.39	2.98	-10.76	-.42
Rule of law	-0.75	0.46	-1.98	0.10	-0.71	0.33	-1.5	-0.21	-0.79	0.53	-1.95	0.10
Regulatory quality	-.54	.47	-1.59	.38	-.58	.31	-1.08	-.11	-.50	.56	-1.59	.38

As seen in Table 2, a number of descriptive statistics were also included for the country-level indicators which describe the level of financial and institutional development of the OIC countries. On average, private credit, defined as the claims of financial institutions on the private sector as share of GDP, is found to be lower in the LDCs when compared with the developing OIC countries. The same is true for institutional development indicators such as rule of law and regulatory quality.

Table 3: Correlation matrix

Panel A. All OIC Countries											
	access	age	small	medium	large	manuf	trade	export	audit	state own	Foreign own
access	1.00										
age	-0.05	1.00									
small	0.11	-0.12	1.00								
medium	-0.04	0.03	-0.69	1.00							
large	-0.10	0.11	-0.49	-0.29	1.00						
manufacture	-0.04	0.10	-0.16	0.03	0.17	1.00					
trade	0.03	-0.07	0.16	-0.06	-0.14	-0.63	1.00				
export	-0.06	0.02	-0.24	-0.01	0.32	0.18	-0.12	1.00			
audit	-0.04	0.06	-0.34	0.13	0.29	-0.02	0.01	0.16	1.00		
state own	-0.03	0.05	-0.08	0.02	0.08	-0.02	-0.01	-0.01	0.07	1.00	
foreign own	-0.01	0.00	-0.11	0.03	0.10	-0.03	0.01	0.08	0.14	0.01	1.00

.Cont'd..

Panel B. Least Developed OIC Countries											
	access	age	small	medium	large	manuf	trade	export	Audit	stown	frown
access	1.00										
age	-0.08	1.00									
small	0.16	-0.22	1.00								
medium	-0.06	0.12	-0.70	1.00							
large	-0.15	0.15	-0.51	-0.25	1.00						
manufacture	-0.01	0.13	-0.19	0.03	0.22	1.00					
trade	0.05	-0.07	0.19	-0.08	-0.16	-0.62	1.00				
export	-0.11	0.05	-0.31	-0.05	0.48	0.21	-0.14	1.00			
audit	-0.08	0.11	-0.37	0.16	0.31	-0.02	0.02	0.19	1.00		
state own	-0.03	0.09	-0.06	0.04	0.04	0.01	-0.02	-0.02	0.06	1.00	
foreign own	-0.04	0.00	-0.11	0.07	0.06	-0.06	0.04	0.04	0.16	-0.01	1.00
Panel C. Developing OIC Countries											
	access	age	small	medium	large	manuf	trade	export	Audit	stown	frown
access	1.00										
age	-0.03	1.00									
small	0.05	-0.09	1.00								
medium	-0.01	0.01	-0.67	1.00							
large	-0.05	0.10	-0.48	-0.33	1.00						
manufacture	-0.07	0.11	-0.13	0.03	0.13	1.00					
trade	-0.02	-0.07	0.14	-0.05	-0.13	-0.64	1.00				
export	-0.03	0.01	-0.19	0.03	0.21	0.16	-0.11	1.00			
audit	-0.01	0.05	-0.31	0.11	0.27	-0.02	-0.01	0.12	1.00		
state own	-0.02	0.05	-0.09	0.01	0.10	-0.03	-0.01	0.00	0.08	1.00	
foreign own	-0.01	0.00	-0.11	0.00	0.14	-0.01	-0.01	0.11	0.12	0.02	1.00

Table 3 describes the correlation between financing obstacles and different firm characteristics. According to this table, small and medium sized firms report more financing obstacles, while access to finance seems to decrease as firms age. Among LDCs, enterprises operating in the manufacturing sector report less financing obstacles, while those in the retail trade sector report obstacles to financing to be more of a challenge. This trend runs opposite in developing countries where trade sector enterprises report less financing obstacles. Furthermore, obstacles are found to be significantly lower for exporting firms and for externally audited firms. In terms of ownership status, both foreign and government-owned enterprises face lower levels of obstacles to financing.

In contrast, Table 3 describes high correlation among some of the characteristics of firms. For example, large enterprises in the manufacturing sector are found to be primarily externally audited firms. Furthermore, manufacturing firms appear primarily to be exporters, and small firms tend to be younger and mostly involved in the retail trade sector.

The next section is devoted to a quantitative assessment of the determinants of obstacles with respect to financing through the application of standard maximum likelihood estimation models.

5. Regression Analysis

Seven series of maximum likelihood regression models were estimated sequentially, and the results are reported in Table 4, Table 5 and Table 6. Table 4 presents the results of the first three models (benchmark models) according to the order in which firm-level characteristics are estimated for the entire sample (Model 1), for LDCs (Model 2), and for developing OIC countries (Model 3). Table 5 reports the outcomes of two models where country-specific dummies for LDCs (Model 4) and developing OIC countries (Model 5) are estimated in conjunction with the firm-specific variables. Table 6 presents the results of the benchmark models in which firm-level variables are estimated together with country-level development variables for LDCs (Model 6) and developing OIC countries (Model 7) separately.

Firm –level characteristics

The results of the binary probit regression models for the whole sample (Model 1) suggest that a firm's size, age and export status are found to be statistically significant determinants of financing obstacles (Table 4). The estimated marginal effects are also found to be economically significant, implying that smaller, older, domestic market oriented enterprises report higher obstacles to financing. However, not the same number and combination of variables determine the financing obstacles in LDCs and in the developing countries of OIC.

Table 4: Probit estimation results (marginal effects) – firm-level variables

	Model 1: All OIC	Model 2: LDC - OIC	Model 3: Developing - OIC
log(age)	-0.0379*** (0.0061)	-0.0458*** (0.0103)	-0.0366*** (0.0072)
small	0.1341*** (0.0132)	0.2002*** (0.0227)	-0.0484*** (0.0155)
medium	0.0648*** (0.0139)	0.1085*** (0.0241)	0.0312** (0.0158)
manuf	-0.0095 (0.0109)	0.0736*** (0.0173)	-0.0680*** (0.0134)
trade	-0.0070 (0.0123)	0.0599*** (0.0203)	-0.0420*** (0.0142)
export	-0.0454*** (0.0151)	-0.0799*** (0.0246)	-0.0271 (0.0188)
audit	0.0097 (0.0093)	-0.0042 (0.0151)	0.0087 (0.0113)
state own	-0.0778* (0.0409)	-0.1132 (0.0929)	-0.0459 (0.0422)
foreign own	0.0007 (0.0153)	-0.0455** (0.0234)	0.0207 (0.0197)
# of countries	30	16	14
# of observations	13300	5825	7475
Pseudo R²	0.0159	0.0296	0.0113

Note:1. Independent variable: "General Financing Obstacle" is the response to the question "How problematic is financing for the operation and growth of your business?" 1 - denotes major or severe constraint, 0 - otherwise.

2. Standard errors reported in parentheses

3. *, **, *** indicates significance at the 10%, 5% and 1% level, respectively

According to the regression results of Model 2 and Model 3 presented in Table 4, one can observe that the number of firm characteristics driving the perception of financing obstacles is found to be larger for the LDCs

in comparison with those of the developing countries of OIC. The regression results of Model 2 described in the Table 4 indicate that age, size, sectoral origin, export status, and foreign ownership are significant predictors of financing obstacles in LDCs. However, export, ownership status and the external auditing of firms do not appear to be significant in the developing countries of the OIC (Model 3).

Firms in LDCs are found to be affected unevenly across the sample with respect to challenge in financing, since almost all firm-specific characteristics of enterprises in these countries appear to be statistically significant. This may also suggest that, on the one hand, due to overall shortages in the supply of financial resources and on the other, the huge demand on financial products, entire financial systems in LDCs (including both the formal and informal sectors) seems to be very selective and risk-averse towards firms with certain characteristics.

Firm age drives the severity of concern regarding access to finance in LDCs. The marginal effects of age are both negative and statistically significant at the 1 percent level. This result suggests that younger firms in LDCs tend to face more restrictive conditions in terms of their level of access to finance. Small and medium sized firms display higher levels of concern regarding obstacles to financing when compared to large enterprises. The results also reveal that after controlling for other explanatory variables, export orientation decreases the probability that a firm rates access to finance as a serious constraint. Foreign firms complain less about access to finance than do domestic enterprises. Finally, government ownership does not appear to be statistically significant in predicting financing obstacles in the LDCs.

Country-specific dummies

The firm-level characteristics hold true even after controlling for country dummies as the fixed effects in the regressions. If firms are responding to country-specific differences in access to finance, differences should simply appear as fixed effects at the country level (Table 5). The number of firm-level coefficients that appear significant even after controlling for country fixed effects suggest that there is a high level of dispersion, or inequality, among firms in the LDCs (Model 4).

Table 5: Probit estimation results (marginal effects) – country fixed effects

Model 4: LDC-OIC		Model 5: Developing – OIC	
Log(age)	-0.0182* (0.0109)	Log(age)	0.0038 (0.0078)
small	0.1086*** (0.0254)	small	0.0373** (0.0162)
medium	0.0514** (0.0252)	medium	0.0216 (0.0160)
manufacture	0.1337*** (0.0184)	manufacture	0.0447*** (0.0146)
trade	0.0463** (0.0210)	trade	-0.0179 (0.0151)
export	-0.0209 (0.0267)	export	0.0343 (0.0213)
audit	-0.0483*** (0.0159)	audit	-0.0178 (0.0118)
stown	-0.1445 (0.0965)	stown	-0.0167 (0.0452)
frown	-0.1321*** (0.0228)	frown	-0.0548*** (0.0184)
Bangladesh	0.0055 (0.0296)	Afghanistan	0.1023*** (0.0334)
Benin	0.3703*** (0.0357)	Albania	-0.0842*** (0.0271)
Burkina Faso	0.4727*** (0.0215)	Azerbaijan	0.0319 (0.0325)
Chad	0.2911*** (0.0418)	Cameroon	0.2731*** (0.0389)
Gambia	0.2052*** (0.0441)	Gabon	0.0232 (0.0424)
Guinea	0.3126*** (0.0355)	Ivory Coast	0.4192*** (0.0352)
Guinea-Bissau	0.4308*** (0.0301)	Indonesia	-0.1643*** (0.0187)
Mali	0.2402*** (0.0342)	Kazakhstan	0.0614* (0.0316)
Mauritania	0.1906*** (0.0396)	Kyrgyzstan	-0.0050 (0.0348)
Mozambique	0.2588*** (0.0315)	Pakistan	-0.1190*** (0.0207)
Niger	0.2897*** (0.0420)	Suriname	0.0615 (0.0447)
Senegal	0.2239*** (0.0318)	Tajikistan	-0.0138 (0.0305)
Sierra Leon	0.1385*** (0.0485)	Turkey	-0.1328*** (0.0199)
Togo	0.3423*** (0.0384)		
Uganda	0.2997*** (0.0292)		
Pseudo R²	0.0898		0.1121

Note: 1. Reference group for LDCs is Yemen and for developing OIC is Uganda.
2. Standard errors reported in parentheses

3. *, **, *** indicates significance at the 10%, 5% and 1% level, respectively

In the case of developing OIC countries, the outcomes of the regressions are quite similar, but they hold less explanatory powers (Table 5). The results of Model 5 show that in the developing countries, firm-level characteristics do not adequately explain financing obstacles regardless of their size, export and auditing statuses. However, only two firm-level variables (foreign ownership and sectoral origin) are significant at the 1 percent level if controlled for country fixed effects.

As the results of Table 5 suggest, the marginal effects of the variables are found to be smaller in developing countries when compared with the LDCs. For example, being a small firm increases the probability of experiencing obstacles in financing by 10 percent in LDCs versus about by 4 percent in the developing countries. Operating within the manufacturing sector decreases the perceived access to finance by 14 percent in LDCs when compared with only 5 percent in the developing OIC countries.

The final point that is important to mention is with respect to the results of Table 4 and Table 5 in terms of the pseudo R-squares of the estimations. Since the dependent variables in the models involve binary responses, it is suggested that McFadden's pseudo R-square estimates as an analogous to the R-square measure for OLS regressions is used (Wooldridge, 2002). Table 4 shows that firm-level variables explain 3 percent of the variance in the financing obstacles of LDCs while this figure stands at 1 percent in developing countries. When the country dummies are entered after the firm-level variables, the pseudo R-square becomes higher for developing countries when compared with LDCs. Table 5 indicates that country dummies explain 6 percent (0.0898-0.0296) of the variance in the dependent variable of LDCs, while these dummies explain 10 percent (0.1121-0.0113) of the variance in the financing obstacles experienced by firms in developing countries. This again shows that country dummies provide the highest marginal contribution to pseudo R-square in developing countries, confirming that unobserved country differences hold the greatest explanatory power in these countries compared with the LDCs, where firm-specific variables are found to be significant determinants of the financing obstacles of firms.

Country-level determinants

So far, we have focused our consideration on firm-specific predictors and their effects on obstacles to financing. As described in the literature review, previous research has indicated that financial and institutional development in countries also alleviates financing obstacles. In Table 6 country-level variables were included to allow for the testing of the effects of specific country characteristics on the financing obstacles experienced by firms. These regressions also constitute a robustness test for the firm-level regressions that only controlled for country-level effects, but not for country specific determinants.

According to the results of Model 6 and Model 7 in Table 6, all country level variables are found to be statistically significant in predicting financing obstacles in both groups of countries. Except for the institutional development status of a country, which is not found to be economically significant for LDCs, all other variables appear to have similar effects in both LDCs and in developing OIC countries. The firms in countries with higher levels of GDP per capita, financial intermediary and institutional development report lower financing obstacles. GDP per capita, private credit and institutional development (except for LDCs) turned out to be negative and significant at the 1 percent level. When the three variables are included simultaneously, only institutional development does not enter negatively, while GDP per capita and private credit enter negatively and significantly at the 1 percent level. These results may be due to the high correlation between the country-variables and the multicollinearity which resulted from the change in the sign of the institutional development variable.

Table 6: Probit estimation results (marginal effects) – country-level variables

	Model 6: LDC-OIC			Model 7: Developing-OIC		
Log(age)	-0.0395*** (0.0104)	-0.0397*** (0.0104)	-0.0425*** (0.0104)	-0.0328*** (0.0105)	-0.0324*** (0.0072)	-0.0313*** (0.0072)
small	0.1880*** (0.0229)	0.1674*** (0.0235)	0.1788*** (0.0232)	0.1445*** (0.0240)	0.0211 (0.0157)	0.0302* (0.0156)
medium	0.0956*** (0.0242)	0.0849*** (0.0244)	0.0931*** (0.0243)	0.0656*** (0.0246)	0.0258 (0.0158)	0.0272 (0.0158)
manufacture	0.0748*** (0.0174)	0.0849*** (0.0174)	0.0795*** (0.0174)	0.0891*** (0.0175)	-0.0406*** (0.0134)	-0.0307*** (0.0137)
trade	0.0556*** (0.0204)	0.0515** (0.0204)	0.0577*** (0.0204)	0.0475*** (0.0205)	-0.0211 (0.0141)	-0.0220 (0.0146)
export	-0.0794*** (0.0247)	-0.0484* (0.0255)	-0.0669*** (0.0250)	-0.0416 (0.0258)	-0.0111 (0.0194)	-0.0137 (0.0193)
audit	-0.0164 (0.0152)	-0.0178 (0.0152)	-0.0221 (0.0153)	-0.0395*** (0.0154)	0.0135 (0.0114)	0.0080 (0.0113)
state own	-0.1021 (0.0955)	-0.1392 (0.0902)	-0.0886 (0.0965)	-0.1100 (0.0956)	-0.0584 (0.0400)	-0.0719* (0.0386)
foreign own	-0.0783*** (0.0232)	-0.0659*** (0.0233)	-0.0592** (0.0233)	-0.0987*** (0.02300)	0.0162 (0.0197)	0.0163 (0.0197)
Log (GDP p.c.)	-0.2288*** (0.0227)			-0.1746*** (0.0235)	-0.0874*** (0.0062)	-0.0799*** (0.0113)
Credit		-0.0056*** (0.0007)		-0.0050*** (0.0008)	-0.0058*** (0.0004)	-0.0041*** (0.0007)
Institutional development			-0.0296*** (0.0032)	0.0224*** (0.0033)		-0.0206*** (0.0017)
Pseudo R2	0.0425	0.0367	0.0402	0.0539	0.0349	0.0276

Note: 1. Independent variable: “General Financing Obstacle” is the response to the question “How problematic is financing for the operation and growth of your business?”

1 - denotes major or severe constraint, 0 - otherwise.

2. Standard errors reported in parentheses

3. *, **, *** indicates significance at the 10%, 5% and 1% level, respectively

Another interesting result of the regressions with country-level variables is that there are only two firm-specific variables, namely age and sectoral origin, of the firms which were found to be significant in predicting financing obstacles in developing OIC countries (Model 7). However, seven out of nine firm-level characteristics hold significance in the LDCs (Model 6). When country-level variables are included, the firm characteristics that were previously found to be significant continued to enter as statistically and economically significant in LDCs, while foreign ownership status, which was a significant predictor of financing obstacles in Table 4 and Table 5, turned out to be insignificant for the developing OIC countries.

6. Conclusions

According to the literature, access to finance has been found to be one of the most binding obstacles for firm growth. This study's aim was to reveal the firm-level and country-specific predictors of financing obstacles in both LDCs and in developing OIC countries. Overall, age, size, external auditing status and foreign ownership predict financing obstacles in OIC countries. The results reveal that the number and content of firm-level characteristics that predict obstacles to financing in LDCs and developing OIC countries are not the same. A separate analysis of LDCs and developing OIC countries indicates that firm-level characteristics predict more of the financing obstacles in the LDCs when compared with developing OIC countries.

Categorizing firms by their age, size, sectoral origin, world trade integration and ownership is found to be more useful when considering the financing obstacles in LDCs. Thus, when controlled for country fixed effects, financing inequality among firms appears to be even more prominent in LDCs when compared with the developing countries. Younger, smaller, manufacturing, domestic market-oriented and domestically owned firms report higher levels of financing obstacles in LDCs.

The results also indicate that broad economic development and financial deepening are important factors in alleviating firms' financing obstacles in OIC countries. The analysis of the regression models suggests that firms in countries with higher economic development, deeper financial intermediation, and better institutional development report lower

financing obstacles. Nevertheless, the findings suggest that it is hard to distinguish the effects of institutional development from the effects of financial and overall economic development in the OIC countries when we estimate the effects of these country-level variables simultaneously.

Furthermore, in the developing countries of the OIC, if country-specific development variables were controlled for, it was found that access to finance seems to be independent of some firm-level characteristics such as size, export status, external auditing and ownership. However, all these firm characteristics (except export status) appear to be significant predictors of financing obstacles in the firms of LDCs.

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APPENDIX 1**Table A.1:** Country sample statistics

		Year of the Survey	Number of Observations
1	Afghanistan	2008	535
2	Albania	2007	304
3	Azerbaijan	2009	380
4	Bangladesh	2007	1,504
5	Benin	2009	150
6	Burkina Faso	2009	394
7	Cameroon	2009	363
8	Chad	2009	150
9	Gabon	2009	179
10	Gambia	2006	174
11	Guinea	2006	223
12	Guinea-Bissau	2006	159
13	Indonesia	2009	1,444
14	Ivory Coast	2009	526
15	Kazakhstan	2009	544
16	Kyrgyz Republic	2009	235
17	Mali	2010	360
18	Mauritania	2006	237
19	Mozambique	2007	473
20	Niger	2009	150
21	Pakistan	2007	935
22	Senegal	2007	506
23	Sierra Leone	2009	150
24	Suriname	2010	152
25	Tajikistan	2008	360
26	Togo	2009	155
27	Turkey	2008	1,152
28	Uganda	2006	563
29	Uzbekistan	2008	366
30	Yemen	2010	477
	Total	-	13,300