

Journal of Economic Cooperation & Development

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**Linking Sustainable Livelihoods to Natural
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ISSN 1308 – 7800

Volume 32, No. 2, June 2011

J o u r n a l o f E c o n o m i c C o o p e r a t i o n & D e v e l o p m e n t



Statistical Economic and Social Research
and Training Centre for Islamic Countries
(SESRIC)

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EDITORIAL NOTE

Five papers make up this issue. The first one, titled ‘Small and Medium Enterprises (SMEs) and their Financing Pattern: Evidence from Malaysia’, by Moha Asri Abdulla and Siti Khadijah Ab.Manan, attempts to examine SMEs; their financing pattern and their accessibility to external debt finance based on 124 SMEs surveyed in Klang Valley, Malaysia. The findings revealed that start up SMEs do not require much external funding for set up, and besides they are commonly deficient of the means to obtain added funds. As SMEs grow and expand, the need for additional fund will arise, thus the external financial needs will start to increase even though the internal funds represent a significant proportion of their available funds.

The second paper, titled ‘Development of Defence Capability from an Innovation Perspective: The Case of Turkey’ by Filiz Ersöz, and Atilla Karaman, assessed the case of Turkey from a defence capability perspective with respect to the European Union Countries by using innovation indicators. The multi-dimensional scaling analysis (MDSA) showed that the innovation performance of Turkey is in the category of “Catching-up Countries”. Several policy recommendations have been given at the end of the study to increase the defence capability of Turkey from innovation indicators perspective.

The third paper, titled ‘Arab Trade Integration: Evidence from Zero-Inflated Negative Binomial Model’ by Walid Abdmoulah, sheds light on the effectiveness of major Arab Regional Trade Agreements, i.e. GAFTA, AMU, GCC and AGADIR. He used an extended trade data for the years 1997 and 2008 and estimate the gravity equation in its multiplicative form using a Zero-Inflated Negative Binomial model. Results indicate that export and import patterns are comparable. Specific effects to regional integration are disappointing except for GAFTA found to be trade-enhancing to some extent, while GCC, AMU and AGADIR trade gains are not relevant. This can be explained by oil dominance, by persistent barriers and by increasing trade flows towards APEC countries.

The fourth paper, titled ‘Exchange Rate Determination in Pakistan: Role of Monetary Fundamentals’ by Muhammad Arshad Khan and Abdul Qayyum, examines the role of monetary fundamentals in the determination of Pak-rupee vis-à-vis US-dollar exchange rate using quarterly data over

the period 1982Q2-2008Q2. Based on the Johansen (1988) and Johansen-Juselius (1990) cointegration approach, there exist one significant long-run relationship among the cointegration vectors between the exchange rate and the monetary fundamentals. The long-run cointegrating coefficients are generally consistent with the predictions of Frankel's (1979) interest rate differential variant of the monetary exchange rate model. The results of the adjustment coefficients suggest that disequilibrium is corrected by changes in exchange rate, relative money and inflation differential in the short-run. To examine the short-run dynamics in a system-wide context, we have applied persistence profiles approach and the results indicate that the effect of system-wide shocks initially declines rapidly but decays slowly thereafter and completely dies out after 9 quarters. These results are consistent with non-linear adjustment and monetary factor being the main source of exchange rate volatility in Pakistan.

The last and fifth paper, titled 'Linking Sustainable Livelihoods to Natural Resources and Governance in OIC Countries: Prospects and Challenges' by Abdul-Mumin Abdulai and Chamhuri Siwar, investigates natural resource endowment and good governance, and the extent to which these two variables impact sustainable livelihoods in the Organisation of Islamic Conference (OIC) Member Countries. The study has proposed a collaboration model that is all-inclusive seeking to enhance development collaboration among the OIC countries.

Small and Medium Enterprises and Their Financing Patterns: Evidence from Malaysia

Moha Asri Abdullah¹ and Siti Khadijah Ab. Manan¹

The contributions of small and medium enterprises (SMEs) to socio-economic developments have been long recognized, in developed and developing countries alike. In this relation, a wide range of support programmes have been introduced and implemented in many countries. Malaysia is not exceptional to this as various SMEs-oriented policies and SME support initiatives have been nationally initiated. Among the most important areas of support extended to SMEs are financial assistance and credit facilities. Nonetheless, earlier studies indicated that the SMEs' outreach and accessibility to financial facilities, financing needs and pattern are different than of their larger firm counterpart. In view of this, this paper attempts to examine SMEs; their financing pattern and their accessibility to external debt finance based on 124 SMEs surveyed in Klang Valley, Malaysia. The findings revealed that start up SMEs do not require much external funding for set up, and besides they are commonly deficient of the means to obtain added funds. As SMEs grow and expand, the need for additional fund will arise, thus the external financial needs will start to increase even though the internal funds represent a significant proportion of their available funds. Among the SMEs that have obtained external finance, the amount and tenure of the funds tend to be small and short to medium terms respectively. The finding indicated that the age and assets of SMEs are insignificantly correlated to their accessibility to finance. Thus, the study concludes that a wide variety of financial facilities provided by various agencies and financial institutions lead to greater accessibility to finance SMEs in the country.

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1. Introduction

The financing needs and behavior of small and medium sized enterprises (SMEs) should be given prior attention as these establishments play a significant role in the development of most economies around the globe. They have contributed significantly in the development of increasing the nations' Gross Domestic Product (GDP) as well as creating jobs and employment opportunities (Bank Negara Malaysia, 2007). Besides, they have also made valuable contributions in the generation of regional income and savings, facilitation of trainings, stimulation of competition; besides aiding large firms, innovations and inventions, and hence become impetus for economic growth and development (Hall, 2002). The growth and development of SMEs have remarkably contributed to not only employment creation, but also through it, poverty reduction (UNDP, 2007).

The important role of the SMEs as an engine for development could be hampered if the essential elements that contribute to their performance are not catered well by the public and private sectors of the economy. One of the essential elements for the successful performance of the SMEs is the availability and accessibility of financing. The significant contribution and importance of financing to the SMEs have encouraged the government of Malaysia to offer increased support initiatives so to ensure that the financing requirement will not be a hurdle for the development of these enterprises. Huge amount of funds have been made available to SMEs via various schemes and programs. In fact, credit guarantee facilities have been introduced to make the funds more accessible to SMEs, and furthermore, debt resolution scheme has been set up to facilitate the restructuring of SMEs which are viable but being burdened with non-performing loans (NPLs).

Nevertheless, the abundance of loan facilities coupled with the demanding approval requirement of the scantily available equity funds has led many of the SMEs to resort to debt financing. This presents a challenge to SMEs as most banks are more inclined to support secured businesses requirement for financing. This is especially so in Malaysia. Besides conventional banking system, the Islamic banking system is no less different as they would rather mobilize their funds to more-secured financings though there are many other modes of Islamic financing

particularly profit-loss sharing (PLS) equity financing and as such that could be utilized competitively (Hamid and Ahmad, 2001).

Previous studies pertaining to the use of debt vis-à-vis equity financing had so far been focusing on the problems and limitations faced by the financial and non-financial institutions in extending funds to the SMEs. Yet, very little attention is given to the definitive needs of the fund users; in this case, the SMEs, in relation to the use of the financing facility. Thus, this paper attempts to examine the selection of the financing pattern of the SMEs as well as their accessibility to the financing facilities provided by the agencies and financial institutions in Malaysia. In the following sections, a brief review of literature on financing SMEs is presented before a research method is highlighted. Subsequently, findings on characteristics of SME owner managers and their enterprises are discussed, followed by the results from financing pattern of SMEs and their accessibility to external debt finance, respectively.

2. A Review of Literature on Financing SMEs

The SMEs in several advanced economies are comprised of over 98% of total establishments and contributed to over 65% of employment as well as over 50% of the GDP (Bank Negara Malaysia, 2007). It is recorded that SME employment ranges from about 50 to 80 percent of the workforce in the Asia Pacific region (Moha Asri, 2001; Hall, 2002). The status and development of SMEs are also essential to the Malaysian economy. In Malaysia, SMEs in the manufacturing sector refer to establishments with not more than 150 full time employees and sale turnover of not more RM25 million. However, the definitions of such establishments are slightly varied across different economic sectors (SMIDEC, 2009). SMEs contribution was amounted to RM4.3 billion or around 20 percent of the GDP in 1990 and was projected to increase to around RM120 billion by 2020 (Moha Asri and Zarinah, 2008). According to UNDP (2007), employment created by Malaysia's SMEs was approximately 3 million or about 65.1 percent of the total employment. SMEs in Malaysia account for 99 percent or 519,000 of total establishments in the three economic sectors of manufacturing, services and agriculture (UNDP 2007:3).

Much of the discussions pertaining to the SME financing are centered on the issue of information asymmetry that exists in the financial market. The prominence of information asymmetry among the SMEs had created the problems of financial constraint and credit rationing, which then affected the enterprise growth and performance. Information asymmetry refers to the situation where all relevant information is not known by the interested parties (Peirson et. al., 1999). This is typical of the SMEs where insiders (owners/managers/borrowers) generally have better information about their abilities, level of effort, preferences and firm's prospect than the outsiders (shareholders/lenders).

In the world of imperfect capital market, information asymmetry that exists between insiders and outsiders is more pronounced among the SMEs compared to the large-sized firms. Large firms are mostly regulated by the security commission which sets certain standard of disclosure requirement such as the financial status is to be made public with the issuance of periodical reports and prospectus prior to the new issuance. Hence, the large firms are not subject to severe information asymmetry. On the other hand, smaller firms are not publicly regulated and there is no pressure for non-disclosure of their financial status. Hence, SMEs generally kept their internal information to themselves. The outsiders, particularly the banks have very little knowledge about them instead. This had caused them to be subjected to more severe information asymmetry.

The impact of information asymmetry can be ex-ante and ex-post (Scholtens, 1999). Ex-ante information asymmetry refers to the fact that lenders and financiers have very little information on the definitive value of the SMEs as they are generally close in nature. They are generally being controlled by one or few persons and they have fewer disclosure requirements (Hall et al., 2000). As a result, the lenders or financiers may have had difficulty in identifying the best-returned firms, may have entered contractual arrangement with poorly qualified firms or may have made contractual arrangement that created incentives for under performance of the firms. These are referred to as adverse selection problems.

Furthermore, the main concern and consideration of lenders and financiers is not to recognize the downside of the borrowers' businesses,

but to anticipate the return of the principal plus interest. Therefore, they will minimize (or eliminate) all possible loss or downside risks by securing the debts with collateral against any default. Since SMEs are generally young and while they own more intangible assets, they find it difficult to get access to debts at cheaper costs as they are considered risky financially. Besides, collecting specific information about the firms as well as processing and interpreting them is costly. This had caused the lenders to charge smaller firms a high cost of credit on financing. Consequently, SMEs with high potential of profitable investment may not get sufficient finance at reasonable cost or may not get the finance at all. If they obtain the financing, they will have to pay a price higher than that is normally paid by larger counterparts (Petit and Singer, 1985; Apilado et. al., 1992).

The ex-post information asymmetry may create an incentive for moral hazards on the part of the borrowers as they have the control over the firm (Jensen and Meckling, 1976; Harris and Raviv 1991; Scholtens, 1999). They may mismanage the financial funds at hand, may increase the risk of investment, may reduce their managerial effort and as such. As lenders and financiers have anticipated this behavior, they normally perform credibility screening prior to giving the loans and monitoring via greater covenants in the contract. SMEs are generally imposed with greater covenants compared to those of larger enterprises (Apilado et al., 1992). The writing of these covenants is not cost-free, and lenders would normally take these costs into account by including them in the price of the debt. Consequently, the transaction costs incurred by smaller borrowers would normally be higher, hence further squeezing their financial accessibility to debts.

The impact of information asymmetry, as discussed in the economic literature, leads to a certain pattern of SME financing behavior. In addition, the relative size and age of SMEs, which are generally smaller and younger than larger companies, had caused them to have somewhat different nature and constraints, as far as financing is concerned. Apart from the issue of information asymmetry, the size and age of enterprises also play a considerable role in determining the pattern of SME financing throughout their development. Berger and Udell (1998), in describing the economy of SME financing, proposed a model which depicts that firms lie on a size/age/information continuum where the

smaller or younger firms “lie near the left end of the continuum indicating that they must rely on initial insider finance, trade credit and/or angel finance” (Berger et. al. 1998, p.622). As the firms get larger and older, and if the firms remain in existence, external finance will be sought after to finance ongoing businesses as the access becomes easier.

The SMEs’ heavy dependency on insider finance for initial funding is theoretically and empirically appealing because during the start up stage, the firms are still developing their products and have assets mostly in the form of intangibles. Hence, they have no available balance sheet that reflects their eligibility to collateralize their asset for external financing requirement. In addition, external financiers initially could not observe the definitive quality of the firms due to information asymmetry. Hence, financiers (i.e. banks) would normally impose high premiums or interest rates and ration the credits to secure against any possible risk of agency problem. This has further limited the SMEs’ access to external finance. Only when the firms are mature, have more established relationship with banks and have more disclosure about their reputation will the bank lower the credit rate and lessen the credit rationing. Previous empirical studies (such as James, 1986; Hamilton and Mark, 1998; Levenson and Willard, 2000; Beyene, 2002; Cassar, 2004; Tambunan, 2006; Deogratius, 2007) verified the fact that most SMEs are dependent much on insider finance for initial funding.

3. Methods of Study

The present research is done based on descriptive statistical method with a minimum quantitative analysis. Descriptive study is undertaken to describe the characteristics of the samples i.e. small and medium sized enterprises inclusive of the owner’s background and general information of the enterprise. The population of this study comprised of the small and medium-sized enterprises (as defined by SMIDEC 2006). The population frame of the study was the listing of SMEs which operate their businesses in the area of Klang Valley, Malaysia. A proper sampling technique is important in order to have a precise and unbiased sample that represents the whole population. A total of 600 samples were drawn from the population to be adopted in this study. A set of questionnaire was distributed to each of the selected samples via personally-administered survey from between February and November

2007. Two methods of personally-administered survey were normally used i.e. drop-off and mail. Follow-up phone calls were conducted to each of the samples in order to check their acceptance and response. Using Statistical Package for Social Science (SPSS), the profile of the firms and their owners/managers was analyzed descriptively in the form of simple statistics.

Out of the total 600 distributed questionnaires, only 124 questionnaires (with 21 percent response rate) questionnaires were returned. The low response rate could be attributed to the reluctance of some targeted respondents to spend much time in responding to all the questions in advance. Nevertheless, the 21 percent response rate of this study is deemed favorable compared to that of similar study conducted previously in this field (Moha Asri, 1999).

4. Research Findings

The present research findings are divided into three main sections. The first section describes the findings on characteristics of SMEs and its owner-managers. The second section discusses on financing pattern for starting up SMEs and on-going businesses as well as their sources of debt. The third section concentrates on the accessibility of SMEs to external debt finance based on the preceding findings in this research.

4.1. Characteristics of SMEs Owner-Managers and their Enterprises

Most respondents (92 or 74.2 percent) are owners of the enterprises and majority of them are male (78 or 62.9 percent), followed by female (46 or 37.1 percent). This finding is relatively consistent with Malaysia's business environment where the number of male business owners dominates the female though the latter is increasing in number. Nevertheless, many of the owner-managers (OMs), are within the age range of 40 with the average age of 40.2 years. It is found that the majority of the surveyed OMs have had a 10-year business experience. With regards to educational level, many of the surveyed OMs have bachelor's degree (45.2 percent), and quite a significant number of them have professional certificate or diplomas (40 or 32.3 percent).

Table 1: Characteristics of Owner-Manager & Their Enterprises

Characteristics of Owner-Manager (n=124)	Number	Percent
Gender:		
Male	78	
Female	46	
Ethnic:		
Malay	113	91.1
Chinese	11	8.9
Indian	0	0
Others	0	0
Educational Level:		
Primary School	0	0
Secondary School	13	10.5
Certificate/Diploma	40	32.3
Bachelor's Degree	56	45.2
Master	14	11.3
Ph.D	1	0.8
Characteristics of Enterprises (n=124)	Number	Percent
Business Type:		
Construction	10	8.1
Manufacturing	27	21.8
Retailing	24	19.4
Wholesale	6	4.8
Service	49	39.5
Agro-aqua	3	2.4
Tourism	1	0.8
Others	4	3.2
Ownership structure:		
Family	6	4.8
Sole proprietorship	22	17.7
Partnership	9	7.3
Private Limited	87	70.2
Management:		
Owner	92	74.2
Manager	32	25.8

The majority of the enterprises surveyed are engaged in the service sector (72.6 percent), some are engaged in manufacturing (21.8 percent) and only a small number of them are in agriculture or agriculture-related businesses (2.4 percent). In terms of ownership structure, the survey disclosed that about 70 percent of the enterprises are private limited while the others are sole proprietorship (17.7 percent), partnership (7.3 percent) and family-owned businesses (4.8 percent). Consistent with

their structure as small and medium-sized, the majority of the enterprises are managed by their owners (86.3 percent) and only some are managed by managers (13.7 percent).

The average age of the enterprises is seven while the dominant age is four. This indicates that many of the enterprises are still in their early stage of development. The enterprises under survey employed quite a significant number of employees, as the average size of employment is 21. The maximum number of employees employed by a given enterprise in this study is 147. An in-depth study of the employees based on their ethnic background indicates that the majority of them are Malays (72.9 percent) while Chinese and Indian constitute only small percentages (6.07 percent and 2.5 percent respectively). Not surprisingly, quite a significant number of foreign workers (immigrants) are employed (18.9 percent) and this number surpasses the total sum of Chinese and Indian employed by the enterprises. Interviews with several employers disclosed that the main reason for the significant number of foreign workers is their willingness to work hard at reasonable (or sometimes cheaper) wages.

The products sold by the surveyed enterprises are diverse, ranging from the minimum of one product up to more than twenty products, with the average of three products sold. These products are mainly sold in the local market i.e. in their respective locality comprising 54.8 percent, while another 18.6 percent sold their products regionally, i.e. covering a few neighbouring states. Furthermore, about 22.6 percent reached national market, while only a small percentage of their products, i.e. 4.0 percent marketed internationally. This finding is consistent with the data reported by the SMIDEC, where the SMEs in Malaysia contributed not more than 20 percent of output for export (SMIDEC 2006).

4.2 SMEs' Financing Patterns

To obtain funds to start-up a business is a challenge especially to smaller size enterprises as many entrepreneurs have no hands-on experience in business, hence they are perceived to lack credibility in the eye of fund providers. The experiences of many SMEs around the world indicate that most of them used internally generated funds in the form of

personal savings or the savings of their family (James 1986, Beyene 2002 and Deogratius 2007).

This study verified the fact that many of the surveyed enterprises utilized their own funds for starting up the businesses (75.8 percent). Those who sought external equity obtained their funds mainly from partners or development institutions. Approximately 12 percent of the enterprises obtained the start-up funds from development institutions i.e. Perbadanan Usahawan Nasional Berhad (PUNB) and 10.5 percent of them acquired funds from their business partners. Only a very small percentage (1.6 percent) of them received start-up funds from other sources such as banks or government grants.

This study revealed that majority of the enterprises (56.5 percent) still prefer internal funds as the main source of external funding as far as equity is concerned. The surveyed enterprises borrowed a wide-ranging amount of money for their operations. Of the total borrowers, 44.7 percent of them borrowed less than RM50,000 while 25 percent borrowed quite a large amount of loan i.e. more than RM1 million. A little more than 20 percent of the enterprises borrowed between RM100,000 to RM500,000 while another 6.4 percent borrows between RM500,000 to RM1 million. Loan amount of RM50,000 to RM100,000 are borrowed by 2.1 percent of the enterprises surveyed. With regard to the tenure of loan, finding revealed that the enterprises in Malaysia rely more on short (less than three years) and medium-term (three to five years) debt finance (57.4 percent) though quite a significant number of them (42.6 percent) have access to longer term loans (above than five years).

4.3. Accessibility to External Debt Finance

A significant number of the surveyed enterprises (81 respondents or 65.3 percent) had recently applied for loans; of which 50.6 percent had applied for a new loan, 35.8 percent had applied for additional loan, and the rest (13.6 percent) had applied for additional repayment period for their loans. Of those enterprises that borrowed new funds or sought extension on their existing loans or repayment period, 72.8 percent were successful in their first application while 14.8 percent succeeded after

more than one application. Only 12.3 percent of the applying enterprises did not succeed in their application.

The high percentage of successful application for SMEs financing, as found in this study, is consistent with the previous study (Moha Asri, 1999) in the field. This high access to financing could be due to the various guarantee schemes provided by especially the various funding institutions via Credit Guarantee Corporation (CGC).

Cross tabulations were conducted between age and accessibility and between assets and accessibility to examine if the two variables may have influence on the enterprises' access to debts. A 2 x 2 contingency table was employed in order to derive a more accurate chi-square test. Hence, data for the two variables i.e. age of enterprises and their assets were regrouped. Table 2 displayed the outcome of cross tab between enterprises' age and access to finance. The enterprises were categorized into; 10 year or less (Birth Stage) and more than 10 years (Growth Stage)². The table showed that a total of 55 enterprises at Birth Stage had recently applied for loans and of these, 43 had their applications approved (78.2 percent of the total birth-stage-enterprises that applied) and only 12 (or 21.8 percent) experienced some difficulty in getting their loans approved or not approved at all. In comparison, a total of 26 growth enterprises had recently applied for loans and of these, 16 (or 61.5 percent) had their applications approved and 10 (or 38.5 percent) experienced some difficulty in getting their loans approved or not approved at all. Cramer's V test for the two variables (age and access) however indicated that there is a very weak association between the age of enterprises and their status of loan approval (Cramer's V statistic = 0.2). This association is indeed insignificant as the chi-square test observed a value of $p = 0.1$ ($p > 0.001$).

² This categorization is based on Miller and Friesen's (1984) stages of firms where the small and medium-sized enterprises were generally placed at Birth and Growth stages. According to them, firms at Birth Stage are less than 10 years old, have informal structure and dominated by owner-manager.

**Table 2: Cross Distribution between Age of SMEs and
Their Accessibility to Finance**

			Loan Approval		Total
			Approved	Difficult/Not Approved	
Age	10 year or less	Count	43	12	55
		Expected Count	40.1	14.9	55
		% within Age Category	78.2	21.8	100
		% within Loan Approval	72.9	54.5	67.9
		% of Total	53.1	14.8	67.9
	More than 10 years	Count	16	10	26
		Expected Count	18.9	7.1	26
		% within Age Category	61.5	38.5	100
		% within Loan Approval	27.1	45.5	32.1
		% of Total	19.8	12.3	32.1
	Total	Count	59	22	81
		Expected Count	59	22	81
		% within Age Category	72.8	27.2	100
		% within Loan Approval	100	100	100
		% of Total	72.8	27.2	100

Note: Chi-square Test ($p = 0.1$), Cramer's $V = 0.2$

The outcome of cross tabulation between assets and access to finance displayed a similar result. Theoretically, bigger enterprises should have better access to finance. However, findings of this study indicated that assets exert no influence on SMEs in gaining access to finance. As shown in Table 3, a total of 54 smaller enterprises had applied for loans and of these, 38 (or 70.4 percent) had their loans approved with only one application and the rest of 16 (or 29.6 percent) succeeded after more

than one application, or did not succeed. Comparatively, a total of 27 bigger enterprises had applied for loans and of these, 21 (or 77.8 percent) succeeded in their applications and 6 (or 27.2 percent) succeeded after more than one application, or did not succeed. Cramer's V statistic and chi-square test for assets and access to finance indicated that the two variables are not significantly related. The insignificant findings for both age and asset of enterprises with access to finance could mainly be due to the fact that a wide variety of financial facilities were offered by as many as 13 ministries and 30 government agencies or institutions with varying assistance activities (Moha Asri, 1999).

Table 3: Cross Distribution between SMEs' Assets and Accessibility to Finance

			Loan Approval		Total
			Approved	Difficult/Not Approved	
Asset	< RM1million	Count	38	16	54
		Expected Count	39.3	14.7	54
		% within Asset	70.4	29.6	100
		% within Loan Approval	64.4	72.7	66.7
		% of Total	46.9	19.8	66.7
	> RM1million	Count	21	6	27
		Expected Count	19.7	7.3	27
		% within Asset	77.8	22.2	100
		% within Loan Approval	35.6	27.3	33.3
		% of Total	25.9	7.4	33.3
	Total	Count	59	22	81
		Expected Count	59	22	81
		% within Asset	72.8	27.2	100
		% within Loan Approval	100	100	100
		% of Total	72.8	27.2	100

Chi-square Test ($p = 0.4$), Cramer's V Statistic = 0.1

5. Conclusion

SMEs contribute significantly to the economic growth and development of many countries. Some scholars tend to assume the role of SMEs as the ‘backbone’ of the economies of many countries (see for instance ABD, 1990 and Hall, 2002). This is evidently so in the point of view of generating employment, income, export, a source innovation, technology transfers as well as entrepreneurial development. The importance of SMEs in Malaysia is validated by their contribution to about 30 percent of the total GDP and is projected to increase to 50 percent or RM120 billion by the year 2020 (Moha Asri, 2002). The Malaysian government has realized this potential and a wide range of support programmes have been provided to further promote SMEs to the greater heights. However, less exploration on the accessibility of financial facilities and financing structure of SMEs has led to this research, with the aim to fill this gap and vacuum.

Based on the research analysis, it is found that the general profile of the SMEs in Malaysia is no less different than the general profile of other SMEs around the world. This is so as many of SMEs are owner-operated, dominated by male entrepreneurs, have fewer workers and lesser asset value than large enterprises, while SMEs are dependent much on internal sources of finance for start-up. It is also found that SMEs do not need much external funding and besides they are deficient of the means to obtain one. However, as SMEs grow and expand, the external financial needs will start to increase even though internal funds represent a significant proportion of their finances. For those SMEs that have obtained external finance, the amount and tenure of the funds tend to be small and short to medium terms respectively. The study concludes that a wide variety of financial facilities provided by various agencies and financial institutions lead to greater accessibility to finance SMEs in the country. This conclusion, nonetheless, should not be comfortable at all as stiff competition and global economic environment call for more innovative and progressive support strategies for SMEs to ensure that they are made an integral part of the total economic development in the country.

Hence, it can be stressed that although the government has stated its strong commitment to and interest in promoting small businesses, the intention has not been translated into effective action as yet especially with regard to start up SMEs. Similarly, the accessibility and adequacy of most of the support facilities provided at the level of individual businesses are found to be very much low. This may reflect the inflexibility on the part of the banking institutions to provide a much robust financial facilities for SMEs in the country. Realizing the significant role of SMEs to the country's economy, it is a high time now this situation should be reviewed and reexamined.

Internally, there is indeed scope and ample evidence that SMEs can substantially increase their efficiency and productivity, and that the rate of growth, and new enterprises can be established in a number of product lines and sub-industries in the wake of development in the country. On the whole, SMEs in Malaysia have plenty of scope and ample evidence that they can substantially increase their productivity and rate of growth in the wake of the Malaysian economic recovery, which in turn provides further impetus for SMEs' activities in the overall industrial development of the country. Faced with the current global business environment and a high level of business competition, SMEs will require to be more adaptive to maintain their present contribution to the Malaysian economy. While SMEs will need new strategic direction and planning and outward looking managers and entrepreneurs with knowledge and skills, the continued efforts and support of the government in enhancing the development of SMEs retains equally significant. All these require more commitment and hard work from both the public and private sectors to utilise and maximise the available resources and opportunities to ensure that SMEs are capable of meeting the challenges of globalisation.

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Development of Defence Capability from an Innovation Perspective: The Case of Turkey

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In this study, the case of Turkey from a defence capability perspective has been assessed with respect to the European Union Countries by using innovation indicators. Fourteen innovation indicators from year 2008 of the European Innovation Scorecard 2008 Report constituted a base for the current study. Based on these data, the situation of Turkey regarding the innovation indicators was posited by employing multi-dimensional scaling analysis (MDSA) and K-means cluster analysis. Based on the k-means cluster analysis, Turkey is in the same cluster as in Poland, Portugal, Romania, Slovakia and Croatia. The MDSA showed that the innovation performance of Turkey is in the category of “Catching-up Countries”. Several policy recommendations have been given at the end of the study to increase the defence capability of Turkey from innovation indicators perspective.

1. Introduction

The economic and political developments whose impacts are not only felt on a regional scale but also on a global scale enforce organisations and firms, most of which are found under competitive environment, to be open to change. The firms of varying sizes in the defence sector which are one of the stakeholders in the development of a country's defence capabilities have to take the effects of this change into account from the aspects of competitive capacity, profitability and sustainability. In that respect, the Vision 2023 Defence, Aviation and Space Panel Report prepared by the Scientific and Technological Research Council of Turkey (TUBITAK) states that the only way for a country's defence

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industry in general and firms in the defence sector in particular to survive is to produce information and technology intensive goods in information based fields, especially in the information and communication technology industries (TUBITAK, 2003).

The current paradigm shift from traditional production to information and technology intensive production has also been reflected in the contemporary warfare. Under the current circumstances, the theatre of military operations, traditionally dominated by land, naval and air forces, has been carried-out through the electronic environment, especially the Internet. Concordantly, the North Atlantic Treaty Organization (NATO) calls a form of Internet-based warfare as “iWar”. According to the definition of NATO, “iWar” is distinct from what the United States (US) calls ‘cyber war’ or what China calls ‘informationalized war’. These refer to sensitive military and critical infrastructure assets, and to battlefield communications and satellite intelligence. In contrast, “iWar” refers to attacks carried-out over the Internet that target the low security consumer Internet infrastructure, such as the websites providing access to online services (NATO, 2007). The massive interruption of a country’s public and private sector services by attacking the Internet infrastructure was first seen in Estonia in 2007 and then in Georgia in 2008 (NATO, 2007; The Economist, 2008). The expansion of the theatre of military operations into the Internet requires countries to develop their defence capabilities even to overcome an iWar. This fact, once more proves that knowledge and technology are important components of the defence technologies.

In line with these developments, activities for enhancing the defence capabilities gained importance in Turkey, particularly in the last decade. The Turkish defence sector is one of the good examples from the experience of the developing countries regarding the defence capability development. The evolving character of the Turkish defence capability development can be summarized in three phases. Up to 1990, the Turkish defence sector mainly focused on direct procurements from abroad. However, direct procurements posed great risk in times of instability, such as the embargo the Turkish Government faced during the Cyprus Peace Operation in 1974. In the period between 1990 and 2000, while still maintaining direct procurement, the Turkish defence sector started joint production programmes with foreign partners including the manufacturing of Meltem (Breeze) Maritime Patrol and

Surveillance Aircrafts, Cougar Helicopters, Armoured Combat Vehicles, and Mine Hunting Vessels. From 2000 onwards, the Turkish defence sector has been actively carrying out design and export of defence goods and services including Hürkuş (Free Bird) Training Aircraft, Milgem (National Ship) Corvette, unmanned aerial vehicles, and Altay Tank projects (Turkish Undersecretary of Defence Industry, 2011).

As to the Western countries, after the end of the Cold War, the governments in the US and Europe started seeking new models to develop their defence capabilities (James, 2009-I). Although an attitude towards decreasing the defence expenditures that constitute a significant portion of the government expenditures is adopted, it is obvious that a country's capability of protecting its citizens from external threats is dependent on the high technology that its defence equipments have. Furthermore, the production of high-technology defence equipments directly depends on innovation and research and development (R&D) capabilities. For instance, by the end of the Cold War, while the defence R&D budgets recorded sharp falls in some countries, the defence R&D budget of the US reached US\$79 billion in 2009, accounting for 12% of the national defence expenditures, recording a growth of 210% compared to the level in 2000 (The White House Office of Management and Budget, 2010). As matter of fact, the magnitude of defence R&D expenditure of the US reached the expenditure levels of the Cold War in 2005 (James, 2009-II). Indeed, high defence R&D expenditure by investments of the US in the defence industry is an indicator not only of expecting a benefit in a military sense but also of an intention to transform the gains from the defence industry R&D activities into commercial gains in civilian applications with a spill-over effect. A study carried out in 2005 by Fabrizio and Mowery documents the substantial role played by the US Department of Defence in the development of the electronic computer, computer software, and semiconductor components industries, resulting in the development of the Internet. Federal R&D investment, procurement policies, and spillovers of technologies from military to civilian applications contributed to the industrial and technological development of these sectors (Fabrizio and Mowery, 2005). A similar pattern of defence R&D expenditures is also seen in the Europe. In 2009, the defence R&D expenditures of the UK constituted 10% of the total national R&D expenditures (Chantrill, 2010). As for Turkey, the gross domestic R&D expenditure (GDRDE) of Turkey amounted to US\$ 5.4 billion based on

the survey results of public institutions, private universities and private sector firms, and budget and staff data of state universities. However, the share of GDRDE to GDP was still below 1% (exact figure is 0.73%) in 2008 (TUIK, 2009).

All these findings indicate that the role of innovation is becoming increasingly important, particularly in the development of defence capabilities. The term “innovation” is derived from the Latin verb *innovare* (Wordnik, 2010-I). In the Century Dictionary, innovation is defined as “*a novel change in practice or method; something new introduced into established arrangements of any kind; an unwonted or experimental variation*”, “*the introduction of new things or methods*” (Wordnik, 2010-II). According to Noah Webster’s 1828 American Dictionary, innovation is “*expedient when it remedies an evil and safe when men are prepared to receive it. Innovation is often used in an ill sense for a change that disturbs settled opinions and practices without an equivalent advantage*” (Noah Webster's 1828 American Dictionary, 1828). As to the modern usage of the term, an innovation is the implementation of a new or significantly improved product (good or service), or process, a new marketing method, or a new organisational method in business practices, workplace organisation or external relations. The minimum requirement for an innovation is that the product, process, marketing method or organisational method must be new (or significantly improved) to the firm. This includes products, processes and methods that firms are the first to develop and those that have been adopted from other firms or organisations (OECD, 2005).

Although they do not express the same thing, invention and innovation are related terms. According to Tidd et al. (Tidd, Bessant, Pavitt, 2005), innovation is the sum of theoretical conception, technical invention and commercial exploitation (as cited in Arpaci, 2009).

The establishment of and progress in theoretical conception, stated as a sub-component of innovation in Tidd’s formulation, depends on the education attainment level among the youth, the ratio of the population graduated from higher-education institutes, and the number of people participating in life-long learning programs. However, the quantitative increase in the number of trained people is not enough for innovation capability per se. According to a report published by the Association of American Universities (AAU) in January 2006, serious problems in the

American educational system and a weakening federal commitment to research in the physical sciences and engineering are eroding the innovative edge of the US, with increasingly evident and alarming results. The report also states that following the launch of Sputnik by the Soviet Union in 1957, the US responded those similar challenges by enacting the National Defence Education Act and by multiplying the investment of the US in university-based research. The AAU expects to see a comparable response from the national stakeholders to meet the current challenges the US are facing now (Association of American Universities, 2006).

Beside the factors affecting the theoretical conception, the public/private sector R&D expenditures and innovative SMEs collaborating with other SMEs are indispensable factors for technical invention, the second component of Tidd's innovation formula. Meanwhile, to measure commercial exploitation – the last component in Tidd's innovation formula – private sector financing, trademark and design ownership ratios, employment ratios in high-tech manufacturing and knowledge-intensive services, high-tech goods/services trade and exports are needed.

As a response to the challenges of globalisation, the European Council approved the Lisbon Strategy in March 2000 which aspires to make the EU into the most dynamic, most competitive economy in the world by 2010. Despite an ambitious research and innovation agenda, the Lisbon Strategy unfortunately seems to have failed. According to the European Innovation Scoreboard Report 2008 published by the European Commission (EC), the European Union (EU) fell behind the US and Japan regarding innovation. In parallel to the finding of the European Innovation Scoreboard (EIS), the data disclosed by the EC show that the European defence market faces similar problems. The European defence equipment market, worth €41 billion in 2007, is mostly concentrated in six member states, namely France, Germany, Italy, Spain, Sweden and the UK. However, the high regulation at the national level with divergent policies and fragmentation of the European defence market creates bureaucratic drawbacks, slows down innovation and leads to duplication of defence programmes and research. Eventually, this weakens competitiveness of the European defence industry and the effectiveness of the European Security and Defence Policy (ESDP). To improve the competitiveness of the European defence sector, the EC

launched a Defence Package on 5 December 2007 designed to set out a new European policy and legislative framework (European Commission, 2010).

Technology generation is a result of R&D and innovation efforts. Starting with the second half of the 20th century, the commercialisation of technologic knowledge and launch of technology based industrial products necessitated a connection to be made between science institutions and industrial organisations. One of the ways to establish this connection was through the technology park (technopark) models. In 2001, Law No. 4691 of “Technology Development Regions” was enacted in Turkey and formed a legal foundation for the technoparks. The breakdown of the projects carried out in these regions in 2008 is as follows: 61.44% in information technology and software, 12.12% in defence industry, 7.71% in electric, electronics and electromechanics, 5.65% in telecommunication, 2.16% in advanced materials, 2.10% in medicine and biotechnology, and 8.01% in miscellaneous fields (State Auditing Board of the Presidency of the Republic of Turkey, 2009).

The European Innovation Scoreboard (EIS), which is the main data source of this study, is one of the international indices covering the performance of the European countries in technologic innovation. According to the EIS 2008 Report, Turkey was placed in the “Catching-up Countries” together with Bulgaria, Croatia, Hungary, Latvia, Lithuania, Malta, Poland, Romania and Slovakia. In the report, it was stated that although the innovation performance of Turkey was well below the EU average, there was an expectation of Turkey’s catching the EU average over time with the current performance pace. Nevertheless, it was also stated in the report that data obtained from Turkey were incomplete, majority of the data were not reflected in the European statistics. For these reasons, Turkey got the lowest rankings in relevant innovation indicators of the EIS despite its fastest growth rates (Maastricht Economic and Social Research and Training Centre on Innovation and Technology (UNU-MERIT), 2009).

2. Methodology

In this study, the data for the innovation indicators were obtained from the EIS 2008 Report. Based on these data, the place of Turkey regarding the innovation indicators was posited. For the analysis, multivariate

statistical methods; i.e. multi-dimensional scaling (MDS) analysis and K-means cluster analysis were applied.

The users of the MDS method lay emphasis on information visualisation rather than a result. What the statistical methods need for explaining the application is an explanatory graphical technique. In this sense, the MDS method is one of the best techniques available (Young and Hamer, 1987). K-means clustering method clusters the units and gives the cluster parameter estimates of the formed clusters (Anderberg, 1973; Jobson, 1991; SPSS, 1999).

The EIS Report, which was prepared for the EU and in which the innovation capability of Turkey was analysed, is an official indicator comprising of various criteria and calculated under the control of the EC. The EIS Report has been published annually since 2001. A total of 29 indicators are used to form the innovation scoreboard. The indicators include innovation performance data from Turkey, Croatia, Iceland, Norway and Switzerland, beside the EU countries. The data used in this study were obtained from the EIS 2008 Database (Pro Inno Europe, 2009). The report prepared by using the Summary Innovation Index (SII) figures stated that the data obtained from Turkey were incomplete. The analysis report is on innovation and technology, and is prepared by Maastricht Economic and Social Research and Training Centre on Innovation and Technology (UNU-MERIT) with the support of Joint Research Centre (Institute for the Protection and Security of the Citizen) of the European Commission. The innovation indicators reported in the EIS 2008 are grouped in 3 main blocks (enablers, firm activities and outputs) and 7 sub-blocks.

A total number of 32 countries including the member countries of the European Union, Croatia, Switzerland, Iceland, Norway, the EU Average and Turkey have been included in this study. The main data source for the study has been the European Innovation Scoreboard. The following 14 indicators from the 2008 European Innovation Scoreboard Report in which data are available for Turkey have been used for the analysis:

1. Population with tertiary education per 100 population aged 25-64: This is a general indicator of the supply of advanced skills. It is not limited to science and technical fields because the adoption of

innovations in many areas, in particular in the service sectors, depends on a wide range of skills. Furthermore, it includes the entire working age population, because future economic growth could require drawing on the non-active fraction of the population. International comparisons of educational levels however are difficult due to large discrepancies in the educational systems, access, and level of attainment that is required to receive a tertiary degree. Differences among countries should be interpreted with caution.

2. Participation in life-long learning per 100 population aged 25-64: A central characteristic of a knowledge economy is on-going technical development and innovation. Individuals need to continually learn new ideas and skills or to participate in life-long learning. All types of learning are valuable, since it prepares people for “learning to learn”. The ability to learn can then be applied to new tasks with social and economic benefits.
3. Youth education attainment level: The indicator measures the qualification level of the population aged 20-24 years in terms of formal educational degrees. It provides a measure for the “supply” of human capital of that age group and for the output of education systems in terms of graduates. Completed upper secondary education is generally considered to be the minimum level required for successful participation in a knowledge-based society and is positively linked with economic growth.
4. Public R&D expenditures (% of GDP): R&D expenditure represents one of the major drivers of economic growth in a knowledge-based economy. As such, trends in the R&D expenditure indicator provide key indications of the future competitiveness and wealth of the EU. R&D spending is essential for making the transition to a knowledge-based economy as well as for improving production technologies and stimulating growth.
5. Private credit (relative to GDP): Following the Innovation Monitor of FORA (The Danish Enterprise and Construction Authority, Division for Research and Analysis) (2007), the availability of private credit is used as an indicator for the supply of start-up capital. This indicator is the most reliable available indicator for

finance for innovation other than venture capital and given the importance of finance as an enabler for innovation it is included as an innovation indicator.

6. Business R&D expenditures (% of GDP): The indicator captures the formal creation of new knowledge within firms. It is particularly important in the science-based sector (pharmaceuticals, chemicals and some areas of electronics) where most new knowledge is created in or near R&D laboratories.
7. Innovative SMEs collaborating with others (% of SMEs): This indicator measures the degree to which SMEs are involved in innovation co-operation. Complex innovations, in particular in ICT, often depend on the ability to draw on diverse sources of information and knowledge, or to collaborate on the development of an innovation. This indicator measures the flow of knowledge between public research institutions and firms and between firms and other firms. The indicator is limited to SMEs because almost all large firms are involved in innovation co-operation.
8. Community trademarks per million population: The Community trademark gives its proprietor a uniform right applicable in all member states of the European Union on the strength of a single procedure which simplifies trademark policies at European level. It fulfils the three essential functions of a trademark at European level: it identifies the origin of goods and services, guarantees consistent quality through evidence of the company's commitment vis-à-vis the consumer, and is a form of communication, a basis for publicity and advertising. The Community trademark may be used as a manufacturer's mark, a mark for goods of a trading company, or service mark. It may also take the form of a collective trademark: properly applied, the regulation governing the use of the collective trademark guarantees the origin, the nature and the quality of goods and services by making them distinguishable, which is beneficial to members of the association or body owning the trademark.
9. Community designs per million population: A design is the outward appearance of a product or part of it resulting from the lines, contours, colours, shape, texture, materials and/or its

ornamentation. A product can be any industrial or handicraft item including packaging, graphic symbols and typographic typefaces but excluding computer programs. It also includes products that are composed of multiple components, which may be disassembled and reassembled. Community design protection is directly enforceable in each EU Member State and it provides both the option of an unregistered and a registered Community design right for one area encompassing all EU Member States.

10. Employment in medium-high & high-tech manufacturing (% of workforce): The share of employment in high technology manufacturing sectors is an indicator of the manufacturing economy that is based on continual innovation through creative, inventive activity. The use of total employment gives a better indicator than using the share of manufacturing employment alone, since the latter will be affected by the hollowing out of manufacturing in some countries.
11. Employment in knowledge-intensive services (% of total workforce): Knowledge-intensive services provide services directly to consumers, such as telecommunications, and provide inputs to the innovative activities of other firms in all sectors of the economy. The latter can increase productivity throughout the economy and support the diffusion of a range of innovations, in particular those based on ICT.
12. Medium-tech and high-tech exports (% of total exports): The indicator measures the technological competitiveness of the EU i.e. the ability to commercialise the results of R&D and innovation in the international markets. It also reflects product specialisation by country. Creating, exploiting and commercialising new technologies are vital for the competitiveness of a country in the modern economy. This is because high technology sectors are key drivers for economic growth, productivity and welfare, and are generally a source of high value added and well-paid employment. The Brussels European Council (2003) stressed the role of public-private partnerships in the research area as a key factor in developing new technologies and enabling the European high-tech industry to compete at the global level.

13. New-to-market sales (% of turnover): This indicator measures the turnover of new or significantly improved products, which are also new to the market, as a percentage of total turnover. The product must be new to the firm, which in many cases will also include innovations that are world-firsts. The main disadvantage is that there is some ambiguity in what constitutes a 'new to market' innovation. Smaller firms or firms from less developed countries could be more likely to include innovations that have already been introduced into the market elsewhere.
14. New-to-firm sales (% of turnover): This indicator measures the turnover of new or significantly improved products to the firm as a percentage of total turnover. These products are not new to the market. Sales of new to the firm but not new to the market products are a proxy of the use or implementation of elsewhere already introduced products (or technologies). This indicator is thus a proxy for the degree of diffusion of state-of-the-art technologies.

Multivariate statistical methods have been employed in this study to analyse the similarities and differences among the countries by using the European Innovation Scoreboard indicators. SPSS (PASW) 17.0 has been used for analysing the dataset.

3. Findings and Discussion

3.1 Multi-Dimensional Scaling Analysis (MDSA)

The efficiency of the multi-dimensional scaling analysis is measured with the Kruskal stress measure (Kruskal, 1964). The measure is calculated by taking square root of the rate of the differences between the actual configuration dimension and the estimated ones to the estimated configuration distances, and represents the compatibility between data distances and configuration distances (Kalaycı, 2006). It is desirable for MDSA to determine the stress statistics to a level near zero. In the analysis, Kruskal stress value has been found as 0.19 for $k=2$ and the compatibility level has been determined as low compatibility (0.10 – 0.20). The stress value has been calculated according to the Kruskal's formulation and found as 0.85. In this context, dimension the stress value explains the data in the rate of 0.85 for $k=2$. The Euclidean

Distance Model that is computed according to distances of countries to one another is presented below in a two-dimensional chart (Figure 1).

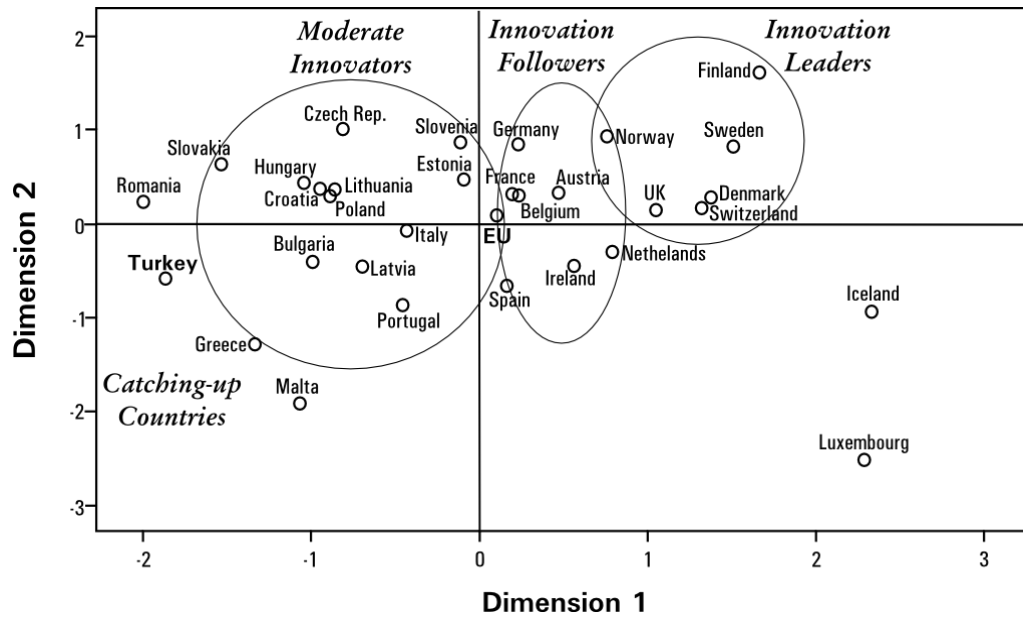


Figure 1. Similar and different countries in innovation based on the Euclidean Distance Model

In Figure 1, the countries which have been perceived as most similar to each other are grouped together based on the EIS data. As a result of the analysis, the countries regarding the 14 chosen innovation indicators formed four different groups in the two-dimensional space. According to the MDSA, the “Innovation Leaders” group includes Finland, Sweden, Denmark, Switzerland, Norway, and the UK. France, Germany, the Netherlands, Austria, Spain and Belgium are included in the “Innovation Followers” group. The group of “Moderate Innovators” includes mostly newly accessed EU countries; i.e., Portugal, Czech Republic, Slovenia, Estonia, Lithuania, Poland, Hungary, Croatia, Greece, Italy, Bulgaria, and Latvia. The last group, “Catching-up Countries”, includes Turkey, Malta and Romania.

3.2. K - Means Clustering Analysis

As a result of the k-means clustering analysis, Table 1 gives the clusters and cluster members for K=7. Turkey together with Poland, Portugal, Romania, Slovakia, and Croatia are observed to be in the 4th cluster.

Table 1. Cluster Membership

Cluster No	Cluster Members
1	Czech Republic, Hungary, Malta
2	Luxembourg
3	Iceland
4	Turkey, Poland, Portugal, Romania, Slovakia, Croatia
5	EU Average, Belgium, Bulgaria, Estonia, Ireland, Spain, France, Italy, Latvia, Lithuania, Netherlands, Slovenia, Norway
6	Denmark, Germany, Austria, Finland, Switzerland, England, Sweden
7	Greece

The ANOVA table has been calculated in order to reveal the differences of the innovation indicators in the cluster analysis. The ANOVA output is used for descriptive purposes in here. Table 2 gives the variance analysis showing the clustering effectiveness of the variables in k-means solutions.

Based on the analysis, among the 14 innovation indicators chosen for clustering N=31 countries, all the indicators are significant, except for “Youth education attainment level” and “Innovative SMEs collaborating with others (% of SMEs)”, which have p-values greater than 5% level.

4. Conclusion and Recommendations

A country can develop by increasing its social capital, technology and competitive capacity. To increase the competitive power, the country needs to improve its productivity. In this respect, innovation plays an important role in increasing the productivity levels. In order for Turkey to raise its defence capabilities to those of the developed countries, the levels to be reached regarding innovation should be analysed in an

objective and accurate manner. In this way, up-to-date, appropriate and effective national roadmaps and strategies can be established.

Table 2. ANOVA Output of the Cluster Analysis

Innovation Indicators	Cluster Mean Square	Error Mean Square	Sd	F	Sig. (p)
Population with tertiary education per 100 population aged 25-64	3.231	0.464	6	6.95	0.000
Participation in life-long learning per 100 population aged 25-64	3.618	0.372	6	9.73	0.000
Youth education attainment level	1.191	0.954	6	1.24	0.316
Public R&D expenditures (% of GDP)	3.765	0.336	6	11.1	0.000
Private credit (relative to GDP)	2.687	0.595	6	4.51	0.003
Business R&D expenditures (% of GDP)	3.786	0.331	6	11.4	0.000
Innovative SMEs collaborating with others (% of SMEs)	1.342	0.918	6	1.46	0.231
Community trademarks per million population	4.482	0.164	6	27.2	0.000
Community designs per million population	4.936	0.553	6	89.2	0.000
Employment in medium-high & high-tech manufacturing (% of workforce)	2.229	0.705	6	3.16	0.019
Employment in knowledge-intensive services (% of workforce)	3.227	0.465	6	6.93	0.000
Medium-tech and high-tech exports (% of total exports)	2.858	0.554	6	5.15	0.001
New-to-market sales (% of turnover)	3.516	0.396	6	8.87	0.000
New-to-firm sales (% of turnover)	2.271	0.695	6	3.26	0.016

In this study, the significance of innovation and innovation indicators in the development of defence capabilities has been highlighted. Moreover, the position/location of Turkey based on the 14 innovation indicators from the 2008 European Innovation Scoreboard has been put forward.

The study shows that Turkey is in the same cluster as in Poland, Portugal, Romania, Slovakia and Croatia according to the k-means cluster analysis of the innovation indicators. The result of the multi-dimensional scaling analysis (MDSA) reveals that the innovation performance of Turkey is less than the EU average and in the category of “Catching-up Countries” when compared to that of the EU countries together with Norway and Switzerland. Comparing the results obtained in this study with the results of the EIS 2008 Report, similar findings have been reached. However, in the EIS 2008 Report, it has been stated that the data obtained from Turkey were incomplete. In this sense, it is an urgent issue for Turkey to complete the missing data in the innovation indicators, establish innovation policies and apply them efficiently in order to reach the level of innovation performance of the developed countries.

In order for the Turkish defence industry to better integrate innovation, science and technology infrastructure, the following are suggested:

1. The relationship between industry and universities/research institutions should be strengthened.
2. The technology transfer between the higher education institutions and enterprises should be developed.
3. The private sector should allocate more funds to research and development investments.
4. Innovation should not only be restricted to research and development activities, but also a thriving science and innovation community should be brought about by taking part in international cooperation and collaboration initiatives.
5. Sources allocated to research and development should be increased.
6. The number of technology parks providing the technology transfer channel for the industry should be increased.

7. Beside the armed forces constituting the defence capability of a country, the other factors providing the survival and development of this capability are high-technology oriented defence industry, stable economy, well-trained human resources, sound policies and science/technology infrastructure, universities, research and application centres supported with financial sources. If innovation efforts in a country are not supported by theoretical conception, technical invention and commercial exploitation, they cannot be expected to cause any effect in the country.

In order for the three components to create a synergetic impact regarding the development of defence capability, the following are required:

1. The education attainment level among the youth should be fostered.
2. Tertiary education should be encouraged and the ratio of the population graduated from higher-education institutes should be enhanced.
3. The life-long learning programs should be incorporated as a component into the national education strategy. The citizens should be encouraged to participate in such programs no matter what their ages are.
4. The public and private sector research and development expenditures should be allocated to the fields that are effective, commercially profitable and can develop the defence capabilities strategically.
5. The number of innovative small and medium sized enterprises open to national and international collaboration should be increased.
6. The financial instruments available for private sector should be diversified. The access to these instruments should also be facilitated.
7. The rates of ownership in commercial trademarks and industrial designs should be improved.
8. The labour force should be oriented towards technology and knowledge-intensive manufacturing and service sectors.
9. Efficient policies should be carried out for increasing the high-technology exports.

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Arab Trade Integration: Evidence from Zero-Inflated Negative Binomial Model

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New light is shed on the effectiveness of major Arab Regional Trade Agreements, i.e. GAFTA, AMU, GCC and AGADIR. We use an extended trade data for the years 1997 and 2008 and estimate the gravity equation in its multiplicative form using a Zero-Inflated Negative Binomial model. Results indicate that export and import patterns are comparable. Specific effects to regional integration are disappointing except for GAFTA found to be trade-enhancing to some extent, while GCC, AMU and AGADIR trade gains are not relevant. This can be explained by oil dominance, by persistent barriers and by increasing trade flows towards APEC countries.

1. Introduction

Arab intraregional trade has long been too weak in spite of all undertaken efforts to improve its trend. Indeed, to this end Arab countries have embarked upon liberalizing their trade regime through a complicated web of trade agreements involving bilateral, sub-regional and regional preferential trade agreements. Most important agreements are AMU (Arab Maghreb Union)¹, GCC (Gulf Cooperation Council)², AGADIR 2004 Agreement³, and GAFTA (Greater Arab Free Trade Area)^{4,5}.

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¹ Launched in 1989 between Mauritania, Morocco, Algeria, Tunisia and Libya.

² Launched in 1981 between Saudi Arabia, Kuwait, Oman, Qatar, UAE and Bahrain.

³ Launched in 2004 between Egypt, Jordan, Morocco and Tunisia. It is seen as the first building block of the Europe-Mediterranean Free Trade Area by 2010.

⁴ Launched in 1997 between Jordan, UAE, Bahrain, Tunisia, Saudi Arabia, Syria, Oman, Qatar, Kuwait, Lebanon, Libya, Egypt, Morocco, Yemen, Iraq, Palestine and Sudan. In 2005, Algeria was accepted into the GAFTA.

The latter is a pact adopted in 1997 by 17 Arab countries that agreed on a progressive elimination of trade barriers. GAFTA aims to promote regional trade and achieve a complete Arab economic bloc that can compete internationally in a world where globalization and regionalization live side by side since most countries both industrialized and emerging achieved powerful Regional Trade Agreements (RTAs such as EU, NAFTA, APEC and ASEAN among others) while being members of the World Trade Organization (WTO),

GAFTA has been in force since January 1st, 1998, and reached full trade liberalization of goods as of January 1st 2005 through the full exemption of customs duties and charges having equivalent effect between all Arab countries members of the GAFTA. In order to overcome previous mistakes the Economic and Social Council of the Arab League designed gradual decreasing of tariffs and similar impacts' taxes (by 10% annually and by 20% since 2003) that are imposed on agricultural-animal production, minerals and metals, semi-manufactured products that are mentioned in the approved list of the council, and other manufactured products. Likewise, AGADIR Agreement comes into force in March 2007. This agreement remains open to other Arab countries being linked to the EU in order to facilitate integration between Arab countries and the EU under the EU-Mediterranean integration process. GCC significantly evolved in the few last years to become a customs union in 2003 and a common market in 2007. In the contrary, UMA agreement acquired no progress since its launch in 1989. Therefore, undertaking to quantitatively evaluate Arab trade integration is a crucial feature from policymakers and managers point of views.

Few attempts tried to quantitatively evaluate Arab trade integration trade. Outwards the bulk of descriptive studies (Sekouti 1999, Tahir 1999, Zarrouk 2000, Hadhri 2001, Al Atrach and Youssef 2000, Maamri 2004, Bayar 2005, Galal and Hoekman 2003, among others), Bousseta (2004) and Achy (2006) focused on trade in Maghreb

⁵ Agreements previous to GAFTA include:

- Agreement of facilitating intra trade and crossing borders in 1953,
- Agreement of Arab Economic Unity in 1957,
- Agreement of Arab common market in 1964 which aimed to encourage gradual, reduction of tariffs for all Arab commodities accompanied with free movement for people, services, products and capitals,
- Agreement of facilitating and promoting Arab intra trade in 1981.

countries, while Limam and Abdalla (1998), Al-Obaidan (2000), Ruzita et al. (2005), Neaime (2005), Abedini and Péridy (2006), Iqbal and Nabli (2007), Yu-Feng and Abdelaziz (2009) and Harb (2009) considered trade integration in the whole region. Babili and Baghasa (2008) investigated GAFTA impacts on Syrian trade after its full implementation. Bhattacharya and Wolde (2010) studied the constraints on the trade in the region.

Most of these studies have come to the conclusion that Arab trade agreements have failed to live up to expectations that were raised by their launch. Nonetheless, it is difficult to draw a strong conclusion because most of these studies rely on data prior to their year of entry into effect, i.e., 2005 and 2007 respectively for GAFTA and AGADIR, which makes it difficult to accurately assess the effectiveness of trade integration in the region. In addition, most of these studies focused on Arab Trade Agreements performance solely upon progress of exports flows.

The present paper tries to overcome these drawbacks by looking at Arab intraregional trade trends and determinants as well as GAFTA, AMU, GCC and AGADIR Agreements effectiveness. We use a consistent database of exports and imports flows and a host of explanatory variables over 1997 and 2008 years. Trade flows cover exports and imports flows of 20 Arab countries as well as 77 partners accounting for more than 90% of their trade flows. Moreover, the paper addresses the problem of oil dominance due to oil trade flows collected from COMTRADE. On the other hand, the paper follows the recent developments initiated by Santos Silva and Tenreyro (2006) by estimating the gravity equation in its multiplicative form by using the Zero-Inflated Negative Binomial model suggested by Burger et al. (2009). This robust alternative to OLS and other panel regressions allows tackling the inconsistency of the traditional loglinearized gravity equation in presence of over-dispersion and high frequency of zeroes.

The paper is organized as follows. Section 2 provides a brief discussion of trade trends in Arab countries over 1997-2008 period. Section 3 presents the augmented gravity model. Results are discussed in section 4. Section 5 concludes the paper.

2. Arab Trade Trends

The global trade flows witnessed a rapid surge over the past twenty years reaching 16.05 trillion\$ and 16.7 trillion\$ in 2008 in terms of exports and imports respectively (Table 1) (the difference is often explained by different valuation methods, exports being generally reported on a Free on Board (FOB) basis while imports are generally reported on the basis of Cost, Insurance and Freight (CIF), That's why import values tend to be higher than export values), This represents more than 190% and 198% of increase when compared to trade flows in 1997. Arab region trade flows increased from 0.177 trillion\$ in 1997 to 0.886 trillion\$ in 2008 in terms of exports and from 0.137 trillion\$ to 0.667 trillion\$ in terms of imports for the same period, which means 400% and 386% of increase over the period. Although these increases are greater than those of the global flows, they remain very limited as their proportion of global trade flows do not exceed 5.6% and 4% in terms of exports and imports, respectively. It is noteworthy that these proportions fall to 1.5% and 4.5% if we exclude oil accounting for 77.4% of Arab exports and 6.8% of their imports. Further evidence is given by looking at the annualized growth rates of global and Arab trade flows. Thus, Arab exports and imports growth rates are slightly greater than those of the global flows, even after excluding oil. In fact, exports and imports annual growth rates over the period are 12.4% and 15.1% when excluding oil. Nonetheless, as stated previously, Arab countries failed to significantly increase their proportion in global trade, likely because of their lagging industrialization and their excess reliance on resource based commodities. As pointed by Iqbel and Nabli (2007) "*the MENA region has lagged most other regions of the world in both development outcomes and international integration (such as trade and foreign investment)*".

When it comes to exports destinations and imports sources, countries belonging to APEC⁶, NAFTA⁷ and EU15⁸ blocks represent the main

⁶ Asia-Pacific Economic Cooperation including Australia, Brunai, Canada, Chile, China, Hon Kong, Indonesia, Japan, Korea, Malaysia, Mexico, New Zeland, Papua New Guinea, Peru, Phillipines, Russia, Singapore, Chinese Taipei, Thailand, USA, VietNam.

⁷ North America Free Trade Area including USA, Mexico and Canada.

⁸ EU15 including Austria, Belgium, Greece, Denmark, Finland, France, Germany, Ireland, Italy, Luxembourg, Netherlands, Portugal, Spain, Sweden and UK.

trade partners for the region, notwithstanding the decrease of trade flows with EU countries in favor to APEC countries, while trade flows with NAFTA remain modest. Arab intraregional trade flows remain far behind not exceeding 9% and 12% in terms of exports and imports in 2008. Unfortunately, data regarding oil flows' details being unavailable for most of the Arab countries for 1997 and 2008 years make it impossible to assess Arab intraregional ratios when oil is excluded. According to UN-ESCWA, 2008 Arab intra exports when excluding oil is almost 17.7% in 2007.

Likewise, mainly two facts raise when looking at the bottom part of the Table 1. Firstly, GAFTA, UMA, GCC and AGADIR blocks failed to significantly expand their trade, overwhelmingly relying on oil especially for GCC countries. Secondly, the share of intra-block trade remains far behind those achieved by other trade blocks (67%, 65% and 49% in EU⁹, APEC and NAFTA in 2008 respectively), Nonetheless, AGADIR countries appear as the most integrated despite its recent launch. At the opposite, GCC show the least integrated countries, while GAFTA and UMA show moderate integration rates. It is noteworthy that ARAB and GAFTA countries have slightly similar intraregional trade rates albeit GAFTA comprises only 17 countries from the 20 under study (excluding Iraq and Palestine), This means that trade flows from or to Comoros, Somalia and Mauritania, not being members in GAFTA, are almost insignificant.

Overall, despite the pessimistic findings regarding the incapability of Arab countries to significantly benefit from the surge of global trade flows either to increase their share in international trade nor to enhance their intraregional trade, intraregional trade can be seen as a good advocate of strategic and potential economic development and stability. Therefore, increasing trade integration leads to a need to explain more precisely the factors preventing GAFTA, and the other regional agreements AMU, GCC and AGADIR, from expanding trade to a wider scale. The next sections try to bring more light on Arab trade flows drivers due to the augmented gravity model.

⁹ EU15 plus Bulgaria, Cyprus, Czech Rep., Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Romania, Slovakia and Slovenia.

Table 1: Arab Trade Flows Destinations and Sources for 1997-2008
(million US dollars)

	Exports			Imports		
	1997	2008	GR*	1997	2008	GR*
Total World Trade Flows	5530795	16058845	10.2%	5605744	16709050	10.4%
Oil Trade Flows	441817	2705378	17.9%	465825	2820693	17.8%
Excluding Oil	5088978	13353466	9.2%	5139919	13888356	9.5%
Total ARAB trade flows to World	177206	886297	15.8%	137363	667099	15.4%
Oil Trade Flows	121719	686064	17.0%	4844	45240	22.5%
in %	68.7%	77.4%		3.5%	6.8%	
Excluding Oil	55486	200232	12.4%	132518	621859	15.1%
Share of ARAB to Total World Trade	3.20%	5.52%		2.45%	3.99%	
Share of ARAB to Total World Trade excluding Oil	1.09%	1.50%		2.58%	4.48%	
Intra ARAB Trade Flows	14644	76298	16.2%	13495	79859	17.5%
Share of Intra ARAB Trade flows	8.26%	8.61%		9.82%	11.97%	
Share of ARAB Trade flows to EU15	24.49%	19.43%		39.04%	32.08%	
Share of ARAB Trade flows to NAFTA	9.25%	11.40%		13.41%	9.24%	
Share of ARAB Trade flows to APEC	45.48%	51.69%		32.14%	36.44%	
Total GAFTA trade flows to World	176414	883074		135982	660993	
Share of GAFTA to Total World Trade	3.19%	5.50%		2.43%	3.96%	
Share of GAFTA to Total World Trade excluding Oil	1.08%	1.48%		2.55%	4.44%	
Share of Intra GAFTA Trade flows	8.18%	8.51%		9.80%	11.95%	
Total UMA trade flows to World	34724	175060		32739	129990	
Share of UMA to Total World Trade	0.63%	1.09%		0.58%	0.78%	
Share of UMA to Total World Trade excluding Oil	0.26%	0.42%		0.59%	0.84%	
Share of Intra UMA Trade flows	5.22%	5.27%		4.36%	6.25%	
Total GCC trade flows to World	125988	630803		71803	385823	
Share of GCC to Total World Trade	2.28%	3.93%		1.28%	2.31%	
Share of GCC to Total World Trade excluding Oil	0.64%	0.73%		1.39%	2.71%	
Share of Intra GCC Trade flows	1.90%	2.36%		1.20%	1.63%	
Total AGADIR trade flows to World	16132	73185		35118	145487	
Share of AGADIR to Total World Trade	0.29%	0.46%		0.63%	0.87%	
Share of AGADIR to Total World Trade excluding Oil	0.27%	0.43%		0.63%	0.89%	
Share of Intra AGADIR Trade flows	17.86%	11.68%		11.90%	8.90%	

Note: * Annualized growth rate.

3. Suggested Gravity Model

The analysis of trade relationships amongst countries involves a complex system of geo-economic entities and their relations. The theoretical bases of gravity models were largely developed and rest on the law of Newton, used as well by geographers as by economists (Camagny, 1996). The gravity model of trade in international economics predicts bilateral trade flows (F_{ij} which can be exports or imports flows) based on the economic sizes (often using GDP measurements, i.e., Y_i, Y_j) and distance between two countries (Dis_{ij}). The basic form of the gravity equation can be written as $F_{ij} = \alpha_0 Y_i^{\alpha_1} Y_j^{\alpha_2} Dis_{ij}^{\alpha_3}$ (where i and j are reporter and partner countries respectively). The model being initially introduced in economics by Izard (1954) and Tinbergen (1962) and first tested by Pöyhönen (1963) and Linnemann (1966),

Many authors using the gravity model has also sought to evaluate the impact of various variables in addition to the basic gravity equation. Among these, income level (GDP per capita), price levels, language relationships, tariffs, contiguity, colonial history, exchange rates, institutional quality and macroeconomic environment. The model has also been used in international relations to evaluate the impact of agreements on trade. Specifically, trade flows between two countries should increase with their real GDPs (gravity variable), since large countries should trade more than small ones, and with per capita incomes, since rich countries should trade more than poor ones. It should diminish with geographical distance increasing transportation and information costs. Dummy variables are added to account for common language, border or participating in trade agreements. A positive coefficient on the dummy variable means that two countries trade more with one another than predicted by their incomes and distance, indicating that being part of the same trade agreement is trade-enhancing for its members.

Despite its popularity, the gravity model has been widely criticized for a long time because of its lack of theoretical foundations (Leamer, 1994 and Polak, 1996). Recently, Evenett and Keller (2002) by addressing the so called 'model identification' find a robust evidence that an Increasing Returns to Scale based trade theory largely explains why gravity model

fits trade flows. This result is in line with the contributions of Anderson (1979), Helpman (1987), Leamer (1992) and Eaton and Kortum (2002) among others leading to the conviction that the prediction of the gravity model can be derived from theories based on different foundations, including endowment and technological differences, increasing returns to scale, and Armington demands.

On the empirical side, Polak (1996), Matyas (1997, 1998), Egger (2000, 2002) and Cheng and Wall (2002) are concerned with the appropriate specification of gravity equation. Fik and Mulligan (1998) question the appropriateness of log-linear specification of gravity models. Pirotte (1999) and Egger (2002) think that attention should also be paid to the association of different estimators with short-term and long-term time horizons. More recently, Santos Silva and Tenreyro (2006) explain that the loglinearized gravity equation leads to inconsistent and biased estimates because of the Jensen's inequality, i.e., $E(\ln y) \neq \ln E(y)$, which is likely to hold in presence of heteroskedasticity characterizing trade data. In addition, the existence of zero bilateral trade flows pose an additional problem to the use of loglinearized gravity equation even after using the inverse hyperbolic sine transformation (originally introduced by Johnston (1949)). To address these problems Santos Silva and Tenreyro (2006) suggest estimating the gravity equation in its multiplicative form by using a Poisson Pseudo Maximum Likelihood technique, hereinafter PPML. A second alternative to account for the high prevalence of zero trade flows and the asymmetry in bilateral trade flows between country pairs is the sample selection approach proposed by Helpman, Melitz and Rubinstein (2008). This approach is a two-stage estimation procedure. The first stage uses a probit regression to account for the probability that country j exports to country i . The second stage estimates a loglinearized gravity equation. According to Santos Silva and Tenreyro (2009) it seems that the assumptions needed for the estimation of the Helpman, Melitz and Rubinstein (2008) model are too strong to make it practical.

Likewise, the PPML, despite being accepted as a viable alternative for loglinearized gravity model and widely adopted (see among others Westerlund and Wilhelmsson (2007), Hebble, Shepherd and Wilson (2007)), has been criticized for its restrictive assumption of equi-dispersion while trade data often exhibit over-dispersion and excess zeroes. Burger et al. (2009) extend the empirical model initiated by

Santos Silva and Tenreyro (2006) by suggesting overcoming the drawbacks of PPML by using the Zero-Inflated Negative Binomial or Zero-Inflated Poisson regressions. The Negative binomial regression being able to model count data with over-dispersion, while Zero-inflated regressions address the issue of excess zeroes in their own rights. By comparing several modelling strategies for count data they have found out that zero-inflated negative binomial or zero-inflated poisson models outperform standard negative binomial or poisson models in presence of over-dispersion and high frequency of zeroes. This concurs with previous work as Martin and Pham (2008) and Liu and Cela (2008), .

Following Burger et al. (2009), the present paper implements zero-inflated negative binomial regressions, hereinafter ZINB, to estimate the determinants of the Arab counties exports and imports flows. In addition to the three variables discussed previously in the basic multiplicative gravity equation, further explanatory variables were added. Thus, we use GDP per capita_i and GDP per capita_j to account for the purchase power in reporter and partner countries. Furthermore, dummy variables are used to take into account the common border and the common colonisation history. In order, to evaluate the role of the Arab trade agreements we add four dummies relative to GAFTA, GCC, UMA and AGADIR in addition to three trade partner blocks, i.e., EU15, NAFTA and APEC. These different dummies allow us to measure the relative importance of each block in terms of trade flows. Finally, trade complementarity scores are used in order to assess how well Arab countries exports fit with partners' imports.

4. Data and Empirical Results

4.1. Highlights from the Data

Trade data come from IMF, Direction of Trade statistics, 2010 edition. Hydrocarbon flows used to calculate 'trade flows excluding oil' are extracted from The World Bank's WITS system. The remaining data were collected from various datasets as described in Table 2. The data include 20 Arab countries in addition to 77 trade partners for the years 1997 and 2008. These benchmark periods were chosen so as to evaluate the latest changes in Arab countries trade flows after full entry into force of the trade agreements under study. The list of the countries is reported

in Appendix A. Thus, the number of observations is 1940 for each year (20 Arab countries $\times$ 97 partner countries including the 20 Arab countries),

Table 2: Data sources

Variables	Dataset used
Trade flows	Direction of Trade Statistics, IMF, 2010 edition
Hydrocarbon trade flows	COMTRADE, through WITS system.
GDP and GDP per capita	World bank and IMF
Distance, border, colonisation and language	CEPII
Trade Complementarity index	Author's calculations

Selected summary statistics of the variables are reported in Table 3. It is worth emphasizing that Arab countries are very heterogeneous regarding market size. In terms of GDP, Saudi Arabia accounts for more than 25% of the total GDP of the region. Likewise, GCC countries account for more than 70% of the total GDP and thus have the highest income level while most of the other Arab countries still have lower middle income level and even less than that in Comoros, Djibouti, Somalia and Mauritania. Likewise, Saudi Arabia accounts for more than 30% of the exports of the region in 2008. Saudi Arabia, UAE, Algeria, Kuwait, Libya and Qatar account for almost 80% of the exports. In terms of imports, UAE stands first with almost 30%. UAE, Saudi Arabia, Egypt, Algeria and Morocco account for 66% of the region's imports.

Trade complementarity index¹⁰ is added to show how well Arab countries exports fit with partners' imports. Trade complementarity

¹⁰ Obtained by using the following

$$\text{formula: } TCI_{ij} = 1 - \left(\sum_k \left| \frac{M_j^k}{M_j} - \frac{X_i^k}{X_i} \right| \right) / 2 ; (0 \leq TCI_{ij} \leq 1).$$

Where i is an exporting country, j is an importing country, and k represents goods categories. This index takes the value of one when a composition of import needs in an importing country matches perfectly with the export bundle of an exporting country. Inversely, this index is equal to zero when an export bundle of an exporting country has no relevance to the import needs of an importing country. The indices are computed based on the United Nations/COMTRADE bilateral trade flow data at the SITC two-digit level.

scores varies widely from a minimum of 0.02 to a maximum of 0.88. Appendix B reports only Arab countries scores. Their exports fit moderately with their imports since the average is about 0.35. This concurs with Arab trade structure as described by the Arab Economic Report 2006 emphasizing that Arab region mainly exports Oil (73.4% in 2005) followed by Manufactures, Machinery and transport equipment and Food and drinks in addition to other goods (with 13.2%, 3.4% and 3% respectively in 2005). Inversely, Arab countries imports are dominated by Manufactures, Machinery and transport equipment and Food and drinks (37.7%, 26.3% and 14% respectively in 2005),

4.2. Results and Discussion

Table 4 and Table 5 report the estimation outcomes resulting from ZINB regressions applied to the multiplicative form of the gravity equation as stated previously. Precisely, Table 4 reports estimation outcomes using exports flows as the dependant variable for years 1997 and 2008. While, Table 5 reports estimation outcomes using imports as the dependant variable for years 1997 and 2008. For comparison, exports and imports excluding oil are then used as dependant variables. Their estimation outcomes are added to Tables 4 and 5 respectively. It is worth pointing out that oil trade flows are unavailable in COMTRADE data base for several Arab countries and for several years. Hence, for the year 1997, Bahrain, Comoros, Djibouti, Kuwait, Libya, Mauritania, Qatar, Saudi Arabia, Somalia, Syria, UAE and Yemen are excluded, limiting the number of observations to 776. In 2008, only Bahrain, Comoros, Djibouti, Kuwait, Libya, Mauritania, Saudi Arabia, Somalia and Syria are excluded, which leads to 1076 observations.

As expected, the basic gravity specification works well since reporter and partner countries market size as expressed by GDP are found to be trade-enhancing while distance is found to be trade-inhibiting. All variables are significant at 1% level. GDP per capita of reporter countries are export-enhancing while GDP per capita of partners plays no role or a negative role on trade. As found by Santos Silva and

Table 3: Summary statistics

	Mean	Maximum	Minimum	Std. Dev.	Obs.
Exports 1997 (million US dollars)	82.2	11190.4	0	517.1	1940
Exports 2008(million US dollars)	409.2	51823.1	0	2452.9	1940
Imports 1997(million US dollars)	66.6	6391.7	0	263.2	1940
Imports 2008(million US dollars)	334.4	25313.4	0	1283.3	1940
Exports excluding oil 1997 (million US dollars)	20.9	1478.7	0	98.177	776
Exports excluding oil 2008 (million US dollars)	183.8	14377.8	0	824.1	1067
Imports excluding oil 1997 (million US dollars)	65.2	2265.8	0	196.1	776
Imports excluding oil 2008 (million US dollars)	399.5	25299.7	0	1497.9	1067
Reporter's GDP 1997 (million US dollars)	27533.0	164993.9	212.1	37170.8	1940
Reporter's GDP 2008 (million US dollars)	90558.4	468800.3	530.1	109897.7	1940
Reporter's GDP per capita 1997(thousand US dollars)	5.131	20.494	0.360	6.3	1940
Reporter's GDP per capita 2008 (thousand US dollars)	15.434	79.870	0.491	22.3	1940
Partner's GDP 1997 (million US dollars)	299815.0	8250900.0	212.1	972465.1	1940
Partner's GDP 2008 (million US dollars)	601117.2	14093310.0	429.6	1636280.0	1940
Partner's GDP per capita 1997 (thousand US dollars)	8.544	37.328	0.185	10.5	1940
Partner's GDP per capita 2008 (thousand US dollars)	18.316	94.759	0.252	21.3	1940
Distance (kilometer)	5205.9	18953.2	85.9	3303.1	1940
Border	0.02	1	0	0.15	1940
Language	0.26	1	0	0.44	1940
Colonizer	0.15	1	0	0.36	1940
GAFTA	0.13	1	0	0.34	1940
GCC	0.02	1	0	0.12	1940
UMA	0.01	1	0	0.10	1940
AGADIR	0.01	1	0	0.08	1940
EU15	0.14	1	0	0.35	1940
NAFTA	0.03	1	0	0.17	1940
APEC	0.18	1	0	0.38	1940
Trade Complementarity index 1997	0.36	0.88	0.03	0.2	1940
Trade Complementarity index 2008	0.39	0.88	0.02	0.2	1940

Tenreyro (2006) the coefficients generated by Poisson estimates are oftentimes smaller than those commonly generated by OLS. Thus, this finding contradicts with the widely accepted proportional relationship between trade and GDP.

Furthermore, common colonizer dummy is shown to affect trade flows. Its coefficient is generally larger before excluding oil from exports flows and the opposite when it comes to imports. Similarly, common border is largely trade-enhancing when explaining exports and imports flows including oil. This effect surprisingly disappears after excluding oil, indicating that Arab countries do not benefit from contiguity. Common language is dropped since it is highly correlated to GAFTA dummy (see Appendix C reporting correlation matrix),

As for the dummies representing the four Arab blocks, the results are to the least disappointing except for GAFTA. In 1997, GAFTA coefficient is not significant neither in explaining exports nor in explaining imports then becomes positive and weakly significant in 2008. When oil is excluded from exports flows, GAFTA coefficient becomes substantial (around 1 and 0.9 in 1997 and 2008, respectively) and significant at 1% level. This means that GAFTA did help its members to reap benefits from the agreement since 1997. This effect is substantial when we count for exports apart from oil. Regarding imports flows, GAFTA coefficient is only significant in 2008. Its magnitude has roughly doubled since 1997. This means that imports flows patterns between GAFTA members have improved after the entry into force of GAFTA as well. Therefore, this result contradicts with many previous pessimistic findings but remains below the expectations raised by the launch of GAFTA by Arab countries, as shown when GAFTA results are compared with APEC coefficient estimates. In fact, the coefficient of APEC dummy exceeds 2 in 2008 while GAFTA dummy coefficient do not exceed 0,29 and 0,9 in 2008 before and after excluding oil respectively.

Contrarily, AMU dummy coefficient becomes negative and significant at 1% in 2008. When oil is excluded, its coefficient turns positive but not significant when we look for exports flows and negative and significant when we look to imports flows, which shows its failure to create a significant incremental effect on trade between Maghreb countries. Likely, as for GCC dummy, coefficients are oftentimes

negative and not significant before and after excluding oil. Only in 2008 coefficients are substantially negative and significant revealing the failure of GCC to have an incremental effect on trade despite the launch of the customs union in 2003 and a common market in 2007. These results are to be taken with caution since numerous countries have been removed for unavailable oil flows as stated previously. For example, Saudi Arabia and Bahrain are well integrated since the opening of the King Fahd Causeway, both countries being excluded from regressions ran in the right side of Tables 4 and 5.

Looking at AGADIR dummy, the coefficient estimates are everywhere positive when using exports flows as dependant variable, even though not significant except in 1997. In contrary, the coefficient is oftentimes negative and not significant when imports flows are used as dependant variable. This result is even more disappointing because of the higher inherent trade complementarity between Tunisia, Egypt, Jordan and Morocco than in the other groups. Indeed, complementarity index is, on average, much higher through AGADIR countries (0.67) than in other Arab countries groups (0.35, 0.34, 0.47 and 0.23, for Arab, GAFTA, UMA and GCC groups respectively) once again because of the heavy reliance on oil production and exports in many Arab countries. With this regard, Trade complementarity index plays a significant substantial positive effect only when oil is excluded, as reported in Table 4. Then, one would expect higher trade complementarity within AGADIR countries to make it much easier and prompt to reap benefits from the trade agreement. Though, as said previously, AGADIR agreement is not yet effective indicating that large exports similarity coupled with low levels of trade complementarity are not the only reasons why Arab countries have so far failed to effectively expand their intraregional trade, as stated in previous empirical research.

One key factor underlying this failure is that Arab countries trade with each other less than with many other developed or developing countries as picked up by the substantial positive and significant coefficient of APEC dummy, either before or after excluding oil from exports or imports point of view. The story about EU15 and NAFTA is quite different. Exports towards EU countries are positive and significant only in 2008 and after excluding oil in 1997, while imports are not significant everywhere. Regarding NAFTA, exports and imports coefficients are negative and significant everywhere, indicating that trade with North

American countries is not active at all. One explanation, the most obvious, is that North African countries trade historically widely with Europe, because of different colonial history and trade cost, while Middle Eastern countries trade more with North America and increasingly with Asian countries (In table 4, EU coefficient falls from 0.491 in 1997 to 0.086 in 2008 given that Qatar and UAE are added to the countries list),

Other deterring factors that hamper integration have been cited. Many argue that lagging industrialization, slow structural transformation and weak private sector are the most important disabilities preventing Arab countries from expanding trade (Abdmoulah and Laabas, 2010), Furthermore, Bhattacharya and Wolde (2010) find that transport constraints and inefficiencies in customs clearance processes are important in explaining the region's underperformance in trade. This is consistent with the tangible barriers introduced by Andersen and Van Wincoop (2004) and Linders et al. (2008), Besides, other intangible barriers (incomplete information, and institutional barriers for example) as identified by these authors would inhibit trade between Arab countries, likely to a larger extent, as discussed in Saidi (2003) and Ruzita et al. (2005), This deserves to be studied in future research.

Table 4: Determinants of Arab countries Exports flows

	Exports		Exports Excluding Oil	
	1997	2008	1997	2008
GDP of reporter country	0.803*	0.863*	0.415*	1.126*
	(0.055)	(0.051)	(0.111)	(0.089)
GDP of partner country	0.892*	0.900*	0.796*	0.824*
	(0.050)	(0.045)	(0.066)	(0.048)
GDP per capita of reporter country	0.255*	0.209*	0.428*	0.277*
	(0.068)	(0.057)	(0.116)	(0.060)
GDP per capita of partner country	-0.124***	-0.300*	-0.215*	-0.321*
	(0.067)	(0.055)	(0.079)	(0.055)
Log Distance	-1.603*	-1.565*	-0.863*	-1.228*
	(0.131)	(0.122)	(0.145)	(0.133)
Common Colonizer dummy	1.087*	1.041*	0.866*	0.705*
	(0.233)	(0.200)	(0.235)	(0.175)
Common Border dummy	2.178*	2.883*	0.496**	0.504***
	(0.766)	(0.934)	(0.320)	(0.270)
GAFTA	-0.067	0.297***	1.019*	0.919*
	(0.184)	(0.177)	(0.183)	(0.222)
AMU	-0.163	-0.933**	0.571	0.199
	(0.528)	(0.457)	(0.442)	(0.366)
GCC	-0.789	-1.041**	0.576	-0.410
	(0.527)	(0.479)	(0.610)	(0.380)
AGADIR	1.239**	0.136	0.425	-0.744
	(0.644)	(0.266)	(0.559)	(0.305)
EU15	-0.240	0.415***	0.491***	0.086
	(0.259)	(0.241)	(0.263)	(0.252)
NAFTA	-1.893*	-1.254*	-1.060**	-0.990**
	(0.319)	(0.366)	(0.475)	(0.458)
APEC	1.832*	2.249*	0.728**	2.047*
	(0.265)	(0.248)	(0.320)	(0.321)
Trade Complementarity	-1.102*	-0.184	1.075***	2.231*
	(0.359)	(0.325)	(0.623)	(0.403)
Constant	4.197*	4.135*	0.769	-2.631
	(1.459)	(1.300)	(2.057)	(1.664)
Number of obs.	1940	1940	776	1067
Nonzero obs.	1308	1537	632	872
Zero obs.	632	403	144	195
Wald chi2 (16)	1054.67	1498.02	439.42	983.50
Prob > chi2	0.000	0.000	0.000	0.000

Note: Reporter countries are the 20 Arab countries while the partner countries are the 97 countries including the 20 Arab countries. Robust standard errors in parentheses. * significant at 1%; ** significant at 5% and *** significant at 10%.

Table 5: Determinants of Arab countries Imports flows

	Imports		Imports Excluding Oil	
	1997	2008	1997	2008
GDP of reporter country	0.622*	0.636*	0.685*	0.917*
	(0.037)	(0.042)	(0.073)	(0.089)
GDP of partner country	0.830*	0.943*	0.955*	0.961*
	(0.041)	(0.040)	(0.045)	(0.046)
GDP per capita of reporter country	0.028	0.004	0.167*	0.042
	(0.041)	(0.040)	(0.072)	(0.048)
GDP per capita of partner country	0.019	-0.027	0.094***	-0.068
	(0.044)	(0.046)	(0.050)	(0.053)
Distance	-1.042*	-1.171*	-0.854*	-0.952*
	(0.107)	(0.088)	(0.087)	(0.110)
Common Colonizer dummy	0.572*	0.479*	1.584*	0.830*
	(0.155)	(0.169)	(0.222)	(0.231)
Common Border dummy	1.843*	2.847*	1.377**	0.336
	(0.654)	(0.905)	(0.611)	(0.258)
GAFTA	0.076	0.285***	0.012	0.509*
	(0.168)	(0.154)	(0.178)	(0.179)
AMU	-0.264	-0.831**	-1.314*	-0.699**
	(0.349)	(0.396)	(0.437)	(0.311)
GCC	-0.239	-0.908**	0.240	-0.311
	(0.416)	(0.434)	(0.500)	(0.507)
AGADIR	-0.221	-0.059	0.294	-0.080
	(0.221)	(0.254)	(0.222)	(0.240)
EU	0.029	-0.125	-0.237	0.258
	(0.137)	(0.152)	(0.177)	(0.162)
NAFTA	-0.623*	-1.322*	-0.894*	-1.310*
	(0.185)	(0.200)	(0.258)	(0.212)
APEC	0.698*	1.028*	0.278***	1.080*
	(0.153)	(0.132)	(0.174)	(0.152)
Constant	2.672*	2.793*	-2.719**	-2.553**
	(0.973)	(0.875)	(1.283)	(1.296)
Number of obs.	1940	1940	776	1067
Nonzero obs.	1390	1603	663	927
Zero obs.	550	337	113	140
Wald chi2 (16)	1191.42	1183.03	1152.37	1007.07
Prob > chi2	0.000	0.000	0.000	0.000

Note: Reporter countries are the 20 Arab countries while the partner countries are the 97 countries including the 20 Arab countries. Robust standard errors in parentheses. * significant at 1%; ** significant at 5% and *** significant at 10%.

5. Conclusion and Recommendations

This paper addresses the many drawbacks of previous research concerned with Arab trade integration regarding data and econometric method. First, exports and imports flows are used for the years 1997 and 2008, allowing us to account for the relevance of Arab Trade agreements under study, i.e., GAFTA, AMU, GCC and AGADIR, fairly after their entry into force. Besides, oil trade flows of many Arab countries collected from COMTRADE allowed addressing the problem of trade dependence on oil. Most importantly, the paper is in line with Santos Silva and Tenreyro (2006) and Burger et al. (2009) as it addresses the problem laid by the traditional loglinearized gravity equation in presence of over-dispersion and high frequency of zeroes by estimating the gravity equation in its multiplicative form by using a Zero-Inflated Negative Binomial model.

There are many pieces of evidence resulting from the analysis. First, standard market size and distance are shown to affect trade regarding intuition. Their coefficients are found to be systematically smaller than those commonly obtained using the loglinearized form. Furthermore, common colonizer and border are shown to be trade-enhancing. The outcomes regarding Arab trade agreements are to the least disappointing except for GAFTA. The regression coefficients regarding AMU, GCC and AGADIR dummies estimated using exports or imports flows as dependent variables are oftentimes negative and/or not significant either in the years 1997 or in 2008, proving that these agreements are not effective so far. This is contrary to the results obtained regarding GAFTA dummy's coefficient, which becomes positive and significant in 2008 and even substantial after excluding oil from exports and imports flows. This result contradicts with many previous pessimistic findings but remains below the expectations raised by the launch of GAFTA by Arab countries.

Furthermore, trade complementarity index is found to have a substantial effect on trade only when oil is excluded. Although, higher trade complementarity between AGADIR members were not found to reap benefits from the AGADIR agreement, proving that large exports similarity through Arab countries coupled with low levels of trade complementarity are not the whole story in explaining the failure of these countries in expanding the intraregional share of trade, as stated in

previous empirical research. One key feature underlying this failure is that Arab countries trade with each other less than with many other developed or developing countries particularly towards APEC countries. Moreover, tangible and intangible trade barriers between Arab countries are crucial deterring factors preventing the region from expanding intraregional trade.

These findings suggest that Arab countries could boost intraregional trade first by diversifying exports from oil dominance and secondly by promoting local products in other Arab countries and thus reap effective benefits from proximity and advantages ensured by these different Agreements. Furthermore, efforts have to be undertaken in order to unify visions and efforts regarding the regional integration project, as well as removing the remaining barriers on intraregional trade by developing infrastructure of means of transport and telecommunications in order to foster and facilitate movements of goods, services, labour as well as capital.

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Appendix A: List of countries

Algeria	Egypt, Arab Rep.	Madagascar	Slovenia
Angola	Finland	Malaysia	Somalia
Argentina	France	Malta	South Africa
Australia	Germany	Mauritania	Spain
Austria	Ghana	Mauritius	Sri Lanka
Azerbaijan	Greece	Mexico	Sudan
Bahrain	Guinea	Morocco	Sweden
Bangladesh	Guinea-Bissau	Netherlands	Switzerland
Belarus	Hong Kong SAR, China	New Zealand	Syrian Arab Republic
Belgium	Hungary	Niger	Tanzania
Benin	Iceland	Nigeria	Thailand
Brazil	India	Norway	Togo
Bulgaria	Indonesia	Oman	Tunisia
Cameroon	Iran, Islamic Rep.	Pakistan	Turkey
Canada	Ireland	Peru	Uganda
China	Italy	Philippines	Ukraine
Colombia	Japan	Poland	United Arab Emirates
Comoros	Jordan	Portugal	United Kingdom
Costa Rica	Kazakhstan	Qatar	United States
Cote d'Ivoire	Kenya	Romania	Vietnam
Croatia	Korea, Rep.	Russian Federation	Yemen, Rep.
Cyprus	Kuwait	Saudi Arabia	Zambia
Czech Republic	Lebanon	Senegal	Zimbabwe
Denmark	Libyan Arab Jamahiriya	Singapore	
Djibouti	Lithuania	Slovak Republic	

Appendix B: Trade Complementarity Index for Arab countries

	Algeria	Bahrain	Comoros	Djibouti	Egypt	Iraq	Jordan	Kuwait	Lebanon	Libya	Mauritania	Morocco	Oman	Qatar	Saudi	Somalia	Sudan	Syria	Tunisia	UAE	Yemen	Average	
Algeria			0.46	0.13	0.11	0.15	0.06	0.19	0.05	0.20	0.05	0.22	0.19	0.07	0.03	0.04	0.04	0.08	0.13	0.12	0.12	0.17	0.13
Bahrain	0.14		0.23	0.20	0.27	0.15	0.30	0.16	0.32	0.16	0.32	0.31	0.19	0.15	0.16	0.14	0.18	0.25	0.24	0.23	0.27	0.22	
Comoros	0.51	0.30		0.43	0.51	0.56	0.43	0.41	0.41	0.45	0.42	0.37	0.41	0.35	0.42	0.60	0.44	0.47	0.34	0.38	0.53	0.44	
Djibouti	0.70	0.56	0.65		0.76	0.66	0.69	0.62	0.67	0.63	0.76	0.64	0.62	0.56	0.63	0.58	0.63	0.66	0.61	0.60	0.63	0.64	
Egypt	0.45	0.80	0.39	0.68		0.38	0.65	0.48	0.64	0.47	0.63	0.65	0.48	0.45	0.46	0.42	0.47	0.46	0.57	0.49	0.57	0.53	
Iraq	0.03	0.45	0.05	0.09	0.10		0.17	0.02	0.17	0.04	0.21	0.18	0.04	0.02	0.02	0.03	0.07	0.08	0.11	0.03	0.15	0.10	
Jordan	0.56	0.49	0.54	0.59	0.60	0.56		0.61	0.61	0.56	0.51	0.60	0.55	0.61	0.60	0.51	0.58	0.56	0.65	0.65	0.54	0.57	
Kuwait	0.09	0.51	0.11	0.34	0.20	0.10	0.24		0.23	0.11	0.24	0.24	0.11	0.09	0.08	0.08	0.11	0.33	0.17	0.14	0.27	0.19	
Lebanon	0.69	0.55	0.67	0.74	0.71	0.63	0.71	0.73		0.69	0.54	0.73	0.67	0.70	0.73	0.62	0.70	0.78	0.76	0.75	0.65	0.69	
Libya	0.07	0.49	0.08	0.14	0.15	0.08	0.22	0.07	0.24		0.24	0.23	0.08	0.06	0.07	0.07	0.11	0.13	0.15	0.10	0.20	0.15	
Mauritania	0.32	0.20	0.25	0.25	0.30	0.24	0.28	0.19	0.23	0.29		0.20	0.18	0.17	0.21	0.51	0.19	0.20	0.15	0.18	0.41	0.25	
Morocco	0.71	0.52	0.74	0.73	0.76	0.71	0.72	0.69	0.72	0.68	0.65		0.61	0.64	0.68	0.50	0.66	0.70	0.74	0.67	0.74	0.68	
Oman	0.18	0.61	0.26	0.36	0.27	0.06	0.33	0.18	0.34	0.20	0.37	0.33		0.18	0.18	0.09	0.18	0.19	0.26	0.18	0.27	0.25	
Qatar	0.11	0.52	0.26	0.35	0.21	0.09	0.30	0.11	0.28	0.13	0.26	0.29	0.13		0.11	0.10	0.14	0.36	0.21	0.11	0.30	0.22	
Saudi	0.13	0.53	0.70	0.37	0.21	0.11	0.28	0.12	0.27	0.13	0.26	0.28	0.14	0.11		0.11	0.16	0.38	0.21	0.12	0.33	0.25	
Somalia	0.32	0.16	0.55	0.23	0.37	0.26	0.25	0.22	0.26	0.25	0.20	0.22	0.21	0.16	0.24		0.20	0.31	0.18	0.18	0.31	0.25	
Sudan	0.14	0.58	0.30	0.40	0.29	0.18	0.35	0.13	0.34	0.18	0.22	0.34	0.15	0.11	0.13	0.14		0.16	0.25	0.14	0.31	0.24	
Syria	0.30	0.62	0.30	0.38	0.39	0.29	0.44	0.27	0.45	0.29	0.44	0.43	0.28	0.23	0.28	0.30	0.31		0.33	0.27	0.42	0.35	
Tunisia	0.61	0.56	0.65	0.79	0.68	0.64	0.71	0.67	0.72	0.64	0.62	0.75	0.59	0.65	0.63	0.53	0.67	0.73		0.69	0.74	0.66	
UAE	0.30	0.68	0.32	0.35	0.38	0.45	0.45	0.31	0.45	0.28	0.16	0.51	0.34	0.31	0.31	0.56	0.48	0.40	0.40		0.50	0.40	
Yemen	0.08	0.50	0.18	0.15	0.20	0.10	0.23	0.10	0.25	0.10	0.27	0.23	0.11	0.08	0.08	0.09	0.13	0.18	0.17	0.16		0.17	
Arab Average																						0.35	

Appendix C: Correlation matrix

	Exports 1997	Exports 2008	Imports 1997	Imports 2008	Reporter's GDP 1997	Reporter's GDP 2008	Reporter's GDP per capita 1997	Reporter's GDP per capita 2008	Partner's GDP 1997	Partner's GDP 2008	Partner's GDP per capita 1997	Partner's GDP per capita 2008	BORDER	LANGUAGE	COLONIZER	GAFTA	GCC	UMA	AGADIR	EU	NAFTA	APEC	Trade Complementarity Index 1997	Trade Complementarity Index 2008
Exports 1997	1.00																							
Exports 2008	0.91	1.00																						
Imports 1997	0.64	0.63	1.00																					
Imports 2008	0.51	0.54	0.78	1.00																				
Reporter's GDP 1997 (Ln)	0.16	0.16	0.20	0.21	1.00																			
Reporter's GDP 2008(Ln)	0.15	0.16	0.19	0.21	0.97	1.00																		
Reporter's GDP per capita 1997 (Ln)	0.13	0.14	0.15	0.17	0.53	0.60	1.00																	
Reporter's GDP per capita 2008 (Ln)	0.13	0.14	0.14	0.17	0.55	0.66	0.98	1.00																
Partner's GDP 1997 (Ln)	0.21	0.22	0.35	0.32	-0.01	-0.01	0.00	0.00	1.00															
Partner's GDP 2008 (Ln)	0.19	0.21	0.33	0.32	-0.01	-0.01	-0.01	-0.01	0.97	1.00														
Partner's GDP per capita 1997 (Ln)	0.13	0.12	0.23	0.16	0.00	-0.01	-0.01	-0.01	0.64	0.61	1.00													
Partner's GDP per capita 2008 (Ln)	0.11	0.10	0.20	0.15	-0.01	-0.01	-0.01	-0.01	0.61	0.65	0.96	1.00												
BORDER	0.03	0.02	0.04	0.05	0.06	0.06	0.01	0.02	-0.05	-0.04	-0.03	-0.02	1.00											
LANGUAGE	-0.04	-0.05	-0.05	-0.05	-0.06	-0.07	-0.06	-0.08	-0.34	-0.32	-0.14	-0.15	0.24	1.00										
COLONIZER	-0.03	-0.03	-0.07	-0.05	-0.09	-0.05	-0.03	-0.01	-0.27	-0.28	-0.26	-0.28	0.05	0.25	1.00									
GAFTA	-0.02	-0.02	-0.02	-0.01	0.16	0.17	0.10	0.12	-0.14	-0.10	-0.02	0.01	0.30	0.67	0.09	1.00								
GCC	0.05	0.03	0.07	0.06	0.06	0.08	0.16	0.16	-0.03	0.00	0.11	0.13	0.31	0.21	0.09	0.32	1.00							
UMA	-0.01	-0.01	-0.01	-0.01	0.02	0.01	-0.02	-0.02	-0.04	-0.05	-0.04	-0.04	0.32	0.17	0.13	0.14	-0.01	1.00						
AGADIR	-0.01	-0.01	-0.01	-0.01	0.04	0.02	-0.02	-0.03	-0.02	-0.02	-0.03	-0.04	-0.01	0.13	0.00	0.20	-0.01	0.12	1.00					
EU15	0.06	0.03	0.19	0.14	0.00	0.00	0.00	0.00	0.42	0.39	0.50	0.47	-0.06	-0.19	-0.17	-0.16	-0.05	-0.04	-0.03	1.00				
NAFTA	0.07	0.09	0.16	0.10	0.00	0.00	0.00	0.00	0.30	0.29	0.17	0.15	-0.03	-0.05	-0.08	-0.07	-0.02	-0.02	-0.01	-0.07	1.00			
APEC	0.14	0.18	0.11	0.14	0.00	0.00	0.00	0.00	0.42	0.39	0.18	0.14	-0.07	-0.23	-0.08	-0.18	-0.06	-0.05	-0.04	-0.19	0.39	1.00		
Trade Complementarity Index 1997	-0.04	-0.06	0.00	0.00	-0.06	-0.15	-0.12	-0.19	-0.04	-0.04	-0.09	-0.09	-0.04	0.06	-0.02	-0.01	-0.05	0.00	0.11	-0.03	-0.05	-0.06	1.00	
Trade Complementarity Index 2008	-0.03	-0.04	0.01	0.02	-0.11	-0.18	-0.17	-0.22	-0.02	-0.03	-0.06	-0.07	-0.06	0.06	0.00	-0.02	-0.10	0.01	0.10	0.00	-0.03	-0.03	0.84	
																							1.00	

Exchange Rate Determination in Pakistan: Role of Monetary Fundamentals

Muhammad Arshad Khan¹ and Abdul Qayyum²

This paper examines the role of monetary fundamentals in the determination of Pak-rupee vis-à-vis US-dollar exchange rate using quarterly data over the period 1982Q2-2008Q2. Based on the Johansen (1988) and Johansen-Juselius (1990) cointegration approach there exist one significant cointegration vectors between the exchange rate and the monetary fundamentals. The long-run cointegrating coefficients are generally consistent with the predictions of Frankel's interest rate differential variant of the monetary exchange rate model. The results of the adjustment coefficients suggest that disequilibrium is corrected by changes in exchange rate, relative money and inflation differential in the short-run. To examine the short-run dynamics in a system-wide context we have applied persistence profiles approach and the results indicates that the effect of system-wide shocks initially declines rapidly but decays slowly thereafter and completely dies out after 9 quarters. These results are consistent with non-linear adjustment and monetary factor being the main source of exchange rate volatility

1. Introduction

Exchange rates have attained great prominence in macroeconomic policy discussions since the breakdown of the Bretton Woods system of fixed exchange rate in the early 1970s. Movements in exchange rates may influence macroeconomic fundamentals such as interest rates, prices, wages and unemployment, level of output and investment decisions in the economy. This may result in a macroeconomic

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disequilibrium that would lead to exchange rate devaluation to correct for external imbalances (Parikh and Williams, 1998 and Feridun, 2005). A stable exchange rate may help enterprise and financial institutions in evaluating the performance of investments, financing and hedging and reducing their operational risks (Nieh and Wang, 2005, Rahman and Hossain, 2003 and Khan and Qayyum, 2007).

It can be argued that exchange rate affects the economy through influencing a country's macroeconomic stability and affecting the size of its external sector. Unfortunately, in the past Pakistan's performance is not much impressive on both fronts (Ahmed, 2009). The economy of Pakistan has experienced a number of problems during the Seventies, Eighties and Nineties.³ A prominent feature of these problems was the inappropriate policy measures with respect to the exchange rate. The government of Pakistan pursued a fixed exchange rate policy until December 1981, which in part caused the over-valuation of Pak-rupee and thereby a drastic decline in exports. The fall in exports results a decline in foreign exchange reserves, led to serious economic repercussions⁴. This policy was partly responsible for low productivity level, increased poverty and excessive government intervention in the economy.⁵

In January 1982, the appreciation of the US dollar in international markets forced the government of Pakistan to adopt a managed floating exchange rate regime based on a trade-weighted basket of currencies of Pakistan's major trading partners. The rationale for this switch in

³ Pakistan suffered from external shocks during the 1970s, 1980s and 1990s because of the high external debt burden and debt servicing. Over the period 1978 to 1984 the foreign real interest rate rose sharply over 9%. Since 1984 it has reached on average over 16% annually (Khan, 1996). Furthermore, fixed and highly over-valued exchange rate; large budget deficit; inappropriate monetary expansion, high inflationary pressure, ever increasing debt burden and debt servicing, and price controls posed serious threat to the Pakistan's economy.

⁴ For example, trade gap led to external borrowing, which has reached to over 40% of the GDP in 1996 and expected to grow up to 70% of the GDP by the first decade of the 21st century (Khan, 1996).

⁵ Khan (1986) has noted that during the late 1970s and early 1980s Pakistan suffered from various external shocks that were quite severe. The balance of payments picture was highly uncertain from year to year; increase in the level and variability of inflation and built up of a significant amount of foreign debt. High and increasing debt service ratio resulted in an increasing drain on foreign exchange resources as well as imposing constraints to the macroeconomic policymakers. These shocks adversely affect the stability of exchange rate and hitting the economy to a large extent.

exchange rate regime was that the trade share-weighted float would be responsive to the changing trade flows among major trading partners and bilateral currency fluctuations. The managed floating exchange rate was expected to induce a greater geographical and commodity diversification of exports. But since the implementation of managed float regime, output and balance of payments have experienced wide fluctuations and inflation has been consistently high.⁶

To contain balance of payments deficit, the government constantly relied on the policy of devaluation and rupee had continuously lost its value against major foreign currencies.⁷ The persistent loss in the strength of Pak-rupee vis-à-vis other currencies may cause balance of payments crisis because of depletion in foreign exchange reserves and forcing the authorities to intervene in the foreign exchange markets to stabilize the domestic currency. As a result, the private sector capital continuously outflows (Bhatti, 2001). In a highly integrated world the direction of exchange rate changes on macroeconomy is rather complex and requires a detailed analysis.

In order for analyzing the role of fundamental factors involved in determining exchange rate, many models and their modifications have been proposed.⁸ However, the monetary model of exchange rate determination emerges as the dominant theoretical paradigm in

⁶ As Akhtar and Malik (2000) noted that during 1980 to 1995, the 5-year average share of 4 major trading partners of Pakistan including USA, UK, Japan, and Germany, has remained in the narrow range of 31-39 per cent. These countries accounted for an average 53-68 percent of total trade deficit of Pakistan during the same period. They further stated that export commodity diversification remains weak; textile yarn and its manufactures dominate and constitute 72 to 85 percent of total exports to each of the four countries during 1990-1995.

⁷ The rupee lost its value by nearly 500 percent from Rs. 9.9/\$ in 1982 to almost Rs. 60/\$ and exports has not risen a fraction as much. Devaluation increased the cost of rupee conversion. For example, in 1995/6 external debts servicing grew by 0.5% in US dollar terms, the total interest and principal payments increased by 15.5% in rupee terms. Since 1997/8 debts servicing was lowered by 8% and the rupee costs were higher by 17.2% on account of a weaker rupee (Zaidi, 2006). From 1993-2000, furnace oil price rose by 292% due to devaluation, high imported prices increased domestic, oil, petroleum and electricity prices, and due to dollarization, the rupee further depreciated consistently (Ibid, 2006, p. 181). It is also to be noted that cumulative real depreciation of the Pak-rupee during 1982-96 ranged from 47% vis-à-vis US-dollar to 65% vis-à-vis Japanese-Yen. Moreover, Pakistan trades with UK, Germany, and Japan in terms of their respective currencies rather than dollar.

⁸ There is wide variety of exchange rate models, including purchasing power parity (PPP), traditional flow, monetary and portfolio balance models of exchange rates.

exchange rate studies since the demise of the fixed exchange rate regime since early 1970 (Neely and Sarno, 2002 and Schroder and Dornau, 2002). In the 1970s and early 1980s, the monetary approach dominated the literature on exchange rate determination.⁹ The monetary approach to exchange rates hypothesizes that the nominal exchange rate is determined solely by contemporaneous supplies of money between the two trading nations. Countries that follow relatively expansionary monetary policies usually face a depreciation of their currencies and countries that follow relatively restrictive monetary policies experiencing an appreciation of their currencies. The theory, therefore, predicts a proportional relationship between exchange rates and relative money supplies of trading nations over a long period of time. This makes the monetary model of exchange rate an attractive theoretical as well as empirical tool for understanding the fluctuations in exchange rates over time. It also provides a long-run benchmark for the nominal exchange between two currencies and sets the criterion for determining whether a currency is overvalued or undervalued (Rapach and Wohar, 2002). Thus, the monetary approach to exchange rate determination has far-reaching implications for the conduct of monetary and exchange rate policies. Since exchange rate management is at the centre of many financial stabilization plans and monetary approach provides theoretical basis for the external adjustment policy. It also plays a role in the choice between money supply, exchange rate and inflation targeting in the design of the monetary policy.

Despite the simplicity and theoretical appeal, there is inconclusive evidence regarding the monetary approach to exchange rate determination. Monetary approach is silent on the issue regarding the process of convergence towards the long-run equilibrium. Recently many researchers emphasize to measure the speed of adjustment towards long-run equilibrium (Coakley and Fuertes, 2000). The slow speed of adjustment and a very high volatility of exchange rate in the short-run are central to the exchange rate misalignment. The consensus suggests a speed of reversion of about 15 percent per annum, equivalent to half-lives of around 3 to 5 years (Boyd and Smith, 1999 and Engle and Morley, 2001). The root cause of slow speed of adjustment is that the

⁹ The reviews of this literature can be found in McDonald (1988) and McDonald and Taylor (1992).

nominal exchange rate does converge at a much slower rate than that of monetary fundamentals. Much of the existing literature on exchange rate dynamics have employed orthogonalized impulse response functions to measure the impact of shocks to individual variables. However, one major drawback of this approach is that the impulse functions are not uniquely identified (Coakley and Fuertes, 2000). Pesaran and Shin (1996) proposes the persistent profiles approach to measure the system-wide shocks rather than individual variable shocks. This approach focuses on analysis of the effect of system-wide shocks on equilibrium relations within a cointegration framework.¹⁰ Unlike the standard approach, it does not require any exogeneity property of the variables involved in the monetary approach and provides information on the shape of the whole adjustment path (Helg and Serati, 2000).

A large body of literature concerning the empirical validity of the monetary exchange rate models has been accumulated. The earlier comprehensive survey of the studies carried out during the 1970s and 1980s can be found in Levich (1985), Frenkel and Mussa (1985), MacDonald (1988), and Isard (1988), while the most current survey is provided by MacDonald and Taylor (1992, 1995). These surveys provide inconclusive evidence regarding the validity of the monetary approach to exchange rate determination despite its theoretical appeal. For example, Meese and Rogoff (1983) demonstrated that, at short horizons, random walk forecast of the exchange rate generally outperforms alternative models drawn from economic theory, including purchasing power parity (PPP), uncovered interest parity (UIP) and simple version of the monetary and portfolio balance models of exchange rates (Faust *et al.*, 2003). However, a number of studies provide evidence for the long-run validity of the monetary model as well as its out-of sample forecasting performance for a number of key currencies (MacDonald and Taylor, 1991, 1993, 1994, Chinn and Meese, 1995, Mark, 1995, MacDonald and Marsh, 1997, Kouretas, 1997, Diamandis *et al.*, 1998, Groen, 2000, 2002, Mark and Sul, 2001 and Rapach and Wohar, 2001, among others). Recent findings of Groen (2000, 2002) and Mark and Sul (2001) again revive hope in the ability of monetary fundamentals to track nominal exchange rates.

¹⁰ For further detail see Pesaran and Shin (1998).

The empirical literature on exchange rate determination that deals with the developing countries is relatively sparse because most of the existing monetary exchange rate models have been mainly tested for industrialized countries. The application of the monetary approach to exchange rate determination in the context of developing countries include Odedokun (1997) for sub-Saharan Africa, Lyons (1992) and Edward (1983) for Peru, Fry (1978) for Afghanistan, Chinn (1998) for East Asian Countries, Kletzer and Kohli (2000) for India and Yunus (2001) for five South Asian Countries and Khan (2007) for Pakistan. This is partly due to the fact that developing countries left the exchange rate determination to the market forces until recently.¹¹ Restrictions on capital mobility and domestic financial transactions in developing countries create a very different economic environment for exchange rate determination as well as dynamics for testing the generalized monetary approach to exchange rates. An empirical test of such models in countries with binding restrictions on international capital flows and underdeveloped and repressed financial sector can help to understand the role of monetary and exchange rate policies in the developing world (Kletzer and Kohli, 2000). These studies suggest that the major determinants of the level of exchange rate include money supply, national income, interest rates, inflation, trade balance and fiscal deficit.¹²

The behaviour of exchange rate and its responses to nominal and real shocks as a part of macroeconomic adjustment process has great relevant for policymakers in Pakistan, which has recently shifted to a market-based exchange rate regime. Pakistan opted for a managed floating exchange rate system in January 1982. In July 2000, the exchange rate policy shifted from a managed float to free flexible exchange rate.¹³ Besides changes in exchange rate regime, trade and financial sector liberalization and loosening of restriction on capital inflows during the past one and half decades have reduced many

¹¹ Although forty developing countries have adopted an independently floating exchange rate regime since the beginning of the 1980s

¹² Hooper and Mortan (1982) extend the basic monetary model by incorporating trade balance and fiscal deficit as an arguments.

¹³ Adjustment to parity is made through the movements in domestic price level in a fixed exchange rate regime, while in the case of managed floating exchange rate, parity reversion take place through the movements in exchange rates (Froot and Rogoff, 1995).

distortions.¹⁴ These structural changes may force the nominal exchange rate to converge towards the long-run equilibrium path. It is therefore interesting to examine the behaviour of monetary fundamentals in the process of exchange rate determination in Pakistan.

The empirical evidence associated to Pakistan on this issue is still sparse (Haque and Montiel, 1992, Chisti and Hasan, 1993, Afridi, 1995, Siddiqui *et al.*, 1996 and Zakaria *et al.*, 2007). These studies mainly focused on the determination of real exchange rate following the model developed by Edwards (1988). Most of these studies concentrated on the external fundamentals, such as terms of trade, ratio of remittances and official transfer to GDP. On the other hand, the studies conducted (for example, Chishti and Hasan, 1993; Bhatti, 1996, 2000; Liew *et al.*, 2004; Tang and Butiong, 1994; Yunus, 2000, Ahmed and Khan, 2002 and Qayyum *et al.*, 2004, Khan and Qayyum 2007, 2008) have tested nominal exchange rate determination focusing only on the PPP hypothesis or some of its variants. In Pakistan, the majority of studies focused either on the real exchange rate determination or testing the PPP hypothesis. These studies failed to examine short-run dynamics of exchange rate, which provide important information about the speed of adjustment towards the long-run equilibrium path. Despite a strong need of examining the role of monetary fundamentals in the determination of exchange rate, no comprehensive study so far has been carried out on this important and challenging issue in Pakistan. Furthermore, no serious efforts have been made to measure the speed of adjustment in the system-wide context in Pakistan. The present study attempts to fill the gap.

Given the paramount importance of exchange rate dynamics in the macroeconomic adjustment process, this paper seeks the answer of the following questions:

¹⁴ Since 1991, foreign exchange controls have been gradually liberalized. Individual and firms resident in Pakistan were allowed to hold foreign currency bank accounts and freely move the currency into and out of the country. Companies with foreign direct investment (FDI) were allowed to remit profits and capital without any prior approval of the State Bank of Pakistan. In 1994, the rupee becomes fully convertible on current account transaction. Elimination of Hundi/Hawala system, establishment of inter-bank market and adoption of free floating exchange rate policy since July, 2000, among others.

- (1) How well does the monetary fundamental explain fluctuations in nominal exchange rate in Pakistan?
- (2) At what speed nominal exchange rate converge to its long-run equilibrium level?

The rest of the paper is organized as follows: Section 2 outlines theoretical model, persistence profiles approach in cointegration framework and data. The interpretation of empirical findings is given in section 3, while some concluding remarks are given in the final section.

2 Theoretical Model, Methodology and Data

2.1 Theoretical model

The monetary model of exchange rates is an extension of the quantity theory of money demand (Diamandis *et al.*, 2000). The monetary exchange rate model postulates that exchange rates are determined by the demand for and supply of money across countries. The basic contention of the monetary approach is that the monetary policy is an important determinant of the behaviour of exchange rate. The central feature of the monetary exchange rate model is that it combines the purchasing power parity (PPP) theory with the quantity theory of money. Theoretical literature suggest that the long-run equilibrium relationship of the exchange rate is determined by the relative money supply, relative real income, interest rate differential and inflation differential. Following Nieh (2005), the conventional monetary model of exchange rate can be expressed by the following equation.

$$s_t = \beta_0 + \beta_1(m_t - m_t^*) - \beta_2(y_t - y_t^*) + \beta_3(i_t - i_t^*) + \beta_4(\pi_t - \pi_t^*) + u_t$$

$$\beta_1 > 0, \beta_4 > 0, \beta_2 < 0, \beta_3 > 0 \quad (1)$$

Where s_t indicates the nominal exchange rate. m_t , y_t , i_t and π_t are respectively, money supply, real income, nominal interest rate and inflation rate, while u_t is the error term. Asterisk indicates the corresponding foreign variables. Except for the interest rate and inflation rate, all the variables are transformed with natural logarithms. These

variables are often referred to as exchange rate fundamentals and these fundamentals may predict and explain the behaviour of exchange rate. The monetary exchange rates model hypothesizes the increase in domestic money supply will reduce the relative purchasing power of the Pak-rupee and thus push the Pak-rupee toward depreciation. Moreover, the greater the economic growth of Pakistan, the more products needed by Pakistani people. This accelerates the demand for domestic currency. In an attempt to decrease the real money balances, domestic residents will decrease their expenditures in order to increase their real money balances. This will reduce the price level until money market equilibrium is achieved. Then via PPP channel, an appreciation of the domestic currency will ensure that equilibrium is restored (Hallwood and MacDonald, 1994).¹⁵ An increase in domestic interest rate relative to global levels, leads to depreciation of domestic currency by creating excess money supply. Because high interest rate decreases the amount of money demand, making the domestic currency relatively abundant.¹⁶ Hence β_3 should be positive according to monetarist (Hallwood and MacDonald, 1994). However, Dornbusch (1976) and Frankel (1979) predict that when the domestic interest rates are higher than the global levels, foreign investors will invest more in the domestic financial market. This increases capital inflow and will tend to appreciate the domestic currency. Hence β_3 should be negative.¹⁷ The increase in both interest rate and exchange rate may refer as “Double Rise of Domestic Currency”. Finally, an increase in the expected inflation results, an agents switching from domestic currency to bonds and physical assets. Thus the demand for money decreases causing a depreciation of domestic currency. Hence the coefficient of the inflation rate differential (i.e. β_4) is expected to be positive.

¹⁵ The prediction of negative coefficient for relative income is opposite to what the Mundel-Fleming approach predicts. In the Mundel-Fleming model, a higher real income will increase imports; this will worsen the trade balance and will require a depreciation of the domestic currency in order to restore equilibrium. On the other hand, when interest rates of Pakistan are higher than the global levels,

¹⁶ This is in contrast to the Keynesian model with perfect capital mobility, in which a higher interest rate differential causes capital inflows, which appreciates the domestic currency.

¹⁷ β_3 takes positive or negative value, is an empirical question and testable hypothesis.

2.2 Persistence Profiles and Short-Run Dynamics

To analyze the short-run dynamics of equilibrium relations, consider the following m -dimensional unrestricted VAR(L) model:

$$x_t = \sum_{i=1}^L \Phi_i x_{t-i} + c_0 + c_1 t + u_t \quad t = 1, 2, \dots, T \quad (2)$$

where x_t is an $m \times 1$ vector of jointly determined variables, c_0 and c_1 are $m \times 1$ vectors of unknown coefficients, $\Phi_i (i = 1, 2, \dots, L)$ are unknown $m \times m$ matrices of autoregressive parameters and u_t is unobserved vector of shocks satisfying the assumptions $E(u_t) = 0$, $E(u_t u_t') = \Sigma \forall t$, $E(u_t u_{t-j}') = 0 \forall j \neq 0$, with Σ an $m \times m$ constant positive-definite matrix. The system in equation (2) can be reparameterized in vector error-correction (VEC) form as:

$$\begin{aligned} \Delta x_t &= \sum_{i=1}^{L-1} \Gamma_i \Delta x_{t-i} - \Pi x_{t-1} + c_0 + c_1 t + u_t \quad t = 1, 2, \dots, T \\ \Pi &= I_m - \sum_{i=1}^L \Phi_i \quad \Gamma_i = - \sum_{j=i+1}^L \Phi_j \quad i = 1, 2, \dots, L-1 \end{aligned} \quad (3)$$

Assuming x_t to be first difference stationary, if $\text{rank}(\Pi) = \rho < m$, the $m \times m$ matrix Π can be expressed as $\Pi = \alpha \beta'$ where α and β are $m \times \rho$ matrices of full column rank. In this context β is the cointegrating matrix and $z_t = \beta' x_t$ is an $\rho \times 1$ long-run equilibrium vector representing ρ cointegrating relations.

To analyze the response of the equilibrium relations z_t to particular shock, one can use simple adaptation of the orthogonalized impulse response approach based on the Cholesky decomposition of the covariance matrix of innovations ($\Sigma = TT'$). However, this approach is sensitive to the ordering of the variables in the cointegrating VAR and to the choice of the matrix T . Alternatively, one can use the variance-based persistence profiles approach due to Pesaran and Shin (1996) which measure the effect of system-wide shocks on the equilibrium

relations. The main features of these time profiles are that they are uniquely identified since their estimation does not require prior orthogonalization of the vector of shocks.¹⁸

Pesaran and Shin (1996) proposed the following unscaled measure of persistence profiles to examine the effect of system-wide shocks on cointegrating relations:

$$H_z(n) \equiv V(z_{t+n} | I_{t-1}) - V(z_{t+n-1} | I_{t-1}) \quad n = 0, 1, 2, \dots \quad (4)$$

where $V(z_{t+n} | I_{t-1})$ is the variance of z_{t+n} conditional on the information set I_{t-1} . In the context of equation (3) this is given by

$$H_z(n) \equiv \beta' B_n \sum B_n' \beta \quad n = 0, 1, 2, \dots \quad (5)$$

where $B_j = \sum_{i=0}^j A_i$ ($j = 0, 1, 2, \dots$) and A_j are the $m \times m$ coefficient matrices of the $MA(\infty)$ representation of Δx_t . The matrices B_j satisfy the following recursive relation with the matrices Φ_j of the $VAR(L)$ model:

$B_j = \Phi_1 B_{j-1} + \Phi_2 B_{j-2} + \dots + \Phi_L B_{j-L}$ for $j = 1, 2, \dots, \infty$ with $B_0 = I_m$ and $B_j = 0$ for $j < 0$. The diagonal elements of the matrix $H_z(n)$ are the system-wide impulse responses of the cointegrating relations $z_t = \beta' x_t$. The persistence profiles of the j th cointegrating relation $z_j = \beta' x_t$ is then given by

$$h_{zj(n)} = \frac{H_{zj(n)}}{H_{zj(0)}} = \frac{\beta_j' B_n \sum B_n' \beta_j}{\beta_j' \sum \beta_j} \quad n = 0, 1, 2, \dots \quad (6)$$

which by construction has unit value at the time of impact when $n = 0$. It should tend to zero as $n \rightarrow \infty$ if β_j' is indeed a cointegrating vector. Pesaran and Shin show that the maximum likelihood estimates of these

¹⁸ For further detail see Coakley and Fuertes (2000).

persistence profiles are $\sqrt{T}$ consistent with a limiting normal distribution.

The persistence profile can be given different interpretations. First, the unscaled persistent profiles can be regarded as the variance of the reversion in the n -step-ahead forecast of z_t , i.e. $H_z(n) = V(v_{t+n})$, where $v_{t+n} = E(z_{t+n} | I_t) - E(z_{t+n} | I_{t-1})$. When the system has just one cointegrating vector, β' , there is formal correspondence between the persistence profiles and the impulse response function of the cointegrating relation. The persistence profile approach can be applied to analyze the short-run dynamics of the monetary model of exchange rate in the wake of a shock. We formulate a VEC model as in equation (3) with $x_t = [s_t, (m_t - m_t^*), (y_t - y_t^*), (i_t - i_t^*), (\pi_t - \pi_t^*)]'$ to investigate the exchange rate dynamics.

Quarterly data over the period 1982Q2 to 2008Q2 is used for the analysis. Quarterly data on GDP for Pakistan is not available. We use Goldstien and Khan (1976) methodology to generate quarterly observations for GDP. Data on money supply (M2 definition), call money rate, federal fund rate, consumer price index and GDP for Pakistan and United States is retrieved from International Financial Statistics CD-ROM (2008).

3. Empirical Analysis of the Monetary Model of Exchange Rate

3.1 The Unit Root Test

To examine the time series properties of the data we employ Augmented Dickey Fuller (ADF) unit root test on the series in both levels and first differences. To capture the effects of seasonality, seasonal dummies (D) have been included in the ADF test. Table 1 reports the unit root results.

Table 1: Results of Unit Root Test

Series	C + D		C	
	Log-level	Log-difference	Log-level	Log-difference
s_t	-1.413 (1)	-9.071 (0)*	-1.675 (0)	-8.808 (0)*
$(m - m^*)_t$	-1.867 (4)	-5.627 (1)*	-1.605 (2)	-5.385 (1)*
$(y - y^*)_t$	-1.671 (1)	-7.924 (0)*	-1.613 (1)	-7.507 (0)*
$(i - i^*)_t$	-2.790 (1)	-13.39 (0)*	-2.631 (1)	-13.16 (0)*
$(\pi - \pi^*)_t$	-2.875 (3)	-11.140 (2)*	-3.360 (3)*	-7.703 (3)*
Critical Values	5% (-2.89)		1% (-3.49)	

indicate significance at the 5 percent level. Number in brackets shows lag length. C and D stands for constant and seasonal dummies respectively.

It is evident from Table 1 that all the series are non-stationary in their log-levels and stationary in their first log-differences. Thus we conclude that $X_t = [s_t, (m_t - m_t^*), (y_t - y_t^*), (i_t - i_t^*), (\pi_t - \pi_t^*)] \sim I(1)$.

3.2 Cointegration Analysis

Since all the variables entered in the monetary exchange rate model are integrated to order $I(1)$, it is possible to test for the existence of cointegration between the exchange rate, relative money supply, relative real output, interest rate differential and inflation differential.

The Johansen (1988) and Johansen and Juselius (1990) procedure is applied to estimate the vector autoregression (VAR) model containing five dimensional vectors $X_t = [s_t, (m_t - m_t^*), (y_t - y_t^*), (i_t - i_t^*), (\pi_t - \pi_t^*)]$ and to determine the cointegrating rank ρ . The VAR model is specified with initially 6 lags and sequentially tested down using general-to-specific methodology. The final lag length is selected when the estimated VAR passes all the diagnostic checks and the whitened of the

residuals. Based on this criterion we select 3 lags for VAR.¹⁹ We select a VAR model with constant to enter unrestrictedly following the procedure developed by Johansen (1992). We do not include a linear trend in the model because the inclusion of a linear trend could be viewed as a weaker form of the long-run monetary model (see for example, Rapach and Wohar, 2002).

The diagnostic checks in the form of vector statistics reported in Table 2 suggest that the residuals are white noise. However, normality is rejected.²⁰ This implies that VAR model is satisfactorily a close approximation to the actual data generating process.

Table 2: Vector Test Statistics

Series: $s_t, (m_t - m_t^*), (y_t - y_t^*), (i_t - i_t^*), (\pi_t - \pi_t^*)$		
	Test Statistic	p-value
Vector Portmanteau (12)	272.086	-
Vector AR 1-5 test: F (125,300)	1.2539	0.061
Vector Normality test: χ^2 (10)	64.932	0.000
Vector hetero test: F (450,650)	0.932	0.791

Note: Misspecification tests are against the alternative hypothesis – residual autocorrelation (AR), Skewness and Kurtosis (normality), ARCH and heteroscedasticity (Hetero). Hendry (1995) provides a description of these tests.

The model constancy test statistics are obtained by recursive estimation of the VAR model. For each of the equations, one-step ahead residuals $\pm 2SE$ in the first five parts of

¹⁹ We also introduced two intervention dummies D98 and D00 for nuclear tests and free floating exchange rate regime respectively. Our preliminary results suggest that all the dummies remain insignificant. Therefore, we left out these dummies variables from the model.

²⁰ Cheung and Lai (1993) and Gonzola (1994) have demonstrated the robustness of the Johansen procedure to non-normality.

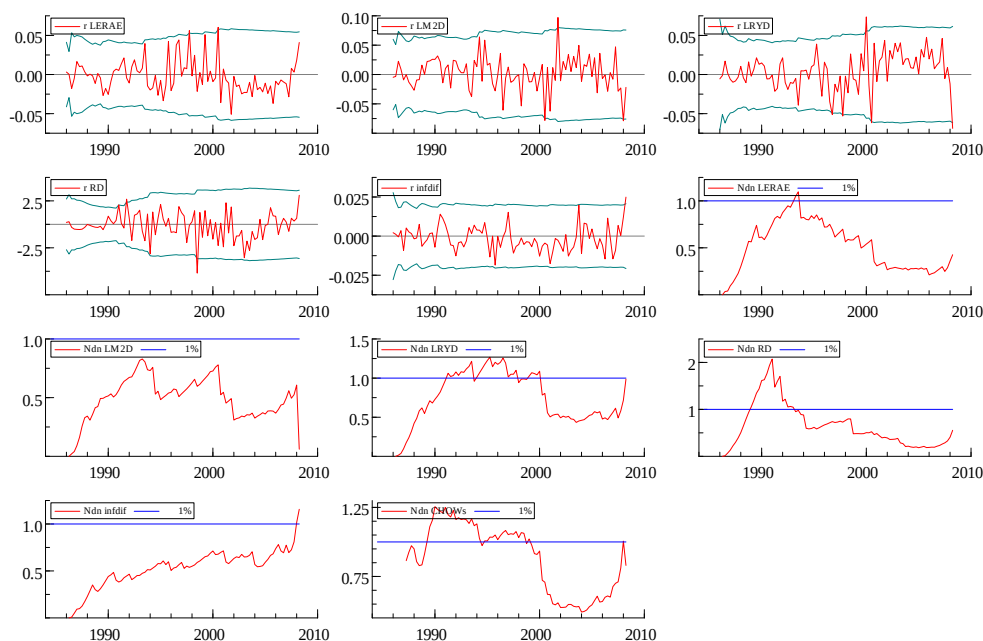
Figure 1: Parameter Constancy Test

Figure 1 and Chow breakpoints are shown in the second five parts, while Ndn Chows are shown in the last part of the Figure. These Chow statistics are scaled by their critical values at the 1 percent level. As can be seen from the Figure, the Chow test does not reject the hypothesis of parameter stability for exchange rate equation. It implies that the estimated parameters of the VAR model are constant.

The results presented in Table 3 (panel A) reveals that there is cointegration relationship between exchange rate and monetary fundamentals because the null hypothesis of no cointegration is rejected using either maximum eigenvalues (λ -Max) or trace (λ -Trace) statistics. Both tests favours the existence of cointegration between exchange rate, relative monies, relative real income, interest rate differential and the inflation differential with cointegrating rank is 2 based on trace test and one based on maximum eigenvalue test.

Table 3: Cointegration Tests of the Monetary Exchange Rate Model**Series:** s_t , $m_t - m_t^*$, $y_t - y_t^*$, $i_t - i_t^*$, $\pi_t - \pi_t^*$

Panel A: Cointegration Test					
Null Hypothesis	$\rho = 0$	$\rho \leq 1$	$\rho \leq 2$	$\rho \leq 3$	$\rho \leq 4$
Maximum Alternative	$\rho = 1$	$\rho = 2$	$\rho = 3$	$\rho = 4$	$\rho = 5$
λ -Trace	80.48 (0.005)*	47.87 (0.048)**	24.44 (0.188)	9.97 (0.288)	0.29 (0.592)
λ -Max	32.61 (0.067)***	23.43 (0.159)	14.47 (0.341)	8.68 (0.239)	0.29 (0.592)
Panel B: Standardize Eigenvector (Beta Matrix)					
	Vector 1	Vector 2	Vector 3	Vector 4	Vector 5
s_t	1.000	-0.116	0.700	-405.46	0.047
$m_t - m_t^*$	-0.415	1.000	-1.019	-54.080	0.053
$y_t - y_t^*$	1.761	-2.364	1.000	-785.93	0.041
$i_t - i_t^*$	0.007	-0.270	0.004	1.000	0.001
$\pi_t - \pi_t^*$	-27.635	-1.150	12.800	-691.14	1.000
Panel C: Standardized Adjustment Coefficient (Alpha Matrix)					
	Vector 1	Vector 2	Vector 3	Vector 4	Vector 5
s_t	-0.048	-0.009	-0.034	-4.0999e-005	-0.014
$m_t - m_t^*$	0.049	-0.001	0.091	1.31316e-005	-0.013
$y_t - y_t^*$	0.031	0.015	0.029	8.7239e-005	-0.002
$i_t - i_t^*$	0.025	1.00	1.129	-0.006	-0.398
$\pi_t - \pi_t^*$	0.020	-0.002	-0.011	-2.2243e-005	-0.004

Note: Values in brackets are the probability; taken from Mackinnon-Haug-Michelis (1999). *, ** and indicates significant at the 1%, 5% and 10% level of significance.

The normalized long-run cointegrating vectors reported in Table 3 (Panel B). Given the finite sample problems associated with the Johansen trace test, the rank restriction $\rho=1$ is imposed. The first cointegrating vector reveals that cointegrating coefficients of relative money supplies, relative real income, interest rate differential and inflation differential are correctly signed as predicted by Frankel's interest rate differential variant of the monetary exchange rate model. The adjustment coefficients which indicate the average speed of adjustment towards the long-run equilibrium, corresponding to the cointegrating vectors are shown in Table 3 (panel C). The zero restrictions on the speed of adjustment coefficients determine the weak exogeneity of the variables in the system. Testing for weak exogeneity of the variables entered in the first cointegrating vector is conducted by using likelihood ratio (LR) test, and the results are reported in Table 4.

Table 4: Exogeneity Tests

$\chi^2(2)$	s_t	$m_t - m_t^*$	$y_t - y_t^*$	$i_t - i_t^*$	$\pi_t - \pi_t^*$
LR	6.1213[0.013]	4.5011[0.034]	2.1314[0.144]	0.0403[0.841]	8.213[0.004]

Note: LR= likelihood ratio test. Figures in [.] are the p-values.

It is evident from Table 4 that relative real income and interest rate differential are weakly exogenous while exchange rate, relative monies and inflation differential are not weakly exogenous and has significant feedback coefficients in the nominal exchange rate, relative money supplies and inflation differential equations. This suggests that nominal exchange rate, relative money supplies and inflation differential play an important role in the adjustment process to achieve long-run equilibrium.

The normalized the first cointegrating vector on nominal exchange rate. Equation (8) reports cointegrating coefficients along with standard errors.

$$s_t = 0.42(m_t - m_t^*) - 1.76(y_t - y_t^*) - 0.07(i_t - i_t^*) + 27.64(\pi_t - \pi_t^*) \quad (8)$$

s.e (0.26) (0.18) (0.02) (6.09)

The adjustment coefficients along with the standard errors in parenthesis are:

$$\begin{array}{lll} \Delta s_t = -0.05 & \Delta(m_t - m_t^*) = 0.05 & \Delta(y_t - y_t^*) = 0.03 \\ (0.01) & (0.02) & (0.03) \\ \Delta(i_t - i_t^*) = -0.25 & \Delta(\pi_t - \pi_t^*) = 0.02 & \\ (0.91) & (0.005) & \end{array}$$

As can be seen from the results reported in equation (8), the exchange rate is determined by the relative money supply, relative real income, interest rate differential and inflation differential. All the coefficients are consistent with the predictions of interest rate differential variant of monetary exchange rate model. The positive coefficient of relative money supply suggests that a one percent increase in the domestic money supply relative to foreign money results in 0.42 percent increase in the nominal exchange rate, thus depreciating the Pak-rupee. This disproportional depreciation of domestic currency may interpret as an evidence of currency substitution. This result confirms the earlier findings by Khan (2008). The income elasticity with respect to nominal exchange rate is in accordance with the predicted responses in the monetary model of exchange rate. This empirical evidence verifies the predictions that an increase in domestic real income relative to foreign real income increases demand for real money balances leading to a monetary contraction. Consequently, a fall in the price level appreciates nominal exchange rate. The coefficient of the relative income is equal to -1.76 which is quite consistent with the evidence for other developing countries. For example, Odedokun (1997) estimates the elasticity of domestic-foreign elasticity of income for a panel of sub-Saharan economies to be above -2.00 and Edward (1983) estimates it to be -2.9 for Peru. Chinn's estimates (1998) of income elasticity for the East Asian economies lie between 1.00-3.00. Kletzer (2000) estimated the relative income elasticity, which is less than -0.50 for India. Khan (2008) obtains the elasticity of exchange rate with respect to relative real income equal to 1.48 for Pakistan.

The semi-elasticity of exchange rate with respect to interest rate is negative and significant; indicating that a rise in the domestic interest rate relative to foreign interest rate induces exchange rate appreciation

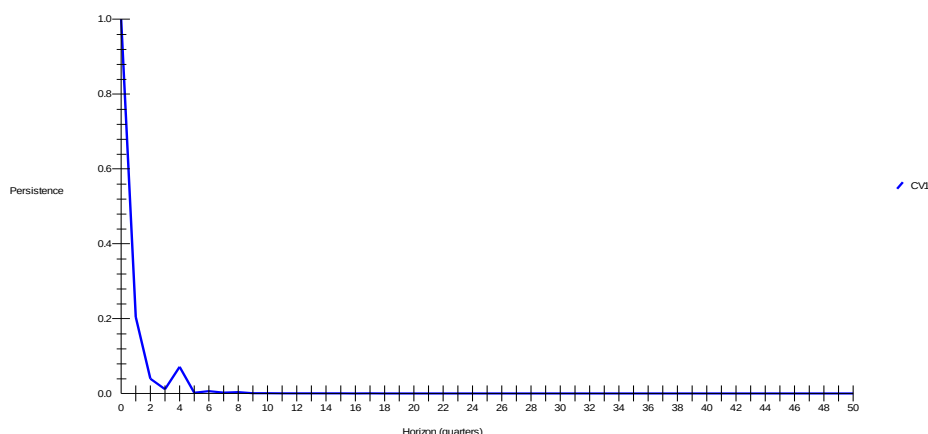
via capital inflows. However, the size of the coefficient is relatively small. This result verifies the earlier findings obtained by Bhatti (2001) for the case of Pak-rupee vis-à-vis US dollar. The coefficient of the inflation differential is positive and significant implies that an increase in domestic inflation relative to foreign inflation induces exchange rate depreciation via the deviation from the purchasing power parity.

The adjustment coefficients indicate that how fast the exchange rate and the monetary fundamentals are adjusted towards long-run equilibrium. The results suggest that the nominal exchange rate, relative money supply and inflation differential has significant feedback coefficients and restores the long-run equilibrium. However, feedback coefficient of exchange rate possesses expected negative sign only. The feedback coefficient associated to exchange rate (Δs) suggests that around 5 percent of the deviations are eliminated by changes in exchange rate per quarter. This implies that the response of exchange rate is much weaker, while real income differential and interest rate differential play no role in the adjustment process in the short-run.

Persistence Profiles

The persistence profiles for the monetary exchange rate model are computed from the maximum likelihood estimates of the restricted VEC model. Figure 2 present these profiles.

Figure 2: Estimates of the Persistence Profiles for the Monetary Exchange Rate Model



The value of persistence profile is unity on impact, but should tends to zero as time horizon (T) $\rightarrow \infty$. The persistence profile can be viewed as a function of T which provides information on the speed with which the effects of system-wide shocks on the cointegration relations disappears. The persistence profiles of the monetary exchange rate model shown in Figure 2, tends to zero as time horizon grows. These profiles provide an important insight into the dynamic response of the system to disequilibria (Yazgan, 2003). The persistence profile presented in Figure 2 indicates that due to system-wide shock initially nominal exchange rate depreciates sharply. After second quarter the depreciation of exchange rate is relatively slow. It appreciates from third-fourth quarters. Again it depreciates and completely dies out after ninth quarter. The possible explanation of this inverted J-shaped persistence profile would be due to the price stickiness, asymmetric information, less developed domestic markets and productivity differential across countries. Another reason for this slow speed of adjustment may be the J-effect characterizing the adjustment path of the current account in the presence of monetary shocks (Rogoff, 1996). Since the system-wide shocks is rapidly eroded that provides indirect evidence of monetary factor as a main source of exchange rate volatility which is consistent with monetary model of exchange rate determination.

5. Conclusions and policy implications

This paper examines the role of monetary fundamentals in the determination of Pak-rupee vis-à-vis US-dollar exchange rate over the period 1982Q2-2008Q2 using multivariate cointegration technique. The results are broadly consistent with the predictions of the Frankel's interest rate differential variants of the monetary exchange rate model. The adjustment coefficient is equal to -0.05 suggests that about 5% of the deviations are corrected to bring back the exchange rate at its long-run equilibrium level. Furthermore, short-run exchange rate dynamics are analyzed using persistence profiles approach of Lee and Pesaran (1993) and Pesaran and Shin (1996). The results indicate that the effect of system-wide shocks on nominal exchange rate is not permanent. Due to system-wide shock initially exchange rate depreciates sharply and after second quarter it appreciates. It again depreciates after fourth quarter and completely dies out after ninth quarter. This pattern of adjustment may be due to the non-linearities in the exchange rate

adjustment process, asymmetric information, less developed domestic markets and productivity differential across countries. Moreover, our results provide indirect evidence of non-linearities in exchange rate adjustment and monetary factor as main source of exchange rate volatility.

The most important policy implication derived from these results is that the monetary fundamentals would be so important in determining the exchange rate in Pakistan. Hence, the monetary authorities may use monetary fundamentals as stabilization tools for the prediction of Pak-rupee exchange rate. Furthermore, non-linearities in exchange rate are important in the short-run adjustment process. Therefore, non-linearities in exchange rate should be considered at the time of policy formulation.

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Linking Sustainable Livelihoods to Natural Resources and Governance in OIC Countries: Prospects and Challenges

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This article investigates natural resource endowment and good governance, and the extent to which these two variables impact sustainable livelihoods in the Organisation of Islamic Conference (OIC) member countries. This study draws heavily from secondary data. The findings revealed that countries having better scores in good governance performed better in more than one of the selected livelihood indicators. Performances in the selected indicators for sustainable livelihoods and good governance vary markedly among the countries, which underscores the need to intensify the existing collaboration. The study has proposed a collaboration model that is all-inclusive seeking to enhance development collaboration among the OIC countries.

1. Introduction

Undoubtedly, the OIC member countries are endowed with natural resources prominent of which are oil resources. It is not an overstatement that these countries constitute the cream of the Muslim World with respect to their total population and the available stock of resources. Therefore, it will not be misplaced expectations that these resources should engender appreciable level of social and economic development in the OIC member countries. Although contestable, that the prevailing level of socio-economic development in the majority of

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the OIC countries can best be described as dismal is a fact; especially in scaling up livelihood opportunities for the poor. The pace of development expected to bring about the much desired improvements in poverty reduction or livelihoods sustainability has not been encouraging in many of these countries. This paper, therefore, examines the inherent challenges, the realities and to explore a workable mechanism that will improve livelihoods through effective natural resource utilization and good governance in the OIC member countries.

Good governance is an essential factor in ensuring sustainable social and economic development. Good governance is conventionally interpreted as synonymous with sound development management. A myriad of factors contribute to sound development management. Of great importance is for the state to pursue well-orchestrated development policies devoid of any defects, inefficiencies and corruption. Being able to check to the barest minimum or completely stamp out corruption and inefficiencies will go a long way to improving livelihoods as this will allow programmes and projects to successfully reach their targets.

It is no secret that many of the OIC member countries are among the least-developed nations of the world, while paradoxically, many of these countries are the world's leading oil-producers. Again, many OIC member countries are unlikely to meet the targets enshrined in the Millennium Development Goals, especially reducing abject poverty and chronic hunger. What factors are responsible for this unfortunate scenario and what then needs to be done? What responsibilities should the better-off member countries, especially the richer, oil-producing countries, assume to prevent the less fortunate members from sinking further with human poverty and deprivations? Should that come in a form of intensifying collaboration among these countries or by simply giving development aids (or development hand-outs literally) to the less developed member countries? The main objective of this paper is to address these questions. The paper is organized as follows: The first section is an introduction that gives an overview of the study; The linkages among sustainable livelihoods, natural resources and governance are examined in the second section; Prospects of scaling up livelihoods in the OIC countries are examined in the third section; Section four assesses the challenges to scaling up livelihoods in the OIC countries; Research methodology is discussed in the fifth section; Results are presented in section six; The seventh section discusses the

results; Collaboration model is presented in the section 8, while section 9 concludes, and gives policy recommendations.

2. Sustainable Livelihoods, Natural Resources and Governance in the Development Literature

How is the phrase ‘sustainable livelihoods’ explained in the development literature? In its rudimentary sense, livelihood refers to living or existence. An individual’s livelihood concerns his/her life, existence or living. Therefore, his/her ability to meet continually (and into the foreseeable future) the day-to-day needs of existence can be termed as sustainable livelihood. In its broader sense, sustainable livelihoods, according to the Stockholm Environment Institute (SEI), refer to the creation of conditions that promote not only sustainable development in human, natural and economic systems, but also safeguarding resources and opportunities for future generations. The International Institute for Sustainable Development (IISD) conceived of sustainable livelihood as being ‘concerned with people’s capacities to generate and maintain their means of living, enhance their well-being, and that of future generations’ (Singh & Titi, 1994).

Widening the scope of sustainable livelihoods further above basic needs, Chambers and Conway (1991) sustainable livelihoods as consisting of people’s capabilities including their means of living such as food, income and assets. Linking sustainable livelihoods to the environment, Chambers and Conway (1991) observed that ‘a livelihood is sustainable (both environmentally and socially) when it can cope with and recover from stresses and shocks, and maintain or enhance its capabilities and assets both now and in the future, while not undermining the natural resources base.’

Finally but importantly, United Nations Development Programme (UNDP) defined sustainable livelihoods as livelihoods which ‘provide meaningful work that fulfils the social, economic, cultural and spiritual needs of all members of a community—human, non-human, present and future—and safeguard cultural and biological diversity.’ From the definitions of sustainable livelihoods given above, it is obvious that reliable sources of income and access to public and social goods and services are crucial determinants of livelihoods sustainability.

Undoubtedly, economic growth is essential to livelihoods sustainability. However, the role of natural resources in socio-economic development has generated heated debate in the development literature, that is, whether natural resources play any significant role in the socio-economic development of nations. The proponents of the 'so-called resource-curse' argue that resource-rich countries are more likely to perform worse on various social and economic indicators than resource-poor countries (Pegg, 2006, p. 337)—regard as insignificant the role of natural resources in socio-economic development of nations. Incidentally, a study conducted by the World Bank on the role of mining in economic development seems to corroborate the stance of the resource-curse group. The World Bank used three different categories of mining countries labeled as 'dominant', 'critical' and 'relevant'—which refer to countries in which mining products constitute more than 50% of all exports; between 15 -50% and between 6-15% of all exports respectively, the study found negative per capita GDP growth in the three groups of mining countries from 1990 to 1999(Weber-Fahr, 2002, p. 7 cited in Pegg, 2006, p. 377).

However, the finding showed an inverse relationship between dependence on incomes from mining and economic growth. In other words, the more a country depends on mining exports, the worse its per capita GDP performance. Thus, the 'dominant' mining countries (more than 50% of all exports) showed -2.3% per capita GDP growth rate per annum; the 'critical' (between 15-50% of exports) had -1.1%, whereas the 'relevant' mining countries (between 6-15% of all exports) posted -0.7% per capita GDP growth rate per annum (Ibid). Nevertheless, Pegg (2006) did not agree totally with the 'resource-curse' argument and cited Botswana (diamonds) and Chile (copper) as clear examples of the possibility of mineral resources to sustain social and economic development (p. 337). Similarly, Ruddle and Rondinelli (1983) noted that it became more apparent during the past decade that closer attention must be paid to preserving and renewing bio-physical systems and to transforming resources for human development. Both resources and patterns of living must be transformed to meet the needs of the human population [especially] in developing countries during the rest of this century.

Unfortunately, the awareness on the need to transform natural resources for human development is yet to be translated into action to meet the

development goals, especially livelihoods sustainability, in most countries. There is, therefore, the growing need in recent times to devise efficient mechanisms to better transform natural resources for human development. Such mechanisms, as conventional wisdom would require, should aim at creating a win-win environment in which economic growth with social equity is achieved within a sustained natural resources base.

Realizing the positive effects of natural resource utilization on socio-economic development of any nation in question is largely explained by the existing 'technology, capital, resource endowment [and] the socio-cultural (particularly the administrative and political) environment' (Ibid). Thus, the inability to attain the set objectives of transforming natural resources for socio-economic development can largely be blamed upon institutional and administrative lapses.

In their seminal work, Ruddle and Rondinelli (1983) argued that to achieve any results in efforts to transform natural resources for human development, then governments would have to better understand the existing environmental and resource conditions. Insufficient or lack of knowledge about the conditions and elements of environmental resources hinders achieving the objectives of transforming environmental resources for human development. This, one may argue, has formed part of the predicament in the majority of the OIC member countries. Buttressing this argument in a study, Ruddle and Rondinelli (1983) have concurred that 'there are significant gaps in our understanding of natural systems. Of the estimated 5 to 10 million plant and animal species in the world, for example, only about 1.6 million have been named; a much smaller number can be said to be known completely'. Therefore, effective and efficient resource utilization requires improvement of institutions and agencies in collecting, analyzing and the use of information about the 'immediate and long-run impacts of development policies and programmes on the resource systems and environments, especially on marginal areas within developing nations' (Ibid). It also requires mobilizing, budgeting and allocating financial resources for transformational programmes that develop human potential; especially in the marginal areas.

2.1 Good Governance

The need to reconcile natural resource system with the social system to facilitate transforming natural resources for human development, as alluded to in the preceding section, boils down to governance and of course good governance. The importance of good governance in the overall development of a nation can be fathomed and better gauged by first, understanding what governance means in the development literature. According to UNDP ‘governance is the exercise of economic, political, and administrative authority to manage a country’s affairs at all levels. It comprises mechanisms, processes, and institutions through which citizens and groups articulate their interests, exercise their legal rights, meet their legal obligations, and mediate their differences’.¹ The World Bank construes good governance as ‘epitomized by predictable, open and enlightened policy making (that is, transparent processes); a bureaucracy imbued with a professional ethos; an executive arm of government accountable for its actions; and a strong civil society participating in public affairs; and all behaving under the rule of law’.²

Against this backdrop, this paper works around the understanding of good governance generally as sound and comprehensive development management of a nation, especially livelihoods sustainability. Political instability, corruptions, institutional weaknesses, etc, most often associated with bad and poor governance will cease to exist under good governance. Corrupt practices lay the solid foundation for bad governance, as development policies and programmes may go little beyond the drawing board.

Development targets, for instance sustainable livelihood programmes, may remain far from being achieved due to rampant corruption, as resources earmarked for poverty reduction and sustainable livelihoods programmes will be diverted for personal and parochial motives. Invariably, countries that fiercely fight corruption in its totality, both at the public and private levels, are believed conventionally to be steadily making headway in development and *vice versa*. Therefore, in assessing the role of good governance, the paper dwells heavily on perceptions on public sector corruption in the selected OIC member countries by drawing heavily from the corruption perceptions index developed by Transparency International (2007 and 2009).

3. The Prospects of Scaling up Livelihoods in the OIC Countries

The OIC member countries are abundantly endowed with mineral resources, particularly oil resources. For instance, the first 5 of the world's largest oil-reserve countries are OIC member countries; namely Saudi Arabia, Iraq, Kuwait, Iran and the United Arab Emirates.³ With the exception of Venezuela (Angola and Ecuador joined in November, 2007), all the Organization of Petroleum Producing Countries (OPEC) members are OIC countries. Such is the magnitude of oil wealth in the OIC countries.

In this regard, the OIC member countries could adopt appropriate institutional arrangements and technologies to effectively transform the existing natural resources for human development, particularly to enhance and unleash the potentials of the poor people. The importance to tailor-suit natural resource utilization for the poor majority has been highlighted in a study by USAID. It argued that the ability of a government to manage environmental resources effectively is likely to depend in large measure on its abilities to reach the poor majority because their activities relate to environmental and natural resource problems (USAID, 1979, p. 20 cited in Ruddle and Rodenelli, 1983).

It has also long been favoured in line with the principle of 'equity and basic needs' that much attention be paid to the factors that facilitate poor people's access to the resource system; most especially in the marginal areas. In short, there is the need to reconcile natural resource system with the social system to facilitate transforming natural resources for human development. This has been the importance of natural resources in socio-economic development if tactfully utilized. To a large extent, livelihood assets can be enhanced by the available stocks of natural resources. For instance, in the Sustainable Livelihoods Frameworks put forward by UK's Department for International Development (DFID, 1999) and International Fund for Agricultural Development (IFAD, 2002), the poor are surrounded by those assets deemed capable of improving their lives and lifting them entirely out of poverty.

These resources include: (a) *Natural Capital or Assets*; for instance, land, water, forest, wildlife, biodiversity, etc. The terms 'asset' and 'capital' are roughly interchangeable in this framework, except that the term 'capital' emphasizes the concept of potential investment or

depletion (Parkinson and Ramirez, nd, p. 3); (b) *Human Assets*; examples include strength, good health, information, skills, ability, capabilities, traditional and local knowledge; (c) *Physical Assets*; examples include infrastructure, roads, water, electricity supply, schools, etc; (d) *Financial Assets*; examples are cash, savings, credit, cattle, jewellery, etc; and (e) *Social Assets* such as family, relatives, non-governmental organizations (NGOs), community-based organizations (CBOs), institutional support, etc.

A cursory look at these categories of assets reveals some degree of interconnectedness among them. Therefore, it seems to suggest that much success can be achieved when one or two of these 5 asset categories are successfully managed, particularly the natural assets. Coupled with governance (identified as one of the *direct influencing factors*) , the above listed assets are crucial ingredients in attaining livelihood outcomes such as improvements in well-being, health, incomes, happiness, knowledge, sustainable natural resources base, etc.

4. Some Challenges to Scaling up Livelihoods in the OIC Countries

Globalization has its pros and cons. On the positive side, globalization has successfully bridged spatial distances that hitherto held countries and continents apart. Boundaries have now been transformed beyond easy recognition. In unprecedented agglomerations, economies and businesses are fast growing, as knowledge and expertise are readily available to be tapped. On the negative side, the sweeping waves underlying the changes accompanying global forces have appeared far too strong for certain economies and likewise for certain groups of individuals and businesses even in the stronger economies. This scenario poses a daunting development challenge to the developing economies of the OIC fraternity.

Specifically, the major challenge has been the prevailing incidence of poverty and deprivation in the majority of these countries. With particular reference to poverty eradication, Ali (2006)⁴ noted that the incidence of poverty had decreased in many Islamic Development Bank (IDB) member countries.⁵ However, the trends of poverty and other social indicators in some member countries raised a cause for alarm. What has been more worrisome, according to Ali, is that 'there are pockets of extreme poverty in the depressed areas of even those

[OIC/IDB] member countries who are posting robust economic growth.’ On the Millennium Development Goals, thirteen member countries are unlikely to achieve the target of halving the number of people living below \$1 a day by 2015.

Furthermore and with particular reference to the 2007 UNDP’s Human Development Index (HDI), there was no OIC member country among countries occupying the first quartile of the index, that is, 0.900 to 1.00. In the second quartile, that is, from 0.800 to 0.900, there were only 10 OIC member countries. Brunei came first with a score of 0.894 and was placed 30th in the world rankings. Not all, among the least Human Developed Countries, 11 are OIC member countries (Wikimedia, 2007). The importance of this index cannot be underestimated as it has been computed on such important human development indicators as literacy/education, life expectancy and standard of living measured by standards such as income inequality, poverty rate, real (i.e. inflation adjusted) and income per person. This scenario calls for effective collaboration that will create a win-win for both the weaker and the stronger economies in which the development needs of the weaker OIC economies will have little adverse impact on the stronger ones. The need for such collaboration underscores the relevance of the model that has been proposed in this paper.

Capacity-building in the struggling OIC member economies is crucial to tackling most of their development obstacles. For instance, to confront effectively the numerous obstacles and constraints to sustainable livelihoods and good governance squarely would require the strengthening of administrative and institutional capacities: first, within the individual economies and second, among the OIC fraternity. This includes training of personnel engaged in administering development programmes and projects. Meeting these development needs can have debilitating impact on their resources when left to a few of the better off member countries.

Against this backdrop, the development collaboration model (**DeCOM**) seeks to put forward a framework that will assist the OIC countries to pull resources and expertise in a comparative kind of advantage to build a strong, synergic front to commensurate the daunting task posed by the deteriorating livelihood conditions underpinning the general socio-

economic underdevelopment in the majority of the selected OIC countries.

5. Research Methodology

This is a cross-country case study that draws data largely from secondary sources to compare and contrast performances in sustainable livelihood and good governance in the selected OIC member countries, segregating the oil-producing countries from the non-oil-producing countries. Again, these countries have been divided into 3 regions: namely, African OIC Member Countries (AFMC); Middle East and Central Asian Member Countries (MECAMC), and East Asia, Pacific and South American Member Countries (EAPSAMC).

Due to data inconsistencies in some of the countries, a convenience sampling technique has been used to select countries that have maintained some consistency in their livelihood data. Sustainable livelihood, which is the dependent variable, is measured using the following indicators: (1) Poverty rate, that is, percentage of the population subsisting below \$1 a day; (2) Literacy rate; (3) Water supply, that is, percentage of the population having access to good drinking water; and (4) Rate of undernourishment, that is, percentage of malnourished people.

The selected indicators measuring the dependent variable—sustainable livelihoods—are generally categorized into two: (1) *Income poverty* measured by poverty headcount at \$1 a day and (2) *Human/Assets poverty* measured by access rates of water supply, literacy and nutrition.

The independent variables are: (1) Natural resource endowments; by categorizing the countries into oil and non-oil-producers, and (2) Good governance, by using the perception index on public sector corruption developed by Transparency International (2007 and 2009). The scores range from 0 to 1, whereby 0 means highly corrupt public sector, while 1 means least corrupt or highly clean public sector. Using 2007 and 2009 corruption indices has shown the changes (either improvement or deterioration) in each country's performance in good governance over that time frame. Although there are many equally important measures of good governance, widespread corruption, the authors believe, is more likely to hamper sustainable livelihoods programmes. Also, statistical

estimations have been undertaken using descriptive statistics, independent samples t-test and Pearson's correlation to ascertain the extent to which performances in the selected indicators may vary among the OIC countries and to test for associations among the variable.

The development collaboration octagon model (*DeCOM*) used in this study has sought to measure the performance in numeric terms (on a scale of 0 to 100) of the sampled OIC member countries in all the selected sustainable livelihood variables and good governance. A composite index is developed by calculating the average score for each country by using the following formula:

$$SLPI = \frac{\Sigma (100-x) + L/R + W/S + (100-Und) + GG}{5}$$

Where $(100-x)$ represents the percentage of the non-poor, meaning total population (100) minus percentage of the poor population (x); L/R represents performance in literacy out of 100%; W/S represents score in water supply out of 100%; $(100-Und)$ means score in nourishment, i.e., total population (100) minus percentage of the undernourished population (Und), and finally GG represents score in good governance (from 0 to 1). This means that sustainable livelihoods performance index (SLPI) for a country is a function of the country's average score in the selected variables (See appendix for the details).

6. Results

6.1 Statistical Estimations on the Selected Indicators of Livelihoods Sustainability and Good Governance

The statistical estimations are based on descriptive statistics, independent samples t-test and Pearson's correlation. The estimations are performed on regional basis seeking to facilitate appraising sustainable livelihood performance across the regions.

6.2 African OIC Member Countries

In terms of individual countries, income poverty figures show single-digit headcounts in all the oil-producing countries except in Cameroon, Nigeria and Chad. Ironically, the incidence of income poverty in Nigeria

is higher than all the selected non-oil-producing counterparts in this region. This interesting scenario requires separate scrutiny. Unfortunately, it is not within the scope of this article. As regards human poverty, the oil-producing countries (excluding Chad) appear to be faring quite better compared to the non-oil-producing countries. Literacy rates are quite encouraging in all the oil-producing countries (except in Chad). Likewise, access to water supply is high except in Nigeria and Chad. Performances in nutrition are better in the majority of the oil-producing countries, where single digits of malnutrition or undernourishment can be found. However, scores in good governance are below average in all the selected countries of this region (Table 1).

6.3 Middle East and Central Asian OIC member countries

This region can best be described as the ‘power house’ of the OIC fraternity taking into account the performances in the selected indicator. Scores by the individual countries in all the selected indicators of sustainable livelihoods and good governance are remarkable, not excluding the non-oil-producing countries. With reference to good governance, the majority of countries posting the best scores in the corruption perceptions index are found in this region. Qatar has improved her score tremendously to 7.0 in 2009, down from 6.0 in 2007. Thus, making Qatar the country with the highest score among the 40 OIC member countries selected in this article. United Arab Emirates (UAE) has also scored better and Bahrain has maintained above-average scores (See Table 2). Oman is the fourth oil-producing country in this region that has managed to score above average in 2009, down from 4.7 in 2007.

Table 1: Selected Indicators of livelihoods Sustainability and Good Governance in the African OIC Member Countries

Oil-Producing OIC Countries	Oil-proved Reserves (bbl) as of 2007 (000'000)	Income Poverty Headcount Y (%) (%)	Human Poverty L/R, W/S, U/ment (%) (%)		Good Governance--Corruption Index (2007) (2009)	
Algeria	14,680	'95(2)	92.5	85	3.0	2.8
Cameroon	95	n/a	4		2.4	2.2
Chad ^a	1,500	'96(32.5)	n/a	70	1.8	1.6
Cote d'Ivoire	250	'01(17.1)	26		2.1	2.1
Egypt	3,750	n/a	37.6	48	2.9	2.8
Libya	45,000	n/a	35		2.5	2.5
Morocco	100	'95(12.3)	60.7	81	3.5	3.3
Nigeria	37,250	'02(14.8)	13		2.2	2.5
Sudan	6,490	'95(2.6)	86.2	98	1.8	1.5
Tunisia	1,700	'00(3.1)	4		4.2	4.2
		n/a	98.9	71		
		n/a	2.5			
		'91(2)	75.1	83		
		'99(2)	6			
		'96(77.9)	86.7	47		
		'03(70.8)	9			
		n/a	77.2	78		
		n/a	26			
		'95(2)	95.7	94		
		'00(2)	2.5			
Non-Oil-Producing OIC Countries						
Burkina Faso		'98(44.9)	39.3	72	2.9	3.6
Gambia		'03(27.2)	15		2.3	2.9
Mali		n/a	n/a	86	2.7	2.8
Niger		n/a	29		2.6	2.9
Senegal		n/a	29.3	60	3.6	3.0
Uganda		n/a	29		2.8	2.5
		'95(60.6)	39	42		
		n/a	32			
		'95(24)	51.3	77		
		'03(22.3)	20			
		n/a	86.3	64		
		n/a	19			

Note: bbl denotes billion barrels. Y (%) denotes year & percentage of population below \$1 a day, *Source:* World Development Indicators database, World Bank via Nationmaster.com. ^a Chad started oil exploration in 2003. n/a= data not available. L/R (%) mean literacy rate, W/S (%) mean water supply, U/ment (%) mean undernourishment. *Source:* UN, MDGs Export, 2008 via Nationmaster.com. Figures taken are the most recent. *Transparency International* for corruption perceptions data; a score of 10 means highly clean, while score of 0 means highly corrupt.

Table 2: Selected Livelihoods Sustainability and Good Governance Indicators in the Middle East and Central Asian OIC Member Countries

Oil-Producing OIC Countries	Oil-proved Reserves (bbl) as of 2007 (000,000)	Income Poverty Headcount		Human Poverty L/R, W/S, U/ment			Good Governance Corruption Index	
		Y (%)	Y (%)	(%)	(%)	(%)	(2007)	(2009)
Albania	198.1	'97(2)	'04(2)	99.4	97	6	2.9	3.2
Azerbaijan	7,000	'95(10.9)		99.9	78	7	2.1	2.3
Bahrain	118.6	'01(3.7)		99.8	n/a	n/a	5.0	5.1
Iran	138,400	n/a	n/a	97.4	94	4	2.5	1.8
Kazakhstan	9,000	'94(2)	'98(2)	99.8	96	6	2.1	2.7
Kuwait	101,500	'96(2)	'03(2)	99.9	n/a	5	4.3	4.1
Kyrgyzstan	40	n/a	n/a	99.6	89	4	2.1	1.9
Oman	4,850	'96(20.3)		98.4	82	n/a	4.7	5.5
Qatar	15,200	'03(2)		97.6	100	n/a	6.0	7.0
Saudi Arabia	264,300	n/a	n/a	97	n/a	4	3.4	4.3
Turkey	300	n/a	n/a	96.4	97	3	4.1	4.4
U. A. E	97,800	n/a	n/a	97.7	100	2.5	5.7	6.5
Uzbekistan	594	'94(2.4)		99.3	88	25	1.7	1.7
Yemen	3,580	'03(3.4)		80.4	66	38	2.5	2.1
		n/a	n/a					
		'93(3.3)	'03(2)					
		'92(3.4)						
		'98(15.7)						
Non-Oil-Producing OIC Countries								
Lebanon		n/a	n/a	n/a	100	3	3.0	2.5
Jordan		'97(2)		99.1	88	6	4.7	5.0
		'03(2)						

Note: bbl denotes billion barrels. Y (%) denotes year & percentage of population below \$1 a day, *Source:* World Development Indicators database, World Bank via Nationmaster.com. ^a Chad started oil exploration in 2003. n/a= data not available. L/R (%) mean literacy rate, W/S (%) mean water supply, U/ment (%) mean undernourishment. *Source:* UN, MDGs Export, 2008 via Nationmaster.com. Figures taken are the most recent. *Transparency International* for corruption perceptions data; a score of 10 means highly clean, while score of 0 means highly corrupt.

6.4 East Asia, the Pacific and South American OIC Member Countries

With the exception of Bangladesh and Pakistan, all the remaining countries, including the non-oil-producing countries, in this region have maintained single-digit income poverty headcounts as at 2002. Likewise the performances of all the countries in the selected indicators of human poverty have been encouraging, except the relatively weak performances of Bangladesh and Pakistan in nutrition (i.e., higher rates of undernourishment). Scores in good governance show that all but Brunei has scored below average in the corruption perceptions index in 2009 (see table 3).

Table 3: Selected Livelihoods Sustainability and Good Governance Indicators in East Asia, the Pacific and South American OIC Member Countries

Oil-Producing OIC Countries	Oil-proved Reserves (bbl) as of 2007 (000,000)	Income Poverty Headcount		Human Poverty L/R, W/S, U/ment (%) (%) (%)			Good Governance Corruption Index	
		Y (%)	Y (%)	(%)	(%)	(%)	(2007)	(2009)
Bangladesh	28	'96(28.6)	'00(41.3)	72.1	80	30	2.0	2.4
Brunei	1,350	n/a	n/a	99.6	n/a	4	n/a	5.5
Indonesia	4,430	'96(14.1)	'02(7.5)	98.9	80	6	2.3	2.8
Malaysia	3,000	'97(1)	'04(0.6) ^b	98.3	99	3	5.1	4.5
Pakistan	376	'99(13.5)	'02(17)	70	90	24	2.4	2.4
Suriname	111	n/a	n/a	95.2	92	8	3.5	3.7
Non-Oil-Producing OIC Countries								
Guyana		'93(8.1)	'99(2)	n/a	93	8	2.6	2.6
Maldives		n/a	n/a	98.2	83	10	3.3	2.5

Note: bbl denotes billion barrels. Y (%) denotes year & percentage of population below \$1 a day, Source: World Development Indicators database, World Bank via Nationmaster.com. ^a Chad started oil exploration in 2003. n/a= data not available. L/R (%) mean literacy rate, W/S (%) mean water supply, U/ment (%) mean undernourishment. Source: UN, MDGs Export, 2008 via Nationmaster.com.

Figures taken are the most recent. *Transparency International* for corruption perceptions data; a score of 10 means highly clean, while score of 0 means highly corrupt. ^b= these figures were obtained from p. 6 of the Malaysia's Household Income Survey in the UNDP's *and Monitoring Poverty and Income*.

7. Discussion

The authors have realized that performances in livelihoods sustainability and good governance differ within and across the regions. Across the regions, the highest score by AFMC collectively is in water supply ($M=72.3$), while scores in literacy ($M=97.4$; $M=90.3$) are the highest in MECAMC and EAPSAMC respectively. However, good governance has attracted the least scores in all the three regions (Table 4). To determine the variations in scores between the oil-producing and non-oil-producing countries, the study hypothesizes that there will be differences in performance between oil-producing countries and non-oil-producing countries.

The results of running an Independent Samples t-Test revealed a statistically significant mean difference $t(35) = 2.853$, $p < .01$ in assets/human poverty between oil-producing countries ($M=60.3$, $SD=7.2$) and non-oil-producing countries ($M=52.1$, $SD= 9.4$). However, there is no significant difference $t(22) = -.864$, $p > .05$ in income poverty between oil-producing countries ($M=11.3$, $SD =18.4$) and non-oil-producing countries ($M=18.8$, $SD= 21.1$). This is true because some of the oil-producing countries are posting large poverty headcount figures, e.g. Nigeria, Yemen, Bangladesh, Pakistan, Chad, Cameroon etc, as in many of the non-oil-producing countries. Also, there is no significant difference $t(37) = .922$, $p > .05$ in good governance between the oil-producing countries ($M=3.3$, $SD =1.5$) and non-oil-producing countries ($M=3$, $SD= 0.7$). See table 4 & 5 for details.

The authors have also predicted that there will be a correlation between good governance and livelihoods sustainability. In other words, countries with better scores in good governance will perform better in more than one of the selected livelihood indicators. Except for income poverty, the results of running Pearson's r showed positive correlations ($r = .330$, $p < .05$) between good governance and all the indicators of assets/human poverty—Literacy; ($r = .399$, $p < .01$) water supply and ($r = -.482$, $p < .01$) malnourishment (see table 6).

Table 4: Group Statistics on Equality of Performance in the Selected Indicators

	Natural Resources	N	Mean	Std. Deviation
Livelihoods Sustainability (Income Poverty)	Oil-producing OIC member countries	17	11.3706	18.43962
	Non-Oil-producing OIC member countries	7	18.8286	21.15961
Livelihoods Sustainability (Assets/Human Poverty--Total)	Oil-producing OIC member countries	26	60.3808	7.29481
	Non-Oil-producing OIC member countries	11	52.1900	9.48288
Good Governance	Oil-producing OIC member countries	28	3.3893	1.51103
	Non-Oil-producing OIC member countries	11	2.9455	.78149

Table 5: Independent Samples Test for Equality of Performance in the Selected Indicators

		Levene's Test for Equality of Variances		t-test for Equality of Means		
		F	Sig.	T	Df	Sig. (2-tailed)
Livelihoods Sustainability (Income Poverty)	Equal variances assumed	.261	.615	-.864	22	.397
	Equal variances not assumed			-.814	9.973	.435
Livelihoods Sustainability (Assets/ Human Poverty- Total)	Equal variances assumed	1.747	.195	2.853	35	.007
	Equal variances not assumed			2.562	15.252	.021
Good Governance	Equal variances assumed	7.751	.008	.922	37	.363
	Equal variances not assumed			1.199	33.879	.239

Table 6: Correlation Matrix between the Selected Indicators of Livelihoods Sustainability and Good Governance

		LS-InP	LS-AHp-Lt	LS-AHp-Ws	LS-AHp-Malnt	GdGv
LS-InP	Pearson Correlation	1	-.569**	-.804**	.538**	-.054
	Sig. (1-tailed)		.004	.000	.003	.402
	N	24	21	24	24	24
LS-AHp-Lt	Pearson Correlation	-.569**	1	.649**	-.703**	.330*
	Sig. (1-tailed)	.004		.000	.000	.025
	N	21	36	32	33	36
LS-AHp-Ws	Pearson Correlation	-.804**	.649**	1	-.625**	.399**
	Sig. (1-tailed)	.000	.000		.000	.008
	N	24	32	36	34	36
LS-AHp-Malnt	Pearson Correlation	.538**	-.703**	-.625**	1	-.482**
	Sig. (1-tailed)	.003	.000	.000		.001
	N	24	33	34	37	37
GdGv	Pearson Correlation	-.054	.330*	.399**	-.482**	1
	Sig. (1-tailed)	.402	.025	.008	.001	
	N	24	36	36	37	40

** . Correlation is significant at the 0.01 level (1-tailed).

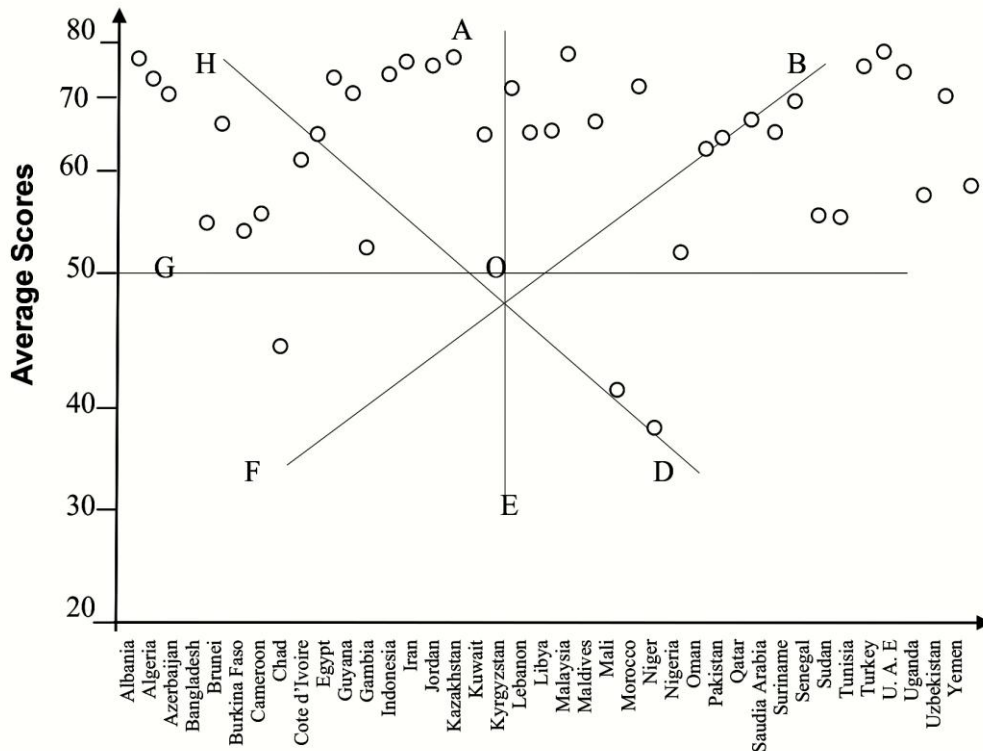
* . Correlation is significant at the 0.05 level (1-tailed).

GdGv = Good Governance; LS-AHp-Malnt = Livelihoods Sustainability (Assets/human Poverty-Malnourishment); LS-AHp-Ws = Livelihoods Sustainability (Assets/human Poverty--Water Supply); LS-AHp-Lt = Livelihoods Sustainability (Assets/human Poverty--Literacy); LS-InP = Livelihoods Sustainability (Income Poverty).

8. Development Collaboration Octagon Model (*DeCOM*)

Performance in scaling up livelihoods varies markedly among the OIC countries. Sustainable livelihood performance index, which has been calculated by the authors (see appendix), reflects the differences in actual performances in livelihoods sustainability among the selected countries (see figure 1).

Figure 1: Sustainable Livelihoods Performance Index for the Selected OIC Countries



In that light, effective collaboration that may galvanise productive resources, administrative and technical expertise to support sustainable livelihood efforts in these countries must adopt a multi-dimensional pattern. The octagonal pattern reflects horizontal, vertical and lateral collaborations in the generation and utilization of sustainable livelihood resources within the individual and across the OIC countries. As endowments in the much needed livelihood resources and performance in good governance vary greatly among these countries, the ability to manage livelihoods sustainably also may vary among them. This underscores the need for win-win collaboration. In a real life scenario, most multilateral collaborations appear heavily skewed to unleash great impact as far as the huge number of poor countries is concerned. For instance, if collaboration for sustainable livelihoods and good governance ensues among countries within each of the four zones or

regions, that is, AOB; BOC; AOH and GOH , such pattern of multi-lateral collaboration will appear to be highly skewed, thereby excluding the other four below-average zones housing the least-developed member countries. These below-average zones include: GOF; EOF; DOE and COD even though there are no countries in some of the zones, possibly because we did not include all the OIC countries in this current study. Similarly, if collaboration develops horizontally among the COG countries, it is most likely that such pattern of collaboration may not have any wider impact in the OIC fraternity as these countries appear to have barely an above-average capability and the needed resources to ensure meaningful poverty reduction and sustainable livelihoods.

Nevertheless, a pattern of collaboration that seems to mirror in the least, the medium and the better-off countries in our case may assume either vertical or lateral dimensions, that is: AOE; BOF and DOH. Such patterns of collaboration have the potential to yield great impact as the least-developed countries are paired with the medium and the relatively developed countries. However, this kind of collaboration may still need other essential features to unleash greater and wider impact. It is to help minimise these pitfalls characterising most conventional multi-lateral development collaborations as discussed above, that the ***Development Collaboration Octagon Model (DeCOM)*** has been proposed. It seeks to capture the horizontal, vertical and the lateral patterns of conventional collaborations. The octagonal collaboration should involve countries along A, B, C, D, E, F, G and H reflecting vertical, lateral or diagonal and horizontal dimensions in a group. Qualitatively ranked, each group of eight OIC member countries will then include the following countries:

- 1=Excellent ability to manage livelihoods (relative standards);
- 2=Very Good ability;
- 3=Good ability;
- 4=Average ability;
- 5=Fair ability;
- 6= Poor ability;
- 7=Very poor ability; and
- 8=Failed or zero ability.

OIC member countries such as Somalia, Sierra Leone (often described as the “dead” or “failed” economies) will fall within the ‘failed or zero

ability' zone. Also war-ravaged member countries like Iraq, Afghanistan & Pakistan cannot be ignored in these noble efforts to scale up member countries' ability to reduce poverty and improve livelihoods within and across the OIC fraternity. Such failed, non-performing and war-stricken economies should be incorporated into the mainstream of the development collaboration. The development needs of the so-called "dead economies" would be far from being met if they are paired with similar, like-manner or medium-level member countries.

In reality and as golden rule of this concept, a group should have at least 8 other member countries in a comparative advantage kind of engagement that reliably and mutually reflects resource endowments (i.e., natural resources & human resources like technical, scientific expertise, etc), utilization needs and, of course, poverty reduction and sustainable livelihoods aspirations of member countries. Starting with 8 countries will serve as a buffer should some countries fall out along the way.

9. Conclusion

This paper has been designed to investigate sustainable livelihoods *vis-à-vis* natural resource endowments (particularly oil resources) and good governance in the selected OIC member countries. A total of 40 member countries have been selected. The paper has found that livelihoods sustainability (measured by income and human poverty) differs significantly among the OIC countries, particularly between oil-producing and the non-oil-producing countries. Performances have been encouraging in the majority of the oil-producing countries. However, a small number of the oil-producing countries are posting dismal performances.

Nevertheless, the fact that the study found a statistically significant mean difference $t(35) = 2.853$, $p < .01$ in assets/human poverty between oil-producing countries ($M=60.3$, $SD=7.2$) and non-oil-producing countries ($M=52.1$, $SD=9.4$) underscores, to a large extent, the significance, and the prospects of natural resources, particularly oil resources, in livelihoods improvement, at least, in the case of OIC countries. This finding, therefore, calls for policy measures that will create the enabling environment for the less-performing member

countries to benefit from the development experiences of the more successful members.

Furthermore, in linking good governance to livelihoods sustainability, although many of the selected OIC countries have scored below average in good governance, there is abundant evidence that connects countries with good governance (i.e., higher score in corruption perceptions index) to better performance in most of the indicators of livelihoods sustainability. This finding implies that good governance—specifically less public sector corruption—can enhance livelihoods sustainability. Thus, OIC member countries need to adopt collaborative anti-corruption measures to improve their current performances in good governance.

In conclusion, intensifying collaboration to effectively utilize natural resources and improve performance in good governance can enable OIC countries to overcome the daunting challenges to the overwhelming prospects of scaling up livelihoods of the people. In that effect, the following policy measures are proposed for consideration by policymakers, development practitioners, and poverty reduction activists in OIC member countries:

1. It is highly necessary and socio-economically beneficial to revamp local, indigenous and labour-intensive industries, particularly import-substituting industries, to circumvent mass importation of basic goods and services to boost job creation (i.e. to raise incomes) and national saving of hard-earned foreign exchange revenues;
2. Intensify trade , especially in what may be described as *trade for the poor*, that is, to ear-mark and reduce or remove tariffs completely on certain public goods and services that can impact positively on poverty reduction and livelihoods sustainability; and finally
3. To intensify exchange of technical, administrative and industrial expertise among the member countries, particularly in improving good governance and transforming natural resources for human development.

Notes

1. For details visit: <http://magnet.undp.org/policy/default.htm>. This has been quoted by World Bank in a chapter entitled “Governance.” Available at:
2. http://siteresources.worldbank.org/INTPRS1/Resources/3836061205334112622/4105_chap8.pdf
3. <http://www.worldbank.org/publicsector/overview.htm>.
4. For more information visit: <http://www.aneki.com/oil.html>. *Countries of oil reserves*.
5. Dr. Ahmad Mohamed Ali is the sitting President of the Islamic Development Bank (IDB) as of the time this paper has been written. These observations were made at the second World Islamic Economic Forum held in Pakistan, Islamabad in Nov., 2006.
6. Using IDB member countries or OIC countries can serve the same purpose as IDB is the financial arm of OIC.

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APPENDIX

**Table 7: Calculated Sustainable Livelihoods Performance Index for
the Selected OIC Countries**

Oil-Producing OIC Countries	Income Poverty (%) X	Non-Poor (%) 100-X	Human Poverty L/R, W/S, U/rshed (%) (%) (%) U _{nd}			N/rshed (%) 100-U _{nd}	Good Gov'nance Corruption Index (2009)	SLPI for the selected OIC Countries
Algeria	2	98	92.5	85	4	96	2.8	74.9
Cameroon	17.1	82.9	n/a	70	26	74	2.2	57.3
Chad	n/a	n/a	37.6	48	35	65	1.6	46.8
Côte d'Ivoire	14.8	85.2	60.7	81	13	87	2.1	63.2
Egypt	3.1	96.9	86.2	98	4	96	2.8	76.0
Libya	n/a	n/a	98.9	71	2.5	97.5	2.5	67.5
Morocco	2	98	75.1	83	6	94	3.3	70.7
Nigeria	70.8	29.2	86.7	47	9	91	2.5	51.3
Sudan	n/a	n/a	77.2	78	26	74	1.5	57.7
Tunisia	2	98	95.7	94	2.5	97.5	4.2	77.9
Albania	2	98	99.4	97	6	94	3.2	78.3
Azerbaijan	3.7	96.3	99.9	78	7	93	2.3	73.9
Bahrain	n/a	n/a	99.8	n/a	n/a	n/a	5.1	INSFD
Iran	2	98	97.4	94	4	96	1.8	77.4
Kazakhstan	2	98	99.8	96	6	94	2.7	78.1
Kuwait	n/a	n/a	99.9	n/a	5	95	4.1	66.3
Kyrgyzstan	2	98	99.6	89	4	96	1.9	71.6
Oman	n/a	n/a	98.4	82	n/a	n/a	5.5	62.0
Qatar	n/a	n/a	97.6	100	n/a	n/a	7.0	68.2
Saudi Arabia	n/a	n/a	97	n/a	4	96	4.3	65.8
Turkey	3.4	96.6	96.4	97	3	97	4.4	78.3
U.A.E	n/a	n/a	97.7	100	2.5	97.5	6.5	75.5
Uzbekistan	2	98	99.3	88	25	75	1.7	72.4
Yemen	15.7	84.3	80.4	66	38	62	2.1	59.0
Bangladesh	41.3	58.7	72.1	80	30	70	2.4	56.4
Brunei	n/a	n/a	99.6	n/a	4	96	5.5	67.0
Indonesia	7.5	92.5	98.9	80	6	94	2.8	73.6
Malaysia	0.6	96.4	98.3	99	3	97	4.5	79.0
Pakistan	17	83	70	90	24	76	2.4	64.3
Suriname	n/a	n/a	95.2	92	8	92	3.7	70.7
Burkina Faso	27.2	72.8	39.3	72	15	85	3.6	54.5
Gambia	n/a	n/a	n/a	86	29	71	2.9	53.3
Mali	n/a	n/a	29.3	60	29	71	2.8	40.8
Niger	60.6	39.4	39	42	32	68	2.9	38.3
Senegal	22.3	77.7	51.3	77	20	80	3.0	57.8
Uganda	n/a	n/a	86.3	64	19	81	2.5	58.5
Lebanon	n/a	n/a	n/a	100	3	97	2.5	66.5
Jordan	2	98	99.1	88	6	94	5.0	76.8
Guyana	2	98	n/a	93	8	92	2.6	71.4
Maldives	n/a	n/a	98.2	83	10	90	2.5	68.4

INSFD = Countries with insufficient data in more than three indicators.

The Formula:

Figure 1 is derived from Sustainable Livelihoods Performance Index (SLPI) for the selected OIC countries, which has been calculated by using the following formula:

$$SLPI = \frac{\sum (\text{Selected indicators})}{\text{Number of selected indicators}} \quad (1)$$

which states that sustainable livelihoods performance index (SLPI) for a country is a function of the country's average score in the selected indicators. Thus,

$$SLPI = \frac{\sum (100-x) + L/R + W/S + (100-Und) + GG}{5}, \quad (2)$$

Where (100-x) represents percentage of non-poor; L/R represents performance in literacy; W/S represents score in water supply; (100-Und) means score in scaling up nourishment; and GG means score in good governance.

However, the calculation is based only on the selected indicators and does not intend to preclude other equally important indicators, as this calculation can take on as many livelihood indicators as possible.

