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An Import Demand for MENA Countries (Case Study for Meat, Dairy and Cereals)

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Abstract: The overall growth performance of the MENA region over has been both mixed and characterized by a higher degree of volatility compared with other regions in the world. The model developed in this paper is applied to explore the role of income in explaining the trade performance of 13 selected Mena countries during 1996-2008 and estimates the impact of the growth in per capita income on the trade of three agrifood products using SITC REV.03 database. The results of the quantitative analysis indicate that there is a positive relationship between distances between trade partners, not as it was expected. High quality agriifood products in not close exporter countries can be the most reason. Having an agricultural agreement between the exporter and importer countries has the statistically positive effect on importing of these three agrifood sectors. Most of the income elasticities are found elastic in this study. In the other word selected countries tend to increase the import of three agrifood sectors by increasing in income per capita.

Key words: Import demand elasticity · Panel data · MENA countries · Importer countries · Exporter countries

INTRODUCTION

Over the last fifteen years or so, growth performance of the MENA region as a whole has been disappointing and mixed relative to that of the rest of developing countries. In comparison with other regions in the world, growth rates in MENA countries have been remarkably volatile. This growth pattern is believed to be inextricably linked to several characteristics of most of the countries in the region notably, their heavy dependence on oil; weak economic base; high population growth and unemployment rates; low rates of returns on investment in physical and human capital; low level of integration in the world economy; underdevelopment of market institutions and, with very few exceptions, the omnipresence of the State.

The recent empirical growth literature has suggested a wide range of growth correlates. The list includes among others, initial conditions, macroeconomic performance, trade openness, government size, income distribution, financial market development, natural resource abundance, institutions, politics and physical geography. These ultimate sources of growth have been shown to be as important as the proximate factors of growth namely, physical capital, labor and the efficiency with which these factors are combined.

The slow growth in developing economies has initiated more attention on emerging markets that appear to offer more exciting growth prospects. Aljebria, Bahrain, Egypt, Iran Israel Jordan, Kuwait, Lebanon, Malta, Morocco, Oman, Qatar, Saudi Arab, Syria, United Arab Emirates, Tunisia, Yemen. This paper addresses a number of questions that will help in understanding the role of the Middle East and North African countries (MENA). Countries income in agrifood trade and how they compare to other emerging market is the subject of the last studies at similar levels of development. We consider influence of economic growth of Middle East and North African countries (MENA). Furthermore varied effect of income elasticity's of import demand in Middle East and North African countries (MENA). Countries and similarity of income elasticity's at same level of economic development [1].

The relationship between trade expansion and economic growth has been a subject of considerable debate in the international economics literature. Trade expansion depends on two key factors - income growth and reduced trade costs that include import barriers, communication and transfer costs [2].

World has witnessed major changes in income growth across the development spectrum. The annual growth rate of per capita GDP growth rate of high

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Table 1: Agrifood imports by country (billions of US dollars) during 1996 to 2008

	Meat	Dairy	Cereals
Algeria	86.8	590.0	836.7
Egypt	293.5	172.5	1549.8
Iran	75.2	64.9	1068.2
Israel	163.3	37.3	608.1
Jordan	85.6	102.1	387.2
Kuwait	148.8	168.7	224.6
Lebanon	69.6	169.1	191.8
Malta	48.8	100.6	46.6
Morocco	10.1	37.5	763.4
Oman	105.8	194.2	649.7
Qatar	49.3	91.5	255.2
Saudi Arabia	745.8	772.9	1695.9
United Emirates	522.0	434.2	802.5

Source: Research findings

income countries fell from 4.1 percent in 1961-65 to about 1.5 percent in 2000-06 while the per capita GDP of low income countries grew steadily from 1.5 percent to 4.5 percent during the same period. Middle income countries suffered a decline in their per capita GDP during the 1970s and 1980s; grew faster in the early part of the 1990s and have experienced even more rapid growth more recently [3]. This study examines effect of changes of GDP in the global economic landscape have the potential in traditional patterns of global agrifood trade.

An import demand model is developed to explore the role of income in explaining the trade performance of low, middle and high-income countries with a special emphasis on Brazil, Russia, India and China – the BRIC economies. The study estimates the impact of the growth in per capita income on the trade of agrifood products using data for 52 countries and 20 agrifood products for the years 1990 to 2006. The results suggest that China, Russia and Brazil have more income elastic import demand than other middle-income countries. Conversely, the income elasticities of import demand in India are similar to other low-income countries and for the most part statistically equal to zero [4].

Table 1 shows the average value of the selected agrifood imports in 13 years by selected MENA countries.

United emirates imports of meat grew from $501 billion in 1999 to $1195 billion in 2008 has the largest increase in comparison to other selected countries. Iranian import of meat in comparison to other countries has the largest decrease in this period. Saudi Arabia had the largest import of meat and Morocco had the lowest one. Dairy import of Saudi Arabia has the largest increase from $467 billion in 1998 to $1310 billion in 2007. The largest decrease in the value of dairy import in these 13 years is related to Iran with a $26 billion decrease from 1997 to 2006. The largest average value of dairy import is related to Saudi Arabia and Israel and Oman had the lowest increase.

United emirates import of cereals that has changed from $1155 billion in 1999 to $3621 billion in 2008, has the largest change among other selected countries. Algeria import of cereals has the less change during 1999-2008.

MATERIALS AND MATHODS

The fundamental assumption for developing an import demand is that food and non-food products are separable and food product demand in each country i is generated by a representative consumer with a two-stage utility function:

$$U^i = U(u_1^i,\ldots,u_f^i,\ldots,u_{F+1}^i,\ldots,u_h^1,\ldots u_H^1 \quad (1)$$

In this utility function Q_f indicates imported food products where f = 1… F indexes imported and Q_h indicates domestically produced food products and h = F+1… H, indexes domestically produced products.

The sub utility index U_h^i is a general function of the quantity consumed of product h while the sub utility index is assumed to have a constant elasticity of substitution (CES) utility function to allow for substitution between differentiated products [5].

$$U_f^i = \left(\sum_{f=1}^{F} Q_f^{?f}\right)^{1/?f},\ 0 < ?f < 1,\ f = 1 \ldots 20 \quad (2)$$

Food expenditure for country i is:

$$E_f^i = \sum_{f=1}^{F} P_f^i Q_f^i \quad (3)$$

Second stage of budgeting and maximizes the CES approximation of preferences subject to this expenditure, generating expenditure functions (equation 3) where $\rho_f{}^i$ represents the price of each product in country i and the demand for product f of country I symbolize with $Q_f{}^i$. And food expenditure by per capita income in country i represents with I_i, demand for a food product is:

$$P_f^i Q_f^i = \frac{(p_f^i)^{\frac{\rho f}{1-\rho f}}}{\sum_{f=1}^{F}(p_f^i)^{\frac{\rho f}{1-\rho f}}}\ \bar{I}_i \quad (4)$$

The elasticity of substitution between any two products within a product sector faced by a consumer in country i indicate with ó $_f$ that it can be calculated from this formula:

$$\sigma_f = 1/(1-\rho_f)$$

Separable assumption between demand for imported and domestically produced agrifood products the value of country i's per capita imports from country j in year (y) of product f (imp_{ijfy}) is given as:

$$imp_{ijfy} = \frac{(P_{jfy}T_{jfy})^{1-\rho f}}{\sum_{f=1}^{F}(P_{jfy}T_{jfy})^{1-\rho f}}\ \bar{I}_{iy} \quad (5)$$

The seven product sectors are: meat; dairy; cereals; vegetables; fruits; tea and coffee; oilseeds. Since the price P_{ijfy} of a product in sector f in importing country i in year y is affected by trade costs, the import price is replaced by (P_{jfy} T_{jfy}) using the equality between the import price and the product of the export price and trade costs. Trade costs (T_{jfy}) are influenced transportation costs that are proxied by the distance between trade partners i and j (distij); trade partners sharing a common border (DCBij) and preferential trade agreements (DPTAij) that approximate the tariff structure between trade partners [6].

$$\ln T_{ijf} = \beta_1 \ln dist_{ij} + \beta_2 DCB_{ij} + \beta_3 DPTA_{ij} + v_{ij} \quad (6)$$

Taking the logarithm of both sides of equation (4) and substituting for the variables that determine T_{jfy} and simplifying yields:

$$\ln imp_{ijfy} = \psi_i + \psi_j + \psi_y + \psi_f + \Upsilon_1 \ln dist_{ij} + \Upsilon_2 DCB_{ij} + \Upsilon_3 DPTA_{ij} + \Upsilon_4 \ln \bar{I}_{iy} + \varepsilon_{ijfy} \quad (7)$$

Where ψ_i, ψ_y and ψ_f are importing, year and product specific fixed effects included in equation (6) to account for unobserved heterogeneity, including factors like prices and product specific characteristics and also include domestic and trade related policies, industry specific border related hindrances, immeasurable product quality characteristics, technical and nontechnical barriers to trade and so on. Therefore, fixed effects provide a solution to unobserved heterogeneity and this is the reason why these fixed effects are included in the empirical model [7]. In addition to this it is considerable that γ_4 is the income elasticity that showing the proportionate change in the expenditure on the imports of an agrifood product as income changes. Equation (6) is further modified to facilitate hypotheses testing. The study uses data from 1996 to 2008.

The Main Equation to Be Estimated Is:

$$\ln imp_{ijf} = \psi_i + \psi_j + \psi_f + y_1 \ln dist_{ij} + y_2 \ln agree_{ij} + y_3 \ln \bar{I}_i + \varepsilon_{ijf} \quad (8)$$

Where $\bar{I}$ represents per capita income for i country. $Dist_{ij}$ is the distance between each importer and exporter country for each food sector. "$Agree_{ij}$" is a dummy variable that indicates that if there is any agricultural agreement between to relative countries. ψ_i , ψ_j and ψ_f are the constant coefficients. ε_{ijf} stands for error terms.

Equation (8) is used to test a number of hypotheses for MENA countries and other regions.

Data: The main purpose of the research was the situation of MENA countries in importing of 3 important food sectors; meat, dairy and cereals. Some of the MENA countries are omitted in this study because of lack of data. So our research includes Algeria, Egypt, Iran, Israel, Jordan, Kuwait, Lebanon, Malta, Morocco, Oman, Qatar, Saudi Arabia and United Emirates. The value import of 3 food sectors for 13 MENA countries has been collected from SITC Rev. 3 from 1996 to 2008. The average of these data is presented in Table 1 in appendix. For choosing the exporter countries we contain 80 per cent of imports the 3 food sectors for 13 years, so we have selected the exporter countries that are most common in 13 MENA countries. The export value of 8 or 9 most important exporter countries in the world that exports meat, dairy and cereals to the 13 selected countries for 13 years is collected from SITC Rev. 3. Also the distances between each exporter and importer country has collected from DISTANCES site. Gross Domestic Products (GDP) per capita for each country is used as per capita income to estimate the import demand elasticity. Contracting between each exporter and importer country by any agricultural agreement is used as a dummy variable in the model. We have collected these data from CIB site. We had also involved common border between two related countries as another dummy variable, but because none of the exporter and importer countries had common border we omit it.

RESULTS AND CONCLUDING OBSERVATION

Table 2 represents the result of equation 8 for 3 food sectors: meat, dairy and cereals. We have used panel data for these time-series and cross sections for 13 MENA countries during 13 years. 80 per cent of import values of the food sectors have distinguished and we have chosen the exporter countries that were the exporter of most selected MENA countries. So we select Australia,

Table 2: Regression results for agrifood products imports (real 2000 US dollars) using Least Squares

	Meat	Dairy	Cereals
Log of distance	0.36** (0.00)	0.35** (0.00)	0.18* (0.04)
Agreement	1.93** (0.00)	2.19** (0.00)	3.97** (0.00)
Income elastities			
Algeria	1.79 (0.06)	0.54 (0.14)	0.44 (0.12)
Egypt	0.78 (0.72)	-0.39 (0.56)	2.07 (0.08)
Iran	-0.49 (0.50)	-0.75* (0.05)	-0.61 (0.30)
Israel	4.1* (0.04)	1.79 (0.08)	-0.84 (0.61)
Jordan	2.97** (0.00)	0.53 (0.32)	1.03 (0.22)
Kuwait	1.28* (0.04)	0.41 (0.09)	0.24 (0.61)
Lebanon	2.98** (0.01)	-0.08 (0.9)	1.93 (0.14)
Malta	1.57** (0.00)	0.47 (0.08)	1.36** (0.01)
Morocco	2 (0.06)	1.57** (0.00)	1.28** (0.00)
Oman	1.24** (0.00)	1.12** (0.00)	-0.66 (0.30)
Qatar	1.06** (0.00)	0.17 (0.36)	0.31 (0.27)
Saudi Arabia	1.39** (0.01)	0.75** (0.00)	1.52** (0.00)
United Emirates	1.73** (0.00)	0.94** (0.01)	0.41 (0.18)

Source: Research findings

*Stands for 95 per cent significant

**Stands for 99 per cent significant

Data for Algeria in 2008, for United Emirates in 2006-2008, for Iran in 2007-2008, for Kuwait in 2005-2006, for Lebanon in 2005 and for Qatar and Saudi Arabia in 1996-1998 are not available

The meat sector includes two individual products having SITC codes 011(bovine meat) and 012(other meat); the dairy sector 022(milk and cream), 023 (butter) and 024 (cheese and curd); cereals 041(wheat), 042 (rice), 043 (barley), 044 (maize), 045 (other cereals), 046 (wheat meal), 047(cereal meal) and 048(cereal preparation)

Brazil, Denmark, France, India, Ireland, Netherland and New Zealand as meat exporter countries, Australia, Belgium, Denmark, France, Germany, Ireland, Netherland, New Zealand and United Kingdom as dairy exporter countries and Argentina, Australia, Canada, France, Germany, Federal Russia, United Kingdom, Ukraine and USA as cereals exporter country to the 13 MENA countries. We have used the distances between the capitals of each exporter and importer countries. Signing an agricultural agreement between two countries, as a dummy variable, is contained to the model. Having common border or not as a dummy variable is omitted because there was no share border between the trade partners. Theoretically, distance is expected to have a negative sign, because an increase in the distance between trading partners is expected to decrease imports. In this study distance is appeared with positive sign for all 3 food sectors. It is probably because of the high quality exports that were more valuable than the distance cost for most of the MENA countries like Saudi Arabia, Kuwait, United Emirates and so on. High quality agrifood products in not close exporter countries and the importance of import quality rather than import costs is the main reason for positive effect of distance on import value.

Similarly, countries with trade agreements are expected to trade more and these variables are expected to have positive signs. In our study we the agreement dummy is represented positive for all 3 food sectors. Having an agricultural agreement between trade partners insures the safety and guaranty and motivates countries to be in trade with each other Table 2 presents the income elasticities for each food sector by importer countries. Some hypothesizes are rejected and some are reliable in 95 per cent or 99 per cent. These import demand elasticities can be positive or negative, because an increase in per capita that is an index for economic growth, will cause more import for countries that allocate much more expenditures for importing necessary products, in contrast it will cause less import for countries that invest in producing to be more self sufficient. Most of the coefficients are positive as it was expected. For some countries like Algeria and Egypt none of the coefficients are reliable, for some countries like Saudi Arabia all 3 coefficients are reliable in 99 per cent. It means that changing in per capita income in this country effects on the value import of meat, dairy and cereals.

The largest coefficient is relates to the import demand elasticity of meat in Egypt, it can indicates that 1 per cent change in per capita income in Egypt will cause a 4 per cent increase in meat import.

All the income elasticities that are statistically significant, are elastic for meat and cereals. As it is clear in Table 2 the income elasticity of meat is 4.1 for Israel, 2.97 for Jordan, 1.28 for Kuwait, 2.98 for Lebanon, 1.57 for Malta, 1.24 for Oman, 1.06 for Qatar, 1.39 for Saudi Arabia and 1.73 for United Emirates. This coefficient for cereals is 1.36 for Malta, 1.28 for Morocco and 1.52 for Saudi Arabia. Demand elasticities for other countries are not statistically significant.

Import demand elasticities of dairy is elastic for some countries (1.57 for Morocco, 1.12 for Oman) and inelastic for some others (0.75 for Iran, 0.75 for Saudi Arabia and 0.94 for United Emirates). This coefficient is not statistically reliable for other countries.

None of the negative coefficients (import demand elasticities) are statistically significant, it means that none of these selected countries have tent to be more self sufficient in the 3 selected food sectors.

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