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## **Do RTAs Increase Bilateral Trade in the MENA Region?**

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# **Do RTAs Increase Bilateral Trade in the MENA Region?**

## **ABSTRACT**

Middle East and North Africa (MENA) is an area with some special character, i.e. not easy to realize the process of integration and the country with abundant natural resources have better trade performance. This study aims to analyze the effects of RTAs to the trade of countries in MENA regions. The Gravity Model used to test the effects of democracy on trade. Estimation is done with several models, i.e. FE, RE, MLE, and PPML. The effects of RTAs on trade in MENA regions are varies. AA (Agadir Agreement) affects without trade creation, but trade diversion (1.41 percent) in the block and creates exports and imports with countries outside the block. The AMU (Arab Maghreb Union) affects through trade creation (4.07 percent) in blocks and imports diversion from outside into blocks. COMESA (Common Market for Eastern and Southern Africa) affects through trade creation (7.09 percent) in the blocks and export and import diversion from outside into blocks. The GAFTA (Greater Arab Free Trade Region) affects through trade creation (2.57 percent) in the blocks and export and imports creation outside the block. While the GCC (Gulf Cooperation Council) affects through export and import creation (2.59 percent). From this results can be concluded that RTAs increase bilateral trade in MENA region through several ways and various effect.

Keywords: trade, export, RTA, Gravity Model, MENA.  
JEL: F14, F17.

## **1. INTRODUCTION**

Since the mid of 1980s, there has been a wave of regional trade agreements (RTAs) in the world. Through the RTA, a group of countries agreed to have free international economic relations between them (Bowen, et al., 2001). The RTA is defined by the World Trade Organization (WTO) as a reciprocal trade agreement between two or more partners which includes free trade areas and custom unions (WTO, 2016). RTA is a regionalization in terms of international trade. Middle East and North Africa (MENA) is one of the areas where many countries apply RTA.

RTA can be done either with countries within or outside the region. The RTAs in the MENA region began in the 1950s through two stages (Shui and Walkenhorst, 2010). The first stage took place in 1950-1960, the signing process (beginning of many countries that joined) Arab League Agreement (1953), Arab Economy Unity Agreement (1957), and the efforts of Egypt, Iraq, Jordan and Syria to form Arab Common Market (1964). The second stage began with the explosion of world oil prices in 1970. Some Arab League members signed The Trade Facilitation and Trade Promotion Accord (1981), the Gulf states signed the Gulf Cooperation Council (1981), Arab Cooperation Council (1989) , Arab Maghrib Union (1989),

Common Market for Eastern and Southern (1994), Greater Arab Free Trade Area (1997), and Agadir Agreement (2004). At a glance, it appears that the progress of RTAs in the MENA region is relatively dynamic and overlap.

### **Figure 1 about here**

Some countries in MENA regions are potential export markets for the United States and Europe, (Söderling, 2005). Export is dominated by transportation and industrial goods. It makes both the United States and the European Union to enter into trade agreements with countries in the MENA region that are considered potential. They have stronger relations with countries in the MENA region through free trade agreements (both bilateral or multilateral) and lead to overlapping. The overlapping of one agreement with another agrees resulting in ineffective integration process in MENA regions (Dennis, 2006). Figure 1 shows some RTAs in the MENA region.

## **2. LITERATUR REVIEW**

Trade agreements can be signed between the two countries (bilateral trade agreement) and several countries in a region (regional trade agreement, RTA). Through RTA, economic integration begins to be attained. The cooperations in RTA consist of agrees on free flow of goods and services, capital and labor factors among countries involved in RTA. However, internal institutional arrangements may affect the implementation of RTA.

Based on the level of intensity, the integration process is done through this stages, that is (1) Preferential Trade Agreement (PTA), (2) Free Trade Aggrandizement (FTA), (3) Custom Union (CU), (4) Common Market (CM), (5) Economic Union (EU), and Total Economic Integration (Balassa, 1965; Bowen, et al., 2001; McCarthy, 2006). Policies in the integration phase consist of tariff elimination, joint tariff setting, release of factor production mobility, harmonization of economic policy, and economic policy unification. One of the policy at the CU stage is to reduce or eliminate import tariffs for members in the RTA, and also to set outgoing tariffs on imports from outside the RTA. Such discriminatory policies will lead to two conditions, namely trade creation, and trade diversion (Bowen, et al., 2001).

Trade creation is a trade that takes place after the CU is formed, where the elimination of tariffs between countries incorporated in the RTA will create inter-state trade in RTAs that did not exist previously. For example, a country may divert some of its goods needs by importing into a country in RTA. Trade diversion is the amount of home countries that move, from non partner countries to partner countries with the same RTAs. Trotignon (2010) divides trade creation and trade diversion into five types, that is intra-bloc trade creation with

stimulating effect on trade between partners, export trade creation with stimulating effect on exports to the rest of the world, import trade creation with stimulating effect on imports to the rest of the world, export trade diversion with effect of exports to the rest of the world are replaced by intra-bloc trade, and import trade diversion with effect of imports to the rest of the world are replaced by intra-bloc trade. Then Trotignon (2010) and MacPhee and Sattayanuwat (2014) link between the influence of creation and trade diversion with the sign on the coefficient of the RTA dummy variable. The full explanation is presented in Table 1.

**Table 1 about here**

Shui and Walkenhorst (2010) and WTOB state that there are five RTAs that have considerable influence on trade in the MENA region, namely Agadir Agreement/AA (signed in 2004 with FTA type), Arab Maghreb Union/AMU (signed in 1989 with FTA type), Common Market for Eastern and Southern Africa /COMESA (signed in year 1994 with CU type), Greater Arab Free Trade Area/GAFTA (signed in 1997 with FTA type), and Gulf Council Cooperation/GCC (signed in 1981 under CU type).

The effect of RTA on trade can be seen with the Gravity Model by adding the dummy variable. As a control variables, the results of Rose and Wincoop (2001), Rose (2004), Rose (2007), Tomz, et al. (2007), Kono (2008), Yu (2010), Behar and Freund (2011), and Elshehawy, et al. (2014) indicates that the RTA has a positive and significant effect on the trade flow. As the main variables, Abedini and Péridy (2008), Coulibaly (2009), Ekanayake, et al. (2010), Insel and Tekce (2011), Freund and Perez (2012), and MacPhee and Sattayanuwat (2014) support that the RTA has a positive and significant effect on the trade flow.

RTA will reduce trade barriers and RTA tends to increase trade flow between the two countries. Anderson and Wincoop (2004) state that trade costs are due to policies (tariffs, quotas) and the environment (transportation costs as well as large and retail distribution costs). RTA is a regional agreement that will affect trade policy so that it will affect the cost/trade barriers. The relationship between RTAs and exports can be developed into:

$$x_{ij} = f(y_i^+, y_j^+, d_{ij}^-, RTA_{ij}^+, p_i^-, p_j^-, \dots) \dots \dots \dots (1).$$

**3. METHODOLOGY**

**3.1. DATA**

This study focused on 16 MENA countries, i.e. Egypt, Jordan, Lebanon, Morocco, Jordan (resource poor – labor abundance); Algeria, Iran, Syria, Yemen (resource rich – labor

abundance); and Bahrain, Kuwait, Libya, Oman, Qatar, Saudi Arabia and the United Arab Emirates (resource rich – labor importing) from 1988 to 2015. Djibouti, Iraq and Israel / Palestine were excluded from observations due to the lack of available data. The bilateral trade partners included in the observations are 16 countries in the MENA region and important trading partners outside the MENA, that is United States, United Kingdom, France, Italy and Germany. The pattern of trade is analyzed in five years while the Gravity Model is analyzed annually.

This study uses secondary data sourced from United Nations Commodity Trade Statistics Database (UN-Comtrade), Direction of Trades-International Monetary Fund (DOTS-IMF), International Financial Statistics (IFS), World Development Report- World Bank (BAWDILY ), CIA's World Facebook, and POLITY IV Data set.

### 3.2. GRAVITY MODEL

To measure the effect of RTAs on trade flow, three RTA variables are used (Trotignon, 2010; MacPhee and Sattayanuwat, 2014). Equation 2 uses three RTA dummy variables, that is RTA\_E (1 = if home country is the member of RTA, 0 = others), RTA\_I (1 = if partner country is the member of RTA, 0 = others), and RTA\_2 (1 = both countries are the member of RTA, 0 = others)

$$\begin{aligned} \ln(Ex_{ijt}) = & \beta_0 + \sum_{r=1}^n \beta_{1n} \sum_{r=1}^n RTA\_E_{ijt} + \sum_{r=1}^n \beta_{2n} \sum_{r=1}^n RTA\_I_{ijt} \\ & + \sum_{r=1}^n \beta_{3n} \sum_{r=1}^n RTA\_2_{ijt} + \beta_4 \ln(GDP_{it}) + \beta_5 \ln(GDP_{jt}) + \beta_6 \ln(Dist_{ij}) \\ & + \beta_7 \ln(Pop_{it}) + \beta_8 \ln(Pop_{jt}) + \beta_9 \ln(Area)_i + \beta_{10} ER_{ijt} \\ & + \beta_{11} Oil_t + \beta_{12} Col_{ij} + \beta_{13} Comcol_{ij} + \beta_{14} Lang_{ij} + \beta_{15} GFC_t + \varepsilon_{ijt} \dots (2) \end{aligned}$$

where i is the home country, j is a partner country, and t is the year. There are five RTAs in this model, namely AA, AMU, COMESA, GAFTA, and GCC.

#### Table 2 about here

According to the literature review, the estimation begins with applying the Fixed Effect (FE) Model, Random Effect (RE) Model, Maximum Likelihood Estimation (MLE), and Poisson Pseudo Maximum Likelihood (PPML). Model adjustment is performed if the model is not eligible to apply. The robustness test is performed by comparing the various models and estimators. The sign consistency test is done by estimating the data as whole, divided by country group (resource poor – labor abundant, resource rich – labor abundant, and resource rich – labor importing), and divided by year period (1988 - 1994, 1995 - 2001,

2002 - 2008, and 2009 - 2015). Table 2 describes the operational definition of regression variables used to see the effect of RTAs on trade flows.

#### **4. RESULT AND DISCUSSION**

In MENA region, RTAs are relatively dynamic and overlap. In this period (1988 - 2015), there are five RTAs that have an important role in the MENA region, that is GCC which began in 1981, AMU which began in 1989, COMESA which began in 1994, GAFTA which began in 1997, and AA which began in 2004. The five RTAs are subsequently put into the binary dummy variables. Table 3 shows the dummy variables of the five RTAs in the period 1988 - 2015.

##### **Table 3 about here**

Table 4 shows the results of regression with export as dependent variable. The estimations use several models, that is FE (Abedini and Péridy, 2008; Boughanmy, 2008; Coulibaly, 2009; Ekanayake, et al., 2010; Trotignon, 2010; Insel and Tekce, 2011; Frenund and Perez, 2012), RE (Coulibaly, 2009), and PPML (MacPhee and Sattayanuwat; 2014). MLE is also used to test robustness of model.

##### **Table 4 about here**

Simultaneously, it can be argued that all independent variables can explain changes in export values. This is indicated by the value of F (for FE) or Wald Chi<sup>2</sup> (for RE) or LR Chi<sup>2</sup> (for MLE) which is much higher than the critical value for 99 percent confidence degree. All R<sup>2</sup> values are greater than 0.5.

For the main variable of Gravity Model, GDP of home country and destination country have positive and significant effect, while the distance has negative and significant effect to export. This fact is in accordance with the model developed by Tinbergen (1962), Poyhonen (1963), and Linnemann (1966).

Country characteristic control variables are included to address endogenous problems. These variables and their relationship are the population of home country (positive and significant), the population of partner country (positive and significant), the area of home country (negative and significant), exchange rate (negative and significant), world oil prices (positive and significant), colonized after 1945 (inconsistent and insignificant), common colonized (positive and significant), linguistic similarities (positive and significant), and the period of global economic crisis of 2008 (negative and significant). Variable area of the home country is removed from the FE model (automatically by the software) due to col-linearity problems.

The analysis of the three RTA dummy variables is conducted to analyze the effect of RTA on trade. The AAE and GAFTA dummy variables have positive and significant effect. It means that AA and GAFTA effectively affect trade if the home country is member (creating exports with the rest of AA and GAFTA members). Variables AMU2 and COMESA2 have positive and significant effect. It means that AMU and COMESA effectively affect trade (creating trade in AMU and COMESA blocks) if both countries (home and partner) are incorporated in the RTA. For GCC, GCCE and GCC2 have also positive and significant effect so that RTAs will be effective if the countries of origin or both countries are incorporated into the GCC (trade creation in the GCC block and export creation with the rest of GCC member).

Not all marks on the RTA dummy variable correspond to the hypothesis of trade creation and trade diversion. It supports the findings of Ekanayake, et al. (2010), Trotignon (2010), and MacPhee and Sattayanuwat (2014) who stated that not all marks in the RTA dummy variables indicate trade creation within the RTA block.

All signs of effect are consistent on all models. This indicates that the variables in the model are strong enough to explain the exports of countries in MENA region. The chi square value of Hausman's test is 39.01 (with probability 0.0272). It shows that FE model is preferred than RE Model with a 95 percent degree of confidence and Model RE is preferred than FE Model with a 95 percent degree of confidence. With the same model, MacPhee and Sattayanuwat (2014) use PPML to overcome the bias in the Gravity Model with natural logarithms. The bias is caused by logarithmic transformations, the failure of homoscedasticity assumptions, and the existence of zero in the dependent variable.

The above results support the findings of Abedini and Périidy (2008), Coulibaly (2009), Ekanayake, et al. (2010), Insel and Tekce (2011), Freund and Perez (2012), and MacPhee and Sattayanuwat (2014) that use RTA dummy variable as the main variable and showed that the trade relationship of two countries in the same RTA have a positive and significance effect on trade flows. These results also support the findings of Rose and Wincoop (2001), Rose (2004), Rose (2007), Tomz, et al. (2007), Kono (2008), Yu (2010), Behar and Freund (2011), and Elshehawy, et al. (2014) that use RTA dummy variable as a control variable and show that the RTA has a positive and significant effect too.

#### **Table 5 about here**

For consistency test, the estimation is estimated by five equations where each equation includes only one RTA and all RTAs with the PPML model. Table 5 shows that all coefficients of RTA dummy variables give the same sign, except AMUI, COMESAI, and

GAFTAI variables. All of non RTA explanatory variables also have a consistent sign. In general, it can be said that the influence of RTA is consistent, whether estimated jointly or separately. AA and GCC are the most consistent RTA.

#### **Table 6 about here**

Table 6 summarizes the estimation results with the entire period with a seven year period. Not all RTA dummy variables can be estimated in each period. The AAE, AAI, AA2, AMUI, AMU2, COMESAI, COMESA2, GAFTA2, GCCI, and GCC2 variables have consistent sign between all period and seven year period. The AMUE and COMESAE variables were only inconsistent in the period of 1988 - 1994. The GAFTAE and the GAFT variables were only inconsistent during the period of 1995 - 2001. While GCCE was inconsistent in the period of 1988 - 1994 and the period of 2002-2008. Thus, AA is an RTA variable that has the most consistent sign. Based on Table 4 and Table 5, it can be concluded that AA is an RTA that has the most consistent effect.

For AA, the four models give the same result, that is not creating (diverting) bilateral trade flow intra-block. The results support the findings of Freund and Perez (2012) stating that AA has no impact on intra-bloc trade creation. Meanwhile, AA creates exports and imports with non AA countries.

For AMU, the models (FE, MLE, and PPML) give the same result, creating trade in blocks, and diverting exports and imports. The RE model gives slightly different results, which creates trade in blocks, creates exports, and diverts imports. The four models have in common, creating trade in blocks and transferring imports. These results support Coulibaly's (2009) findings that AMU positively impacts the flow of trade within the block.

For COMESA, the models (FE, MLE, and PPML) give the same result, that is intra-block trade creation, export and import diversion. The RE model gives slightly different results, which creates trade in blocks, creates exports, and diverts imports. The four models have in common, that is creating trade in blocks and transferring imports.

For GAFTA, the models (FE, RE, and MLE) give the same result, that is no intra-block trade creation. These results support the findings of Freund and Perez (2012) stating that GAFTA does not have a positive impact on the flow of trade in the block. On the other hand, PPML model gives the different result, that is creating trade in blocks, creating exports and imports. R<sup>2</sup> value of PPML model is greater than another models.

For GCC, all models give the same result, that is export and import creation (building in FE, RE, and PPML models but stumbling in MLE model). This result supports the

findings of Boughanmi (2008) which concludes that the GCC has a positive impact on trade flow in the block.

PPML is chosen to elaborate the effect of RTAs (Table 7). MacPhee and Sattayanuwat (2014) use PPML to overcome the bias in the Gravity Model with natural logarithms. The bias is caused by logarithmic transformations, failure of homoskedasticity assumptions, and the existence of a zero in the dependent variable.

#### **Table 7 about here**

To measure the effect of RTA dummy variables, the calculations refer to Halvorsen and Palquist (1980) who interpret the dummy variables in the semi-logarithm model. The amount of influence of the dummy variable to the dependent variable is equal to  $e^{c-1}$ , where the value  $e$  is equal to 2.718 and  $c$  is the coefficient value of the dummy variable. The next analysis are based on the measurement on Table 7 and the frame analysis on Table 1.

#### **4.1. AA**

Table 7 shows that AA has a negative sign on the coefficient of RTA2 and positive on RTAE and RTAI. These results can not be elaborated because AA does not effectively affect trade in MENA regions. AA contributes to divert trading from AA to non AA countries by 1.41 percent. In this research, AA is the youngest RTAs (signed in 2006 and became effective in 2006). AA was supported by EU for establishing a free trade area and as a possible first step in the establishment of Euromed (Rouis and Tabor, 2013). Until now, free trade area has been achieved. All members of AA are MENA countries that is Egypt, Jordan, Morocco, and Tunisia. These were categorized by World Bank as resource-poor and labor-abundance countries. Egypt has 24 agreements, Jordan has 20 agreements, Morocco has 29 agreements, and Tunisia has 18 agreements. These are relatively high for MENA countries. Many agreements tend to overlap and ineffective, one of the non effective RTAs is AA.

#### **4.2. AMU**

AMU have positive (significant) for RTA2, negative for RTAE (not significant), and negative (significant) for RTAI. Value of  $RTA2 > |RTAE + RTAI|$ . These results indicate that AMU contributes to intra-bloc trade creation, export and import diversion. AMU contributes to create trade in blocks by 4.07 percent. AMU was signed in 1989. AMU tries to intensity trade among the member, laying down custom union by 1995 and common market by 2000, but none of these have been achieved (Rouis and Tabor, 2013). Until now, only free trade area has been achieved. MENA countries which members of AMU are Algeria, Libya,

Morocco, and Tunisia. These were categorized by World Bank as resource-poor and labor-abundance countries for Morocco and Tunisia; resource-rich and labor-abundance countries for Algeria; and resource-poor and labor-importing countries for Libya.

### **4.3. COMESA**

COMESA have the same sign with AMU, which is positive (significant) for RTA2, negative for RTAE (significant), and negative (significant) for RTAI. Value of  $RTA2 > |RTAE + RTAI|$ . These results indicate that COMESA contributes to intra-bloc trade creation, export and import diversion. COMESA contributes to create trade in blocks by 7.09 percent. COMESA was signed in 1994 with countries in Africa continent as members. Free trade area has been achieved by 2000 and custom union by 2008.. MENA countries which members of COMESA are Egypt and Libya. These were categorized by World Bank as resource-poor and labor-abundance countries for Egypt and resource-poor and labor-importing countries for Libya. COMESA has relatively great effect in intra-bloc trade creation, but only two of twenty members of COMESA are MENA countries.

### **4.4. GAFTA**

For GAFTA, all dummy variables have a positive and significant value where  $RTA2 > ||RTAE + RTAI|$ . These results indicate that AMU and COMESA contribute to intra-block trade creation, non block export and import creation. GAFTA contributes to create trade in blocks by 2.57 percent. Historically, GAFTA is the oldest RTAs. GAFTA was signed in 1997, but the members of GAFTA were the members of Arab League that was signed in 1953. All of MENA countries in this research are member of GAFTA, except Iran. Until now, only free trade area has been achieved. The members of GAFTA have varying characters. These were categorized by World Bank as resource-poor and labor-abundance countries for Egypt, Jordan, Lebanon, Morocco and Tunisia; resource-rich and labor-abundance countries for Algeria, Syria, and Yemen; and resource-poor and labor-importing countries for Bahrain, Kuwait, Libya, Oman, Qatar, Saudi Arabia, and United Arab Emirates. GAFTA has had little impact on MENA trade. GAFTA has faced substantial challenges because of restrictive non-tariff measures and inefficient cross-border measures (Shui and Walkenhorst, 2010).

### **4.5. GCC**

For GCC, the coefficients of RTA2 and RTAE are positive (significant), and RTAI is negative (significant).  $RTA2 < |RTAI|$  and  $RTAE < |RTAI|$ . These results indicate that the

GCC contributes non block exports and imports creation that are building than intra-bloc trade creation. GCC contributes to create export and import by 2.59 percent. GCC was signed in 1981. GCC tries to intensity trade among the member, laying down custom union by 2003, common market by 2008, and single currency (Rouis and Tabor, 2013). Until now, only custom union has been achieved. The members of GCC are Persian Gulf Countries, that is Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, and United Arab Emirates. These were categorized by World Bank as resource-rich and labor-importing countries. The member of GCC have a better economic in MENA region with oil and gas production. Boughanmi (2008) states that GCC intra trade is seem insignificant. This is probably the relative trade openness of GCC members toward to the rest of the world compared to all other trade agreements in MENA region. Insel and Tecke (2011) state that the 2003 custom union agreement has not fostered intra-GCC trade, except United Arab Emirates.

## 5. CONCLUSION

The Gravity model is a good model for explaining the variables that affect trade flow (export). It can be seen from  $R^2$  values that greater than 0.55 for the entire observation (8.960). Simultaneously, all explanatory variables significantly explain exports. For the gravity variable, GDP of home country and partner country have positive and significant effect, while distance has negative and significant effect to export. This fact is in accordance with the model developed by Tinbergen (1962), Poyhonen (1963), and Linnemann (1966). The country characteristic variables and their relationship are the population of home country (positive and significant), the population of partner country (positive and significant), area of the home country (negative and significant), exchange rate (negative and significant), world oil prices (positive and significant), common colonized (positive and significant), the similarity of language (positive and significant), and the period of global economic crisis of 2008 (negative and significant). Only colonized after 1945 have an inconsistent sign.

The RTAs in the MENA region are relatively dynamic and overlap (see Figure 1). The effects of RTAs on trade in MENA region are varies. AA (Agadir Agreement) affects without trade creation, but trade diversion (1.41 percent) in the block and creates exports and imports with countries outside the block. The AMU (Arab Maghreb Union) affects through trade creation (4.07 percent) in blocks and imports diversion from outside into blocks. COMESA (Common Market for Eastern and Southern Africa) affects through trade creation (7.09 percent) in the blocks and export and import diversion from outside into blocks. The GAFTA (Greater Arab Free Trade Region) affects through trade creation (2.57 percent) in the

blocks and export and imports creation outside the block. While the GCC (Gulf Cooperation Council) affects through export and import creation (2.59 percent). For this result, these RTAs are seemed a little effect on trade. MENA region faces a number of serious economic management, that is high youth unemployment, vulnerability to global commodity market shock, weak governance, inefficient public sectors, and water scarcity (Rouis and Tabor, 2013).

AA is the RTA with the smallest effect in MENA region. Intra-block trade creation is not created. On the other hand, COMESA is the RTA with the greatest effect in intra-bloc trade creation, but only two of twenty members of COMESA are MENA countries. AMU is the second best of intra-block trade creation. Four of five members of AMU are MENA countries. All of GCC members are MENA Countries and the most of GAFTA members are too, but this RTAs have a little effect of intra-bloc trade creation (less than 3 percent). From this results can be concluded that RTAs increase bilateral trade in MENA region through several ways and various effect.

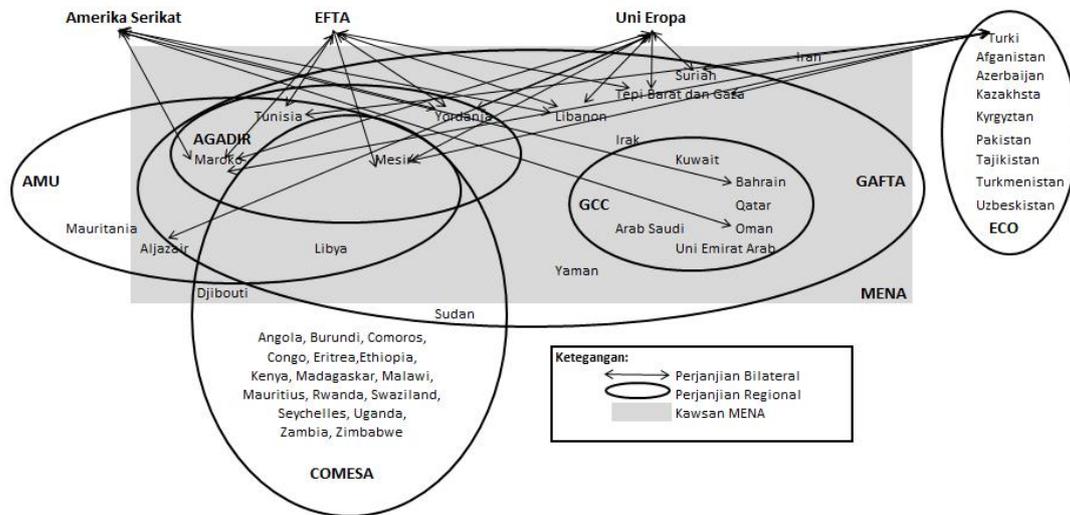
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## 7. APPENDIX

**Figure 1 RTAs in MENA Region**



Source: Modified from Shui and Walkenhorst (2010)

**Table 1 Trade Creation, Trade Diversion, and Block Typology**

Expected Sign			The Difference of Absolute Value	Tipologi Penciptaan dan Pengalihan Perdagangan	Building vs Stumbling
RTA2	RTAE	RTAI			
+	+	+		Intra-bloc trade creation, export and import creation.	Building
+	+	-	$RTA2 >  RTAI $	Intra-bloc trade creation, export creation, and import diversion.	Building if $RTAE >  RTAI $ .
+	+	-	$RTA2 <  RTAI $	Export and import creation.	Building if $RTAE <  RTAI $ .
+	-	+	$RTA2 >  RTAE $	Intra-bloc trade creation, export diversion, and import creation.	Building if $ RTAE  < RTAI$ .
+	-	+	$RTA2 <  RTAE $	Pengalihan export dan penciptaan import.	Building if $ RTAE  > RTAI$ .
+	-	-	$RTA2 >  RTAE + RTAI $	Intra-bloc trade creation, export and import diversion.	Stumbling
+	-	-	$RTA2 <  RTAE + RTAI $	Export and/if import diversion.	Stumbling

Source: Trotignon (2010); MacPhee and Sattayanuwat (2014)

**Table 2 Variable Definitions**

<b>Notoation</b>	<b>Meaning</b>	<b>Variable Definition</b>	<b>Unit</b>	<b>Source</b>
Ex <sub>ijt</sub>	<i>Bilateral Trade</i>	Bilateral trade (export) from country i to country j, years t.	US\$	UN-Comtrade
GDP <sub>it</sub>	<i>Gross Domestic Product (GDP)</i>	GDP country i, years t	US\$	WDI-WB
GDP <sub>jt</sub>	<i>Gross Domestic Product (GDP)</i>	GDP country j, years t	US\$	WDI-WB
Dist <sub>ij</sub>	<i>Distance</i>	Distance between coutry i and country j.	km	CEPII Data set
POP <sub>it</sub>	<i>Population</i>	Population number of country i, year t.	Person	WDI-WB
POP <sub>jt</sub>	<i>Population</i>	Population number of country j, year t.	Person	WDI-WB
Area <sub>i</sub>	<i>Area</i>	Area of country i.	Km <sup>2</sup>	CEPII Dataset
ER <sub>ijt</sub>	<i>Exchange Rate</i>	Exchange rate between country i and j.	Abroad value/home value	WDI-WB
OP <sub>t</sub>	<i>Oil Price</i>	World crude oil price.	\$/bbl	WDI-WB
Col <sub>ij</sub>	<i>Colony</i>	Binary variable, 1 = pairs ever in colonial relationship, 0 = others.	-	CEPII Dataset
Comcol <sub>ij</sub>	<i>Common Colony</i>	Binary variable, 1 = common colonizer post 1945, 0 = others.	-	CEPII Dataset
Lang <sub>ij</sub>	<i>Language</i>	Binary variable, 1 = common language, 0 = others.	-	CEPII Dataset
GFC <sub>t</sub>	<i>Global Financial Crisis</i>	Binary variable, 1 = 2008 and after, 0 = others.	-	
RTA_E <sub>ijt</sub>	<i>RTA Export</i>	Binary variable, 1=if country i is the member of RTA, 0=others.	-	WTO
RTA_I <sub>ijt</sub>	<i>RTA Import</i>	Binary variable, 1=if country j is the member of RTA, 0=others.	-	WTO
RTA_2 <sub>ijt</sub>	<i>RTA 2 Members</i>	Binary variable, 1=both countries are the member of RTA, 0=others.	-	WTO

**Tabel 3 The Membership of RTAs in MENA Region**

<b>Tahun</b>	<b>AA</b>	<b>AMU</b>	<b>COMESA</b>	<b>GAFTA</b>	<b>GCC</b>
1988	0	0	0	0	1
1989	0	1	0	0	1
1990	0	1	0	0	1
1991	0	1	0	0	1
1992	0	1	0	0	1
1993	0	1	0	0	1
1994	0	1	1	0	1
1995	0	1	1	0	1
1996	0	1	1	0	1
1997	0	1	1	1	1
1998	0	1	1	1	1
1999	0	1	1	1	1
2000	0	1	1	1	1
2001	0	1	1	1	1
2002	0	1	1	1	1
2003	0	1	1	1	1
2004	1	1	1	1	1
2005	1	1	1	1	1
2006	1	1	1	1	1
2007	1	1	1	1	1
2008	1	1	1	1	1
2009	1	1	1	1	1
2010	1	1	1	1	1
2011	1	1	1	1	1
2012	1	1	1	1	1
2013	1	1	1	1	1
2014	1	1	1	1	1
2015	1	1	1	1	1

Source: WTO, calculated. 1 is member of RTA dan 0 is not member of RTA.

**Tabel 4 Effect of RTAs on Export in MENA Region**

Variables	LEXij / Coeff. (Standard Error)			
	FE	RE	MLE	PPML
<b>RTA</b>				
AAE	-0.0862 (0.0941)	-0.0314 (0.0911)	-0.0302 (0.0926)	0.0467*** (0.0039)
AAI	0.5282*** (0.0850)	0.5365*** (0.0852)	0.5319*** (0.0849)	0.0316*** (0.0042)
AA2	-0.2675 (0.1750)	-0.2741 (0.1752)	-0.2704 (0.1747)	-0.0142** (0.0060)
AMUE	-0.1136 (0.1993)	0.0332 (0.1776)	-0.0443 (0.1911)	-0.0053 (0.1911)
AMUI	-0.1531** (0.0678)	-0.1551** (0.0679)	-0.1541** (0.0677)	-0.0088** (0.0044)
AMU2	0.6360*** (0.1328)	0.6356*** (0.1329)	0.6361*** (0.1326)	0.0399*** (0.0081)
COMESAE	-0.0861 (0.1339)	0.0962 (0.1776)	-0.0905 (0.1321)	-0.0126*** (0.0049)
COMESAI	-0.2191*** (0.0793)	-0.2190*** (0.0794)	-0.2190 (0.0791)	-0.0158*** (0.0046)
COMESA2	1.1454*** (0.2774)	1.1430*** (0.2778)	1.1444*** (0.2770)	0.0685*** (0.0086)
GAFTAE	-0.2292*** (0.0824)	-0.1713** (0.0809)	0.2052** (0.0820)	0.0056 (0.0049)
GAFTAI	0.5345*** (0.1534)	0.5490*** (0.1525)	0.5161*** (0.1529)	0.0024*** (0.0049)
GAFTA2	-0.0350 (0.1677)	-0.0032 (0.1672)	-0.0216 (0.1672)	0.0254*** (0.0088)
GCCE	-	0.6718* (0.4076)	0.7216 (0.5950)	0.0209*** (0.0056)
GCCI	-0.6693*** (0.0826)	-0.6688*** (0.1005)	-0.6691*** (0.0825)	-0.0340*** (0.0054)
GCC2	0.5710*** (0.1003)	0.5690*** (0.1049)	0.5703*** (0.1002)	0.0256*** (0.0056)
<b>Gravity</b>				
LGDPi	0.8704*** (0.1407)	0.8459*** (0.1226)	0.8635*** (0.1330)	0.0460*** (0.0026)
LGDPj	0.9474*** (0.0220)	0.9488*** (0.0220)	0.9480*** (0.0219)	0.0575*** (0.0015)
LDISTij	-1.417*** (0.0328)	-1.4180*** (0.0328)	-1.4174*** (0.0328)	-0.0878*** (0.0019)
<b>Countries Characteristics</b>				
LPOPi	1.0494*** (0.1594)	0.8733*** (0.1363)	0.9705*** (0.1514)	0.0171*** (0.0027)
LPOPj	0.0119 (0.0271)	0.0124 (0.0272)	0.0121 (0.0271)	0.0018 (0.0018)
LAREAi	-	-0.4535*** (0.0802)	-0.4971*** (0.1217)	-0.0098*** (0.1217)
ERij	-0.0000*** (0.0000)	-0.0000*** (0.0000)	-0.0000*** (0.0000)	-0.0000*** (0.0011)
OP	0.0053*** (0.0012)	0.0058*** (0.0012)	0.0056*** (0.0012)	0.0003*** (0.0001)

Variables	LEXij / Coeff. (Standard Error)			
	FE	RE	MLE	PPML
COLij	0.1573 (0.1108)	-0.1498 (0.1110)	0.1544 (0.1107)	-0.0011 (0.0057)
COMCOLij	0.4930*** (0.0644)	0.4907*** (0.0644)	0.4922*** (0.0643)	0.0204*** (0.0037)
LANGij	0.4551** (0.0774)	0.4740*** (0.0773)	0.4626*** (0.0772)	0.0340*** (0.0045)
GFC	-0.1805** (0.0782)	-0.1401* (0.0777)	-0.1632** (0.0780)	-0.0017** (0.0042)
C	-35.6468*** (2.4148)	-27.1759*** (1.9848)	-28.5693*** (2.4134)	0.6298*** (0.0508)
N	9,960	9,960	9,960	9,960
F / Wald Chi <sup>2</sup> / LR Chi <sup>2</sup>	429,90***	10.728,89***	7.076,70***	-
R <sup>2</sup> / R <sup>2</sup> within	0.5465	0.5463	-	0.5531

Source: UN-Comtrade, WDI-World Bank, CEPII, calculated. \* significant at  $\alpha=10\%$ , \*\* significant at  $\alpha=5\%$ , \*\*\* significant at  $\alpha=1\%$

**Table 5 Effect of RTAs on Export in MENA Region (Classified by RTA)**

Variables	LEXij / Coeff. (Standard Error)					
	ALL	AA	AMU	COMESA	GAFTA	GCC
<b>RTA</b>						
AAE	0.0467*** (0.0039)	0.0478*** (0.0036)	-	-	-	-
AAI	0.0316*** (0.0042)	0.0381*** (0.0042)	-	-	-	-
AA2	-0.0142** (0.0060)	-0.0125** (0.0063)	-	-	-	-
AMUE	-0.0053 (0.1911)	-	-0.0014 (0.0039)	-	-	-
AMUI	-0.0088** (0.0044)	-	0.0059 (0.0043)	-	-	-
AMU2	0.0399*** (0.0081)	-	0.0290*** (0.0078)	-	-	-
COMESAE	-0.0126*** (0.0049)	-	-	-0.0048 (0.0049)	-	-
COMESAI	-0.0158*** (0.0046)	-	-	0.0002** (0.0047)	-	-
COMESA2	0.0685*** (0.0086)	-	-	0.0586*** (0.0088)	-	-
GAFTAE	0.0056 (0.0049)	-	-	-	0.0093 (0.0048)	-
GAFTAI	0.0024*** (0.0049)	-	-	-	-0.0166*** (0.0064)	-
GAFTA2	0.0254*** (0.0088)	-	-	-	0.0406*** (0.0087)	-
GCCE	0.0209*** (0.0056)	-	-	-	-	0.0216*** (0.0056)
GCCI	-0.0340*** (0.0054)	-	-	-	-	-0.0382*** (0.0050)
GCC2	0.0256*** (0.0056)	-	-	-	-	0.0202*** (0.0055)
<b>Gravity</b>						
LGDPi	0.0460*** (0.0026)	0.0563*** (0.0016)	0.0534*** (0.0017)	0.0530*** (0.0015)	0.0524*** (0.0015)	0.0438*** (0.0026)
LGDPj	0.0575*** (0.0015)	0.0531*** (0.0011)	0.0524*** (0.0012)	0.0516*** (0.0011)	0.0510*** (0.0012)	0.0565*** (0.0014)
LDISTij	-0.0878*** (0.0019)	-0.0926*** (0.0015)	-0.0917*** (0.0017)	-0.0921*** (0.0016)	-0.0924*** (0.0016)	-0.0908*** (0.0017)
<b>Country Characteristics</b>						
LPOPi	0.0171*** (0.0027)	0.0075*** (0.0017)	0.0120*** (0.0016)	0.0120*** (0.0016)	0.0125*** (0.0017)	0.0213*** (0.0028)
LPOPj	0.0018 (0.0018)	0.0111*** (0.0013)	0.0124*** (0.0013)	0.0137*** (0.0013)	0.0135*** (0.0012)	0.0045*** (0.0018)
LAREAi	-0.0098*** (0.1217)	-0.0101*** (0.0011)	-0.0113 (0.0011)	-0.0107*** (0.0010)	-0.0105*** (0.0011)	-0.0106*** (0.0010)
ERij	-0.0000*** (0.0011)	-0.0000*** (0.0000)	-0.0000*** (0.0000)	-0.0000*** (0.0000)	-0.0000*** (0.0000)	-0.0000*** (0.0000)
OP	0.0003*** (0.0001)	0.0004*** (0.0001)	0.0006*** (0.0001)	0.0006*** (0.0001)	0.0004*** (0.0001)	0.0007*** (0.0001)
COLij	-0.0011 (0.0057)	0.0006 (0.0052)	0.0001 (0.0053)	0.0006 (0.0053)	0.0092* (0.0053)	-0.0096* (0.0055)
COMCOLij	0.0204*** (0.0037)	0.0316*** (0.0033)	0.0295*** (0.0036)	0.0333*** (0.0034)	0.0318*** (0.0034)	0.0304*** (0.0035)

Variables	LEXij / Coeff. (Standard Error)					
	ALL	AA	AMU	COMESA	GAFTA	GCC
LANGij	0.0340*** (0.0045)	0.0475*** (0.0034)	0.0523*** (0.0034)	0.0545*** (0.0035)	0.0347*** (0.0044)	0.0586*** (0.0036)
GFC	-0.0017** (0.0042)	-0.0053 (0.0042)	-0.0061 (0.0044)	-0.0062 (0.0044)	-0.0031 (0.0044)	-0.0055 (0.0044)
C	0.6298*** (0.0508)	0.5227*** (0.0547)	0.5177*** (0.0476)	0.5241*** (0.0465)	0.5580*** (0.0471)	0.6196*** (0.0494)
N	8,960	8,960	8,960	8,960	8,960	8,960
R <sup>2</sup>	0.5531	0.5425	0.5350	0.5343	0.5392	0.5387

Source: UN-Comtrade, WDI-World Bank, CEPII, calculated. \* significant at  $\alpha=10\%$ , \*\* significant at  $\alpha=5\%$ , \*\*\* significant at  $\alpha=1\%$

**Tabel 6 Effect of RTAs on Export in MENA Region (Classified by Period)**

Variables	LEXij / Coeff. (Standard Error)				
	Total	1988-1994	1995-2001	2002-2008	2009-2015
<b>RTA</b>					
AAE	0.0467*** (0.0039)	-	-	0.0550*** (0.0064)	0.0910*** (0.0076)
AAI	0.0316*** (0.0042)	-	-	0.0243*** (0.0063)	0.0249*** (0.0064)
AA2	-0.0142** (0.0060)	-	-	-0.0107 (0.0092)	-0.0122 (0.0079)
AMUE	-0.0053 (0.0040)	0.0060 (0.0089)	-0.0031 (0.0079)	-0.0173** (0.0069)	-0.0443*** (0.0081)
AMUI	-0.0088** (0.0044)	-0.0208* (0.0116)	-0.0220** (0.0087)	-0.0069 (0.0068)	-0.0057 (0.0074)
AMU2	0.0399*** (0.0081)	0.0846*** (0.0178)	0.0526*** (0.0184)	0.0137 (0.0140)	0.0369*** (0.0130)
COMESAE	-0.0126*** (0.0049)	0.0013 (0.0225)	-0.0155* (0.0086)	-0.0298*** (0.0087)	-0.0113 (0.0083)
COMESAI	-0.0158*** (0.0046)	-0.0125 (0.0220)	-0.0277*** (0.0095)	-0.0179** (0.0076)	-0.0160** (0.0072)
COMESA2	0.0685*** (0.0086)	0.0726** (0.0322)	0.1028*** (0.0140)	0.0505*** (0.0131)	0.0646*** (0.0133)
GAFTAE	0.0056 (0.0049)	-	-0.0064 (0.0087)	0.0078 (0.0168)	0.0804*** (0.0281)
GAFTAI	0.0024 (0.0069)	-	-0.0222 (0.0138)	0.0107 (0.0192)	0.1042*** (0.0299)
GAFTA2	0.0254*** (0.0088)	-	0.0356** (0.0168)	0.0592*** (0.0180)	0.0163 (0.0292)
GCCE	0.0209*** (0.0056)	-0.0168 (0.0132)	0.0349*** (0.0108)	-0.0063 (0.0094)	0.0084 (0.0104)
GCCI	-0.0400*** (0.0054)	-0.0549*** (0.0143)	-0.0436*** (0.0105)	-0.0463*** (0.0095)	-0.0398*** (0.0101)
GCC2	0.0256*** (0.0056)	0.0819*** (0.0142)	0.0124 (0.0106)	0.0125 (0.0094)	0.0173* (0.0099)
<b>Gravity</b>					
LGDPi	0.0460*** (0.0026)	0.0302*** (0.0056)	0.0407*** (0.0049)	0.0625*** (0.0045)	0.0734*** (0.0056)
LGDPj	0.0575*** (0.0015)	0.0614*** (0.0033)	0.0553*** (0.0028)	0.0604*** (0.0032)	0.0606*** (0.0039)
LDISTij	-0.0878*** (0.0019)	-0.0989*** (0.0043)	-0.0873*** (0.0036)	-0.0856*** (0.0032)	-0.0749*** (0.0036)
<b>Country Characteristics</b>					
LPOPi	0.0171*** (0.0027)	0.0259*** (0.0052)	0.0204*** (0.0048)	-0.0014 (0.0049)	-0.0153** (0.0064)
LPOPj	0.0018 (0.0018)	0.0022 (0.0047)	0.0018 (0.0034)	0.0008 (0.0031)	0.0019 (0.0035)
LAREAi	-0.0098*** (0.0011)	-0.0115*** (0.0026)	-0.0106*** (0.0022)	-0.0044** (0.0019)	-0.0023 (0.0018)
ERij	-0.0000*** (0.0000)	0.0000*** (0.0000)	-0.0000 (0.0000)	-0.0000* (0.0000)	-0.0000*** (0.0000)

Variables	LEXij / Coeff. (Standard Error)				
	Total	1988-1994	1995-2001	2002-2008	2009-2015
OP	0.0003*** (0.0001)	-0.0008 (0.0012)	0.0003 (0.0005)	0.0002*** (0.0001)	0.0002** (0.0001)
COLij	-0.0011 (0.0057)	-0.0277** (0.0123)	0.0053 (0.0102)	0.0073 (0.0091)	0.0428*** (0.0104)
COMCOLij	0.0204*** (0.0037)	0.0134 (0.0105)	0.0271*** (0.0075)	0.0200*** (0.0056)	0.0171*** (0.0051)
LANGij	0.0370*** (0.0045)	0.0441*** (0.0084)	0.0464*** (0.0083)	0.0040 (0.0085)	-0.0287*** (0.0103)
GFC	-0.0017 (0.0042)	-	-	-	-
C	0.6298*** (0.0508)	0.8992*** (0.1195)	0.7823*** (0.1042)	0.3870*** (0.1033)	0.1022 (0.1140)
N	8,960	2,240	2,240	2,240	2,240
R <sup>2</sup>	0.5531	0.4606	0.4871	0.5743	0.5593

Source: UN-Comtrade, WDI-World Bank, CEPII, calculated. \* significant at  $\alpha=10\%$ , \*\* significant at  $\alpha=5\%$ , \*\*\* significant at  $\alpha=1\%$

**Tabel 7 Effectiveness of RTAs in MENA Region with PPML Model**

No	Nama RTA	Coeff. of RTA Dummy			Trade Creation and Trade Diversion	Building vs Stumbling	Signed
		RTA2	RTAE	RTAI			
1	AA	-0.0142 **	0.0467 ***	0.0316 ***	Defective.	-	2004
2	AMU	0.0399 ***	-0.0053	-0.0088 **	Intra-block trade creation, export and import diversion.	Stumbling	1989
3	COMESA	0.0685 ***	-0.0126 ***	-0.0158 ***	Intra-block trade creation, export and import diversion.	Stumbling	1994
4	GAFTA	0.0254 ***	0.0056	0.0024 ***	Intra-block trade creation, export and import creation.	Building	1997
5	GCC	0.0256 ***	0.0209 ***	-0.0340 ***	Export and import creation.	Building	1981

Source: UN-Comtrade, WDI-World Bank, CEPII, calculated. \* significant at  $\alpha=10\%$ , \*\* significant at  $\alpha=5\%$ , \*\*\* significant at  $\alpha=1\%$