A LONG-RUN RELATIONSHIP BETWEEN THE TRADE AND ITS DETERMINANTS FOR A GROUP OF SELECTED ARAB MAGHREB UNION COUNTRIES

Hussin Abdullah

School of Economics, Finance and Banking, College of Business,
Universiti Utara Malaysia, 06010 Sintok, Kedah, MALAYSIA

Norehan Abdullah

School of Economics, Finance and Banking, College of Business,
Universiti Utara Malaysia, 06010 Sintok, Kedah, MALAYSIA

Hadi Mohamad Othman Abuhriba[c]

School of Economics, Finance and Banking, College of Business,
Universiti Utara Malaysia, 06010 Sintok, Kedah, MALAYSIA

Abstract: *The Arab Maghreb Union (AMU) comprising Algeria, Libya, Mauritania, Morocco, and Tunisia has established a framework to enhance regional cooperation on trade facilitation. It is doubtful whether the Arab Maghreb countries could achieve the goals of this regional cooperation or not. The objective of this study is to examine a long-run relationship between the trade and its determinants for a group of selected Arab Maghreb Union Countries. Using a data set consisting of a panel observation for the AMU countries for the period of 1989-2009; a panel unit root test was done to investigate the possibility of panel cointegration. Overall, the results are consistent with those found in Pedroni approach in all cases, parameters for the variables are found to be correctly signed and highly significant. In terms of trade openness, the results show that the trade barriers are found to be positively and significantly correlated with openness where their relationships within the AMU trade intensity ratios show a strong correlation. In other words, the trade barriers are fairly effective for increasing trade.*

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INTRODUCTION

The Arab Maghreb Union (AMU) comprising Algeria, Libya, Mauritania, Morocco, and Tunisia has established a framework to enhance regional cooperation on issues of common interest, focusing initially on trade facilitation. Over the last decade, the Arab Maghreb Union countries have increased their trade integration into the world economy, including in the context of the Association Agreements between the European Union (EU) and Arab Maghreb countries. However, there is an arguement, whether the Arab Maghreb countries could achieve the goals of this regional cooperation or not. In addition, there were an opposite views that, the Arab Maghreb countries were affected by this regional integration. According to Brenton et al. (2006) the Maghreb countries have experienced lacklustre growth rates during the last decade.

There are many issues and challenges ahead that have to be resolved related to the regional integration. One of the major concerned of this paper is related to the impact of regional integration on trade among the Maghreb countries in terms of intra-trade. This study argues that these are important issues to be addressed since the status quo is not tenable if trade is to

fuel higher rates of growth and employment generation in the Maghreb member states. On the one hand, the structure of economies in the Maghreb is not conducive to sustained export growth (Brenton et al., 2006).

It should be noted that the four stages of economic integration specified in the guidelines adopted by the Council of Heads of State of the AMU at its third meeting in Libya in March 1991 were: (1) a free *trade* area by the end of 1992, (2) a customs union by the end of 1995, (3) a common market by the end of 2000, and (4) a monetary union some time thereafter (Mohamed and Bell, 1995). Key issues related to economic integration in the Maghreb and the progress made and benefits so far should be examined. The extent to which the main prerequisites for economic integration are in place are assessed, and the challenges the Union members need to address if the AMU is to make further progress toward achievement of its objectives would be also addressed in this study.

The level of intra-Maghreb trade is lower than that of many of the world's trading blocs. In 2007, intra-Maghreb trade represented less than 2% of the subregion's combined gross domestic product (GDP) and less than 3% of the subregion's total trade. Some of the reasons for this low performance include high barriers to trade, logistical bottlenecks, lack of production base diversification, and political considerations (World Bank, 2010).

Table 1: Trade in the Arab Maghreb Union (% of GDP)

	1990-1999		2000-2008	
	Exports	Imports	Exports	Imports
Algeria	26	24	42	23
Libya	29	25	57	28
Mauritania	37	48	40	68
Morocco	26	31	32	37
Tunisia	43	47	49	52

Source: World Bank, GDF and WDI data, April 2010

Overall exports accounted less than between 57 % to 32 % of GDP and import less than between 67 % to 28 % in the Arab Maghreb Union during the period 2000–2008 (Table 1). This represents a slight increase from trade levels in the 1990s, with Libya showing the greatest increase. Mauritania and Tunisia are the most open economies in the sub region, with average trade volumes exceeding GDP during 2000–2008.

Al-Atrash and Youssef (2000) found that Maghreb countries traded less with the rest of the world than the model would have predicted. Furthermore, the level of regional trade among Maghreb countries is low compared with other trading blocs. There are some indications, however, that official data do not fully capture trade within the region. This is particularly true for trade between Libya and Tunisia, and between Algeria and Tunisia. Thus as compared with its potential, trade in the Maghreb is low in terms of both intra-regional exchanges the rest of the world.

The purpose of this study is to investigate a long-run relationship between the trade and its determinants for a group of selected AMU countries. This study is divided into five sections. Section 2 critically reviews the literature and theories related to the issue of the study. Section 3 discusses the methods and techniques used in the study. Analyses of data and findings of the study are undertaken in Section 4. Section 5, the conclusion, summarizes the arguments of preceding chapters.

LITERATURE REVIEW

This section reviews literature and theories related to the topic of the study. It is meant to be the base for the analytical section of the study. Amiot and Salama (1996) stated that in order to strengthen strategic alliances with European trading and industrial partners, Maghreb firms should rethink the logistics of their distribution strategy in Europe, taking recent changes into account and adjusting their trade practices. In that regard it was pointed out that these firms needed to strengthen interdependency with European partners, develop just-in-time multimodal transport and logistics management, and negotiate maritime and inland freight rates in the context of general transport contracts. Without a competitive transport industry, the Maghreb countries would not truly benefit from reform aimed at increasing the region's share of international trade. A study of barriers to the region's trade, especially with countries of the European Union, identified more than 30 barriers, in four categories: import barriers, exports barriers, infrastructure and equipment, and of intra-Maghreb trade.

Brenton et al., (2006) discussed a trade strategy for the Maghreb countries, with a particular focus on regional initiatives, as trade expansion could generate higher and sustained growth rates, and employment. The analysis was based upon identification of the key internal and external barriers that were constraining integration into regional and global markets and discussed how poor design and weak implementation of trade agreements amongst countries in the region limited their impact. The study observed that Maghreb countries would reap significant benefits from enhancing their integration with regional partners, with the EU and with global markets.

Bahmani-Oskooee and Hegerty (2007) attempted to assess the main trends in modeling and estimating these trade flows at the aggregate, bilateral, and sectoral levels. An argument put forward by the opponents of the floating exchange rates is that such rates introduce uncertainty into the foreign exchange market, which could deter trade flows. However, a theoretical argument is put forward by some to show that uncertainty could also boost trade flows if traders increase their trade volume to offset any decrease in future revenue due to exchange rate volatility. The empirical literature reviewed in this paper supports both views. This study classified the empirical studies into three categories. The first includes studies that used aggregate trade data between one country and the rest of the world. The second category includes studies that used disaggregate data at the bilateral level, i.e. trade flows between two countries. Finally, the third category includes those studies that disaggregated the trade data further by commodities or by sectors between two countries. For each group a table is provided which summarizes each paper by its main features.

Martinez-Zarzoso and Nowak-Lemann (2004) study also helps us to understand the effects of geographic and economic distance. When analyzing potential trade between pairs of countries or pairs of economic blocs engaging in free trade agreements two different types of trade can be distinguished as pointed out by Hirsch and Hashai (2000). According to Hirsch and Hashai geographical distance refers to miles or kilometers between capitals of trading countries. Since local products are cheaper than products transported over long distances, it is expected that geographical distance hinder trade. The second type, economic distance refers to absolute differences in the per capita income of the trading countries. These differences are expected to play a crucial role in explaining trade between the AMU and other major trading blocs.

METHODOLOGY

In order to investigate a long-run relationship between the trade and its determinants for a group of selected AMU countries, we proposed our empirical model as follows:

$$lnY_{ijt} = \beta_0 + \beta_1 lnGDP_{it} + \beta_2 lnGDP_{jt} + \beta_3 lnPOP_{it} + \beta_4 lnPOP_{jt} +$$
$$\beta_5 lnFCR_{ij} + \beta_6 lnRER_{ij} + \beta_7 lnOpen_{ij} + u_{ijt} \qquad (1)$$

where lnY_{ijt} is the trade variable between the country *i* (AMU) and the country *j* at time *t*; $lnGDP_{it}$ is a measure of income of the country *i* at time *t*; $lnGDP_{jt}$ is a measure of income of the country *j* at time *t*; $lnPOP_{it}$ and $lnPOP_{jt}$ are local and target populations, respectively at time *t*; $lnFCR_{ij}$ is the target country's foreign currency reserves at time *t*; $lnRER_{ij}$ is the real exchange rate between the two countries at the time *t*. $lnOpen_{ij}$ is the most basic measure of trade intensity is the so-called ''trade openness'' that is the ratio of exports plus imports to GDP. *ßi* (i = 1, 2... 7) are parameters of the equation, and u_{ijt} is a white noise disturbance term. All variables are in logs so the estimated coefficients are interpreted as elasticities.

RESULTS

As with standard cointegration tests, it is important to know the stationarity properties of the data to ensure that incorrect inferences are not made. The tests are run on full sample of the five Arab Maghreb Union (AMU) countries, namely Algeria, Libya, Mauritania, Morocco and Tunisia for the period 1989-2009. The results of the panel unit root tests confirmed that the variables are stationary at first difference.

The next step is to test whether the variables are cointegrated using Pedroni's (1999, 2001, and 2004) methodology as described previously for Equation (1). This is to investigate whether on the long-run steady state or cointegration exist among the variables and to confirm what Oh *et al*. (1999) and Coiteux and Olivier (2000) stated that the panel cointegration tests have much higher testing power than conventional cointegration test. Since the variables are found to be integrated in the same order *I*(1), we continued with the panel cointegration tests proposed by Pedroni (1999, 2001, and 2004). Cointegrations are carried out for constant and constant plus time trend and the summary of the results of cointegrations analyses are presented in Table 2 and Table 3.

At constant level, we found that Algeria indicates 4 out of 7 statistics reject null by hypothesis of no cointegration at 1% and 5% level of significance except for the panel-*p*, group-*t* and group-*adf* which are not significant. Libya indicated that 6 out of 7 statistics reject the null hypothesis of no cointegration at 1% and 5% level of significance except for the group-*adf* which is not significant. In Morocco and Tunisia, the results are indicated that the null hypothesis was rejected by 3 out of 7 statistics at 1% level of significance. In Mauritania as well as Libya, the results indicated that 6 out of 7 statistics reject the null hypothesis of non cointegration at 1% and 5% level of significance.

Overall, results on the panel cointegration tests among the AMU countries show constant level, however, the independent variables do hold cointegration in the long run for a group of the AMU countries with respect to trade. As indicated by the panel non-parametric (*t*-statistic) and parametric (*adf*-statistic) statistics as well as group statistics that are analogous to the IPS-test statistics, the null hypothesis of non cointegration are rejected at 1% and 5% level of significance.

Table 2: Panel cointegration tests for heterogeneous panel - Constant

	Algeria	Libya	Morocco	Mauritania	Tunisia
Panel-v	3.061***	2.617***	3.127***	3.345***	2.242**
Panel-ρ	-1.368	-3.528***	-0.744	-4.082***	-0.508
Panel-t	-3.267***	-2.622**	-4.032***	-2.657**	-3.147***
Panel-adf	-2.501**	-1.965**	0.905	-2.681**	-0.725
Group-ρ	-4.334***	-4.509***	-5.171***	-5.147***	-4.409***
Group-t	-1.050	-2.329**	-0.525	-2.433**	-0.558
Group-adf	-1.136	0.086	0.902	0.935	-1.622

Notes: ***, **, * indicates rejection of the null hypothesis of no-cointegration at 1%, 5%, and 10% level of significance.

In constant plus trend level, we found that Algeria, Libya, and Mauritania indicate that 4 out of 7 statistics reject null by hypothesis of no cointegration at the 1% and 5% level of significance. Morocco indicates that all 7 statistics reject the null hypothesis of no cointegration at 1% and 5% level of significance. In Tunisia, the result indicates that the null hypothesis is rejected by 5 out of 7 statistics at 1% and 5% level of significance. It is shown that independent variables do hold cointegration in the long run for a group of the AMU countries with respect to trade. However, since most the statistics are in favour of cointegration, and thus, combined with the fact that according to Pedroni (1999) the panel non-parametric (*t*-statistic) and parametric (*adf*-statistic) statistics are more reliable in constant plus time trend, we conclude that there is a long run cointegration among our variables among the AMU countries.

According to Table 3, we found that most of the panel statistics are more reliable in constant plus time trend compared to the panel statistic in constant. As indicated by the panel non-parametric (*t*-statistic) and parametric (*adf*-statistic) statistics as well as group statistics that are analogous to the IPS-test statistics, the null hypothesis of non cointegration is rejected at 1% level of significance. These results also imply that taken as a group, the cointegration among the AMU countries does hold over the estimation period.

Table 3: Panel cointegration tests for heterogeneous panel - Constant + Trend

	Algeria	Libya	Morocco	Mauritania	Tunisia
Panel-v	1.606	-0.269	1.985**	0.974	3.501***
Panel-ρ	-1.529	-4.453***	-4.877***	-5.134***	-3.719***
Panel-t	-4.080***	-3.125***	-2.533**	-3.843***	-2.216**
Panel-adf	-1.966**	-3.110***	-3.235***	-3.834***	-1.132
Group-ρ	-1.447	-4.284***	-5.059***	-5.059***	-4.457***
Group-t	-4.563***	-0.562	-1.978**	-1.333	-2.628**
Group-adf	-2.122**	-0.664	-2.104**	-0.085	-1.122

Notes: ***, **, * indicates rejection of the null hypothesis of no-cointegration at 1%, 5%, and 10% level of significance.

Cointegration Estimation Results - FMOLS

The previous section already confirmed that all variables among the AMU countries are cointegrated. In other words, the long run equilibrium exists among the variables. This section discusses the estimated long-run equation. Following Pedroni (2000 and 2001), cointegrating explanatory variables for the data is estimated using the Fully Modified OLS (FMOLS) technique.

Table 4, indicates that Libya estimate the coefficient for real gross domestic products of exporter ($lnGDP_{it}$) is positive (25.59) and statistically significant at the 10% level. The estimate coefficient for local ($lnPOP_{it}$) and target population ($lnPOP_{jt}$) are positive (36.59 and 0.03, respectively) and statistically significant at 1% level. The estimate of target country's foreign currency reserves (FCR_{ij}) is positive (0.09) and statistically significant at 5% level. These results show that real gross domestic products of exporter, local and target population, and target country's foreign currency reserves increase trade flow, which means that there is a long run cointegration between that variables and trade from among the AMU to the Algeria. Table 4 also showed that Libya real gross domestic products of importer (GDP_{jt}), the real exchange rate between the two countries (RER_{ijt}), and trade openness ($Open_{ij}$) are statistically not significant.

Morocco in Table 4 also show that the estimates coefficient for real gross domestic products of exporter ($lnGDP_{it}$) is positive (9.62) and statistically significant a 5% level. The estimate of coefficient for local ($lnPOP_{it}$) and target population ($lnPOP_{jt}$) are positive (6.65 and 0.01) and statistically significant at 5% and 1% level, respectively. The estimate target country's foreign currency reserves (FCR_{ij}) is positive (1.04) and statistically significant at 1% level. The estimate of the real exchange rate between the two countries (RER_{ijt}) are positive (0.24) and statistically significant at 1% level. The estimate of trade openness ($Open_{ij}$) is positive (0.07) and statistically significant at 1% level. These results show that all independent variables except real gross domestic products of importer (GDP_{jt}) have a long run cointegration trade among the AMU and Algeria.

On the other hand, the estimation of Mauritania and Tunisia coefficient for real gross domestic products of importer (GDP_{jt}) are positive (14.40 and 2.55, respectively) and statistically significant at the 5% level. The estimate coefficient for local ($lnPOP_{it}$) is positive (2.55) and statistically significant at 10% level only in Tunisia. The estimate of coefficient target population ($lnPOP_{jt}$) in Mauritania and Tunisia are positive (0.03) and statistically significant at 1% level. The estimate of target country's foreign currency reserves (FCR_{ij}) are positive (0.01 and 0.09, respectively) and statistically significant at 1% level. The estimate of the real exchange rate between the two countries (RER_{ijt}) are positive (0.14 and 0.50, respectively) and statistically significant at 1% level. The estimate of trade openness ($Open_{ij}$) are positive (0.20 and 0.25, respectively) and statistically significant at 1% level. These results show that all independent variables except real gross domestic products of exporter ($lnGDP_{it}$) and local ($lnPOP_{it}$) only for Mauritania have a long run cointegration trade among the AMU and the Algeria.

Table 4: Algeria - FMOLS (Individual) Results, dependent variable: Trade (lnY_{ijt})

	$lnGDP_{it}$	$lnGDP_{jt}$	$lnPOP_{it}$	$lnPOP_{it}$	$lnFCR_{ij}$	$lnRER_{ij}$	$lnOpen_{ij}$
Libya	25.59* (1.70)	21.53 (1.37)	36.59*** (6.73)	0.03*** (9.82)	0.09** (2.39)	1.74 (1.30)	0.23 (11.91)
Morocco	9.62** (2.18)	7.16 (1.59)	6.65** (2.70)	0.01*** (5.88)	1.04*** (8.49)	0.24*** (8.45)	0.07*** (4.87)
Mauritania	4.31 (1.01)	14.40** (2.34)	10.61 (1.32)	0.03*** (5.49)	0.01*** (5.35)	0.14*** (9.60)	0.20*** (7.83)
Tunisia	1.17 (0.30)	2.55** (2.11)	2.38* (1.80)	0.03*** (3.67)	0.09*** (6.87)	0.50*** (3.68)	0.25*** (5.99)
Algeria - FMOLS (Group) Results, dependent variable: Trade (lnY_{ijt})							
	1.99 (1.18)	0.42 (1.25)	6.85*** (5.41)	0.02*** (6.08)	0.08*** (3.12)	0.29*** (3.78)	0.14*** (6.41)

Notes: ***, **, * indicates rejection of the null hypothesis of no-cointegration at 1%, 5%, and 10% level of significance.

Table 4 shows the relationship between Algeria and other AMU countries (as individual). Most of the variables reported that tests reject the null hypotheses of non cointegration at 1% and 5% level. While as a Group, real gross domestic products of exporter and importer (GDP_{ij} and GDP_{jt} respectively) are statistically not significant, other variables reported that tests reject the null hypotheses of non cointegration at 1% level.

From Table 5, Algeria estimates coefficient for real gross domestic products of exporter and importer [($lnGDP_{it}$) and (GDP_{jt})] are positive (8.07 and 0.18, respectively) and statistically significant at 1% and 5% level. The estimate coefficient for local ($lnPOP_{it}$) is positive (0.12) and statistically significant at 1% level. The estimation of the real exchange rate between the two countries (RER_{ijt}), and trade openness ($Open_{ij}$) are positive; 0.55 and 0.20, respectively and statistically significant at 1% and 5% level. These results show that real gross domestic products of exporter and importer, local population, and real exchange rate increase trade flow, which means that there is a long run cointegration between the variables and trade among the AMU and Libya.

On the other hand, Table 5 also shows that Morocco and Tunisia estimated the coefficient for real gross domestic products of exporter and importer [($lnGDP_{it}$) and (GDP_{jt})] are positive (2.26 and 0.05 for Morocco and 2.31 and 0.01 for Tunisia, respectively) and statistically significant at the 5% and 1% level. The estimate of coefficient for local population ($lnPOP_{it}$) and target population ($lnPOP_{jt}$) are positive (0.01 and 0.52 for Morocco, 0.05 and 0.19 for Tunisia, respectively) and statistically significant at 1% level. The estimate of target country's foreign currency reserves (FCR_{ij}) is positive (0.12 for Morocco and 0.58 for Tunisia) and statistically significant at 1% level. The estimate of the real exchange rate between the two countries (RER_{ijt}) is positive (0.02) and statistically significant at 1% level for Morocco but not statistically significant for Tunisia. The estimate of trade openness ($Open_{ij}$) is positive (0.17 for Morocco and 0.37 for Tunisia, respectively) and statistically significant at 1% level. These results show that all independent variables have a long run cointegration trade among AMU and Libya. While, Mauritania estimated the coefficient for real gross domestic products of exporter (GDP_{jt}) is positive (0.57) and statistically significant at the 1% level. The estimate of coefficient for local ($lnPOP_{it}$) and target population ($lnPOP_{jt}$) are positive (0.05 and 0.33, respectively) and statistically significant at 1% level. The estimate target for the country's foreign currency reserves (FCR_{ij}) is positive (0.37) and

statistically significant at the 1% level. The estimate of the real exchange rate between the two countries (RER_{ijt}) is positive (0.21) and statistically significant at 1% level. The estimate of trade openness ($Open_{ij}$) is positive (0.05) and statistically significant at 1% level. These results showed that all independent variables have a long run cointegration trade among the AMU and Libya.

The relationship between Libya and other AMU countries as shown in Table 5 is an individual. Most of the variables reported that tests reject the null hypotheses of non cointegration at 1% and 5% level. While as a Group, all variables reported that tests reject the null hypotheses of non cointegration at 1% level.

Table 5: Libya - FMOLS (Individual) Results, dependent variable: Trade (lnY_{ijt})

	$lnGDP_{it}$	$lnGDP_{jt}$	$lnPOP_{it}$	$lnPOP_{it}$	$lnFCR_{ij}$	$lnRER_{ij}$	$lnOpen_{ij}$
Algeria	8.07** (2.09)	0.18*** (5.66)	0.12*** (9.05)	0.51 (0.63)	1.39 (0.28)	0.55*** (5.03)	0.20** (2.00)
Morocco	2.26** (2.24)	0.05*** (8.03)	0.01*** (10.85)	0.52*** (9.32)	0.12*** (7.03)	0.02*** (8.94)	0.17*** (7.85)
Mauritania	0.24 (0.88)	0.57*** (3.83)	0.05*** (7.18)	0.33*** (10.90)	0.37*** (9.25)	0.21*** (5.16)	0.05*** (12.38)
Tunisia	2.31*** (10.95)	0.01*** (9.52)	0.05*** (8.95)	0.19*** (8.18)	0.58*** (13.73)	0.73 (0.85)	0.37*** (7.84)
Libya - FMOLS (Group) Results, dependent variable: Trade (lnY_{ijt})							
	2.57*** (8.24)	0.03*** (8.53)	0.04*** (12.62)	0.14*** (9.74)	0.26*** (9.23)	0.12*** (10.20)	0.14*** (6.40)

Notes: ***, **, * indicates rejection of the null hypothesis of no-cointegration at 1%, 5%, and 10% level of significance.

Table 6 shows the estimate coefficient for real gross domestic products of exporter ($lnGDP_{it}$) are positive (6.00 and 2.09, respectively) and statistically significant at 1% and 5% level for Algeria and Mauritania. But both countries have no statistically significant for real domestic product of importer (GDP_{jt}) and local population ($lnPOP_{it}$). The estimate of coefficient for target population ($lnPOP_{jt}$) are positive (0.01 and 0.11, respectively) and statistically significant at 1% level for both countries. The estimate of target country's foreign currency reserves (FCR_{ij}) are positive (0.07 for Algeria and 0.11 for Mauritania) and statistically significant at the 1% and 5% level. The estimate of the real exchange rate between the two countries (RER_{ijt}) is positive (0.07 for Algeria and 0.46 for Mauritania) and statistically significant at 1% level. The estimate of trade openness ($Open_{ij}$) is positive (0.04 for Algeria and 0.22 for Mauritania) and statistically significant at 1% level. These results show that all independent variables have a long run cointegration to trade between AMU and Morocco.

Libya estimation of the coefficient for real gross domestic products of exporter and importer [($lnGDP_{it}$) and (GDP_{jt})] are positive (9.60 and 5.37) and statistically significant at 1% and 5% level, respectively. The estimate of coefficient for local ($lnPOP_{it}$) and target population ($lnPOP_{jt}$) are positive (0.5.64 and 0.01) and statistically significant at 5% and 1% level, respectively. The target country's foreign currency reserves (FCR_{ij}) is statistically not significant but the estimate of the real exchange rate (RER_{ijt}) is positive (0.18) and statistically significant at 1% level. The estimate of trade openness ($Open_{ij}$) is positive (0.36) and statistically significant at 1% level. These results show that most of the independent variables have a long run cointegration trade among the AMU and the Morocco.

On the other hand, Tunisia estimation of coefficient for real gross domestic products of exporter and importer [($lnGDP_{it}$) and (GDP_{jt})] are positive (9.54 and 0.57) and statistically significant at 5% level. The estimate coefficient for target population ($lnPOP_{jt}$) is positive

(0.02) and statistically significant at 1% level, but we found that the local population ($lnPOP_{it}$) is statistically not significant. The estimate target country's foreign currency reserves (FCR_{ij}) is positive (0.22) and statistically significant at 1% level. The estimate of the real exchange rate between the two countries (RER_{ijt}) is positive (0.31) and statistically significant at 1% level. The trade openness ($Open_{ij}$) is statistically not significant. These results show that most independent variables have a long run cointegration to trade from among the AMU and Libya.

In the relationship between Morocco and the AMU countries (as individual), most of the variables reported that tests reject the null hypotheses of non cointegration at 1% and 5% level. While as a Group, most variables reported that tests reject the null hypotheses of non cointegration at 1% level.

Table 6: Morocco - FMOLS (Individual) Results, dependent variable: Trade (lnY_{ijt})

	$lnGDP_{it}$	$lnGDP_{jt}$	$lnPOP_{it}$	$lnPOP_{it}$	$lnFCR_{ij}$	$lnRER_{ij}$	$lnOpen_{ij}$
Algeria	6.00*** (4.16)	0.39 (0.46)	1.39 (0.47)	0.01*** (6.29)	0.07*** (3.13)	0.07*** (3.03)	0.04*** (5.58)
Libya	9.60*** (3.44)	5.37** (2.26)	5.64** (2.74)	0.01*** (10.84)	1.26 (1.26)	0.18*** (10.14)	0.36*** (7.06)
Mauritania	2.09** (2.63)	0.85 (0.24)	0.04 (0.82)	0.11*** (5.49)	0.11** (2.51)	0.46*** (5.37)	0.22*** (6.43)
Tunisia	9.54** (2.39)	0.53** (2.91)	0.75 (0.42)	0.02*** (3.94)	0.22*** (8.14)	0.31*** (6.01)	1.32 (0.30)
Morocco - FMOLS (Group) Results, dependent variable: Trade (lnY_{ijt})							
	3.34* (1.96)	0.08 (1.51)	3.99*** (3.50)	0.02*** (6.49)	0.12** (2.80)	0.20*** (3.21)	0.34*** (4.33)

Notes: ***, **, * indicates rejection of the null hypothesis of no-cointegration at 1%, 5%, and 10% level of significance.

Libya and Tunisia in Table 7, estimate the coefficient for real gross domestic products of exporter and importer [($lnGDP_{it}$) and (GDP_{jt})] are positive (2.23 and 2.29 for Libya and 0.05 and 0.01 for Tunisia, respectively) and statistically significant at 1% and 5% level. The estimate of coefficient for local ($lnPOP_{it}$) and target population ($lnPOP_{jt}$) are positive (0.01 and 0.54 for Libya and, 0.20 and 0.61 for Tunisia, respectively) and statistically significant at 1% level. The estimate target country's foreign currency reserves (FCR_{ij}) are positive; 0.12 for Libya and 0.61 for Tunisia and statistically significant at 1% level for both countries.

The estimate of the real exchange rate between the two countries (RER_{ijt}) are positive; 0.03 for Libya and 0.08 for Tunisia and statistically significant at 1% level for that both countries. The estimate of trade openness ($Open_{ij}$) are positive for Libya and Tunisia (0.03 and 0.58, respectively) and statistically significant at 1% level. These results show that all independent variables have a long run cointegration trade among the AMU and Mauritania.

Table 7: Mauritania - FMOLS (Individual) Results, dependent variable: Trade (lnY_{ijt})

	$lnGDP_{it}$	$lnGDP_{jt}$	$lnPOP_{it}$	$lnPOP_{it}$	$lnFCR_{ij}$	$lnRER_{ij}$	$lnOpen_{ij}$
Algeria	4.37*** (5.96)	0.08*** (3.89)	0.05*** (6.26)	0.09*** (8.77)	0.63* (1.72)	4.97** (2.80)	0.18 (1.55)
Libya	2.23** (2.21)	0.05*** (8.05)	0.01*** (4.85)	0.54*** (8.61)	0.12*** (7.14)	0.03*** (9.19)	0.03*** (3.96)
Morocco	0.10 (1.21)	0.61*** (3.95)	0.10*** (4.06)	0.35** (2.67)	0.38** (2.29)	0.13*** (3.31)	0.15*** (6.66)
Tunisia	.29*** (10.35)	0.01*** (5.16)	0.04*** (9.61)	0.20*** (7.35)	0.61*** (7.59)	0.08*** (4.61)	0.58*** (4.38)
Mauritania - FMOLS (Group) Results, dependent variable: Trade (lnY_{iit})							
	2.25*** (9.78)	0.02*** (9.71)	0.04*** (4.67)	0.18*** (3.69)	0.21*** (3.05)	0.27*** (4.12)	0.03*** (4.12)

Notes: ***, **, * indicates rejection of the null hypothesis of no-cointegration at 1%, 5%, and 10% level of significance.

Table 7, shows that Algeria and Morocco estimate the coefficient for real gross domestic products of exporter and importer [($lnGDP_{it}$) and (GDP_{jt})] are positive (4.37 and 0.08, respectively) and statistically significant at 5% and 1% level for Algeria. But we found that only the real gross domestic product of importer (GDP_{jt}) has an impact on trade in Morocco, meaning that the estimate coefficient for real gross domestic products of importer (GDP_{jt}) is positive (0.61) and statistically significant at 1% level. The estimate of coefficient for local ($lnPOP_{it}$) and target population ($lnPOP_{jt}$) are positive (0.05 and 0.10 for Algeria and 0.09 and 0.35 for Morocco, respectively) and statistically significant at 1% level. The estimate target country's foreign currency reserves (FCR_{ij}) are positive (0.63 for Algeria and 0.38 for Morocco, respectively) and statistically significant at 1% level. The estimate of the real exchange rate between the two countries (RER_{ijt}) are positive (4.97 for Algeria and 0.13 for Morocco) and statistically significant at 5% and 1% level. The estimate of trade openness ($Open_{ij}$) is positive (0.15) and statistically significant at 1% level for Morocco only. These results show that most independent variables have a long run cointegration trade among the AMU and Mauritania.

In the relationship between Libya and among other AMU countries (as individual), most of the variables reported that tests reject the null hypotheses of non cointegration at 1% and 5% level. While as a Group, all variables reported that tests reject the null hypotheses of non cointegration at 1% level.

Table 8: Tunisia - FMOLS (Individual) Results, dependent variable: Trade (lnY_{ijt})

	$lnGDP_{it}$	$lnGDP_{jt}$	$lnPOP_{it}$	$lnPOP_{it}$	$lnFCR_{ij}$	$lnRER_{ij}$	$lnOpen_{ij}$
Algeria	4.37*** (5.96)	0.08*** (3.89)	0.05*** (6.26)	0.09*** (8.77)	0.63* (1.72)	4.97** (2.80)	0.18** (11.55)
Libya	2.23** (2.21)	0.05*** (8.05)	0.01*** (4.85)	0.54*** (8.61)	0.12*** (7.14)	0.03*** (9.19)	0.80 (0.42)
Morocco	0.10 (1.21)	0.61*** (3.95)	0.10*** (4.06)	0.35** (2.67)	0.38** (2.29)	0.13*** (3.31)	0.01*** (6.76)
Mauritania	2.29*** (10.35)	0.01*** (4.16)	0.04*** (9.61)	0.20*** (7.35)	0.61*** (7.59)	0.08 (4.61)	0.43*** (6.07)
Tunisia - FMOLS (Group) Results, dependent variable: Trade (lnY_{ijt})							
	2.25*** (9.78)	0.02*** (8.71)	0.04*** (4.67)	0.18*** (3.69)	0.21*** (3.05)	0.27*** (4.12)	0.01** (2.61)

Notes: ***, **, * indicates rejection of the null hypothesis of no-cointegration at 1%, 5%, and 10% level of significance.

Table 8 explains the relationship between Tunisia and others AMU countries. Table 8 also estimates Algeria is coefficient for real gross domestic products of exporter and importer [($lnGDP_{it}$) and (GDP_{jt})] are positive (4.37 and 0.08, respectively) and statistically significant at the 1% level. The estimate of coefficient for local ($lnPOP_{it}$) and target population ($lnPOP_{jt}$) are positive (0.05 and 0.09, respectively) and statistically significant at 1% level. The estimate of target country's foreign currency reserves (FCR_{ij}) is positive; 0.63 and statistically significant at 10% level. The estimate of the real exchange rate between the two countries (RER_{ijt}) is positive; 4.97 and statistically significant at 5% level. The estimate of trade openness ($Open_{ij}$) is positive (0.18) and statistically significant at 5% level. These results show that all independent variables have a long run cointegration trade among AMU and Tunisia.

Estimated coefficient for real gross domestic products of exporter and importer [($lnGDP_{it}$) and (GDP_{jt})] are positive (2.23 and 0.05 for Libya, 2.29 and 0.01 for Mauritania, and 0.61 for Morocco in real gross product of importer (GDP_{jt})) and statistically significant at 5% and 1% level. The estimate coefficient for local ($lnPOP_{it}$) and target population ($lnPOP_{jt}$) are positive (0.01 and 0.54 for Libya, 0.10 and 0.35 for Morocco, and 0.04 and 0.20 for Mauritania) and statistically significant at 1% and 5% level. The estimate target country's foreign currency reserves (FCR_{ij}) are positive (0.12 for Libya, 0.38 for Morocco, and 0.61 for Mauritania) and statistically significant at 1% level. The estimate of the real exchange rate between the two countries (RER_{ijt}) are positive (0.03 for Libya and 0.13 for Morocco) and statistically significant at 1% level. The estimate of trade openness ($Open_{ij}$) is positive (0.01 for Morocco and 0.01 for Mauritania) and statistically significant at 1% level for Morocco only. These results show that most independent variables have a long run cointegration trade among the AMU and Tunisia.

In the relationship between Tunisia and other AMU countries (as individual), most of the variables reported that tests reject the null hypotheses of non cointegration at 1% and 5% level. While as a Group, most of the variables reported that tests reject the null hypotheses of non cointegration at 5% and 1% level.

CONCLUSION
Our study attempts to identify the importance of intra-trade among AMU countries namely Algeria, Libya, Mauritania, Morocco and Tunisia. We estimate our equations using econometric approach. We found that the integration order of the series are consistent $I(1)$. We also found that all the variables are cointegrated in the model. Thereafter, the long run equation is extracted from the Fully Modified OLS (FMOLS) analysis (Pedroni; 1996, 2000, 2001). We found a positive and statistically significant impact of trade trade and GDP, population, foreign currency reserves (FOC) and real exchange rate (RER) and trade openness among AMU countries.

The intra-trade among AMU is below the expected level, this study clearly identifies that GDP, population, Foreign currency reserve (FOC), and Real Exchange Rate (RER) measures promote trade relationships which shows that remove barriers to trade is justified. Importantly, there is evidence that the deviation from the expected level of trade is increasing among AMU especially among Mauritania, Morocco, and Tunisia, further highlighting the need for appropriate policies in population and Real Exchange Rate (RER).

The real exchange rate is best thought of as a facilitating condition as keeping it at competitive levels and can be critical for jump-starting growth. From our study, we found that the real exchange rate gave mix results of significant level. Algeria, Mauritania, and Tunisia have positive and negative impact but not significant into trade among the other AMU countries, while only Libya and Morocco have positive and significant impact into trade. From a policy perspective it is important to consider where resources are most effectively used to promote trade. Furthermore, it is also important to consider the appropriate policy tools as these may well differ between countries.

REFERENCES
Al-Atrash, H. & Yousef, T. (2000). Intra-Arab Trade: Is It Too Little?" IMF Working Paper 00/10 (Washington: International Monetary Fund).

Amiot, F. & Salama, O.A. (1996). Logistical constraints on international trade in the Maghreb, World Bank, Middle East and North Africa, Country Dept. I, Private Sector Development, Finance and Infrastructure Division (Washington, DC).

Bahmani-Oskooee, M. & Hegerty, S.W. (2007). Exchange rate volatility and trade flows: a review article, *Journal of Economic Studies*, Vol. 34(3), pp. 211-255.

Brenton, P., Baroncelli, E. & Malouchel, M. (2006). Trade and Investment Integration of the Maghreb, Middle East and North Africa. *Working Paper Series* No. 44, The World Bank.

Coiteux, M., & Olivier, S. (2000). The saving retention coeficient in the long run and in the short run: Evidence from panel data. *Journal of International Money and Finance* 19, 535-548.

Hirsch S. & Hashai N. (2000). Arab Israeli Potential Trade: The Role of Distance Sensitive Products. *The International Trade Journal*, vol. 14 (1), pp. 1-35.

Martinez-Zarzoso, I. & Nowak-Lehman, F.D. (2003). Augmented gravity model: An empirical application to Mercosur-European Union trade flows. *Journal of Applied Economics*, 6(2), 291-316.

Mohamed, F. & Bell. E. (1995). Strategy of Integration, Future Changes. *Middle East Executive Reports,* December 1995.

Pedroni, P. (2004). Panel Cointegration: Asymptotic and Finite Samples Properties of Pooled Time Series Tests with an Application to the PPP Hypothesis. *Econometric Theory* 20, 597-625.

Pedroni, P. (1999). Critical Values for cointegration Tests in Heterogeneous Panels with Multiple Regressors," *Oxford Bulletin of Economics and Stat*istics *Special Issue* 61:653-678.

Pedroni, P. (2001). Purchasing Power Parity Tests in Cointegrated Panels. *The Review of Economics and Statistics*, 83(4), 727-731.

Oh, K, Kim, B., Kim, H. & Ahn, B. (1999). Savings-investment cointegration in panel data. *Applied Economics Letters*, 6, 477-472.

World Bank (2010). *World Development Report: Development and Climate Change*. World Bank web site

E-mail address : hussin2141@uum.edu.my

E-mail address: norehan@uum.edu.my

E-mail address: elhadi_mob@yahoo.com