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Abstract

This paper offers information about the progress made by the Sustainmed project on accomplishing the objectives of the Work Package 3 concerning (i) the identification of MPC's major trade partners and competitors in the international agro-food marketplace, including the analysis of MPCs' comparative advantage in agricultural trade, trade specialisation and competitiveness towards emerging economies; and (ii) the assessment of the trade effects on MPC by deepening the Euro-Med integration process through the Luxembourg roadmap and the recently-created Union for the Mediterranean, as well as by adopting further bilateral and multilateral agreements, with special focus on emerging exporters of products of special interest for MPCs.

Acronyms

ARIMA:	autoregressive integrated moving average
AVE :	Ad Valorem Equivalent
CEEC :	Central and Eastern European Countries
CEP:	Comparative export performance
CES:	Constant Elasticity of Substitution
CET:	Constant Elasticity of transformation
CGE:	Computable General Equilibrium
CIHEAM:	International Center for Advanced Mediterranean Agronomic Studies
COMEXT:	Intra and Extra European Trade database
EPS:	Entry price System
EU:	European Union
EU27:	European Union at 27 countries
F&V:	Fruit and Vegetables
FTA :	Free Trade Agreement
FYROM :	Former Yugoslav Republic of Macedonia
GAFTA:	Great Arab Free Trade Area
GAMS:	General Algebraic Modeling System
GDP:	Gross Domestic Product
I-O:	Input-Output Matrice
LES :	Linear Expenditure System
MC:	Mediterranean countries
MFN:	Most-favored Nation
MPC:	Mediterranean partner countries
MTE:	Maximum Tariff Equivalent
NTB:	Non-tariff barriers
NTM:	Non-tariff measures
OECD:	Organisation for Economic Co-operation and Development
PE:	Partial Equilibrium
RASFF:	Rapid Alert System for Food and Feed
RCA:	Comparative Advantage Indice / Revealed Comparative Advantage
RQ:	Reference Quantities
SAM:	Social Accounting Matrices
SIV:	Standard Import Values
SPS :	Sanitary and Phytosanitary Measures
STIC :	Standard International Trade Classification
TARIC:	Online Customs Tariff Database
TBT :	Technical Barriers to Trade
TEP:	Trigger Entry Price
TRQ:	Tariff-Rate Quotas
UNCTAD:	United Nations Conference on Trade and Development.
URRA :	Uruguay Round Agreement on Agriculture
VPM:	Value of Preferences Margins
WP:	Work Package
WTO:	World Trade Organization

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Introduction

The overall objective of the SUSTAINMED project is to describe and assess the impacts of EU and national agricultural, rural, environmental and trade policies on the Mediterranean Partner Countries and Turkey. Specific impacts include socio-economic structural changes, income distribution, resource management, poverty alleviation, employment and migrations trends, as well as commercial relations with major trade partners (in particular the EU) and competitiveness on international markets. The project integrates a wide range of complementary methods and analytical tools including quantitative modelling, structured surveying, indicator building, and qualitative data analysis, in order to provide (i) orders of magnitude of the impact on MPCs related to changes in important policy parameters, and (ii) qualitative insights into processes which will be important for the future welfare of MPCs but which cannot be fully captured by quantitative indicators. The project findings will enable the EU Commission and relevant stakeholders to formulate realistic policies and action plans to support sustainable agri-food systems, rural development programmes and capacity building in the Mediterranean region. The project outcomes will also contribute to improve collaboration and economic and commercial relations between the EU and target MPCs, in line with the stated goals of the Barcelona Process: Union for the Mediterranean. Further, the project will provide research that will support the promotion of sustainable development to fulfilling the EU's commitment towards the United Nation Millennium Development Goals in the region.

This report supplies information and results corresponding to the Working Package 3 (WP3). The WP provides research on commercial relations between countries in the Mediterranean region and their major trade partners such as the EU, increasing competition on the export market compared with emerging economies, changing trade patterns, and the impact of agro-food trade liberalisation (multilateral and bilateral) in the Mediterranean partner countries. As stated in the project's work description, the objectives of WP3 are (i) the identification of MPC's major trade partners and competitors in the international agro-food marketplace, including the analysis of MPCs' comparative advantage in agricultural trade, trade specialisation and competitiveness towards emerging economies; and (ii) the assessment of the trade effects on MPC by deepening the Euro-Med integration process through the Luxembourg roadmap and the Union for the Mediterranean, as well as by adopting further bilateral and multilateral agreements, with special focus on emerging exporters of products of special interest for MPCs and Turkey. WP3 also aims to deepen and extend knowledge on non-tariff measures (NTMs) and private standards in the agro-food sector and more precisely on sensitive commodities. The WP will highlight a better identification and understanding of NTMs and will assess the role of public and private norms (concerning sanitary, social, or environment fields) on: i) MPCs' producers, exporters and other actors' in the import-export chains; and ii) the pattern of trade flows in the Euro-Mediterranean area.

The report is divided in various sections. First, the current situation of agricultural trade is set as a starting point, highlighting the position of Mediterranean Partner Countries and Turkey (section 1). We will then focus on MPCs competitiveness (section 2) and benchmark projections for agricultural exports from MPCs and Turkey (section 3). Later attention is paid to the role of tariff and non-tariff barriers constraining trade in the Mediterranean region, highlighting the role of EU trade policies, in particular the entry price system (section 4) and Non-Tariff Measures (NTMs) (section 5). The paper will refer to the impact of EU trade preferences (section 6) and further liberalization on selected MPCs' exports, including simulations of some of the proposals of the new EU -. Morocco Association Agreement (section 7). Consideration of distributional impacts of trade liberalization is made in the advanced information of Sustainmed work, given in section 8.

1. Agricultural trade in the world and in the Mediterranean region [2]

In this report we will use the term Mediterranean Partner Countries (MPCs) when we refer to Algeria, Egypt, Palestinian territory, Israel, Jordan, Lebanon, Libya, Morocco, Syria, Tunisia and Turkey. The aim of this chapter is to provide information about the main trade partners and trends in relation to the EU and the World. More specifically, figures, charts and tables will be used to visualize and to present simply and concisely data concerning the EU imports from the countries in the region, exports to the world, trade with main partners, etc.

We are in times of change and the question remains on the impact of the recent political changes in the Arab world on trade policies. What seems probable is that in the building of post-revolution countries trade openness and integration will keep being key words of the relation between the Mediterranean region and the world. Is its also likely that trade patterns will tend to rely less heavily on European markets and more on other parts of the world.

What this report considers is a pre-revolutionary situation, which provides with benchmark projections and simulations needed to assess policy changes. It seems plausible that the agricultural sector will recover a strategic importance for MPCs (Abis and Tamlilti, 2011). In an era of food crisis, or huge volatility in food prices (Sustainmed WP5), agriculture appears as fundamental to the maintenance of economic, social and territorial equilibrium in the Mediterranean region. This is also shown by the statistics of the number of agricultural workers in the MPCs, which remained high during the last decade while in other regions marked significant decrease. More specifically, by 2010 nearly 34 million people were employed in the agricultural sector (compared with 30 million in 1990), or 25 to 30% of active population. Nevertheless, there are stark contrasts between countries (43% in Turkey and 33% in Morocco as opposed to 5% in Libya and 3% in Lebanon) and it also underlines that Turkey and Egypt alone account for 23 million of the agricultural workers.

[2] This section draws on the authors' contribution to the Mediterra report (CIHEAM, 2011) and on the contribution by George Baurakis and Yorgos Gadanakis under W3T1.

Moreover, agriculture makes a considerable contribution to the national economies of the Mediterranean Partner Countries. The share of agriculture in Gross Domestic Product (GDP) is admittedly high and economic growth depends upon the dynamism of the agricultural sector. Agriculture is vital to the economies and currently account for 4 to 8% of GDP (20% in Syria and 14.6% in Morocco).

Table 1: MPCs and Turkey: Agriculture value added (% of GDP) - % of rural over total country population

Country	Agriculture value added (% of GDP)			% of rural over total population
	1989	1999	2008	
Algeria	13	12.2	6.9	34.1
Morocco	17.7	17.5	14.6	43.6
Tunisia	12.9	13	9.9	33
Egypt	19.7	17.3	13.2	57.2
Turkey	17.1	11.5	8.6	30.8
Jordan	6.6	2.4	2.9	22.7
Lebanon	:	7.2	5.3	12.9
Libya	:	:	1.9	:
Syria	24.8	25.2	20	:

Source: UN data, Rural Poverty Report, 2010

What about agricultural trade? In the second half of the past decade, the volume of agricultural trade between Europe and the Southern and Eastern Mediterranean region reached to 200 billion Euros. About one third of this volume in the region is actually the trade with Turkey. Bilateral agricultural trade represent about 10 percent and 40 percent of total trade of the EU and the region respectively. This share is lower for Egypt and Israel (about 29 percent), higher for Turkey (about 51 percent) and even higher for Tunisia and Morocco (almost 70 percent).

The region shows heavy dependence on food staple imports and certain specialization in Mediterranean products' exports. Table 2 presents the agricultural trade balance of the Mediterranean Partner Countries (MPC). Except in fruits and vegetables which is mostly due to Turkey's production amount, the Mediterranean region shows a deficit in agricultural trade of all commodity groups.

Table 2. Trade Balance in Agricultural Products in the Southern and Eastern Mediterranean region

Products	Average of 2004-06 (exports-imports) (Million USD)
Fruits and Vegetables	4,299
Cereals	-5,910
Eggs and Dairy Products	-1,443
Feed Products	-1,400
Oils	-1,261
Sugar, Honey	-1,235
Oilseeds	-1,202
Coffee, Tea, Spices	-1,201
Tobacco and Beverages	-838
Meat	-827
Agricultural Trade Balance	-12,212

Source: Rastoin J. (2009).

Consequently, one of the most outstanding features of agricultural trade in MPCs is their reliance on imports. While Turkish situation is nowadays more or less balanced, the rest of countries show persistent imbalances along the second half of the last decade. Moreover, for most of the MCs. Albania, Algeria, Egypt, Lebanon, Morocco, Tunisia and Turkey- the net trade balance has been worsening over the period 2005-2008 (Table 3).

Table 3. Agricultural net trade balance in MCs (in million US$)

	2005	2008	Net trade as a % of total agricultural trade (average 2007/2008)
Albania	-405.9	-780.3	-84.2%
Algeria	-382.7	-7,709.3	-97.5%
Egypt	-277.8	-6,837.9	-60.9%
Lebanon	-1,078.4	-1,753.1	-66.3%
Malta	-348.1	-517.1	-75.6%
Morocco	-949.8	-3,238.2	-45.1%
Tunisia	-208.4	-1,001.9	-21.8%
Turkey	2,863.4	288.2	-1.8%

Source: authors' calculations based on CIHEAM (2011) and FAOSTAT data

Another remarkable fact to highlight is the concentration of agricultural trade on few countries around the Mediterranean Basin. The main Mediterranean suppliers of agricultural products to the EU are Turkey, Morocco, Israel and to a lesser extent Egypt and Tunisia. These five countries have supplied over 90% of EU agricultural imports from the MPCs in the last decade, Turkey representing the major origin. On the other hand, Algeria is by far the EU's top customer: it alone absorbed about 25% of EU agricultural exports to the MPCs in the same period.

Extra-EU actors are also significant suppliers in the fast growing import market in the MPCs. As recent studies indicate (CIHEAM 2010, Abis, 2011a), the United States ranks the leading trading partner as a source of agricultural products to Turkey, Egypt, Jordan, Morocco and Algeria. The products are mainly grains, in particular wheat, maize and soybeans. Imports are also growing from Brazil, which exported around 6 billion dollars in 2008 to the Arab region (mainly beef, soybeans and sugar); and from Russia and Ukraine, which are forecasted to become major partners in the Mediterranean regions, in wheat trade. Dependency in the Mediterranean region on cereal imports is fostered by demography, by a dramatic change in consumption patterns (with a trend to withdraw from the Mediterranean diet) and by the supply constrains (water scarcity and low productivity in rain-fed areas).

As for the bilateral trade between the EU and the MPCs, the EU mainly buys vegetables from them. In the period 2005-2009 the MPCs supplied in average about over 40% of the vegetables imported by the EU and close to 17% of the fruits imported by the EU. The MPC's are virtually the EU's only suppliers of a number of vegetables, according to Comext data in 2006-2009. Virtually all the potatoes imported into the EU are originated in the Euro-Mediterranean partners, mainly from Egypt, Israel and Morocco; for tomatoes, Morocco alone holds more than 60% of EU imports in value. MPCs represent almost 90% of the EU cucumber import market, with Turkey on top with about two thirds of total imports.

As to fresh fruits, the relevance of Mediterranean exporters to the EU diminishes significantly, except for some exceptions. For instance, Tunisia holds about 50% of dates' imports value, and the all MPCs jointly account for 83% of dates' imports value. Turkey is the main fig supplier to the EU with above 90% of its import market. MPCs don't dominate the European market of most of fresh fruit, mostly due to off-season imports from the Southern Hemisphere. In fresh oranges and fresh grapefruits, about 30% of extra-EU imports are originated in MPCs. For lemons and limes, the percentage decreases to 20%, and for fresh mandarins and clementines, it rises to 50%.

Olive oil is almost exclusively a Mediterranean product, though trade flows are increasing in the rest of the world. While olives are currently grown in many countries, the Mediterranean region accounts to close to 90% of the world's olive oil production, in particular from Spain, Tunisia, Greece, Turkey, Italy and Syria as top producers. It is worth noting that olive oil is losing market share in the world's trade of agricultural fats and oils. Olive oil accounted for about the 13% of fats and oils market share in 2004, while in 2008 this share was down to 7.4%. Per capita consumption declines in virtually all tradition consumers in the

Mediterranean region while increases in other non-traditional consumer countries (Lazzeri, 2011). The emerging Chinese market in 2012 will amount to nearly imported 63,000 tons and the most optimistic forecasts for the period up to 2015 are as high as 100,000 tons per year. For these countries, the healthy properties of the products are the key determinants of the growing demand.

As international trade has become more commonplace in the agricultural sector, trade patterns have emerged. This Sustainmed report refers, first, to benchmark projections of selected agricultural products in MPCs. Secondly, we report on the efforts currently underway to simulate impacts of trade liberalization.

2. Trade patterns and comparative advantages in MPCs

Trade patterns are subject to the influence of domestic as well as international trade policies and factors directly related to crops and the production of goods that can affect the trade of agricultural products. A major objective of WP3 (Task W3T1) has been the the identification of MPCs major trade partners. Annex 1 presents the trade profiles of the main EU's trading partners in the MPCs with relevant information on trade agreements signed, bilateral trade of agricultural products with the EU and trade with the world, stressing the role of non-EU partners, in particular emerging economies.

To assess MPCs competitiveness, Task W3T1 has carried out an update in the estimation of revealed comparative advantages in selected MPCs. In theoretical models, comparative advantage is expressed in terms of relative prices evaluated in the absence of trade. Since these are not observed, task W3T1 has measured comparative advantage indices (RCA) using the trade pattern to identify the sectors in which an economy has comparative advantage, by comparing the country of interests' trade profile with the world average. The RCA index is then defined as the ratio of two shares, the numerator being the share of a country's total exports of the commodity of interest in its total exports. The denominator is the share of world exports of the same commodity in total world exports. Ranging between 0 and $+\infty$, a country is said to have a revealed comparative advantage if the value exceeds unity.

There are other RCA alternative indices suggested and employed in the literature to measure comparative advantage, -discussed in the methodological notes included Annexes 2 and 3 (e.g. Balance et al., 1987; Yeats, 1985; Hinloopen and Van Marrewijjk, 2001). It is therefore encouraged that the policy makers need cautious interpretation of RCA indices by especially underlining probabilities of revealing a comparative advantage or disadvantage. In fact, the Egyptian team in Sustainmed has not restricted the estimated measure to the classical RCA, but it has also applied other more elaborated indices, in order to avoid unfavourable conclusions due to policy distortions and/or the export (supply) pattern and the import (demand) pattern of the specified commodities (see Annex 9).

For the needs of our study, the results shown below are obtained with the classic Balassa index, and apply it to measure the bilateral competitiveness of MPCs with respect to the EU 27. We first used annual two digit SITC REV. 3 (Standard International Trade Classification) data covering exports and imports on the bilateral level for the period of 1999 – 2009 from the Eurostat both for the EU 27 and the MPCs. The following table

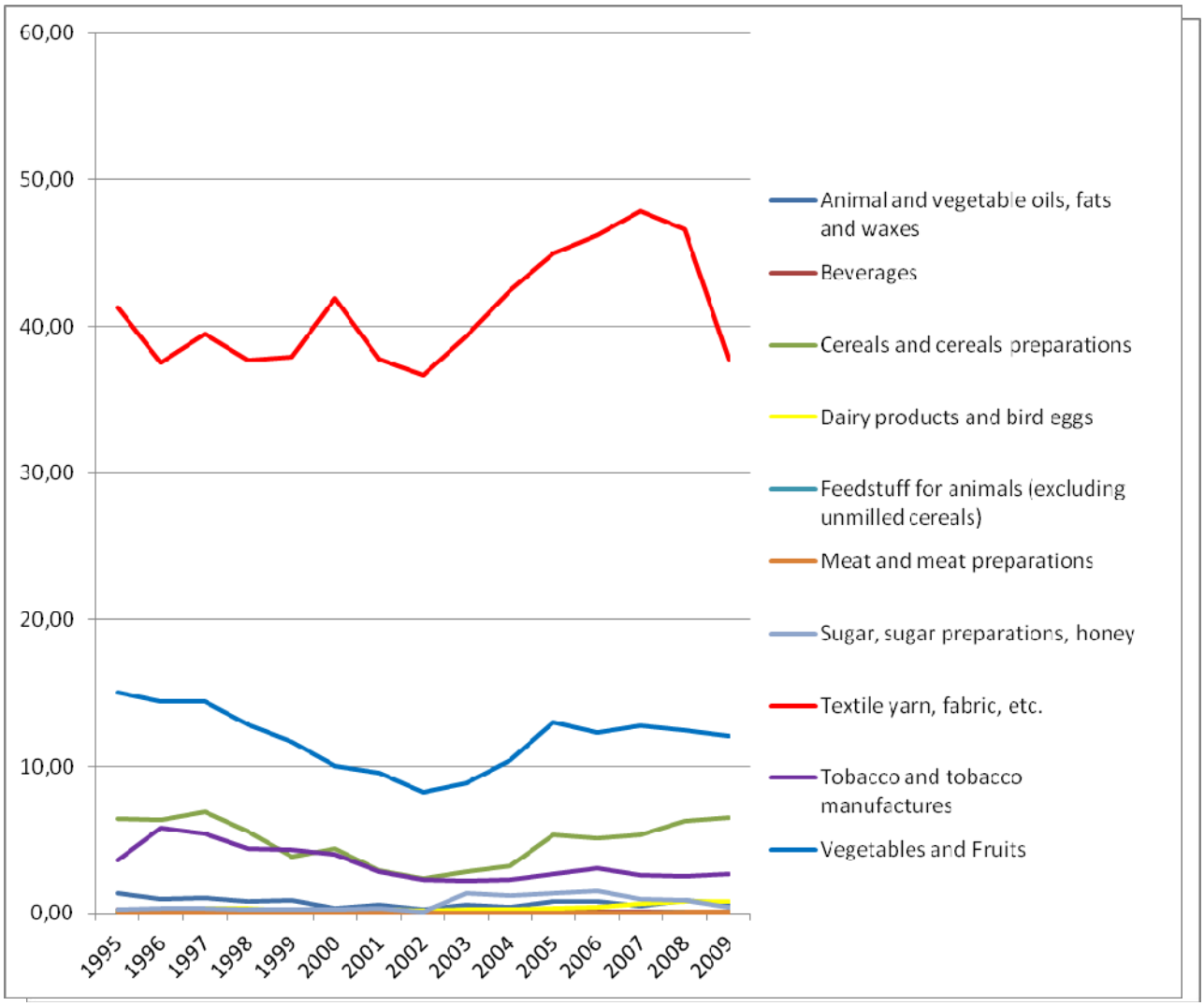
summarise the basic outcomes of our RCA calculations for selected MPC (see Annexes 2 and 4 for detailed results).

Table 4. Product categories showing relatively high RCA in selected MPCs

Morocco.	• Vegetables and fruit category (SITC 05) • Fish (not marine mammals), crustaceans, mollusks and aquatic invertebrates • Preparations thereof (SITC 03)
Tunisia	• Vegetables and fruit (SITC 05) category • Fixed vegetable fats and oils, processed; waxes of animal or vegetables category (SITC 42). • Compared with the rest of the MPCs and Turkey, Tunisia is receiving the lowest RCA value in the Food and live animals category (SITC 0).
Egypt	• Vegetables and fruit (SITC 05)) • Textile and fiber crops

As for Turkey, Figure 1 presents the calculated RCA values in exports of 10 agricultural sub-sectors in Turkey in the period of 1995-2009, indicating relatively high values for textiles and fruit and vegetables (see Annex 4). Some advantage is observed in both in cereals and tobacco products but it is quite low compared to other two sectors. The comparative advantage in all these four sectors seems to deteriorate in the early 2000s but by the end of 2004 improvement begins. It is believed the deterioration could be connected with the required technical adjustments after accession the Customs Union with the EU, and improvement with the widening of export markets and improvement in domestic produce's quality.

Figure 1. Revealed Comparative Advantage of Turkish Agricultural Sub-Sectors



Another measure of competitiveness is the comparative export index (CEP). This is a modification of the classical RCA index, which is often referred to as the ratio of export shares. It reveals the relative comparative advantage of an industry within a country by comparing the share of that particular industry in the country's total exports to the share of that industry in total world exports at a certain point in time. Annex 9 includes estimates for Egypt and Annex 4 for Turkey. Results for Egypt confirm the main conclusion of Egypt showing comparative advantages in textile and fiber crops and in fruit and vegetables. Surprisingly, Egypt is net importer of sugar cane, while there is a revealed competitiveness in exports of such group to the world. However, the surprise will disappear fast, when we know that all sugar products exports from Egypt are under sugar confectionery and no exports of real pure sugar, (Soliman and Mashhour,2000).

The CEP calculated for Turkey considers the relative competitiveness of Turkey relative to all MPCs (Annex 4). Table 5 presents the CEP values in 10 agricultural sub-sectors in Turkey for the

period of 2000-2009. If this calculated CEP is equal to unity or more this means that the particular sector have a greater share in total exports of the individual country than they have in the Mediterranean countries as a whole.

The table reveals that within the Mediterranean region Turkey's comparative export performance is particularly better in fruit and vegetables and in the textile sub-sectors. These are followed by sugar preparations, cereals, tobacco and animal-vegetable oils. In general, there has been a decline in export performance though, since mid-2000's. Feedstuff, beverages and dairy products are the sub-sectors in which Turkey doesn't have a better export performance compared to other Mediterranean regions.

Table 5. Comparative Export Performance in Turkish Agricultural Sub-Sectors

	2001	2002	2003	2004	2005	2006	2007	2008	2009
Animal & vegetable oils	2.3	0.8	4.4	1.1	1.9	1.8	1.1	1.5	1.5
Beverages	0.4	0.4	1.6	0.8	0.8	0.7	0.7	0.7	0.6
Cereals & preparations	1.7	1.3	3.5	1.5	2.2	2.0	1.7	1.4	1.9
Dairy products & eggs	0.2	0.2	0.5	0.2	0.2	0.3	0.4	0.4	0.5
Feedstuff for animals	0.5	0.2	0.6	0.1	0.2	0.1	0.1	0.3	0.3
Meat & preparations	0.1	0.1	0.4	0.1	0.2	0.1	0.2	0.2	0.4
Sugar, preparations, honey	3.8	2.4	6.3	2.1	1.4	1.4	2.0	2.2	1.8
Textile yarn, fabric, etc.	5.5	5.3	13.5	4.8	5.0	4.9	4.7	4.4	4.6
Tobacco & manufactures	1.1	0.8	1.8	0.6	0.7	0.7	0.5	0.5	0.6
Vegetables and Fruits	7.6	6.2	15.8	5.9	6.4	5.4	4.7	4.1	4.5

3. Benchmark scenarios on selected agricultural trade flows for MPCs

We need benchmark scenarios to build a reference for trade policy evaluation. These consist of projections on trade flows, which represent forecasts. They don't include simulations on the impact of trade reforms. However, they offer information on reference trends that are a starting point to assess trade policy changes. The main purpose of this section is to provide a quantitative outlook of agricultural markets for the next decades and the main factors explaining their evolution. For this purpose, WP3 considered the use of ARIMA modeling in order to forecast reference trade flows of major exporting and importing agricultural products for the MPCs and Turkey. To what extent policy changes will affect the reference projections is a matter still under investigation within Sustainmed.

ARIMA model offers a good technique for predicting the magnitude of any variable. Its strength lies in the fact that the method is suitable for any time series with any pattern of change. Its limitations include its requirement of a long time series with a deal of "Black Box". Nevertheless, it can be successfully used for

forecasting long time series data and provide us with the required information for the future trade trends in Mediterranean countries. Further methodological explanations and discussions on the ARIMA methodology and the detailed results can be found in Annexes 3 and 4.

The analysis of the comparative advantage in the previous section revealed the most important categories of exported and imported products for each MPC. This represented a guide for deciding which categories of agricultural products should the ARIMA methodology project for each country. Data for each MPCs were collected for selected products in relation to their importance in the balance of trade, and in relation to the value chains studied in WP4. As a result of this, citrus were studied as a major exporting product for Morocco, Tunisia, Egypt, Syria and Turkey. Olive oil (1509) data were collected for Tunisia, Syria and Turkey, tomatoes data (0702) were collected for Turkey, and wheat (1001) for Egypt and Morocco. These products are presented in detail in table 6.

Table 6: Selected categories of agricultural products according to the Harmonised classification (HS2 - HS4)

Morocco	0805. Citrus Fruit, fresh or dried	1001. Wheat	
Tunisia	0805. Citrus Fruit, fresh or dried	1509. Olive Oil and its Fractions, not Chemically Modified	
Egypt	0805. Citrus Fruit, fresh or dried	1001. Wheat	
Syria	0805. Citrus Fruit, fresh or dried	1509. Olive Oil and its Fractions, not Chemically Modified	
Turkey	0805. Citrus Fruit, fresh or dried	1509. Olive Oil and its Fractions, not Chemically Modified	0702. Tomatoes, Fresh or Chilled

Source: Comext, Eurostat - 2010

Main findings

As a result of the statistical analysis carried out in Annexes 3 and 4, the estimated trends are summarised in the following:

- Forecasted exports of Tunisian **olive oil** are predicted to follow a positive trend for the next three years. At the end of the third year Olive Oil exports will have been increased by 16%. This is revealing a dynamic sector and an important export product for Tunisia. Olive Oil and its Fractions can be a promising product for the future sustainable development of agricultural exports for Morocco. Forecasting analysis of the future trends for Turkey's exports of olive oil to EU27 proves a strong tendency for increasing export volumes. This is expected as new trees entering the production and also

because plantations of the past are becoming mature and ready to harvest. Moreover, an increase in yield is noticed and this is because of the use of new and innovative technologies. As a result, exports of olive oil according to the forecasted results will be increased by 10% over the period of the three years. The results of the analysis show a decline in Syria's olive oil exports for the next three years. Future, research should consider the reasons for this decline and also input more explanatory and predictor variables into the model. Taken into consideration only the flow of exports (time series) in order to develop the model, we exclude other variables and factors that might influence the trade trends. This limitation is known and has been considered by the authors. But as it was aforementioned, our study focus on predicting future benchmark projections.

- **Tomato** exports of Turkey are highly seasonal and generally take place between February and June. Over the year export reaches the lowest level in July when production in open field is bottoms out. Exports are low between July and November and show an increasing tendency in the months onwards to reach the highest level between May-June. The model used for the forecasted results fits well to the data and reveals the same trends and proportions of exports for the next three years with a slightly increase by the end of year three.
- In the case of **citrus** exports all three models are fitting well to the data and have given us validate estimations for the future trends of citrus Fruit, Fresh or Dried exports. From the forecasted exports we conclude that exports have the tendency to follow the same trends and the same seasonal patterns like the past. Trade volumes in the future will remain at the same levels with a slight increase after the second forecasted year. In the case of Egypt, an average increase of 20% per year will lead to a final increase of 60% compared to the production of 2010. Morocco's exports seem to decrease by an annual average of 5% reaching a final decrease in total exports about 13% at the end of year three. Even though the model is not using the last two seasons for its estimation (export data for 2009 and 2010) as it keeps these for the validation of the estimated model forecasted exports are following negative trend but with small changes in the exported volumes. As far as it concerns Turkey's exports to EU 27 forecasted volumes are predicting a slight increase for the next three years. This refers to an annual increase 0f 2, 7% reaching at the end of the third year a total 5,5% compared to the export volume of 2010.
- Finally, as far as it concerns forecasted values for **wheat** we can conclude that imports from EU 27 for Morocco will keep the same trend as the past values and will be increased in an average of 22% per year with a final increase of 0,05%. This is due to the decrease of the last period of forecast where import values are decreased because of seasonality by 54%. In the case of Egypt the trend is reversed where imports of wheat and meslin (1001) from the EU 27 are decreasing. According to the forecasted results, the total reduction between the actual and the forecasted value for Egypt is 11, 8%.

Forecasting comparative advantages

The Egyptian team from Zagazig university undertook the use of autoregressive methods to forecast the values of the relative advantage index till 2018. Relative advantage is projected to significantly increase not only in textiles and fibre products and fruit and vegetables, but also in cereals and their preparations. Sugar and honey relative export advantages are projected to slightly increase over the period (Annex 9).

4. Trade measures: tariffs and entry prices

The core of external protection to the EU F&V is based on tariffs and, for the main products, relies on tariffs, TRQs and the entry price system, which attracts a great deal of attention by Sustainmed's Working Package 3.

Table 7 shows that the EU tariffs are fairly low for most Fresh F&V tariff lines and Processed F&V tariff lines (Jean and Laborde, 2008). As for the entry price system (EPS), when the import price is lower than the TEP by a percentage no greater than 8%, a specific duty is added whose amount is roughly equal to the difference between the TEP and the import price (a sort of a variable levy). If the percentage exceeds 8% the specific duty is the maximum tariff equivalent (MTE). MTEs are fixed tariffs bound in the URAA[3]. Tariffs, TEPs and MTEs change during the year according the seasonality of EU production. For many F&V products the entry price operate only for a limited period when internal supply is marketed, in some cases covering also the periods right before and after the season of production when smaller amount of EU produce can be marketed at higher prices[4]. The entry price system has attracted the attention of previous FP projects such as Tradeag and Medfrol. We come back here to the system but in the context of the assessment of new trade agreements like the eventuality of a new protocol for the EU – Morocco's association.

[3] More details on the description of the protection instruments applied on EU imports of fruit and vegetables can be found in European Parliament (2011), in the framework of a external study where two components of the Sustainmed project took part.

[4] Fresh F&V products under EPS are: Tomatoes, Cucumbers, Artichokes, Courgettes, Oranges, Clementines, Mandarins and similar citrus hybrids, Lemons, Table grapes, Apples, Pears, Apricots, Cherries, Peaches (including nectarines), Plums.

Table 7. Comparison of tariffs in selected HS Chapters

		Ad valorem equivalents		Number of tariff lines falling in each tariff band			
HS Chapter		Average bound tariff	Maximum bound tariff	<20%	[20%,50%]	[50%,75%]	>75%
2	Meats	67.5	407.8	127	50	22	34
4	Dairy products	55.9	264.3	33	44	44	54
7	Fresh vegetables	25.0	118.9	109	7	2	4
8	Fresh fruits	25.2	117.1	140	60	0	1
10	Cereals	78.4	93.6	19	23	7	6
12	Oilseeds	0.3	179.1	78	0	1	1
15	Fats and oils	11.9	118.7	110	3	4	3
17	Sugar	129.1	218.1	30	6	2	9
20	Processed F&V	27.2	217.4	214	76	7	10
52	Cotton	0	0	0	0	0	0

Source: Jean-Laborde (2008). Authors' elaboration.

The amount of MTEs is high enough that they can be seen as prohibitive tariffs, capable to make still effective the entry price as a minimum import price and reach substantial ad valorem equivalents for certain products and seasons (Garcia-Alvarez-Coque et al., 2010). The functioning of the current import regime has been thoroughly analysed in the literature by both comparing it to the previous trade regime, in order to assess changes in the degree of openness of the EU F&V market and in the trade pattern, as well as investigating the effectiveness of the EPS in contributing to domestic price stabilization. Traders can possibly avoid the payment of the specific duty showing that the actual sale price of the consignment is such that a lower duty is to be paid (Swinbank and Ritson 1995; Agrosynergie, 2008)[5]. Moreover, importers may also avoid the payment of the specific duty waiting for custom clearance when the SIVs are higher that the TEP[6]. This also suggests that both capability of operators to deal with customs procedures and degree of perishability of products can play a relevant role in making possible to avoid specific F&V duties. A recent evaluation report on the EPS demonstrated that in recent years imports of F&V products covered by the import regime grew at a rate not differing from that shown by F&V not covered by the EPS (Agrosynergie, 2008).

The econometric analysis by Emlinger et al. (2008) through a gravity model approach showed that the

[5] The new system is administered on a shipment-by-shipment level instead of a country-by-country level. The additional specific tariff is charged per individual shipment and, if the c.i.f. price of one shipment undercuts the entry price, this does not affect subsequent shipments from the same country.

[6] Problems of detecting c.i.f. prices of imports have been overcome with different methodologies for monitoring of compliance with entry prices (see the EU Commission explanatory note concerning Commission Regulation No 3223/94 [D (99) 01/10/1999]). Relevant for the working of the system are the "standard import values" (SIVs) that the Commission calculates on a daily basis for each country that actually exports to the EU. SIVs are based on prices monitored on the domestic EU market at wholesale level. One of the methodologies used for assessing compliance with the EPS is based on an entry price - SIV comparison.

import regime had effects on the EU import flows of F&V, although for some product other factors should also be taken into account. Goetz and Grethe (2009), using a multivariate statistic analysis approach, showed that the relevance of the EPS is not homogeneous among different products and origins, being wider for more perishable products and for neighbouring partner countries. As a whole, those studies suggest that the effects of the EPS on EU import flows of F&V are significant, but probably not generalized to entire set of products/partners.

Most studies agree on showing that the EPS is most relevant for the import of artichokes, courgettes, cucumbers, lemons, plums and tomatoes; significantly lower for apples, clementines and pears; and least relevant for apricots, mandarins, oranges, peaches and nectarines and table grapes. This is supported by data from Table 8 based on SIV recorded between 1995 and 2007. Among the products recorded in the table, only for lemons the EPS system appears to be restrictive, in particular for products originating in the Southern Hemisphere.

Somehow similar is the picture offered by some recent studies targeting impact of the EPS on prices of EU domestic products. Here the main policy issue is assessing the contribution of the EPS to domestic prices stabilisation. The recent evaluation report on the EPS (Agrosynerige, 2008) suggests that it does not affect domestic prices globally, but for single products/country/month there could be significant effects.

Results of the aforementioned studies indicate that EP could be significantly lowered in several periods of the marketing year without substantially affecting trade. In fact, between 1995 and 2001, all the components of the protective system (EPs, ad valorem duties, and MTEs) were already reduced in accordance with the Uruguay Round commitments, easing the protective effect of the system. This conclusion does not contradict the fact that the system helps to stabilize prices in certain periods of the marketing year. In fact, the system functions in the contingency of an import surge and its elimination could involve substantial downward pressure on the prices of specific third-country products in the EU market. Though many fruit imports have a counter seasonal nature, the EP may still be active in periods when Southern Hemisphere crops overlap the early EU harvests.

Table 8. Breakings of the trigger EPs

	% of SIV below Trigger EP	Number or % of breakings
Clementines	5%	Turkey (42)
		Israel (6)
		Morocco (2)
Grapes	3%	Tunisia (16)
Lemons	10%	Argentina (20%)
		Uruguay
		Turkey
		South Africa
Mandarins	0.2%	Morocco (4)
		Turkey (1)
Oranges	5%	Cuba (50%)
		South Africa
		Turkey
		Egypt
Peaches	2%	Turkey (3)
		Macedonia (1)

Source: European Parliament (2010); DG Trade, EU export-helpdesk. Authors' calculations

Garcia Alvarez Coque et al. (2010) used simulation of changes in the border measures with partial equilibrium models of four products finding that the removal of the EPS, as well as the reduction of the TEP and of the specific tariff while keeping alive the EPS, would have a moderate impact on prices of EU domestic products. Although the stabilization issue is not directly addressed in these papers, such findings also imply a certain effectiveness of the EPS in price stabilization. Furthermore, the recent econometric work by Cioffi et al. (2010) shows that EU domestic prices in some cases behave differently when import prices are above/below the TEP. Also this paper suggests that in some cases isolation effect of the EPS seems reached and the resulting stabilization effects.

5. Exploring the role of NTM in Euro-Mediterranean trade

Consolidating a free trade area in the Euro-Mediterranean region will require a better harmonization of Non-Tariff Measures (NTM) in order to favor that they foster trade rather than restricting it. NTM are the core of Deliverable D14 in the Sustainmed project, which is due for month 24 (Task W3T4). Here we only supply some preliminary results. NTM cover a large number of measures that are not tariffs and depend on public regulations. UNCTAD or the OECD have elaborated classifications of NTM. Sanitary and Phytosanitary Measures (SPS) and Technical Barriers to Trade (TBT), custom formalities, quality controls, rules of origin

can be mentioned as examples of NTMs.

Recent research has clearly illustrated the importance of NTMs in trade. Hoekman and Nicita (2008) show that the trade restrictiveness of NTMs plus tariffs is at times twice as high as that of tariffs alone. This is consistent to the idea that the relevance of NTMs is growing as tariff barriers dilute as a consequence of preferential agreements or the multilateral trade liberalization.

NTMs don't necessarily restrict trade. In fact, compliance with certain private standards (e.g. GlobalGAP) can bring significant social benefits, such as reduced agrochemical use and a framework that guides good agricultural and management practices. However, there are few empirical studies analysing the compliance process of small producers in detail (Chemnitz et al (2007)). Most of the existing works seem to point out that small and medium producers rarely comply without support from downstream actors. Anyway, the quoted authors identify some cases with a strongly increasing level of wage employment as a result of the development of high-standard markets, which has a positive effect on income distribution and poverty.

In the Mediterranean area, MPCs are in different stages of harmonization of their standards with the EU (Gonzalez-Mellado et al. 2010). It appears that stringency of applying measures by the own MPCs seems to be relatively stronger at the borders as compared to a less effective monitoring in the domestic market (De Wulf et al. 2009). Emlinger (2010) analyses the implications of NTMs on the access of fruits and vegetables to the European markets. She points out that Israel's ability to fulfill these requirements is the best, even compared with EU countries. On the other extreme, Tunisia, Syria, Jordan, Algeria and Lebanon show the worst performance in this field.

Border rejections may serve as indicators of exports' compliance with food safety and quality requirements imposed by importing countries. During the period 2003 – 2008, the Rapid Alert System for Food and Feed (RASFF) reported a total of 1,123 border rejection notifications concerning Fruit and Vegetables (FV) imported from countries in the Mediterranean region to the EU (Grazia et al., 2009). According to the quoted authors, the main exporting sectors from MPCs are less affected by border rejections as a consequence of a higher compliance effort undertaken by exporting countries, including infrastructure, skills, human resources, control and test procedures.

As referred to above, in the framework of the SUSTAINMED project, we have begun to investigate the role of NTM in Euro-Mediterranean trade. This ongoing research follows two different lines:

1. Exhaustive data from the RASFF is being collected and analised. These data are being treated with statistical and econometrical procedures, to test the influence of a set of relevant variables such as country of origin, country of destination, type of alert issued,… on the likelihood for an alert to be notified at the EU borders for a specific shipment of FV. Hitherto, our preliminary findings have not permitted us to detect significant variables affecting such likelihood. On the contrary, the exploratory previous analysis seems to point out some statistical facts:

- It seems that the EU countries with low imports per capita (European Mediterranean Countries) are more likely to issue border notifications that the rest of EU countries.
- Among the EU countries with a high rate of FV imports per capita, France and Benelux countries issue less number of notifications in average. On the other hand, Finland and Denmark seem to issue more notifications in average –but still less than the EU Mediterranean countries).
- Focusing on the origin of EU FV imports, Morocco and Israel in the Med region seem to receive less number of notifications in average among the large FV exporters. This seems to agree with the aforementioned findings from Emlinger (2010).

The next steps in this task will consider the cause of notification in the explanatory analysis, and also refine the econometric procedure to analyze the different variables individually in panel estimation.

2. A review of literature is being carried out with the aim of discussing the analytical framework that empirically analyzes the bilateral trade between MPCs and EU in the fruit and vegetables sector. A working document of the SUSTAINMED project will be produced in the next weeks. The initial results of this review point out the use of gravity equations in this field, not only including standard variables (distance, GDP,…) but also taking into account other indicators measuring the impact of NTM. Drawing on these initial findings, we have begun to test a gravity approach procedure to be applied to Moroccan exports of a set of agricultural goods. The model includes the traditional gravity variables such as population, distance, contiguity, language, GDPs and old colonial relationships, plus other variables indicating the presence/absence of a preferential agreement between Morocco and all its trade partners. The preliminary results of these models indicate that the variable "preferential trade agreement" varies its significance depending on the product analyzed. For some goods, it is positive and significant, for other goods it does not have any significance and for other goods its significance is negative. While these results are not definitive, our first hypothesis are that the treatment granted to different products in the same preferential agreement may be positive, neutral or even detrimental. In the following months we will refine this procedure and finalize the tests and interpretation of findings.

6. Preferences and trade liberalization

6.1. Agriculture and the Euro-Mediterranean Partnership

The EU and each one of the MPCs have bilateral agreements within the framework of the Euro-Mediterranean Partnership. These Association Agreements include a scope of agricultural trade liberalization. At present, there is more progress of agricultural trade liberalization under the Euro-Mediterranean Partnership than under the multilateral round of negotiations promoted by the WTO. The strategy followed in the Euro-Mediterranean Agreements includes a series of reciprocal agricultural concessions with the compromise to negotiate trade liberalization, while planning their revision targeted at a higher liberalization of agricultural exchanges, except for some sensitve products. A number of intra-Mediterranean arrangements have been activated throughout the Mediterranean region (see table 9, extracted from the recent Mediterra report (CIHEAM, 2011). Examples are the Agadir process, the FTA between Turkey and other MCs partners, apart from the other agreements including developing countries outside the Mediterranean region

Table 9. FTA between Mediterranean countries

Countries involved	Entry in force
Israel – Turkey	1997
Greater-Arab FTA (GAFTA), involving Algeria, Egypt, Jordan, Lebanon, Libya, Morocco, Palestine, Syria, Tunisia, and other 10 Arab countries	1998
FYROM – Turkey	2000
Albania-FYROM Bosnia and Herzegovina – FYROM Croatia-FYROM	2002
Albania – Croatia Bosnia and Herzegovina – Turkey Croatia - Turkey	2003
Albania-Serbia and Montenegro Croatia-Serbia and Montenegro	
Bosnia and Herzegovina – Croatia Israel-Jordan upgrade Jordan, Egypt, Morocco, Tunisia (Agadir process)	2004
Palestine - Turkey Tunisia – Turkey	2005
Morocco – Turkey	2006
Egypt – Turkey Syria – Turkey	2007
Albania - Turkey	2008
Jordan – Turkey	2009

Source: CIHEAM (2011)

Regional agreements with other countries outside the Euro-Mediterranean region have become another strategy for some governments, which includes the integration with the USA. This has been the case of Jordan (2001) and Morocco (2006). Since then, the US trade surplus with Morocco has risen from 79 million dollars in 2005 to over 1 billion dollars in 2009, opening a market for US fats, dairy products and cereals.

The Euro-Mediterranean integration process in agriculture has witnessed difficulties towards its progression. The main reason is that agriculture, and particularly the F&V sector, has been and keeps on being one of the most conflictive aspects in the relationships between the EU and the MCs (García Alvarez-Coque and Jordán, 2006; García Alvarez-Coque et al, 2008).

Restrictions to agricultural trade flows persist nowadays in the Mediterranean region. In the next subsections reference is made to (i) preferences and horticultural trade; and (ii) impact of trade liberalization on tariff-preferences.

6.2 Preferential trade agreements and horticultural trade

Tariff concessions imply significant price advantages for the preference-receiving countries (Martinez, 2007). However, after the experience of 25 years of commercial preferences, they have not translated into a great impulse for the exports dynamic of the MPCs, but simply a continuation of the traditional trade flows from these countries to the EU. In fact, there has been a limited impact of the Barcelona Process on agricultural trade (Abis, 2011b). For instance, in 2009, the agricultural exports from MPCs to the EU increased only 7%, although Morocco was an exception, with an increase in exports of 19%. In any case, further consideration can be taken about the potential impact of a deepening of the trade liberalization process, by means of the progressive increase of zero-rated tariff quotas and the reduction of other agricultural trade protection mechanisms.

Preferential trading partners are very relevant in EU F&V trade, in terms of both import flows and concessions on tariff and non-tariff measures. Ad valorem duties and entry prices depend on preferential treatments negotiated between the EU and a number of partners (treatments sometimes bound by tariff quotas[7]). Table 10 displays the trade measures and concessions applied to major exporters of the products selected for this study. It also shows that counter-season productions favors trade flows.

[7] Within TRQs a predetermined volume of goods originating in a specified country can benefit from imports into the EU having a more favorable rate of duty than the MFN duty mentioned in the combined nomenclature. In the case of F&V, most of TRQs as well as all the few entry price quotas are generated by preferential agreements where EU preferences are limited to a predetermined quantity. This kind of preferences are called preferential tariff quotas (TQs).

Table 10. Structure of EU trade protection and concessions to main preferential partners for some fresh F&V products

	EU Import (2009)		**Tariff concessions**				**Preferential Entry Price**	
Product/ Country	tonn		% tariff reduction	TRQ (t)	Period of application		Value (euro/tonn)	Period of application
Oranges								
SouthAfrica	333,823							
Egypt	134,555		60	60,000	01.12 – 21.05		264	01.12 – 31-
Morocco	90,769		100		01.01 – 31.12		264	01.12 – 31-
Argentina	69,971							
Uruguay	59,283							
Clementines								
Morocco	77,305		80	175,000	01.01 – 28.02		484	01.01 –
			100		01.03 – 31.12			
South Africa	33,997		100		01.01 – 28.02			
Uruguay	9,929							
Argentina	9,563							
Israel	6,014		60	40,000	01.01 – 28.02			
Mandarins and hybrids								
Turkey	73,410		100		01.01 – 28.02			
Argentina	37,456							
South Africa	31,262		100		01.01 – 28.02			
Uruguay	24,018							
Israel	18,201		60	40,000	01.01 – 28.02			
Lemons								
Argentina	163,985							
Turkey	118,407		100		01.01 – 30.04			
Brazil	55,793							
South Africa	39,006							
Mexico	22,957							
Peaches and Nectarines								
Chile	16,730		100		01.01 – 10.06			
South Africa	5,208		100		01.01 – 30.04			
Morocco	4,692		100		01.01 – 30.04		491	11.06 –
Egypt	2,213		100	500	15.03 – 31.05			
Table grapes								
Chile	190,393		100		01.01 – 14.07			
South Africa	181,338		100		01.01 – 30.04			
Egypt	48,833		100		01.02 – 14.07			
Brazil	38,768							

Source: European Parliament (2011); COMEXT; DG Trade, EU export-helpdesk. Authors' calculations

The major preferential trade concessions for fresh F&V relates to agreements with Mediterranean partner countries (MPC), most relevant due to both overlapping production calendars with EU domestic production and weight of import flows. Trade concessions normally consist of reduced or zero tariffs, often bounded within TRQs, for a set of products defined for each country. Some preferential conditions are also granted to African, Caribbean, and Pacific countries (Cotonou agreements), other developing countries involved in the GSP, as well as some Latin American, CEECs and fr/Yugoslavian countries.

Trade preferences are relevant not only in the current picture of EU F&V policies, but also because they are a relevant dimension of the ongoing process of trade liberalization, where the interaction between WTO deals and regional/preferential agreements can move the EU F&V market to a condition of increased openness.

In the case of products for which the EU declared EPs at the WTO, the bilateral protection system is applied according to the same procedures described in the previous paragraph, but with some relevant concessions on the level of some EPs. Lower EPs occur only in favour of few F&V products coming from some Mediterranean partners and are also restricted by quota and/or seasonality of MFN protection levels. No preferential measures, however, are foreseen regarding MTEs, which entirely apply whenever operators are not able to prove the import price was above the (preferential) TEP[8].

The literature investigating the effectiveness of the EPS provides analyses and evidence about the role of the preferential setting of EPs for some countries/products. Earlier contribution stressed a new feature of the EPS emerging from the URAA: imports from countries that enjoy a tariff preference could be sold at lower prices on the EU market than those from MFN suppliers. In this sense, the major losers from the EU's concern for traditional inner and outer providers of F&V would be "unpreferred" exporters.

However the EPs have been kept at MFN levels for most of the preferential origin countries and with some of them trade increased after the signature of Association Agreements dealing with the removal of ad valorem duties only (South Africa, Chile) (Agrosynergie, 2008). Among the gainers in F&V trade with the EU are to be mentioned also new Member States (mostly Bulgaria, Poland, Romania and Hungary). In this case countries involved enjoyed full liberalization, as they were constrained by EPs in certain products before EU accession.

Moreover, we have seen that recent studies suggest that only in some cases EPs are effective in influencing the trade pattern and stabilizing domestic prices. This might make room for moves towards a simplification of the a cumbersome effort of distributing EU market shares among preferential partners by crafting concessions on a product/country basis, with seasonal restraints and quotas on a large number of products.

[8] Detailed discussions of trade agreements with MPCs affecting F&V trade are available in INEA (2002), Garcia-Alvarez-Coque (2002); Cioffi-dell'Aquila (2004); Agrosynergie (2008).

6. 3 Value of preferences and trade liberalization

SUSTAINMED considered the assessment of the scope of preferences by using indicators based on trade flows. This type of indicators allows carrying out an assessment on the coverage, the level of utilization, the deepness and the value of preferences. In this field, we are assessing the value of preferences under a specific case of concession (see Annex 5).

The starting point is considering that preferential exporters can take advantage of the border concession through two alternatives, or a combination of them (Grethe and Tangermann, 1998): A product with the same border price as a Most-Favored Nation (MFN) product can be sold at EU markets cheaper than its competitors, increasing market share; alternatively, a product sold in destination markets at the same price as a MFN product represents a higher price received by preferential exporters.

Under this approach, the specific indicator is the VPM. By definition, it is the difference in prices received by preferential and non-preferential exporters multiplied by the quantity that is exported under these conditions, as equation (1) shows.

$$VPM = (P_P - P_{MFN})q_P \quad (1)$$

Where P_P is the price received by preferential exporters, P_{MFN} is the price received by MFN exporters and q_P is the quantity exported by the preferential country.

The monetary value calculated using (1) corresponds to the tariff revenue forgone by the donor country. Also, it corresponds to the calculation in monetary terms of the potential value of benefits to a preference-receiving country for a particular product (Yamazaki, 1996).

The term "potential" indicates the assumption that all the rents from preferential access accrue to the exporter country. Grethe et al. (2005) indicate that the actual appropriation of the rent crucially depends on the allocation of the rights to export under the preferential regime. Additionally, the indicator assumes the full level of utilization of the preferential scheme, which sometimes may not be fully used due to the costs of acceding to the preferences, as happens when strict rules of origin are in effect (Alexandraki and Lankes, 2004; Brenton and Manchin, 2003). Another factor affecting the actual value of the transfer is the rent dissipation occurring under certain circumstances (Skully, 1999).

Another characteristic of the VPM is its static nature; as it uses trade flows belonging to a given period, it may not account for the changes in trade flows occurring when exporters adapt themselves to variations in the preferential regime.

While some researches (Grethe et al., 2005; Tangermann, 1996) apply the VPM for all the agricultural

products, including F&V, some of these products have the EP system as specific border measure and, as indicated in the previous section, specific preferential concessions include reduced EP. Jean et al. (2008) indicate that their calculations of the ad valorem equivalent (AVE) for F&V may be underestimated due, among others, to the existence of the EP. Then, using the AVE in equation (1) may lead to poor estimates of the transfer in the case of products affected by the EP system.

When there are reduced EP, Martinez-Gomez (2008) proposes a modification of this indicator to consider the cases where entry prices are in force. This new indicator is calculated as in (2).

$$VPM_{EP} = (s_{MFN} - s_P)q_P + \left(d_{MFN} - d_p\right)q_p P_p - \left(\frac{t_{MFN} - t_p}{1 + t_{MFN}}\right)d_{MFN} q_P P_P \quad (2)$$

S_i indicates specific tariffs, d_i indicates ad valorem tariffs, and t_i is the AVE for the whole measure.

The indicator presented in (2) keeps the above-mentioned characteristics, and its added value lies in that it might be useful to properly assess the overall extent of the concession and also to compare the relevance of the reduced EP relative to the ad valorem tariff cut.

In (2), three addends appear. The first corresponds to the gain originated by the specific tariff cut, which in turn is caused by the reduced EP due to the functioning of the system. This addend is labeled as the specific gain. The second addend is labeled as the ad valorem gain, since it is due to the ad valorem tariff reduction granted.

A third addend, or interaction term, corresponds to the preference margin rate -as defined in OECD (2005)- for the AVE multiplied by the preferential trade value weighted by the MFN ad valorem tariff. This interaction diminishes the VPM_{EP} since a negative sign precedes it, and it appears as it impossible to fully disentangle the two different tariff components of the EP system. For comparison purposes, in the next sections we will distribute this addend between the other two addends proportionally to their respective values.
As shown in the previous sections, the reduced EP is an uncommon concession and often limited to certain volumes. One might presume that the reduced EP is of utmost relevance in monetary terms as tariff revenue forgone and/or as a protective measure of domestic producers. Consequently, the next section assesses the monetary value of the reduced EP for some Moroccan F&V by using the VPM_{EP}.

The indicators based on trade flows correspond to an alternative approach to other methodologies widely used in literature to deal with trade preferences. The different approaches are mutually complementary and, as a whole, their results may help to get a comprehensive picture of the scope and implications of trade preferences.

Literature provides with two other main types of methodologies representing trade under preferential conditions. One refers to ex-ante simulation models. Among them, Partial Equilibrium (PE) models allow for a detailed representation of policy measures that may be of crucial importance in the case of F&V. A recent contribution by Garcia-Alvarez-Coque et al. (2009) simulated the impact of eliminating the EP system for

tomatoes with a detailed PE model. Among the Computable General Equilibrium (CGE) models, Kuiper (2004) reviewed eleven different applied models that quantify the impact of the Euro-Mediterranean Association Agreements, but only one of the models (Chemingui and Thabet, 2001) took F&V specifically into account in its scenarios. Two contributions, by Bunte (2005) and Lorca et al. (2000) defined multi-commodity models including some F&V.

Another alternative refers to the use of ex-post econometric models, among which gravity specification has taken a prominent role in the literature. Examples of F&V trade under preferential conditions include Emlinger et al. (2008), Martí-Selva and Garcia-Alvarez-Coque (2007). Aiello et al. (2008) analyze the evidence on the impact of non-reciprocal trade preferences granted by developed countries to exports from developing countries, with mixed results depending on the aggregation level. Philippidis and Sanjuán (2007) simulate the removal of different types of trade barriers faced by Moroccan agro-food exports to the EU, combining the gravity approach with a CGE model. The gravity model is used to estimate the current level of non-tariff barriers (NTB), while the CGE allows for the examining of the long-term effects of the removal of both tariffs and NTB. Related to the topic discussed in the present paper, they consider one aggregate sector as "vegetables, fruits and nuts" and there is no clear indication of considering the entry price as NTB or tariff.

Empirical application

Tomatoes and clementines exported from Morocco to the EU-25 have been chosen to illustrate the VPM_{EP} approach. We have chosen these products among the six with reduced EP because of their major weight in trade value compared to the other products, and also because of the differences between the two products in the use of the reduced EP by Moroccan exporters, as will be shown later. Oranges present a similar trade value as clementines, but as their export prices are always well above the reduced EP, there is no use at all of the reduced EP. For artichokes, cucumbers and zucchini, trade values are relatively small in comparison with the other products.

Data on EU-25 extra imports of tomatoes and clementines have been gathered from COMEXT using the average of the values for the marketing years 2006/2007 and 2007/2008 as quantities and values used in formula (2). In the case of tomatoes, actual trade flows exceed the monthly EP quotas in almost all the periods. As these excesses do not enjoy the reduced EP, we have considered the quotas as the quantities introduced in the formula, also adjusting proportionally the trade values reported.

The periods of reduced EP identified because of sudden changes in border prices from EU partners and also due to changes in the EP system stemming from variations in the trigger EP or in the ad valorem tariff component. Therefore, monthly (or shorter) periods are the base of the analysis, and will be labeled as "months" in the paper. As it will be shown in the next paragraphs, this period-by-period procedure may be necessary to identify different patterns in the use of trade preferences over a marketing year for the same product.

With regard to border prices, daily Standard Import Values (SIV) were collected from the TARIC database corresponding to these months. Their averages were calculated and used as proxies of the border prices. Then, the two tariffs of the EP system were employed in our calculations and applied to these border prices.

It may be worthwhile to stress that, by using SIV as proxies of the border price, we are assuming naïve behavior on the part of exporters: The calculation of the tariff to be paid only takes into account the classification of the products according to the SIV. In fact, this is a simplification adopted to illustrate a less favorable position for traders in tariff terms, since under situations of high specific tariffs it is expected that traders would prefer to be levied under the other two alternatives, which the EP Regulation allows for this purpose. These other alternatives for calculating the levies to each shipment are i) the fob price of the products in their country of origin plus the costs of insurance and freight up to the EU borders, or ii) the customs value minus the duty.

Additionally, as Goetz and Grethe (2009) indicate, it could happen that the SIV calculated are affected by the trigger EP, in the sense that exporters might increase border price in order to avoid undercutting such trigger and, in turn, get levied by the specific tariff. By analyzing a comprehensive data set of SIV, these authors identify Moroccan tomatoes as one of the cases in which this behavior might happen.

While this fact is certainly relevant for simulation purposes, it does not seem to be as significant in the calculations carried out here. If traders altered border prices in this sense, they would be adapting themselves to the commercial policy and deciding how much of the preferential benefits to take. The result of this decision is therefore incorporated into the value calculated for the indicator.

As shown in Table 11, transfers to Morocco in tomatoes and clementines account for almost 53 million Euros, most going to tomatoes. Comparing the relevance of the two gains, about 70% correspond to the specific gain (35 million Euros) and the rest corresponds to the ad valorem gain.

Table 11. VPMEP for Morocco, tomatoes and clementines (€)

	VMP_{EP}	Specific gain	Ad valorem gain
Tomatoes	46,008,149	36,557,201	9,450,948
Clementines	6,899,882	918,267	5,981,616
Total	52,908,031	37,475,467	15,432,563

Source: Calculations based on Commission Regulation (EC) No 1549/2006, Euro-Mediterranean Agreements and COMEXT as well as TARIC data

For fresh tomatoes, the reduced EP is of utmost relevance: While the total tariff revenue forgone by the EU accounts for more than 46 million Euros, about 36.5 million Euros correspond to the specific gain and close to 9.5 million are due to the ad valorem tariff exoneration. Total transfer accounts for 35.5% of the value of

trade for this product within EP monthly quotas.

The significant value of the specific gain is due to the fact that, in 7 out of 10 periods in the marketing year, no specific tariff was paid with the preferential treatment and the MTE should have been paid if Moroccan products were treated as MFN. This means that Moroccan border prices were below MFN trigger EP and above preferential trigger EP. The tariff savings measured by the specific gain account for over 7 million Euros in most of these months, specifically in winter months (December to March). Only in November was the amount of the specific tariff the same under the two alternative regimes (preferential and MFN), as Moroccan border prices were below 92% of the preferential trigger EP and paid the MTE. Another remarkable period was the first fortnight of May when Morocco did not experience any gain from the reduced EP since its border prices were above MFN trigger EP. Additionally, as the May monthly quota was exhausted in a fortnight, exports did not benefit from the reduced EP in the second part of the month. Table 12 shows the period-by-period numeric results for this case in the months with reduced EP.

Table 12 Period-by-period VPMEP for Moroccan tomatoes (€)

	VMP_{EP}	Specific gain	Ad valorem gain
January	9,541,163	7,751,266	1,789,897
February	9,469,934	7,990,672	1,479,262
March	9,585,996	7,822,829	1,763,167
April	4,834,534	3,842,359	992,175
1 to 14 May	203,121	0	203,121
15 to 31 May	0	0	0
October	2,378,204	1,756,154	622,051
November	839,522	0	839,522
1 to 20 December	8,150,931	6,582,513	1,568,419
21 to 31 December	1,004,742	811,408	193,335
Total	46,008,149	36,557,201	9,450,948

Source: Calculations based on Commission Regulation (EC) No 1549/2006, Euro-Mediterranean Agreement and COMEXT as well as TARIC data

For clementines, preferences account for over 9 million euros, which is over 16% of the trade value. In the overall VPM_{EP}, the specific gain accounts for a low share, since only in one period were Moroccan border prices below MFN EP and above the preferential EP. In all the other months, border prices were above MFN trigger EP, indicating a low utilization of the reduced concession. Table 13 depicts the results of the calculations.

Table 13 Period-by-period VPM_{EP} for Moroccan clementines (€)

	VMP_{EP}	Specific gain	Ad valorem gain
January	2,043,671	0	2,043,671
February	860,193	0	860,193
November	1,149,459	0	1,149,459
December	2,846,558	918,267	1,928,292
Total	6,899,882	918,267	5,981,616

Source: Calculations based on Commission Regulation (EC) No 1549/2006, Euro-Mediterranean Agreement and COMEXT as well as TARIC data

Erosion of trade preferences

The change in the value of the preference margin has been used as an indicator of the erosion of preferences by a number of authors, the seminal work on the subject done by Yamazaki (1996). More recent examples can be found in Bureau et al. (2007) and Grethe et al. (2005), the latter concerning this issue for MPC.

As no document has been circulated regarding the changes in the EP system after the World Trade Organization (WTO) trade talks, two scenarios have been outlined to illustrate alternative outcomes for the system. These scenarios assume a definition of "tariff cut" departing from the draft "modalities" paper circulated by the agriculture talks' chairperson C. Falconer in December 2008.

In scenario 1, it is assumed that the EU would include products protected by the EP system as "sensitive products" with regard to the eventually agreed tariff cut. In that case, the actual tariff reduction for EP products would be 25%. The implication is that ad valorem tariffs and the MTE are reduced by this percentage, and the trigger EP is lowered by the same monetary amount as the MTE, consistent with the framework adopted in the Uruguay Round. Additionally, the definition of sensitive products requires the opening of (additional) tariff-rate quotas, in this case 3.5% of the domestic consumption. In practical terms, for the assessment carried out in this paper, we have used actual trade flows in the calculations and have imagined that monthly quotas, currently binding for Moroccan tomatoes, are no longer binding.

In scenario 2, products are not defined as sensitive and, therefore, a 50% cut to the ad valorem tariffs and the MTE is agreed upon. As in the previous scenario, the trigger EP is lowered by the same monetary amount as the MTE. In this case, no change is made to the EP quotas with respect to the current situation.
The Euro-Mediterranean Agreement with Morocco indicates that preferential EP "shall be reduced in the same proportions and at the same pace as the EP bound in the WTO" if bound EP is lowered as a result of a WTO agreement. This "anti-erosion" provision has been considered for the two scenarios.

Table 14 shows that scenario 2 depicts a clear erosion of preferences, while the results for scenario 1 are mixed. In scenario 1, the VPM_{EP} for tomatoes increases, as trade flows are not constrained by the EP quota. If Moroccan trade flows kept the same volumes as current quotas, erosion would be certain. The ability of Moroccan exporters to take advantage of the WTO quotas for sensitive products is therefore crucial in this aspect. A recent simulation by Garcia-Alvarez-Coque et al. (2009) suggests that, under such conditions, Moroccan sales to the EU would see a boost compared to EU sales and the sales from rest of the world partners. For clementines, as current volumes are not constrained by the quotas, the boost in sales would not happen. Therefore, the reduction of the ad valorem MFN tariffs is what would determine the level of erosion of preferences.

Table 14 Erosion of preferences under the two scenarios. VPM_{EP} in €

	Current VPM_{EP}	Scenario 1 VPM_{EP}	Scenario 2 VPM_{EP}
Tomatoes	46,008,149	55,484,969	34,898,768
Clementines	6,899,882	5,483,718	3,690,258
Total	52,908,031	60,968,687	38,589,026
Rate [scenario to current value] (%		115.24%	72.94%

Source: Calculations based on Commission Regulation (EC) No 1549/2006, Euro-Mediterranean Agreement and COMEXT as well as TARIC data

In scenario 2, a higher degree of erosion for clementines is expected following the previous reasoning, while for tomatoes there is no evidence supporting increases in volume provided that no WTO quota has been set. Additionally, the anti-erosion provision mentioned above does not represent an outstanding compensation for Moroccan exporters, as currently they only undercut reduced EP in two periods. In all the other periods, lowering the reduced EP seems of little practical relevance.

Tangermann (2002) discusses some alternatives that would bind preferences. He states that defining preferences relative to MFN tariffs, rather than defining them in absolute terms, would (at least partially) guard against preference erosion, which would result from any further reductions to the MFN tariffs.
The aforementioned "anti-erosion" provision included in the Association Agreement seems to follow this alternative. Nevertheless, the results indicate that in the case of a more complicated system like the EP, erosion seems to be unavoidable without compensations in terms of preferential volumes.

Concluding remarks on preference erosion

In this paper we have assessed the value of the preferences that involve reduced EP by using a method that allows comparing the reduction of the specific component of the EP system (in turn linked with the reduced trigger EP) with the reduction of the ad valorem tariff.

When applying this methodology to Moroccan tomatoes and clementines, the first finding is that there are big differences in the utilization of such a priori relevant preference: For clementines it has little practical relevance; while for tomatoes, most of the preferential gains stem from the reduced EP. In contrast, the elimination of the ad valorem tariff remains very relevant, in monetary terms, for the two products.

A period-by-period assessment also shows some differences in the marketing year for the same product. Most of the gains for tomatoes take place in winter months, with lower gains in spring.
Another relevant finding for tomatoes refers to the restrictiveness of the EP quotas. Since actual trade flows are well above them, they limit the gains obtained through the reduced EP.

Regarding the erosion of preferences after changes in the EP system, the main conclusion is that the designation of tomatoes as a sensitive product may benefit Morocco, provided that market and commercial policy conditions allow it to obtain larger portions of the WTO quotas. If the product were not declared sensitive, a certain degree of erosion would take place. In the case of clementines, the finding is more straightforward: the deeper the tariff cut, the higher the erosion.

From these findings, two main conclusions arise. One has to do with Morocco's interest in keeping the EP system, an interest that may depend on the product at stake. In the case of clementines, the results reported here indicate that they take little advantage of the reduced EP, and their preferential rents stem mostly from the ad valorem tariff reduction.

For tomatoes, the situation is different and Moroccan exporters probably prefer the maintenance of the system, provided that they can increase the quantities traded under preferential conditions.

Hence, linked to the previous conclusion, the second conclusion highlights the possibility of re-negotiating the Euro-Mediterranean agreements regarding the changes implemented in the EP system. In light of these results, a cross-compensation among products (widening the access for tomatoes) could be positive for Morocco.

Finally, some tasks remain ahead after this analysis. The first is to explore other likely outcomes of the changes in the EP system: One could be the elimination of the system, another could be to fix current trigger EP and only change MTE and ad valorem tariffs. In addition, the three alternative levels of tariff reduction for sensitive products and the treatment of subsequent quotas may deserve a more thorough analysis. More information on the possible outcomes for the EP system would be helpful to define more

clearly the possible scenarios.

The second task ahead is to investigate the underutilization of the reduced EP taking place in clementines: One may assume rigidities in the cost structures, in both production and exportation.

The third task refers to the ability of exporters to actually capture the rents calculated here. This type of research requires a deep knowledge of the structure of the exporter's sector and investigating export prices to alternative markets.

7. Assessing trade agreements

Sustainmed is undertaking the assessment of bilateral trade agreements, with a view of evaluation the adoption of further steps in the liberalization of agricultural trade within the Euro-Mediterranean region. To model trade policy impacts two modelling tools are being used 1) Armington type trade partial equilibrium models; 2) Static CGE models that utilizes social account matrix that diversifies households into urban and rural areas and with respect to status in the job; and which has an agricultural focused. Annex 6 reports on the methodological details to be applied by AU, in the context of the evaluation of Turkey's trade agreements. This methodology can be extended to other MPCs.

As for the present report, we will present some preliminary results of our evaluation of scenarios for further EU – Morocco integration. As a first stept, in the next pages, the reader can be found a study of the implications of the new agricultural protocol. Later, we present some simulation results of a modelling exercise, using the Armington approach, for full liberalization between the EU and Morocco, applied to one case study (tomato).

7.1 EU – Morocco trade policy changes

In December 2009 the European Commission and the Kingdom of Morocco concluded the negotiations for the update of the Agricultural Protocol. This Protocol is part of the Euro-Mediterranean Agreement signed by the two parties in February 1996 and in force since March 2000. This is not the first update of the Protocol, since in 2003 an in-depth review was carried out. In the current instance, as in that case, a fierce opposition from some European producers' organizations arose. The arguments against the update of the Protocol are based on the widening and deepening of the trade preferences that Moroccan products benefit to access into the EU market. To date, this "new Protocol" (the aforementioned December 2009 update) has not been endorsed by the EU Parliament and therefore is not into force. **It is worth noting that any time that we refer to the "new protocol", the "protocol draft", or the "new agreement", we are denoting a text that has yet to be legally endorsed and ratified. Consequently, we have to consider the policy changes as merely hypothesis for analysis.**

As a means to gauge the scope of the trade preferences granted to Morocco, a preliminary assessment of the new Protocol has been carried out. Our focus has been put on fruits and vegetables (F&V) since the most of EU producers' criticism are addressed to the concessions to Morocco in this sector. The analysis relies on comparing the current and the new Protocol together with trade data belonging to the last marketing years. We have collected the volumes of Moroccan exports to the EU for selected products - published by Comext- and the Standard Import Values (SIV) for a number of Moroccan products published by the European Commission.

A first comparison between the new Protocol and the one currently in force allows distinguishing the new concessions to Morocco according to three different categories. In Annex 7 a comprehensive comparison between the two Protocols is carried out with to main conclusions:

First, a complete elimination of Tariff-Rate Quotas (TRQ) and Reference Quantities (RQ) in force has been agreed for a number of tariff-lines. For most of these products, such elimination implies a full duty-free access since the previous TRQ and RQ meant a zero tariff within them. Thus, this concession is extended to all the exports in the concerning goods.

Second, for a limited set of goods the new concessions imply that TRQ and RQ are still in force, but they are enlarged. Then, the volumes benefiting from a tariff reduction or exemption would increase. In addition, in most of these cases, the out-of-quota tariffs are usually also set below the Most-Favored Nation (MFN) levels.

Third, the agreed provisions to other products would imply certain benefits in the application of the entry price (EP) regime. These benefits encompass from the widening of the volumes taking advantage of current preferential EP in some goods, to the concession of a new preferential EP for several products, which currently do not benefit from such advantage.

Quota elimination

Dealing with the first category of products, our analysis allows differentiating between two situations. Indeed, there are some goods for which the TRQ and RQ currently in force have not been binding since volumes exported in the recent marketing years from Morocco to the EU were well below those quotas. This group includes **early potatoes**, **onions**, **celery** and **cherries**, among other products. Hence, one might not expect substantial future export changes as a result of the eventual entry into force of the new Protocol.

Quota expansion

On the other hand, it could be noted that for some goods the volumes imported from Morocco were above the TRQ and RQ. For some other goods, the trends in recent years indicate a relatively large likelihood of exceeding them in the forthcoming marketing years. As examples under this circumstance one could mention **leeks**, **cabbage lettuce** (head lettuce), **cabbages**, and other **edible roots**, which had a joint

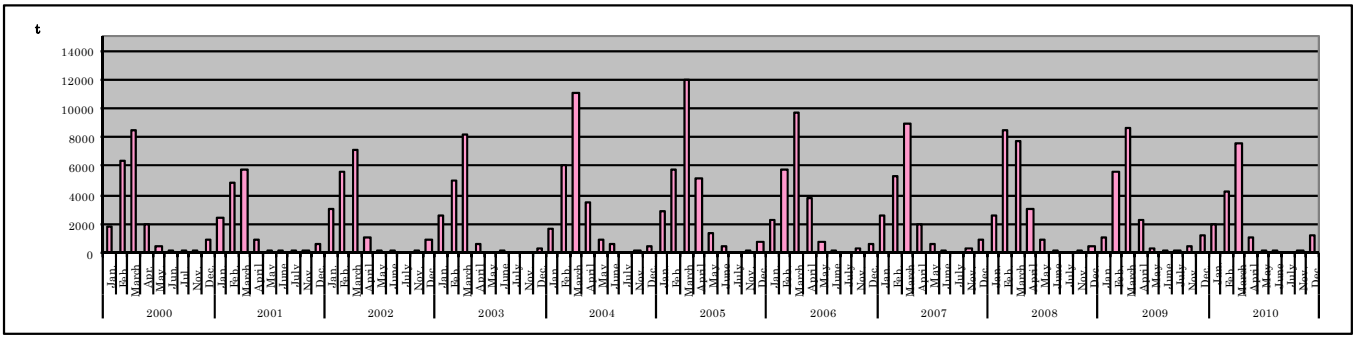
TRQ –like **carrot**, **salad beetroo**t and **chicory**. For both situations the enlargement of the quotas will imply the consolidation of trade volumes. All these volumes of Moroccan products will access the EU under preferential conditions and this could mean more pressure on import markets to the EU, especially in the case of leeks and the edible roots. Market pressures can be important, as the share of Moroccan imports in the total extra-EU origins is significant for these vegetables. In spite of these facts, it seems that it would not suppose a substantial pressure on EU prices, since for all of these products intra-EU supplies dominate the European markets. Therefore, the eventual improvement in the commercial position of Moroccan products will mostly undermine extra-EU suppliers rather than EU producers.

Two extreme cases may be stressed for the products for which TRQ and RQ are enlarged. **Garlic** illustrates one of the extremes. In the last marketing years, the EU producer prices have been low, which has been attributed to the foreign competition. In the case of Moroccan garlic, currently there is a joint –garlic plus shallots plus leeks- TRQ of 1,000t and the new Protocol stipulates a single 1,500t TRQ for garlic. In the previous marketing years, a maximum of 300t have been yearly exported to the EU. Then, it seems that the new TRQ will not be determinant of substantial increases of Moroccan exports to the EU. In fact, trade data and market information show that other countries –chiefly China- are responsible for the events taking place in the EU market.

A quite different situation is the **strawberries** case. In the winter season of the marketing year –from November to March- Moroccan strawberries benefit from a full tariff exemption and the new Protocol maintains such provision. Otherwise, in April the tariff exemption is currently limited to 100t –provision agreed on a *light* update after the Accession to the EU of the Central European and Eastern Countries. The new Protocol lays down that the April TRQ is widened to 3,600t –also duty-free- and it also stipulates an additional 1,000t TRQ for May with 50% MFN tariff reduction.

As Figure 2 indicates, most EU imports take place in March, with peaks about 12,000t in the mid of the last decade and average volumes close to 8,000t. Moreover, exports in April have been showing a decreasing pattern, but always above the 100t TRQ. From these figures, one assumption that could be inferred is that the new TRQ may harness the potential of the Moroccan strawberries sector, easing the switch of some flows from March to April and May. This way, the strong competition that EU producers face in March could be partially "diluted". This outcome could be qualified depending on the ability of Moroccan agents to maintain exports in March and simultaneously, increase them in April and May taking advantage of the widened preferences.

Figure 2. Monthly imports of Moroccan strawberries by the EU, 2000-2010



Source: Comext

EP reduction

Turning now to the products to which the EP regime applies, they deserve a special attention due to the variety of cases appearing and to the complexity of the regime. On the one hand, for certain fruits to which a preferential –reduced- EP is established in the new Protocol, currently levied by the MFN EP levels. Table 15 compares the current EP levels with the newly established reduced levels, together with the season in which the reduction would be effective.

Table 15. Comparison between the stipulated reduced EP and the current MFN EP in force, products to which a new reduced EP is laid down

CN Code	Product	Season of reduced EP in force	Preferential EP (€/t)	MFN EP (€/t)
0806 10 10	Table grapes, fresh	21/07 – 20/11	358	476-546
0809 10 00	Apricots, fresh	01/06 – 31/07	645	771-1071
0809 30	Peaches, including nectarins, fresh	11/06-30/09	491	600-883

Note: For peaches and apricots, the current joint TRQ (3,500t) would be eliminated. There is no quantitative constraint for table grapes currently in force.

Source: new Protocol and TARIC

Among these three products, lowering the EP could have a relatively minor relevance in the case of **table grapes**. The reason is that the SIVs calculated by the European Commission in the last marketing years have been well above the MFN EP. Hence, they are also well above the established preferential EP. Moroccan table grapes account in average for about 5 percent of the total intra+extra EU imports market. As currently there is no volume constraint, one might not expect substantial volume increases due to the new Protocol provisions.

In the case of **apricots** and **peaches**, nowadays they share a joint 3,500t TRQ –together with **cherries**. In the last marketing years, trade flows have been surrounding that volume, with a noteworthy large proportion

of peaches. Then, eliminating the TRQ may certainly increase pressures on the EU imports markets for these products. In any event, this pressure may be mostly concentrated on extra-EU suppliers given the relative predominance of intra-EU sales. With respect to the likely pressure on prices as a result of the reduced EP, there is lack of official evidence to rely on, since no SIV have been published for Moroccan peaches and apricots in the previous marketing years. By itself, this fact is an indication of a minor presence in the market; anyway, as the reduced EP would take place in summer for the two goods, this could concentrate exports in this period.

For another set of goods, the EP regime is currently applied under preferential provisions and the amendments agreed consist of eliminating or enlarging the reduced EP quotas. Details are discussed below. Table 16 summarizes the preferential situation for these products under the new Protocol.

Table 16. Comparison between the preferential EP laid down and the MFN EP, products to which a current reduced EP is in force

CN Code	Product	Season of reduced EP in force	Preferential EP (€/t)	Volume constraint (t)	MFN EP (€/t)
0702 00 00	Tomatoes, fresh or chilled	01/10 - 31/05	461	Monthly quotas	626- 1126
0707 00 05	Cucumbers, fresh or chilled	01/11 - 31/05	449	15.000	481-1105
0709 90 70	Zucchini, fresh or chilled	01/10 - 31/01	424	50.000	488
		01/02 - 31/03	413		413
		01/04 - 20/04	424		692
0709 90 80	Globe artichokes, fresh or chilled	01/11 - 31/12	571	No limitation	943
0805 10 20	Fresh oranges	01/12 - 31/05	264	No limitation	354
0805 20 10	Fresh clementines	01/11 - end of February	484	175.000	649

Note: In the goods with volume constraint for the application of the reduced EP, a zero-duty provision is additionally applied within this quota.

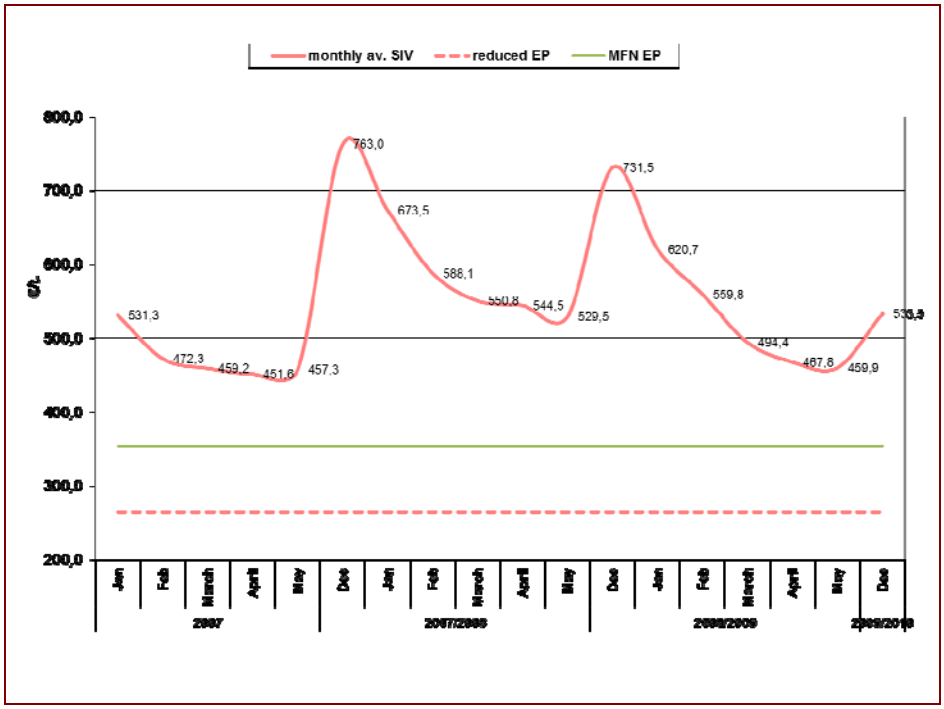
Source: new Protocol and TARIC

Within these products, a wide range of likely effects is foreseen. One the one hand, one might expect minimal effects in **globe artichoke**s. This happens, as Moroccan exports are rare in spite of the potential value of the preferential margin benefiting Morocco (see Annex 5).

In the same line, minor effects may be foreseen for the **citrus fruits** benefiting from a reduced EP. For **fresh oranges**, SIV in the last marketing years have been well above both of the reduced EP and the MFN EP. This is indicative that the leeway for lowering the export prices is narrow, at least in the short term. Moreover, the evolution of trade flows of Moroccan oranges shows a clear downward trend. While in the beginning of the past decade about 180,000t were exported to the EU from Morocco, the average of the 2007-2010 marketing years is about one half of this volume. This reduction has taken place in spite of the 306,800t reduced EP quota in force since 2004. Figures 3, 4, 5 and 6 depict the relationship between

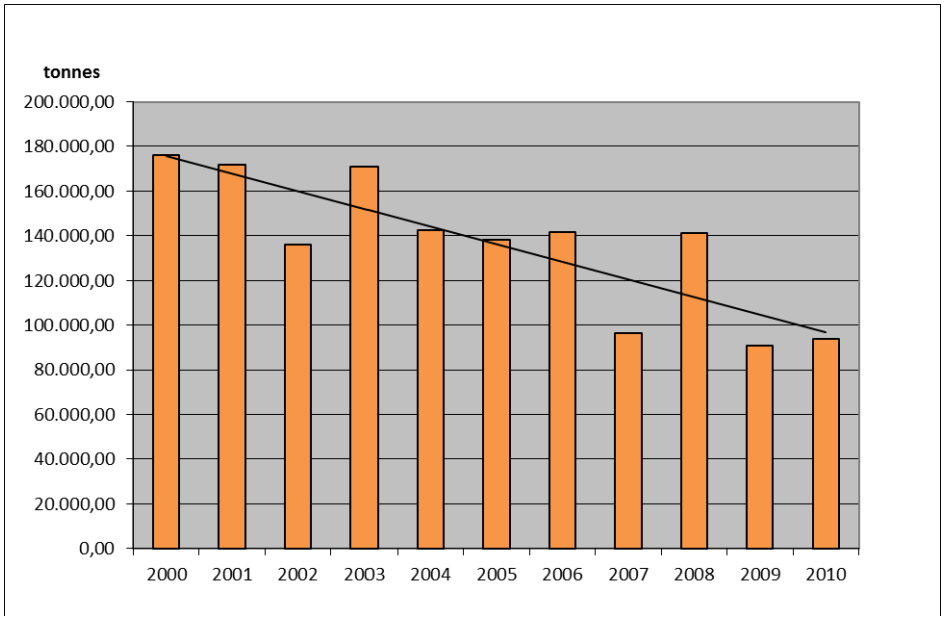
average monthly SIV and the respective EP, and the evolution of Moroccan orange exports to the EU.

Figure 3. Reduced EP, MFN EP and the average monthly SIV. Oranges, marketing years 2007-2010



Source: EU-Morocco Association Agreement, protocol draft and TARIC

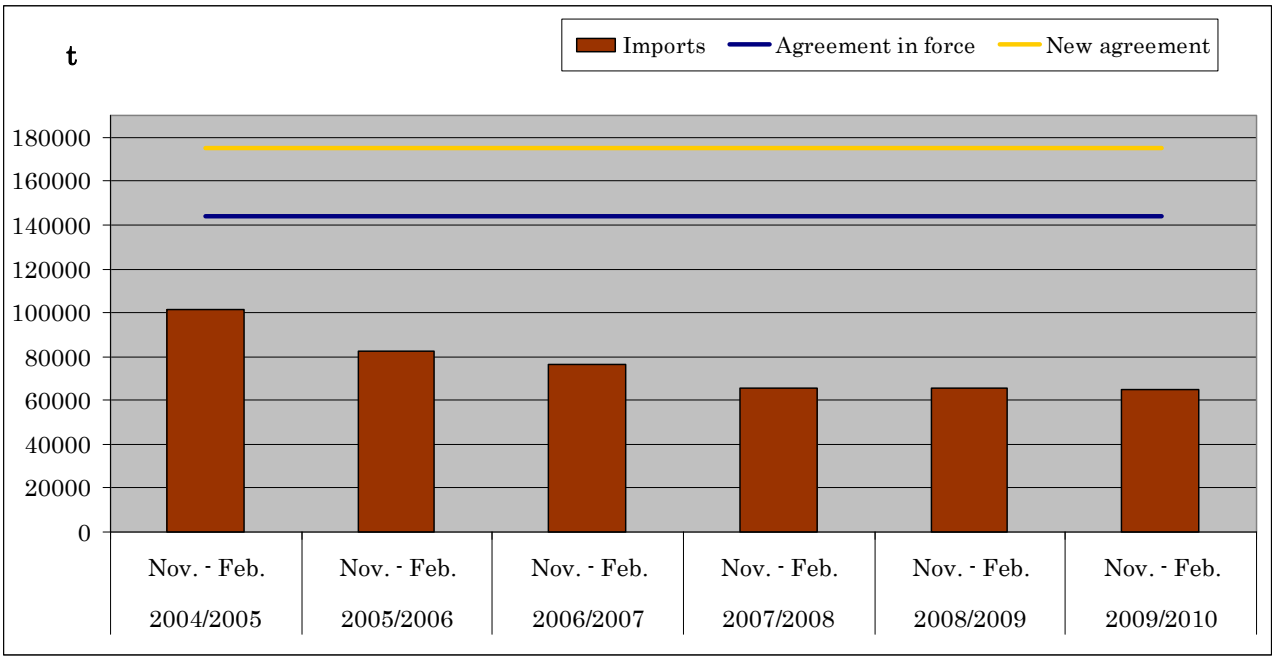
Figure 4. EU imports of Moroccan fresh oranges and linear trend, 2000-2010.



Source: Comext database

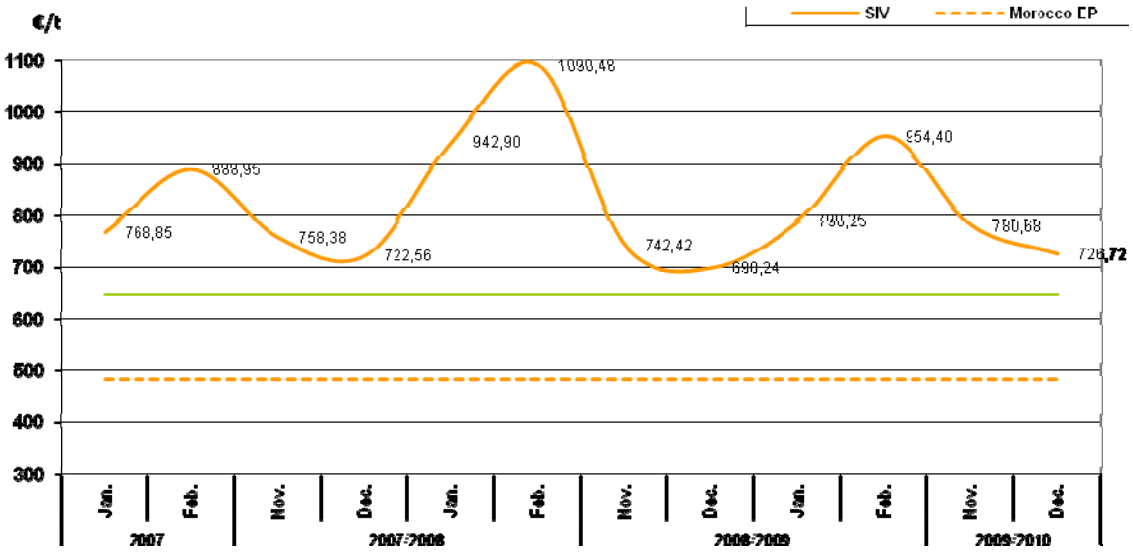
For **clementines**, a similar picture can be described as trade flows have been consistently below the reduced EP quota and SIV have been always above MFN EP.

Figure 5. EU imports of Moroccan clementines and EP quota



Source: EU-Morocco Association Agreement, protocol draft and TARIC

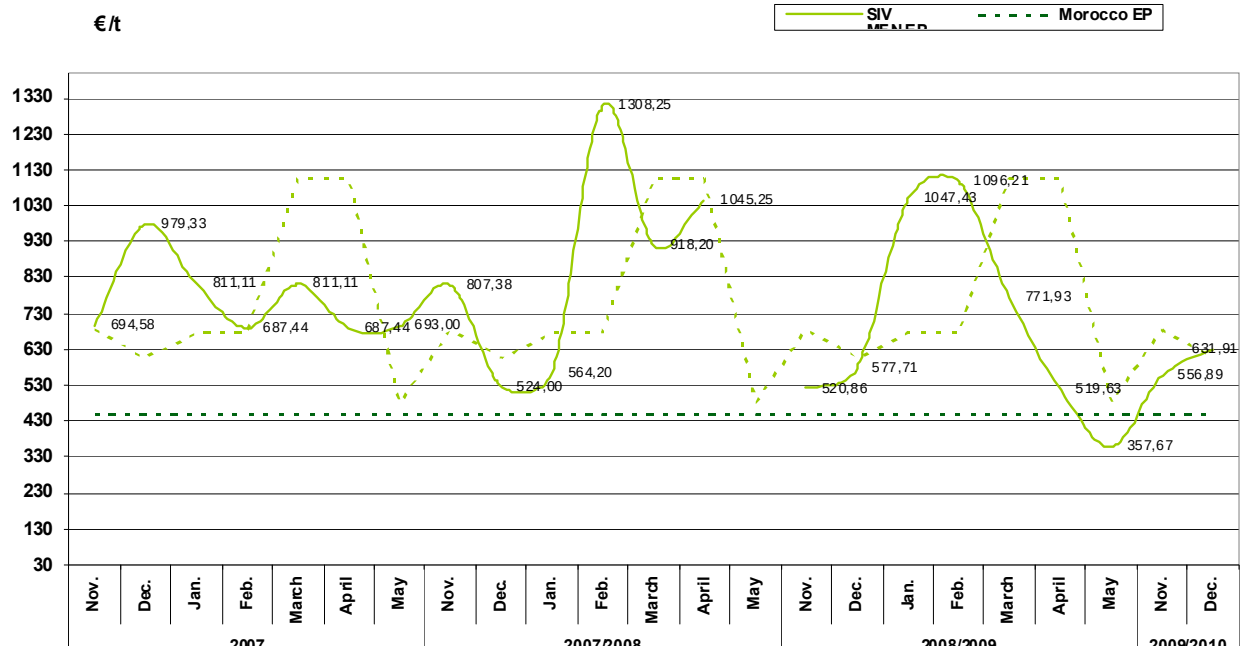
Figure 6. Clementines. SIV, Preferential EP and MFN EP.



Source: EU-Morocco Association Agreement, protocol draft and TARIC

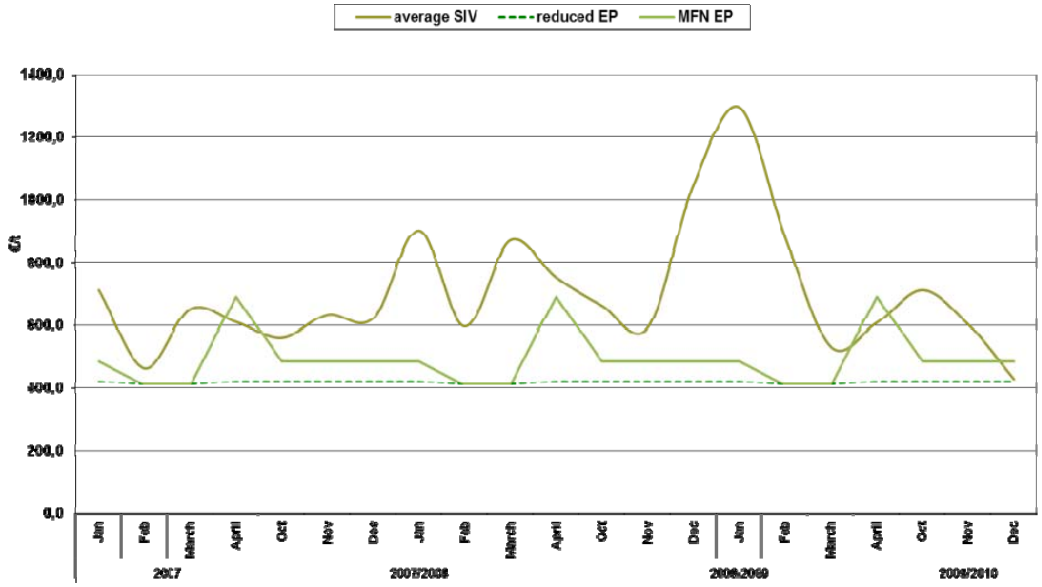
For **cucumbers**, the situation is partly similar to the previous products as the EP quota has not been binding, but in certain marketing years imports from Morocco have been reaching the current quota level. Hence, the enlargement from 6,200t to 15,000t could certainly give more room to eventual additional trade flows. But in this product, the most outstanding fact reveals that in some periods export prices have been close to -and even below- the preferential EP. Then, the likelihood of achieving a substantial market share for Moroccan cucumbers is certain, moreover if Moroccan traders can consolidate in the forthcoming marketing years the recent increase in trade flows taken place after the E. Coli crisis. Figure 7 depicts the relationship between average SIV, reduced EP and MFN EP for cucumbers.

Figure 7. Cucumbers. Preferential EP and MFN EP.



In the cases of the other two vegetables affected by the reduced EP –**tomatoes** and **zucchini**-, the record of trade flows and SIV allows to foreseen more certain advantages as a result of the new Protocol. For zucchini, the enlargement of the EP quota could cover, *de facto*, all the Moroccan flows to the EU. Indeed, between October and April imports of Moroccan zucchini exceed 40,000t for the periods 2006 a 2009. It has meant doubling the current EP quota and the new 50,000t quota could become a worthy trade preference for Morocco with respect to other extra-EU partners. With regard to the relationship between EP and SIV, usually Moroccan products have entered the EU over the MFN price. But in certain days, especially in April, SIV have been very close or below the MFN EP. This trend seems to be stressed in the last marketing years. The next figure plots these relationships.

Figure 8. Reduced EP, MFN EP and the average monthly SIV. Zucchini, marketing years 2007-2010



Source: EU-Morocco Association Agreement, protocol draft and TARIC

After this fact, together with the enlargement of the quota, one then might say that there is the possibility of a downwards pressure on zucchini prices in EU markets in April. This possibility will depend on two main facts: i) the productive and supply chain conditions allowing setting competitive Moroccan exports prices (i.e. below the MFN EP without undercutting the reduced EP), and ii) a certain organization of the trade flows from Morocco should take place to prevent filling the EP quota before April. Other researches in this field (Chemnitz and Grethe, 2005) indicate that the Moroccan exporter sector follows some procedures to prevent filling the EP quotas.

With respect to **fresh tomatoes**, they are perhaps the most controversial agricultural product concerning the EU-Morocco Association Agreement. One of the reasons why it happens is related to the implementation of the EP regime at EU customs. Producers' organizations complain that sometimes the regime has loopholes allowing for cheap products being imported into the EU due to the circumventing of some applicable duties. This fact was confirmed by an OLAF investigation begun in 2004. It found that "importers had 'speculated' on the customs value of the goods by using the so-called 'deductive method' to avoid the payment of higher complementary customs duties on import." (OLAF, 2008). This situation seems to happen mostly in tomatoes, rather than in other products affected by the EP regime.

The analysis focus on trade data to assess to what extent the new Protocol eases the presence of Moroccan tomatoes into the EU market. The first facts to highlight are the maintenance of the reduced EP for Morocco (461€/t) and the enlargement of monthly EP quotas. Tables 17 and 18 summarize the quotas for the current situation and the new Protocol, respectively.

Table 17. Monthly EP quotas in force for Moroccan tomatoes according to the 2003 update of the Association Agreement.

Monthly EP quotas (t) MONTH / Reduction on NMF tariffs (%)	2003/2004	2004/2005	2005/2006	2006/07 and subsequent	Reduction on the MFN tariff for volumes over quota (%)
October 100	10,000	10,600	10,600	10,600	60
November 100	26,000	27,700	27,700	27,700	60
December 100	30,000	31,300	31,300	31,300	60
January 100	30,000	31,300	31,300	31,300	60
February 100	30,000	31,300	31,300	31,300	60
March 100	30,000	31,300	31,300	31,300	60
April 100	15,000	16,500	16,500	16,500	60
May 100	4,000	5,000	5,000	5,000	60
TOTAL	**175,000**	**185,000**	**185,000**	**185,000**	-
Additional quota (1 Nov. to 31 de May)					-
Line A	15,000	28,000	38,000	48,000	-
Line B	15,000	8,000	18,000	28,000	-
1Jun–30Sep 60	Unlimited quantities				**-**

Source: EU-Morocco Association Agreement.

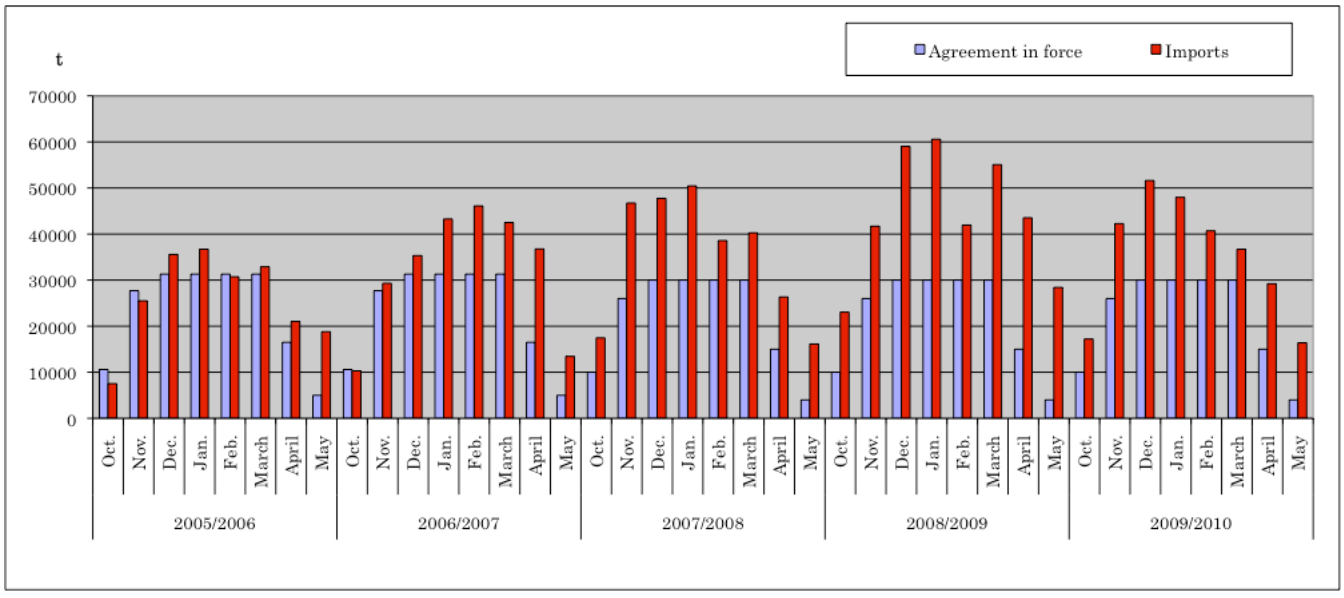
The records of EU imports from Morocco indicate that during the last marketing years **in almost all of these periods the trade flows went beyond the monthly quotas**. Besides, even the additional quotas from November to May were often exceeded. Figures 9 to 11 depict these figures.

Table 18. Monthly EP quotas laid down for Moroccan tomatoes according to the new Protocol

Monthly EP quotas (t) / MONTH / Reduction on NMF tariffs (%)	2010/11	2011/12	2012/13	2013/14	2014/15 and subsequent	Reduction on the MFN tariff for volumes over quota (%)
October 100	12,900	13,350	13,800	14,250	14,700	60
November 100	33,700	34,900	36,100	37,300	38,500	60
December 100	38,100	39,450	40,800	42,000	43,500	60
January 100	38,100	39,450	40,800	42,000	43,500	60
February 100	38,100	39,450	40,800	42,000	43,500	60
March 100	38,100	39,450	40,800	42,000	43,500	60
April 100	20,000	20,700	21,400	22,100	22,800	60
May 100	6,000	6,250	6,500	6,750	7,000	60
TOTAL	**225,000**	**233,000**	**241,000**	**249,000**	**257,000**	-
Additional quota (1 Nov. to 31 de May)	28,000	28, 000	28,000	28,000	28,000	-
1Jun–30Sep 60	Unlimited quantities					-

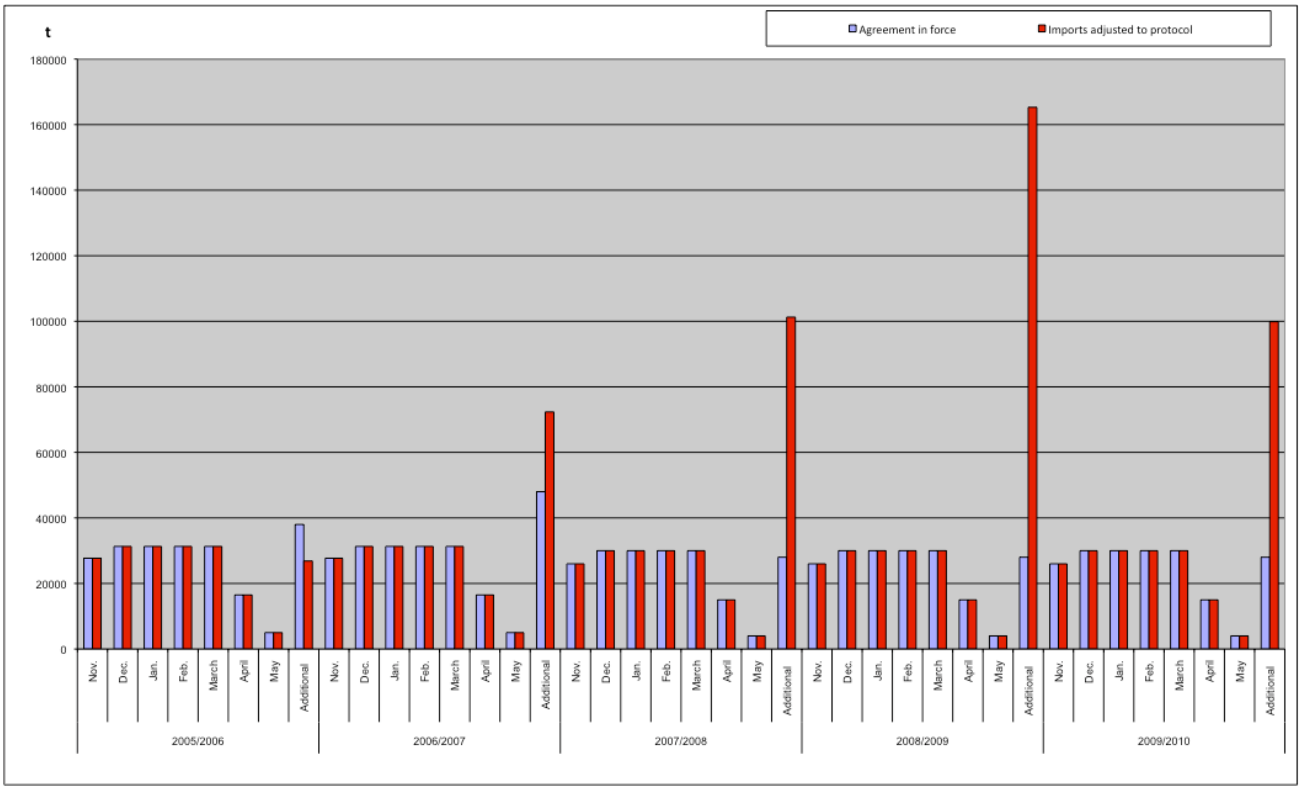
Source: proposal of the new Protocol.

Figure 9. Monthly EP quotas and actual trade flows; current conditions for Moroccan Tomatoes



Source: Comext database and EU-Morocco Association Agreement

Figure 10. The additional quota and actual trade flows; current conditions for Moroccan Tomatoes

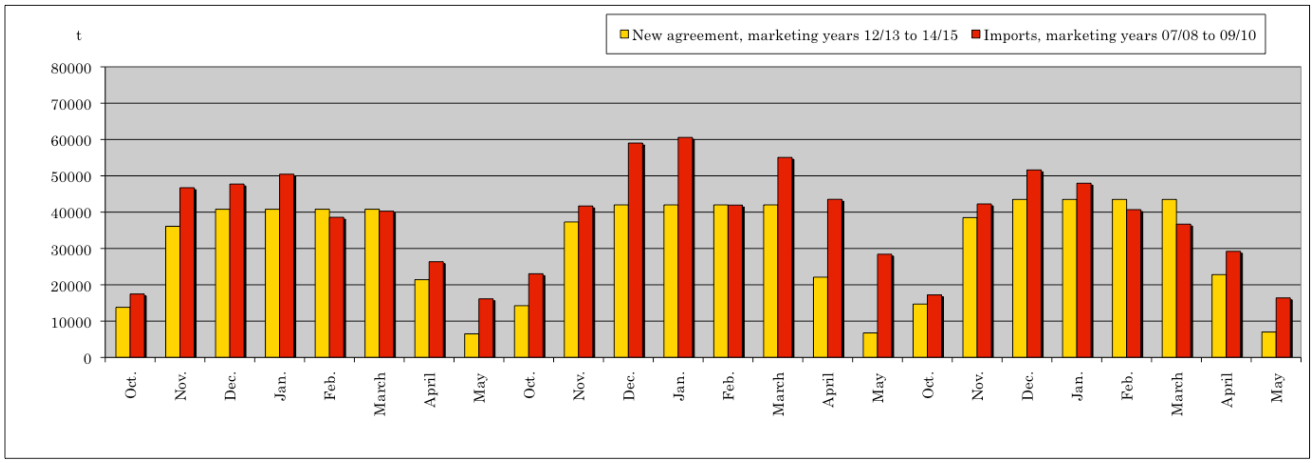


Source: Comext database and EU-Morocco Association Agreement

The new monthly quotas lie in between the actual trade flows and the current quotas, as they do not encompass all the volumes actually traded (refer to Figure 11). Therefore, they could be understood as a compromise solution in the trade-off between granting protection to EU producers and granting a certain degree of accession to Moroccan tomatoes into the EU market. Furthermore, the new additional quota stipulated is more restrictive than the options available via the two Lines A and B.

Hence, one might say that the new quotas are a signal from EU authorities to Moroccan agents, indicating more openness but through more strict rules. It may be worth mentioning that it is the responsibility of State Members to properly monitor the quantities crossing their borders, to prevent excess EP quota benefit from the full preferential treatment; also, the European Commission might issue import licenses if there is a threat of severe perturbations in the market.

Figure 11. New monthly EP quotas and actual trade flows; new conditions for Moroccan Tomatoes

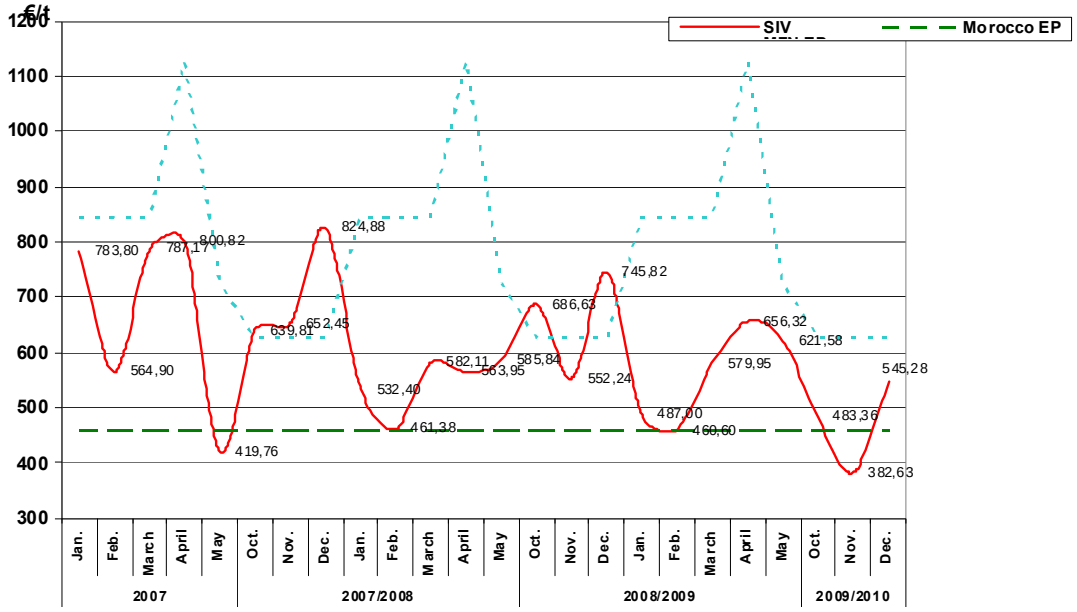


Source: proposal of the new Protocol and Comext database.

With regard to the SIV of Moroccan tomatoes, data on the previous marketing years indicated a mixed situation. Compared with reduced EP, in some periods SIV are well above it, while in other months they accumulate around this level. As Garcia-Alvarez-Coque et al (2010) state, the concentration of observations slightly above the EP could suggest that there is a possibility that the EP are relevant for exporters and have a significant influence on the price of the exports through a strategic supply shift.

Extending that reasoning, one could detect a "sensitive area" in the range ±10% of the reduced EP where the SIV could be affected by such strategic behavior. In the previous campaigns there are a number of instances within this range, as illustrated in the next figure. As a matter of fact, in these periods when SIV are in the sensitive area, there is a clear ability of Moroccan tomatoes to reach EU borders with low prices; then, the strategic pricing behavior is a result of the dissuasive effects of the EP regime.

Figure 12. Average monthly SIV of Moroccan tomatoes compared to the reduced EP and the ±10% range, marketing campaigns 2006/07 to 2009/10



Source: authors' calculations based on TARIC data and the Association Agreement.

As a result of the discussion above, the next table supplies a summary of a qualitative assessment of the expected impact on trade flows as a result of the new protocol for Moroccan exports to the EU.

Summary of the findings for selected products.

CN Code	Product	New concession	Likely effect on Moroccan exports to the EU
ex 0701 90 50	New potatoes, from 1 Dec to 30 April	Elimination of TRQ	Not expected substantial changes
0702 00 00	Tomatoes, from 1 Oct to 31 May	Enlarged EP quota	Consolidation or steady growth, conditioned to the monitoring of trade flows. Strategic pricing behavior continued as a result of the EP regime
0703 10 11 0703 10 19	Onions, from 15 Feb to 15 May	Elimination of TRQ	Not expected substantial changes
0703 20 00	Garlic	Enlarged TRQ	Minor changes
0703 90 00	Leeks	Elimination of TRQ	Consolidation and possible increment
ex 0704	Cabbages	Elimination of TRQ	Consolidation and possible increment
ex 0704	Carrots, turnips, salad beetroot, salsify, celeriac, radishes and similar edible roots	Elimination of TRQ	Consolidation and possible increment
0705 11 00	Cabbage lettuce (head lettuce)	Elimination of TRQ	Consolidation and possible increment
0707 00 05	Cucumbers, fresh or chilled from 1 Nov to 31 May	Enlarged EP quota	Possible increments and likely downward pressure on prices
0709 40 00	Celery, other than celeriac	Elimination of TRQ	Not expected substantial changes
0709 90 70	Zucchini, fresh or chilled (different periods)	Enlarged EP quota	Consolidation of flows under preferential conditions and likely downward pressure on prices, especially in April
0709 90 80	Globe artichokes, fresh or chilled from 1 Nov to 31 Dec	Enlarged EP quota	Minor effects
0805 10 20	Fresh oranges from 1 Dec to 31 May	Elimination of EP quota	Minor effects
0805 20 10	Fresh clementines from 1 Nov to end Feb	Enlarged EP quota	Minor effects
0806 10 10	Table grapes, fresh	Reduced EP	Minor effect
0809 20	Fresh cherries	Elimination of TRQ	Not expected substantial changes
0809 10 00	Apricots, fresh	Reduced EP and elimination of TRQ	Possible increments, with concentration in summer
0810 10 00 0810 10 00 0811 10 00 0811 10 00	Strawberries (different periods)	Enlarged TRQ	Switch of trade flows from March to April and May. Room for further increments
0809 30	Peaches, including nectarins, fresh	Reduced EP and elimination of TRQ	Possible increments, with concentration in summer

Source: authors' calculations based on TARIC and Comext data, and the Association Agreement and the new Protocol

7.2 Modeling a case study of full bilateral liberalization.

Sustainmed has carried out a modeling exercise considering the revision of the agricultural protocols within the Barcelona process – Union for the Mediterranean. This corresponds to Task W3T2 of the project, which has basically reach the stage of defining the quantitative methodology, building the code files in GAMS, setting the policy scenarios to be assessed and performing case studies in selected MPCs. The task will be further developed during the next eight months of the project. The present report includes preliminary results of the modeling exercise applied to the case of the new EU – Moroccan agricultural protocol, which has been extensively considered in the previous section. We will report here the results for fresh tomato, product which remains a controversial issue in the bilateral relations. In this particular case, the previous section found that most Moroccan export flows of tomato overcome the TRQs established in the current agreement and this will also happen with the new draft. Entry prices applied to tomato imports are not changed in the new protocol. This means that the new protocol will not probably affect the amount of trade flows but just the value of bilateral preference estimated in Section 6. This led to Sustainmed to consider new scenarios of further trade liberalization. While the political feasibility of alternative scenarios can be subject to discussion, **Sustainmed is considering making a hypothesis of full trade liberalization as an extreme case.** This allows to assessing what would be the effect on Moroccan exports to the EU and the rest of the world in the most favorable case for Morocco. A complementary outcome of the model is the estimation of the erosion of trade suffered by other MPCs in such extreme case, and also the effects on the EU production and trade.

Methodology

It draws on the contributions by García Alvarez-Coque et al (2009 and 2010), with an important difference in the scope of the scenarios chosen. While the quoted papers referred to cases of multilateral trade liberalization, the present exercise refers to a case of bilateral trade liberalization.

The proposed model approach combines the following characteristics:

- It is a model tailored to assess trade impacts of specific policy instruments such as EPs, preferences and TRQs.
- Impacts are calculated on a seasonal basis since the model focuses on the periods when EPs apply, because the primary aim of this exercise is to illustrate the possible specific impact in given seasons or periods of the year.
- The model considers imports from different sources as imperfect substitutes, which can be undertaken through a non-linear Armington-type model.
- The modelled market is the EU-27.
- Major MPC suppliers are explicitly considered as sources of EU imports.

- A composite demand is formed by different sources, including intra-EU trade plus the main extra-EU suppliers. Intra-EU trade data is considered as a seasonal proxy of domestic good as existing data describing domestic production on a monthly basis are incomplete for the studied products at the EU level.
- The projections are based on comparative static simulations on a monthly basis for a reference year. "Other MPCs" represent Mediterranean countries other than Morocco and Turkey. Given assumed values for demand and supply elasticities of ε_d and ε_s, trade elasticities are calculated as follows: $(Q/X)\varepsilon_S + (C/X)\varepsilon_d$ for export supply and $(Q/M)\varepsilon_S + (C/M)\varepsilon_d$ for import demand, where *Q, C, X, M* refer to domestic production, apparent consumption, exports and imports, from FAOSTAT data

Table 19. Elasticity assumptions

	Demand	Supply
(i) Domestic elasticities	0.5	0.5
(ii) EU import demand	3	
(iii) Export supply		
Intra-EU	3	
Morocco	2	
Turkey	20	
Other MPCs	29	
(iv) Elasticity of substitution		
Among intra-EU and extra-EU imports	10	
Among extra-EU imports	10	

Source: FAOSTAT and authors' calculations

The model draws on the existing knowledge, mainly based on the methodological analysis by Francois and Hall (1997). Nevertheless, our model offers added value through (i) a detailed specification of policy measures, TRQs, MFN and preferential EPs, *ad valorem* and supplementary tariffs applied to certain FVs; and (ii) an estimation of market impacts on a monthly basis.

Columns five and six in Table 20 show the levels of baseline ad valorem equivalents out-of-quota and in-quota estimated for selected trading partners and seasons based on SIV collected between 1st January 2004 and 31st December 2006 (TARIC database). **At present, the SIV are being updated to the period 2007 and 2009** and for that a database that has been constructed with the support of the Fruit and Vegetables Unit at DG AGRI (see folder Annex 8) in Excel files. **Updated model results will be shown in a Sustainmed Working Document during spring 2012.**

For the sake of simplicity, tariffs are presented only for those months when supplementary tariffs are applicable and the elimination of the EP system would make a difference. As supplementary tariffs are

published in specific terms, we converted them from specific to *ad valorem* terms by dividing the specific tariff component of the EP scheme by the border price of the product for each country. SIVs were used as proxies for these border prices. The first two columns of the table specify the supplementary tariffs (in *ad valorem* terms) for each supplier, indicating the currently applied and the hypothetical supplementary tariff for preferential suppliers if the higher MFN EP were in force (this would be the supplementary out-of-quota tariff). Columns three and four show the *ad valorem* in-quota and out-of-quota duties, which are the only ones that are kept in the scenario of eliminated EPs. Note that in some cases supplementary tariffs actually applied are zero but a MFN supplementary tariff can be charged if the preference is lost or if preferential SIVs lie below the MFN EP.

Table 20. Supplementary tariffs, *ad valorem* tariffs and total tariffs in the baseline scenario (in %)

	Actual Supplementary Tariff	MFN Supplementary Tariff	Ad valorem Tariff in-quota	Ad valorem Tariff out-of-quota	Total Tariff In-quota	Total Tariff out-of-quota	Binding TRQ?	
January	0	43.4	0	3.5	0	46.9	Yes	b
February	0	48.7	0	3.5	0	52.2	Yes	b
March	0	44.9	0	3.5	0	48.4	Yes	b
April	0	40.9	0	3.5	0	44.4	Yes	b
15-31 May	0	45.5	0	3.5	0	49	Yes	b
June	5.8	-	5.7	5.7	11.5	11.5	-	c
August	6.5	-	5.7	5.7	12.2	12.2	-	c
October	0.7	65.1	0	3.5	0.7	68.6	No	c
November	69.2	69.2	0	3.5	69.2	72.7	Yes	c
1-20 Dec	0	58.6	0	3.5	0	62.1	Yes	b
21 -31 Dec	0	48.1	0	3.5	0	51.6	No	b

b: SIV < MFN EP but > Agreed EP; c: SIV < Agreed EP

Source: Garcia Alvarez-Coque et. al (2010) and TARIC database (European Commission)

The figures in the last column of Table 20 indicate the binding character of the TRQ, which defines the initial value of baseline t_i . Two situations are identified: (i) no application of the TRQ as in the case of certain months for preferential suppliers and of the whole marketing year for non-preferential suppliers; (ii) binding TRQs for the majority of the marketing season. The model is calibrated to applied tariffs in the base period, i.e. if no supplementary tariffs were charged in a specific month (because of SIV > applied EP), the EP system is assumed to be ineffective in that month and thus its abolishment is without effect.

Preliminary findings

The results are presented as percent change with respect to the benchmark scenario. Results show changes in EU intra-trade, changes in top Mediterranean exporters (Morocco and Turkey) and changes in other MPCs. The scenario evaluated contemplates full bilateral liberalization of EU imports of Morocco's tomato, though a provision is maintained with respect to the current agricultural protocol. This is the application of the TRQs with a preferencial custom duty of 3.5%.

Table 21. Percentage of variation the exports with respect to benchmark

	% variation of sales			
	EU-27	**Morocco**	**Turkey**	**Other MPC**
Months				
January	-3.8	74.2	-10.7	11.9
February	-4.3	84.1	-12.0	13.3
March	-3.8	77.2	-10.7	11.8
April	-2.0	71.5	-5.9	12.5
1-14 May	-0.1	5.8	-0.3	0.4
15-31 May	-1.6	81.3	-4.7	5.2
June	-0.1	13.0	-0.1	0.1
July	0.0	0.0	0.0	0.0
August	-0.1	14.3	-0.1	0.1
September	0.0	0.0	0.0	0.0
October	-0.1	2.5	-0.1	0.1
November	-5.3	125.5	-14.8	45.3
1-20 December	-5.0	103.4	-13.9	15.4
21-31December	0.0	0.0	0.0	0.0

According to the results of the model for tomato, between two markets, the European Union and south Mediterranean, the internal (EU-27) importation of tomato are decreasing for all months. The average decrease for domestic imports into EU market are 2.2%, while imports from Morocco take tendency to increase over the summer, the peak being in November, with 125% over the benchmark exports. Exports from the rest of countries are going down (Turkey and othe MPCs) indicate the preference erosion effect that a bilateral liberalization could involve.

Table 22. Percentage price changes at the EU market (%)

	EU	**Morocco**	**Turkey**	**Other MPCs**
January	-1.3	-6.9	-0.5	-0.4
February	-1.4	-7.7	-0.6	-0.5
March	-1.3	-7.1	-0.5	-0.4
April	-0.7	-6.1	-0.3	-0.4
1-14 May	-0.1	-0.6	-0.1	-0.1
15-31 May	-0.6	-6.4	-0.2	-0.2
June	-0.1	-1.2	-0.1	-0.1
July	0.0	-1,8	0.0	0.0
August	-0.1	-1.3	-0.0	-0.0
September	0.0	0.0	0.0	0.0
October	-0.1	- 0.2	-0.0	-0.1
November	-1.8	-10.0	-0.7	-3.7
1-20 December	-1.7	-8.9	-0.7	-0.6
21-31 Dec	0.0	0.0	0.0	0.0

Table 22 displays the relative variation of import prices in the EU internal market of products from different origins. All prices internal prices goes down, in particular those of Moroccan origin, as it is expected of a policy change that increase competitiveness of Morocco's tomato in the EU market. However, due to the product differentiation caught by the Armington assumptions, the effects in the EU internal market are limited, always below 2% and only significant in the period November to March.

Table 23. Percentage of variation of export prices in selected Mediterranean exporters

	Percentage of export price (%)		
	MO	TR	Other MPCS
January	32.0	-0.5	-0.4
February	35.7	-0.6	-0.5
March	33.1	-0.5	-0.4
April	30.9	-0.3	-0.4
1-14 May	2.8	-0.1	-0.1
15-31 May	34.6	-0.2	-0.2
June	6.3	-0.1	-0.1
July	0.0	0.0	0.0
August	6.9	-0.1	-0.1
September	0.0	0.0	0.0
October	1.2	-0.1	-0.1
November	50.1	-0.7	-2.0
1-20 December	42.6	-0.7	-0.5
21-31December	0.0	0.0	0.0

While the impact on other countries seems limited, and only significant within the EU market, Morocco could accrue substantial export price increases for certain month of the year, as reflected in Table 23.

7.3 A multilateral perspective

As far as the Doha round is concerned, three relevant scenarios could be foreseen at multilateral level, as indicated in the study by European Parliament (2011):

a) A significant reduction of the bound tariffs. The Chair of the Committee on Agriculture Chair drafted in late 2008 a proposal that foresees tariff concessions that will be allocated according to a band system, with tariff reductions of 50% or higher. That percent reduction could be applied to the maximum tariff equivalent (MTE) or specific tariff to be applied in case of import prices fall below entry prices. If the procedure adopted in the previous Uruguay Round (UR) negotiations is adopted, the entry price will be reduced of an amount based on the value generated by the MTE cut. Note that these reductions will be significantly higher than those agreed in the UR.

b) The hypothesis of the products involved being considered as sensitive products[9]. This could involve, according to the Chair's draft, tariff cuts of one third of the normal cut and increase in TRQ. This is a possibility that could be applied to a very limited number of F&V. Market access will in turn have to increase significantly through TRQs of a size up to 6% of the domestic consumption.

c) The phasing out of the entry price system. This considers the elimination of the corresponding supplementary tariffs associated to the existence of entry prices, the ad valorem duties remaining at current levels.

Table 24. Scenarios for external protection of selected F&V in the Doha Round of multilateral negotiations

	Current			Hp. A			Hp. B			Hp. C		
	Tariff (%)	EP level (€/t)	MTE (€/t)	Tariff (%)	EP level (€/t)	MTE (€/t)	Tariff (%)	EP level (€/t)	MTE (€/t)	Tariff (%)	EP level (€/t)	MTE (€/t)
Clementines	16.0	649	106	8.0	596	53	13.3	631	88	16.0	-	-
Lemons	6.4	462-558	256	6.4	334-430	128	5.3	419-515	213	6.4	-	-
Mandarins	16.0	286	106	8.0	233	53	13.3	268	88	16.0	-	-
Oranges	3.2-16.0	354	71	1.6-8.0	318,5	35.5	2.7-13.3	342	59	3.2-16.0	-	-
Peaches/ nectarines	17.6	600-883	130	8.8	535-818	65	14.7	578-861	108	17.6	-	-
Table grapes	8.0-17.6	476-546	96	4.0-8.8	428-498	48	6.7-14.7	476-546	80	8.0-17.6	-	-

Source: European Parliament (2010), WTO IDB notifications. WTO Committee on Agriculture, Chair's draft (Dec. 2008). Authors' calculations

[9] The Dec. 2008 draft set up, for developed countries, a threshold of 4% of tariff lines (about 80 lines at 6 digit level of HS) to be eligible as "sensitive products".

Table 24 summarizes tariff and EPS variations in the three scenarios for selected F&V products of interest for this study. At a first glance, the reduction of the level of protection appears to be significant for scenarios A and C.

The perspective of tariffs and EPs/MTEs dismantling as a result of the Doha Round negotiations should therefore be assessed, and this will attract the attention of Sustainmed's WP3 in the next months. The EU could argue in favor of the maintaining the entry price system, not only on the sake of protecting the EU F&V sector, but also on considering the risk of preference erosion against Mediterranean partner countries. Sustainmed will use the model proposed in the previous section to compare the results previously obtained for a bilateral EU trade liberalization with respect to Morocco's tomato, with the results of the scenario of multilateral liberalization.

8. Investigating distributional impacts of trade liberalization

As Annex 6 suggests, AU is investigating the impact of trade agreements differentiated by social groups. This will allow Sustainmed to make progress in the Task W3T3 of WO3, which looks at domestic policy changes. The study will make use of household diversified social accounting matrix with agriculture focused input-output matrix. These social accounting (SAM) and input output (I-O) matrices were previously built to carry out multiplier analyses particularly to assess the impact of various policies on rural economy. A difference of the Sustainmed approach compared to what other scholars is that land is included in factors of production and labor force is classified into two groups as skilled and unskilled. Secondly, raw agricultural and food industry are disaggregated to present various sub-sectors explicitly. Thirdly, household account is separated into rural and urban areas and in each area households are grouped under five classes with respect to their status in the job. We suggest that if the change in agricultural trade feed back to SAM, the nation-wide income effect can be calculated for urban and rural areas and for various employment statuses by utilizing the direct/indirect and open/closed loop multipliers.

Then a static computable general equilibrium (CGE) model will employ the above SAM and I-O. In the supply side firms employ a nested production structure. Two stage CES functions characterize the producer behavior and firms determine factor demand under profit maximization problem. CES is applied first to calculate value added, based on factor use. Intermediate demand is determined by using Leontief type production technology. Domestic intermediate products are differentiated from imported goods through CES function as well in Armington fashion. Final output is also a Leontief function of intermediate demand and value added. Later, by using CET total output is distributed to domestic and export markets. The demand side is modeled using Stone-Geary expenditure system (LES) and to model trade, Armington specification is used which differentiates goods with respect to geofigureical origin.

There are three different product markets which are imperfectly substitutes to each other: domestic market, export and import markets. Under the assumption that MPCs are "small countries" in international trade,

prices of export and import goods are given by the world market. Domestic price is set a CES function of import and domestic prices. Export price is given by the world market and converted by exchange rate. Import price is given by the world market as well but a tariff rate and value added tax is applied at border. Standard, neoclassical savings-investment equilibrium is used to close the model.

We suggest resolving the model with the new "changed" agricultural trade derived from the bilateral/multilateral trade liberalization exercise. However, due to the small size of anticipated trade changes in the agricultural commodity markets, insignificant amount of changes are expected in the model outcomes. The other option is to simulate the impacts of a MPC's changing unilateral import tariffs on income distribution. However, this will create another challenge as such, trade impacts derived from this exercise cannot be comparable to the impacts derived in the bilateral/multilateral trade liberalization exercise. In addition, insignificant inter-sectoral changes and income effects will be the expected outcome.

9. Summary of conclusions

The present report corresponds to Working Package WP3 of the Sustainmed project. This has been released in month number 20 since the project started. Progress in the project has covered the analysis of trade trends (task W3T1); the methodological definition and pilot essays for trade modeling of bilateral liberalization (task W3T2); some advance of the work carried out with respect to domestic trade liberalization (task W3T3) and the impact of Non-Tariff Measures (Task W3T4). During 2012 the Working package will be releasing more finalized outputs in the form of working papers and journal articles.

We summarise below the main preliminary findings of the research effort:

- The Mediterranean region shows heavy dependence on food staple imports and certain specialization in Mediterranean products' exports. Except in fruits and vegetables, which is mostly due to Egypt, Morocco and Turkey's production, the region shows a deficit in agricultural trade of all commodity groups.

- Extra-EU actors are also significant suppliers in the fast growing import market in the MPCs. The United States is leading as a source of agricultural products of Turkey, Egypt, Jordan, Morocco and Algeria, with a strong base in grains' exports. Imports are also growing from Brazil, and from Russia and Ukraine, which are expected to become major supplying partners in the region.

- Trade profiles of the MPCs participating in the project (Egypt, Morocco, Syria, Tunisia and Turkey) have been elaborated with relevant information on trade agreements signed, bilateral trade of agricultural products with the EU, and trade with the other regions of the world.

- Update estimates of revealed comparative advantages in selected MPCs confirme the pattern of specialization where vegetables, fish and olive oil appear as the only product groupings where the MPCs show a significant competitiveness.

- Trade trends were estimated in the quoted MPCs for selected commodities (related to the value chains to investigate under Sustainmed WP4). Auto-regresive models were used to establish benchmark projections. Olive oil exports appear to have a marked increasing trend for Tunisia and Turkey. Also showing significant positive trends is tomato from Morocco and Turkey; and citrus from Egypt. As to imported goods, the trend for Morocco's wheat imports from the EU keeps positive, showing still a significant reliance on EU sources (although challenged by extra-region suppliers), while such dependence on EU sources is decreasing in Egypt. It is worth recalling that this analysis of trends does not take fully account of the most recent policy changes, as the US – Morocco FTA. Projects are, consequently, only reference forecasts that can be updated with the proposed methodology.

- The core of EU external protection on MPCs exports was researched, contemplating the evaluation of trade preferences and the assessment of new trade agreements, such as the new draft for an agricultural protocol between the EU and Morocco.

- A database of daily Standard Import Values (SIV) for fruit and vegetables affected by the entry price system has been built, including the calculation of the ad valorem equivalent tariffs of the fruit and vegetables affected by the entry price system. Studies on the effectiveness of the entry price system to constrain MPCs exports to the EU indicate that, even if preferences and price reductions apply, they keep restrictive for some products/MPCs. One relevant case is tomato, where the SIV are over the entry prices with relatively high frequency. For most products, in the medium-term, the entry price could play a more restrictive role if MPCs exports increase as a result of further trade liberalization.

- As for Non-Tarif Measures (NTM), SUSTAINMED has begun to investigate the role of NTM in Euro-Mediterranean trade. Exhaustive data from the RASFF system were collected and analised. These data are being treated with statistical and econometrical procedures to test the influence of a set of relevant variables such as country of origin, country of destination, type of alert issued, etc. on the likelihood for an alert to be notified at the EU borders for a specific shipment of MPCs' exported goods. Specific results will be shown in another deliverable specific on NTMs.

- The EU and most MPCs have signed bilateral agreements within the framework of the Euro-Mediterranean Partnership. Regional agreements with other countries outside the Euro-Mediterranean region have become another strategy for some governments, which includes the

integration with the USA. This has been the case of Jordan (2001) and Morocco (2006), which seems to deepen dependency of food imports from the USA.

- Sustainmed has proposed a method to assess the value of the preference involved by the tariff concessions and reduced entry prices. In particular, the reduction of the specific component of the EP system (in turn linked with the reduced trigger EP) has been isolated from the reduction of the ad valorem tariff. This involves a contribution with respect to previous analysis of the preference margin that don't usually take into account specific trade instruments like the EP.

- Regarding the erosion of preferences after changes in the EP system as a result of the Doha negotiations, the designation of certain fruit and vegetables as sensitive products by the EU would influence MPC exports, depending on their ability to keep a preference. If a given product is not declared sensitive, a certain degree of preference erosion would take place. In clementines, the finding is more straightforward: the deeper the tariff cut, the higher the erosion. For tomatoes, the situation is different and Moroccan exporters probably prefer the maintenance of the current system, provided that they can increase the quantities traded under preferential conditions.

- Sustainmed is undertaking the assessment of bilateral trade agreements, with a view of evaluation the adoption of further steps in the liberalization of agricultural trade within the Euro-Mediterranean region. To model trade policy impacts two tools are being used 1) Armington type trade partial equilibrium models; 2) Static CGE models that utilizes social account matrix that diversifies households into urban and rural areas and with respect to status in the job; and which has an agricultural focused.

- We considered the case of the new agricultural protocol for the EU – Morocco Association A preliminary comparison between the new protocol draft and the one currently in force allows to distinguishing the new concessions to Morocco according to three different categories. First, a complete elimination of Tariff-Rate Quotas (TRQ) and Reference Quantities (RQ) in force has been agreed for a number of tariff-lines. For most of these products, such elimination implies a full duty-free access since the previous TRQ and RQ meant a zero tariff within them. Second, for a limited set of goods the new concessions imply that TRQ and RQ are still in force, but they are enlarged. Third, the agreed provisions to other products would imply certain benefits in the application of the entry price (EP) regime.

- A product by product analysis has been carried out to see whether the new provisions allow for significant increase in the volume of trade. In many cases, the trade was actually open (SIV over the EPs, relatively large TRQs and reduced custom out-of-quota duties). Consequently, the new protocol will have significant effects only in few cases.

- For tomato, we found that the new protocol will not probably be the cause for a boost in the Moroccan exports, which will remain constrained by TRQs. It is more likely that a change in the value of preference takes place. Consequently, the new protocol's draft, agreed in 2009 and yet to be ratified by the European Parliament, points to a consolidation of the existing trade trends rather to a significant opening of the EU market. This led us to investigate new scenarios for trade liberalization, and we consider what if would happen if there were a full bilateral liberalization, implying the removal of the existing restrictions (including the entry prices) faced by Morocco's tomato in the EU market. The model draws on the Armington's assumptions and their empirical application to the case indicates that Moroccan export prices could be substantially increased during part of the year, without causing serious disturbances in the EU markets. Some preference erosion will affect negatively the other MPCs and Turkey. A different picture would be given by scenarios of multilateral trade liberalization that will be assessed in the next steps by Sustainmed.

- As for the analysis of distributional effects of trade policy changes, Sustainmed is investigating the impact of trade agreements differentiated by social groups. The present report introduces the methodological basis for that. They will make use of household diversified social accounting matrix with agriculture focused input-output matrix. Rural-urban differentiated impacts will be evaluated. The model will be used for assessing multilateral, reciprocal and unilateral trade options.

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Annex 1. Agricultural trade patterns. Trade profiles

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Abstract:

This task will provide research on global trends related to (i) changing agricultural trade patterns; and (ii) MPCs national competitive positioning compared to emerging economies.

As international trade has become more commonplace in the agricultural sector, trade patterns have emerged. These patterns are subject to the influence of domestic as well as international trade policies and factors directly related to crops and the production of goods that can affect the trade of agricultural products. .

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Chapter 1.

Trade Profiles: Morocco

1.1 Morocco and the EU

Morocco signed an Association Agreement with the EU in the framework of the Euromed process in February 1996, which entered into force in March 2000. Morocco is an active participant in this process, which aims to create a Euro-Mediterranean Free Trade Area by 2010, and pursues a close economic relationship with the EU that is "more than association, but less than accession".

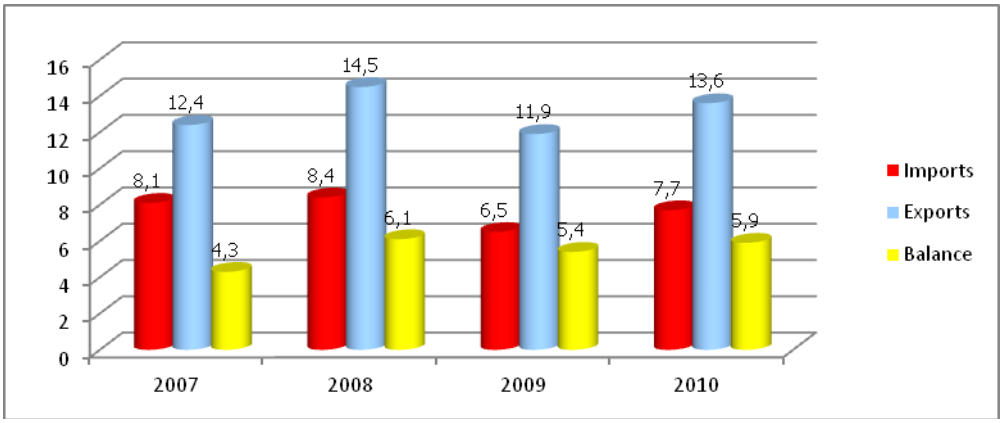
- EU exports of goods to Morocco 2010: **€13,6 billion**
- EU imports of goods from Morocco 2010: **€7,7 billion**

EU-Morocco trade is growing fast. Between 1997 and 2007, trade volumes grew by over 80%. Morocco's economy is still relatively dependant on trade in textile articles (29.9%) and on agricultural products (28.3%), which together account for 58.2% of total Moroccan exports to the EU in 2009. Morocco mainly imports from the EU machinery and transport equipment (38.1%), chemicals (9.8%) and fuels (9.7%).

The EU is Morocco's first trading partner which amounts to approximately €18.5 billion in 2009 (60% of Morocco's total trade) and 21,3 billion in 2010 (increased by 13,15%, the bulk of which is textiles and agricultural goods (Figure 1.2). EU-Morocco trade is growing fast. Between 1995 and 2008, trade volumes grew by over 80% amounting to €2.8 billion (EU exports: €14.4bn, EU imports: €8.4bn). In 2009 trade flows however contracted by 20% in account of the impact of the global crisis on European demand. The main impact was on EU imports from Morocco, which fell by 22.6%, particularly phosphate based products, tourism, remittances and inward investment; EU exports to Morocco also fell by 17.6%. In the first half of 2010 the trend has started to recover and EU imports to Morocco have increased by 16.6%, while exports to Morocco have increased by 8.9%.

EU-Morocco co-operation is an important part of the European Neighbourhood Policy (ENP). The ENP supports political and economic cooperation between Morocco and the EU and is the framework for financial assistance from the EU to Morocco. The European Neighbourhood Policy Instrument - ENPI - is endowed with €11.9 billion for the period 2007-2013. The 2011-2013 National Indicative Programme (NIP) allocated €580.5 million to Morocco to support the following five priorities identified for financial cooperation: **1.** the development of social policies; **2.** economic modernisation; **3.** institutional support; **4.** good governance and human rights; and 5. environmental protection. In the framework of the ENP the EU-Morocco Action Plan was approved in July 2005 for a period of five years. Morocco was among the first countries to sign a Neighbourhood Action Plan with the EU.

Figure 1.1: Trade in goods – Morocco and EU-27



Source: Eurostat, Statistical Regime 4 – 2010

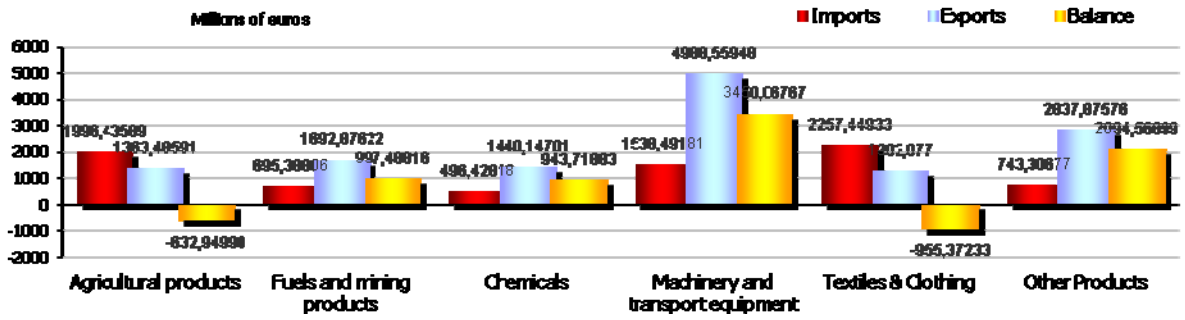
As shown in table 1.1, miscellaneous manufactured articles (SITC 8) is the main exporting product from Morocco to EU-27, accounting for 35,6% of total exports for 2009 reduced to 33,12% for 2010. Food and live animals (SITC 0), follows amounting for 1.702 million of Euro and receives a share of 26,1% in total exports for 2009 and a reduced share of 23,55% for 2010. Machinery and transport equipment (SITC 7) is the third main exporting product from Morocco accounting for 19,91% of total exports in 2010. In 2010 the share of total EU imports from Morocco has increased by 1%, while the higher positive difference is noticed in Animal and Vegetable oils, fats and waxes (SITC 4) where we have an increase of 32%.

Table 1.1: EU-27 Imports from Morocco (2009 - 2010)

SITC Codes	SITC Sections	Value (Millions of euro)		Share of Total (%)		Share of total EU Imports	
		2009	2010	2009	2010	2009	2010
	TOTAL	**6.510**	**7.728**	**100,00%**	**100,00%**	**0,50%**	**0,51%**
SITC 8	Miscellaneous manufactured articles	2.316	2.560	**35,60%**	**33,12%**	**1,30%**	**1,26%**
SITC 0	Food and live animals	1.702	1.820	**26,10%**	**23,55%**	**2,60%**	**2,47%**
SITC 7	Machinery and transport equipment	1.241	1.538	**19,10%**	**19,91%**	**0,40%**	**0,35%**
SITC 2	Crude materials, inedible, except fuels	319	584	**4,90%**	**7,56%**	**0,80%**	**0,91%**
SITC 5	Chemicals and related prod, n.e.s.	277	496	**4,30%**	**6,42%**	**0,30%**	**0,36%**
SITC 6	Manufactured goods classified chiefly by material	245	346	**3,80%**	**4,48%**	**0,20%**	**0,22%**
SITC 3	Mineral fuels, lubricants and related materials	102	171	**1,60%**	**2,22%**	**0,00%**	**0,04%**
SITC 4	Animal and vegetable oils, fats and waxes	27	54	**0,40%**	**0,70%**	**0,50%**	**0,82%**
SITC 9	Commodities and transactions n.c.e.	19	19	**0,30%**	**0,25%**	**0,00%**	**0,07%**
SITC 1	Beverages and tobacco	8	7	**0,10%**	**0,09%**	**0,20%**	**0,10%**

Source: Eurostat (Comext, Statistical regime 4 - 2010)

Figure 1.2: EU-27 Merchandise trade with Morocco by product (2010)



Source: Eurostat (Comext, Statistical regime 4) - SITC Rev. 3: Agricultural products: 0, 1, 2, 4, excl. 27, excl. 28; Fuels and mining products: 3, 27, 28, 68; Chemicals: 5; Machinery and transport equipment: 7; Textiles & Clothing: 65, 84 - 2010

The main agricultural products (SITC 0, REV 3, Food and live animals), exporting from Morocco to EU-27 are fish (SITC 03), vegetables and fruits, (SITC 05), and beverages (SITC 11). In 2009, fish amounted for 756.629 thousand of Euro and represented the 11,26% of the total exports of Morocco to the EU. Respectively, fruit and vegetables amounted for 957.623 thousands of Euro and 14,71% in total exports and beverages amounted for 7.435 thousand of Euro and 0,11% of total exports (Table 1.2).

Table 1.2: Main agricultural product exports of Morocco to EU-27 (2009)

MOROCCO	Total	03. Fish	05. Fruit and Vegetables	11. Beverages	% of fish in total exports	% of fruit and vegetables in total exports	% of beverages in total exports
1999	5.678.603	401.017	609.833	6.871	7,06%	10,74%	0,12%
2000	6.161.757	534.898	559.809	9.530	8,68%	9,09%	0,15%
2001	6.365.431	576.200	589.887	8.237	9,05%	9,27%	0,13%
2002	6.425.050	650.340	688.605	10.012	10,12%	10,72%	0,16%
2003	6.368.435	638.554	701.703	14.274	10,03%	11,02%	0,22%
2004	6.586.330	562.259	738.157	16.617	8,54%	11,21%	0,25%
2005	9.103.550	657.727	738.157	24.271	7,22%	8,11%	0,27%
2006	7.218.261	727.619	797.136	12.492	10,08%	11,04%	0,17%
2007	8.085.472	746.527	1.139.644	11.423	9,23%	14,09%	0,14%
2008	8.403.735	834.147	1.011.967	8.781	9,93%	12,04%	0,10%
2009	6.510.317	756.629	957.623	7.435	11,62%	14,71%	0,11%

Source: Eurostat, trade since 1995 by SITC rev 3, authors calculations - 2010

Morocco is ranked in the 35th place as an exporter of primary products to European Union of 27 member countries in 2010. As a fish exporter, is ranked in the 7th two places lower compared to 2009 where Morocco was in the 5th place and in the 16th place as an exporter of food. The following table is showing the value of exports for primary products and their position and share in the total EU imports.

Table 1.3: Rank of Morocco in EU trade (2010) – Primary products

SITC Rev.3 Product Groups	Rank	Millions of euro	Share in Total	Share of total EU Imports
TOTAL	**35**	**6.510,30**	**100,00%**	**0,50%**
1000 - Primary products	**36**	**2.691,8**	**34,8%**	**0,5%**
1100 - Agricultural products	19	1.996,4	25,8%	1,7%
1110 - Food	16	1.881,1	24,3%	2,0%
1111 - Fish	7	742,6	9,6%	4,3%
1112 - Other food products and live animals	21	1.138,6	14,7%	1,5%
1120 - Raw materials	35	115,3	1,5%	0,5%
1200 - Fuels and mining products	48	695,4	9,0%	0,2%
1210 - Ores and other minerals	16	468,9	6,1%	1,3%
1220 - Fuels	53	171,2	2,2%	0,0%
1221 - Petroleum and petroleum products	50	112,4	1,5%	0,0%
1222 - Other fuels	31	58,8	0,8%	0,1%
1230 - Non ferrous metals	42	55,4	0,7%	0,2%

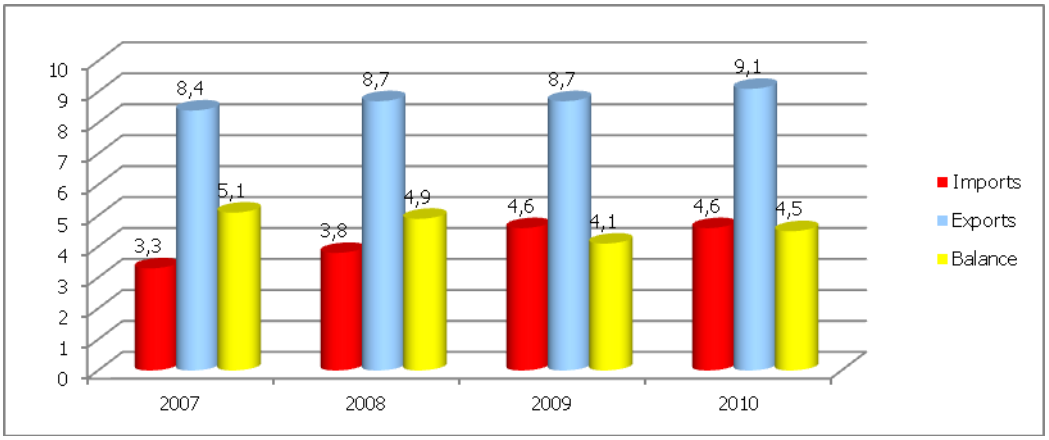
Source: Eurostat (Comext, Statistical regime 4 - 2010)

1.2 Morocco and the world

Morocco's total exports to the world amount €9.5 bn in 2009 while the total imports from the world (excluding intra EU trade) amount for €22.4 bn (Table 1.4). Figures of exports have increased in 2010 by 22,5%. The volumes of trade compared with those of 2008 have been reduced as a result of the global crisis. More specifically, imports have fallen by 17.7% while exports have fallen by 26.3% (Table 1.4). This is changing for next year as the figures of 2010 show a positive change and increase in trade volumes. The main exporting products of Morocco to the world are machinery and mechanical appliances (TDC[1] 16), Vehicles, aircraft, vessels and associated transport equipment (TDC 17), base metals and articles of base metal (TDC 15), and textiles and textile articles (TDC 11).

1 TDC Sections, harmonized system

Figure 1.3: Trade in goods – Morocco and the World



Source: IMF (Direction of Trade Statistics – DoTS 2010)

Table 1.4: Morocco trade with the World – millions of Euro, %

Period	Imports	Variation (%, y-o-y)	Exports	Variation (%, y-o-y)	Balance	Trade
2005	16.762	**14,8**	8.932	**8,8**	-7.830	25.694
2006	19.898	**18,7**	10.544	**18,0**	-9.353	30.442
2007	23.785	**19,5**	11.803	**11,9**	-11.982	35.587
2008	27.103	**14,0**	12.976	**9,9**	-14.127	40.079
2009	22.336	**-17,6**	9.562	**-26,3**	-12.774	31.899
2010	25.296	**13,9**	11.747	**22,5**	-13.549	37.043

Source: IMF (Direction of Trade Statistics – DoTS 2010)

In 2009, Morocco's exports to the World were composed of 26.5% of miscellaneous manufactured articles (SITC section 8), 21.6% of food live animals, beverages and tobacco (SITC sections 0+1) and 18.8% of machinery and transport equipment (SITC section 7) (Table 1.5).

Table 1.5: Morocco's exports to the World by SITC sections (2009) – values in million US$, growth and shares in percentage

SITC Sections[2]	2009	Avg. Growth rates %		2009 share
		2005-2009	2008-2009	
Total	13.937,9	5,7	-31,4	100
0+1	3.006,8	7,7	-12,7	21,6
2+4	1.281,5	3,0	-58,5	9,2
3	457,8	-5,1	-46,1	3,3
5	1.943,5	7,6	-58,7	13,9
6	886,6	5,8	-22,4	6,4
7	2.621,3	10,5	-12,2	18,8
8	3.699,1	2,8	-9,0	26,5
9	41,2	21,2	79,4	0,3

Source: UN Comtrade, 2009

The major trade partner of Morocco as it is shown in the table below is the EU 27, both as an export and import partner. As it is shown in column three "The Major Trade Partners", EU 27, accounts for €19.023,1 million and amounts for the 59.6% of total trade of Morocco. More specifically, France (24.6% of total exports), Spain (20.91% of total exports), Italy (4.6% of total exports) United Kingdom (3,2% of total exports), Germany (3,1% of total exports), Netherlands (2,7% of total exports) and Belgium (1,8% of total exports) are the main EU destinations of Morocco's exports (Table 1.7). China with 7.1%, United States with 5.7%, Saudi Arabia with 5.1% and Iran with 2.4% of total imports, are the major import partners. On the other side, India with 4.9%, United States with 3.6%, Russia with 2.4% and China with 2.3% of total exports are the main export partners. Morocco, has bilateral trade relationships only with Algeria as far as it concerns the MPCs as it is ranked as the 8th main import country for Morocco. Turkey, is also an important trade partner both for imports and exports as it is ranked as the 7th main trade partner for Morocco.

Moroccan trade with the Maghreb and the Mediterranean countries is limited and accounts for just 1% and 5% respectively of its total trade. Reversing the low level of intra-regional trade is therefore one of the key goals of the EU-Morocco trade relationship. On 25 February 2004, Morocco signed the Agadir Agreement (AA) with Egypt, Jordan and Tunisia which entered into force in July 2006. All parties to the AA committed to removing substantially all tariffs between them and to harmonising their legislation with regard to standards and customs procedures. The effective implementation of the AA started in April 2007 with the creation of the Agadir Technical Unit in Amman. The results of the AA are so far modest, despite a small increase in trade flows among AA members.

[2] SITC 1-Beverages and Tobacco, SITC 2 – Crude Materials, Inedible Except Fuels, SITC 3 – Mineral Fuels, Lubrications and Related Materials, SITC 4 – Animal and Vegetable Oils, Fats and Waxes, SITC 5 – Chemical and Related prod, nes, SITC 6 – Manufacturing Goods Classified Chiefly by Material, SITC 7 – Machinery and Transport Equipment, SITC 8 – Miscellaneous Manufactured Articles, SITC 9 – Commodities and Transactions n.c.e.

Morocco is the first Mediterranean country to have adopted the new Pan-Euro-Mediterranean system of cumulation of origin, in December 2005. The system - which makes it simpler to import products manufactured in more than one country throughout the Mediterranean basin is generating new opportunities for economic operators, notably in the textile sector. It is also an important spur for further regional economic integration.

Table 1.6: Morocco's trade with main partners (2009)

The Major Imports Partners				The Major Export Partners			The Major Trade Partners		
Rk	Partners	Mio euro	%	Partners	Mio euro	%	Partners	Mio euro	%
	World (all)	22.336,1	100%	World (all)	9.562,4	100%	World (all)	31.898,6	100%
1	EU27	13.104,7	58,7%	EU27	5.918,4	61,9%	EU27	19.023,1	59,6%
2	China	1.591,0	7,1%	India	470,9	4,9%	China	1.814,1	5,7%
3	United States	1.266,4	5,7%	United States	340,5	3,6%	United States	1.606,9	5,0%
4	Saudi Arabia	1.141,3	5,1%	Russia	225,9	2,4%	Saudi Arabia	1.207,5	3,8%
5	Iran	526,5	2,4%	China	223,0	2,3%	India	632,0	2,0%
6	Turkey	474,0	2,1%	Brazil	220,1	2,3%	Brazil	631,2	2,0%
7	Brazil	411,1	1,8%	Japan	154,1	1,6%	Turkey	625,2	2,0%
8	Algeria	391,9	1,8%	Turkey	151,3	1,6%	Iran	561,6	1,8%
9	Argentina	339,6	1,5%	Mexico	123,2	1,3%	Russia	522,3	1,6%
10	Russia	296,4	1,3%	Singapore	100,2	1,0%	Algeria	445,0	1,4%

Source: IMF (Direction of Trade Statistics – DoTS - 2009)

Table 1.7: Morocco's exports by principal countries and SITC sections in 2009 – value in million US$, percentage of country total

Country	Total	Shares by SITC sections (%)								
		0+1	2+4	3	5	6	7	8	9	Total
World	13.937,9	21,6	9,2	3,3	13,9	6,4	18,8	26,5	0,3	100
France	3.426,9	17,9	2,8	0,0	4,1	5,0	30,8	39,4	0,0	100
Spain	2.951,5	22,6	4,8	0,0	2,9	7,3	17,1	45,2	0,0	100
India	740,7	0,0	13,7	...	85,5	0,6	0,2	0,0	...	100
Italy	646,0	33,9	6,1	0,0	4,1	3,4	25,8	26,7	0,0	100
USA	457,4	18,7	50,1	0,0	4,6	3,0	17,7	6,0	0,0	100
United Kingdom	457,1	14,2	2,2	0,0	5,6	2,4	8,6	67,0	...	100
Germany	431,8	19,2	7,3	0,0	9,9	6,1	15,0	42,6	...	100
Netherlands	374,8	45,9	5,1	18,1	17,4	4,5	2,5	6,5	0,0	100
Brazil	298,2	7,2	17,5	...	74,2	0,6	0,0	0,4	...	100
Belgium	250,2	23,7	20,9	0,0	30,4	8,5	2,4	13,9	0,1	100

Source: UN Comtrade, 2009

Chapter 2.

Trade Profiles: Tunisia

2.1. Tunisia and the EU

The EU is Tunisia's first trading partner, accounting in 2008 for 64.5% of Tunisian imports and 72.1% of Tunisian exports: exports from Tunisia have risen swiftly in recent years until 2008, registering a decrease by 18% of imports and by 9.7% of exports. Tunisia was the first Mediterranean country to sign an Association Agreement with the EU, in July 1995, although even before the date of entry into force, Tunisia started dismantling tariffs on bilateral EU trade. Tunisia finalised the tariffs dismantling for industrial products in 2008 and therefore was the first Mediterranean country to enter in a free trade area with EU. In December 2009, the EU signed a bilateral protocol with Tunisia on the establishment of a dispute settlement mechanism.

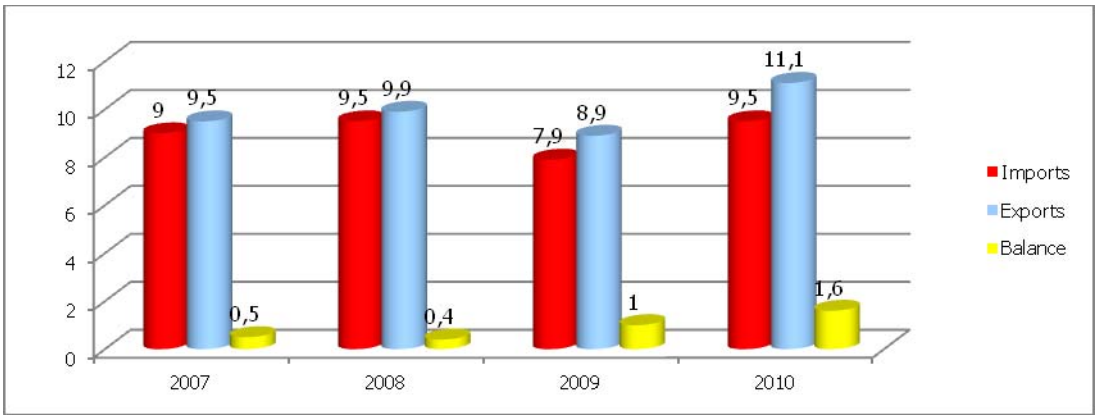
- EU good exports to Tunisia 2010: **€11,1 billion**
- EU goods imports from Tunisia 2010: **€9,5 billion**

Tunisia is one of the EU's most established trading partners in the Mediterranean region (EU's 31st largest trading partner). Tunisia's main exports to the EU in 2010 are manufactured products (77,3% of which 24,5% clothing and 31,7% machinery and transport equipment) energy (16.4%) and agricultural products (4,6%). Major imports from the EU are machinery and transport equipment (36,6%) textiles 11,7% chemicals (9,6%) and other machinery (22,5%) (Figure 2.2).

EU-Tunisia co-operation is an important part of the European Neighbourhood Policy (ENP), on this basis EU-Tunisia ENP Action Plan was adopted in 2005 for five years. The Neighbourhood policy supports political and economic cooperation between Tunisia and the EU and is the framework for financial assistance from the EU to Tunisia. The European Neighbourhood Policy Instrument - ENPI - will be endowed with €11.9 billion for 2007-2013. For the period 2007-2010 the funds allocated by the National Indicative Programme (NIP) to the Tunisian government amounted to €300million. These funds will be used for projects that include measures to facilitate trade.

The trade balance between Tunisia and EU 27 as it is shown in Figure 2.1 is positive during the period between 2007 and 2010.

Figure 2.1: Trade in goods – Tunisia and EU 27



Source: Eurostat (Comext, Statistical regime 4 - 2010)

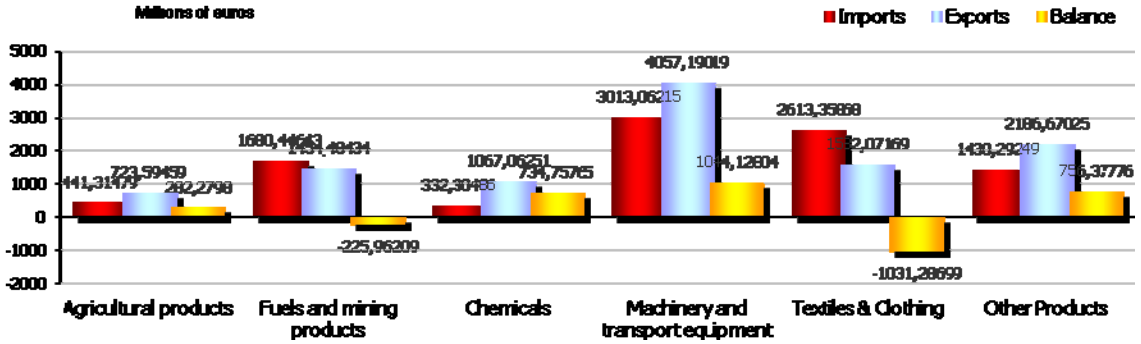
EU 27 is importing mainly miscellaneous manufactured articles (SITC 8) amounting for € 2.981 million in 2009 and accounting for 37,8% of the total exports to EU 27 which are increased by 11% in 2010, machinery and transport equipment (SITC 7) amounting for € 2.240 million accounting for 28,4% of total exports to EU 27 for 2009 are increased by 31,68% in 2010. Food and live animals (SITC 0) and Animal and vegetable oils, fats and waxes (SITC 4) are ranked 6th and 7th amounting for € 265 million and € 194 million respectively for 2010, these figures are increased in comparison to those of 2009.

Table 2.1: EU-27 Imports from Tunisia (2009 - 2010)

SITC Codes	SITC Sections	Value(Millions of euro)		Share of Total (%)		Share of total EU Imports	
		2009	2010	2009	2010	2009	2010
	TOTAL	**7.891**	**9.511**	**100,00%**	**100,00%**	**0,70%**	**0,70%**
SITC 8	Miscellaneous manufactured articles	2.981	3.350	**37,80%**	**35,22%**	**1,70%**	**1,70%**
SITC 7	Machinery and transport equipment	2.240	3.013	**28,40%**	**31,68%**	**0,70%**	**0,70%**
SITC 3	Mineral fuels, lubricants and related materials	1.175	1.490	**14,90%**	**15,66%**	**0,40%**	**0,40%**
SITC 6	Manufactured goods classified chiefly by material	525	675.	**6,70%**	**7,11%**	**0,50%**	**0,50%**
SITC 5	Chemicals and related prod, n.e.s.	252	332	**3,20%**	**3,49%**	**0,20%**	**0,20%**
SITC 0	Food and live animals	214	265	**2,70%**	**2,79%**	**0,30%**	**0,30%**
SITC 4	Animal and vegetable oils, fats and waxes	178	194	**2,30%**	**2,05%**	**3,30%**	**3,30%**
SITC 2	Crude materials, inedible, except fuels	114	149	**1,40%**	**1,57%**	**0,30%**	**0,30%**
SITC 9	Commodities and transactions n.c.e.	13	17	**0,20%**	**0,18%**	**0,00%**	**0,00%**
SITC 1	Beverages and tobacco	6	5	**0,10%**	**0,06%**	**0,10%**	**0,10%**

Source: Eurostat (Comext, Statistical regime 4 - 2010)

Figure 2.2: EU-27 merchandise trade with Tunisia by product (2010)



Source: Eurostat (Comext, Statistical regime 4) - SITC Rev. 3: Agricultural products: 0, 1, 2, 4, excl. 27, excl. 28; Fuels and mining products: 3, 27, 28, 68; Chemicals: 5; Machinery and transport equipment: 7; Textiles & Clothing: 65, 84 - 2010

Food and live animals (SITC 0) account's for an average of 2,89% of total exports to EU 27 from Tunisia for the last ten years. Main exporting agricultural products are vegetables and fruits (SITC 05) and fixed vegetable fats and oils (SITC 42). The last category is represented by a strong fluctuation in the amount of exports. This is mainly because of the perennial nature of olive oil, the main exporting product of Tunisia in this category.

Table 2.2: Main agricultural exports of Tunisia to EU27

TUNISIA	Total	00. Food and Live Animals	05. Vegetables and Fruits	42. Fixed vegetable fats and oils, crude, refined or fractioned	% of food and live animals in total exports	% of vegetables and exports in total exports	% of fixed vegetable fats and oils, crude refine or fractioned
1999	4.852.015.108	153.056.243	62.343.996	285.128.680	3,15%	1,28%	5,88%
2000	5.570.464.720	178.146.112	70.498.630	188.115.921	3,20%	1,27%	3,38%
2001	6.286.677.088	178.781.237	68.264.188	145.328.561	2,84%	1,09%	2,31%
2002	6.168.426.072	178.865.802	71.484.889	35.117.281	2,90%	1,16%	0,57%
2003	6.250.472.692	182.913.541	72.205.935	72.197.958	2,93%	1,16%	1,16%
2004	6.753.915.979	189.747.944	81.990.967	406.028.300	2,81%	1,21%	6,01%
2005	6.811.590.150	215.671.618	94.070.668	258.975.715	3,17%	1,38%	3,80%
2006	7.627.815.844	216.848.069	91.867.877	485.556.160	2,84%	1,20%	6,37%
2007	8.976.673.767	235.022.012	108.263.749	350.587.936	2,62%	1,21%	3,91%
2008	9.499.838.644	247.834.373	120.036.922	357.534.095	2,61%	1,26%	3,76%
2009	7.890.665.569	214.508.576	114.892.505	174.945.540	2,72%	1,46%	2,22%

Source: Eurostat, trade since 1995 by SITC rev 3, authors calculations - 2009

Tunisia is ranked in the 44th place as an exporter of primary products to European Union of 27 member countries in 2009 and in the 30th for 2010 obviously improved. As a fish exporter, is ranked in the 31st and in the 42nd place as an exporter of food. The following table is showing the value of exports for primary products and their position and share in the total EU imports.

Table 2.3: Rank of Tunisia in EU 27 trade (2010) – Primary products

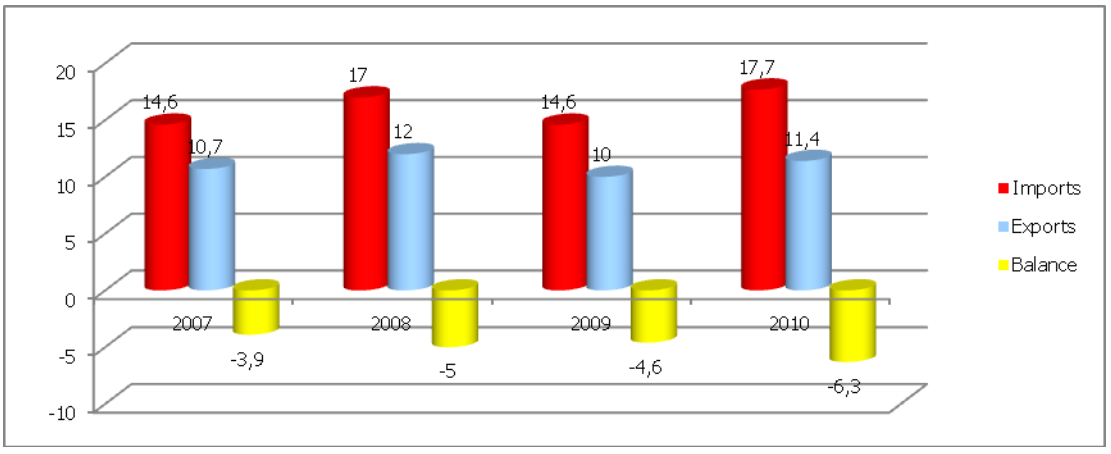
SITC Rev.3 Product Groups	Rank	Millions of euro	Share in Total	Share of total EU Imports
TOTAL	**30**	**9.510,8**	**100,0%**	**0,6%**
1000 - Primary products	**42**	**2.121,8**	**22,3%**	**0,4%**
1100 - Agricultural products	43	441,3	4,6%	0,4%
1110 – Food	42	420,5	4,4%	0,4%
1111 – Fish	31	95,2	1,0%	0,6%
1112 - Other food products and live animals	41	325,3	3,4%	0,4%
1120 - Raw materials	62	20,8	0,2%	0,1%
1200 - Fuels and mining products	33	1.680,4	17,7%	0,4%
1210 - Ores and other minerals	28	174,0	1,8%	0,5%
1220 – Fuels	26	1.489,5	15,7%	0,4%
1221 - Petroleum and petroleum products	22	1.477,3	15,5%	0,5%
1222 - Other fuels	46	12,2	0,1%	0,0%
1230 - Non ferrous metals	54	16,9	0,2%	0,0%

Source: Eurostat (Comext, Statistical regime 4 - 2010)

2.2. Tunisia and the world

Tunisia's total exports to the world amount €11,4 bn in 2009 while the total imports from the world (excluding intra EU trade) amount for €17,7 bn (Figure 2.3). The volumes of trade in 2010 compared with those of 2009 have been increased and improved. More specifically, imports have increased by 17,5% while exports increased by 12,2%. The main exporting products of Tunisia to the world are textiles and textile articles (TDC 11) and machinery and mechanical appliances (TDC[3] 16).

Figure 2.3: Trade in goods- Tunisia and the world



Source: Eurostat (Comext, Statistical regime 4 - 2010)

3 TDC Sections, harmonized system

Table 2.4: Tunisia's trade with the World- Millions of Euro, %

Period	Imports	Variation (%, y-o-y)	Exports	Variation (%, y-o-y)	Balance	Trade
2005	10.684	4,1	8.539	9,6	-2.145	19.224
2006	11.898	11,4	9.295	8,8	-2.603	21.192
2007	14.565	22,4	10.649	14,6	-3.916	25.214
2008	16.949	16,4	11.954	12,2	-4.995	28.902
2009	14.469	-14,5	10.011	-16,3	-4.486	24.507
2010	17.679	29,9	11.429	14,1	-6.250	29.108

Source: Eurostat (Comext, Statistical regime 4 - 2010)

In 2009, Tunisia's exports were composed of 29.9% of miscellaneous manufactured articles (SITC section 8), 25.1% of machinery and transport equipment (SITC section 7) and 13.6% of mineral fuels, lubricants and related materials (SITC section 3) (Table 2.5).

Table 2.5: Tunisia's exports to the World by SITC sections (2009) – values in million US$, growth and shares in percentage

SITC Sections[4]	2009	Avg. Growth rates %		2009 share
		2005-2009	2008-2009	
Total	14.445,1	8,3	-25,2	100,0
0+1	836,5	6,2	-11,5	5,8
2+4	697,3	3,8	-38,6	4,8
3	1.969,2	9,7	-41,1	13,6
5	1.521,1	11,4	-48,3	10,5
6	1.474,0	11,7	-17,5	10,2
7	3.624,9	15,9	-10,4	25,1
8	4.319,1	2,4	-15,5	29,9
9	3,1	-6,1	-70,9	0,0

Source: UN Comtrade, 2009

As it happens in the case of Morocco, Tunisia's major trade partner is the EU 27, both as an importer and as an exporter. As seen in table 2.6, France (29,65 of total exports), Italy (21% of total exports) and Germany (8,3% of total exports) are the three most important EU 27 important countries. Moreover, in column three of table 2.6 "The Major Trade Partners", EU 27, accounts for €17.010,8 million and amounts for the 69.4% of total trade of Tunisia. Libya with 4%, Turkey with 3.5%, China with 3.4% and Algeria with 3.3% of total imports, are the major import partners. On the exports side, Libya with 6.8%, India with 2.8%, United States with 2.2%, and Algeria with 1.8% of total exports are the main export partners. Tunisia, has strong bilateral trade relationships with Algeria as far as it concerns the MPCs as it is ranked as the 4^{h} main import country for Tunisia after EU 27. Turkey, is

[4] SITC 1-Beverages and Tobacco, SITC 2 – Crude Materials, Inedible Except Fuels, SITC 3 – Mineral Fuels, Lubrications and Related Materials, SITC 4 – Animal and Vegetable Oils, Fats and Waxes, SITC 5 – Chemical and Related prod, nes, SITC 6 – Manufacturing Goods Classified Chiefly by Material, SITC 7 – Machinery and Transport Equipment, SITC 8 – Miscellaneous Manufactured Articles, SITC 9 – Commodities and Transactions n.c.e.

also an important trade partner both for imports and exports as it is ranked as the 3rd main trade partner for Tunisia.

On 25 February 2004, Tunisia signed Agadir Agreement with Egypt, Morocco and Jordan. This committed all parties to removing substantially all tariffs on trade between them and to harmonising their legislation with regard to standards and customs procedures. It entered into force in July 2006. The effective implementation started in April 2007 with the creation of the Agadir Technical Unit in Amman. Tunisia signed a free trade agreement with Turkey and EFTA (both entered into force in July 2005), and a bilateral agreement with Libya (entered into force in 2002).

Tunisia has started to implement the new Pan-Euro-Mediterranean system of cumulation of origin. When applied, the system allow Tunisia to export goods made with components imported from elsewhere without losing preferential access to the EU market. This encourages productive industry and the creation of regional markets.

Table 2.6: Tunisia's trade with main partners (2009)

	The Major Imports Partners			The Major Export Partners			The Major Trade Partners		
Rk	**Partners**	**Mio euro**	**%**	**Partners**	**Mio euro**	**%**	**Partners**	**Mio euro**	**%**
	World (all)	**14.496,4**	**100,0%**	**World (all)**	**10.010,6**	**100%**	**World (all)**	**24.507,02**	**100,0%**
1	EU27	9.840,9	**67,9%**	EU27	7.169,9	**71,6%**	EU27	17.010,8	**69,4%**
2	Libya	574,5	**4,0%**	Libya	683,0	**6,8%**	Libya	1.257,5	**5,1%**
3	Turkey	503,7	**3,5%**	India	279,4	**2,8%**	Turkey	653,0	**2,7%**
4	China	485,8	**3,4%**	United States	222,4	**2,2%**	Algeria	652,1	**2,7%**
5	Algeria	471,8	**3,3%**	Algeria	180,4	**1,8%**	United States	612,5	**2,5%**
6	United States	390,1	**2,7%**	Turkey	149,3	**1,5%**	China	557,7	**2,3%**
7	Russia	383,5	**2,6%**	Morocco	131,0	**1,3%**	Russia	420,4	**1,7%**
8	Argentina	242,0	**1,7%**	Japan	95,9	**1,0%**	India	410,4	**1,7%**
9	Ukraine	147,4	**1,0%**	China	71,9	**0,7%**	Argentina	261,2	**1,1%**
10	India	131,0	**0,9%**	Brazil	61,8	**0,6%**	Morocco	194,5	**0,8%**

Source: Eurostat (Comext, Statistical regime 4 - 2009)

Table 2.7: Tunisia's exports by principal countries and SITC sections in 2009 – value in million US$, percentage of country total

Country	Total	Shares by SITC sections (%)								
		0+1	2+4	3	5	6	7	8	9	Total
World	14.445,1	5,8	4,8	13,6	10,5	10,2	25,1	29,9	0,0	100,0
France	4.038,4	3,2	0,7	12,9	3,2	9,2	36,3	34,4	0,1	100,0
Italy	3.038,4	3,4	7,8	17,2	4,1	5,3	15,5	46,8	0,0	100,0
Germany	1.270,1	1,9	0,5	6,6	0,2	1,7	51,0	38,2	...	100,0
Libya	831,8	18,4	4,8	0,8	13,0	42,9	14,6	5,4	0,0	100,0
United Kingdom	686,7	0,6	0,3	66,7	2,8	3,0	9,8	16,8	0,0	100,0
Spain	486,9	6,0	6,7	27,6	6,1	12,5	16,5	24,5	...	100,0
Algeria	451,2	8,8	1,3	1,8	15,0	32,9	29,8	10,3	0,0	100,0
Areas, NES[5]	449,1	17,1	3,8	1,3	29,3	10,0	28,6	9,8	...	100,0
Belgium	319,6	3,0	1,8	0,1	2,5	14,3	12,8	65,6	...	100,0
India	238,3	0,1	2,2	...	96,5	0,5	0,7	0,1	...	100,0

Source: UN Comtrade, 2009

[5] Areas not else specified

Chapter 3.

Trade profiles: Egypt

3.1 Egypt and the EU

Egypt is also a major trading partner for the EU in the Southern Mediterranean region. It is part of the Euromed process for creating a free trade area of the Mediterranean.

The EU and Egypt have made significant progress in freeing up trade between them. Since the entry into force of the EU-Egypt Association Agreement in 2004, half of the EU industrial exports to Egypt has already been liberalised and special preferential treatment for agriculture has significantly boosted agricultural trade. Subsequent negotiations (concluded in 2009) have furthered the liberalisation of agricultural, processed agricultural and fisheries products, and ongoing negotiations aim at improving conditions for services trade and for companies seeking to establish businesses in both markets. An agreement on the establishing of a dispute settlement mechanism has been initialed in April 2010.

- EU goods exports to Egypt 2010: **€14,8 billion**
- EU goods imports from Egypt 2010: **€7,2 billion**

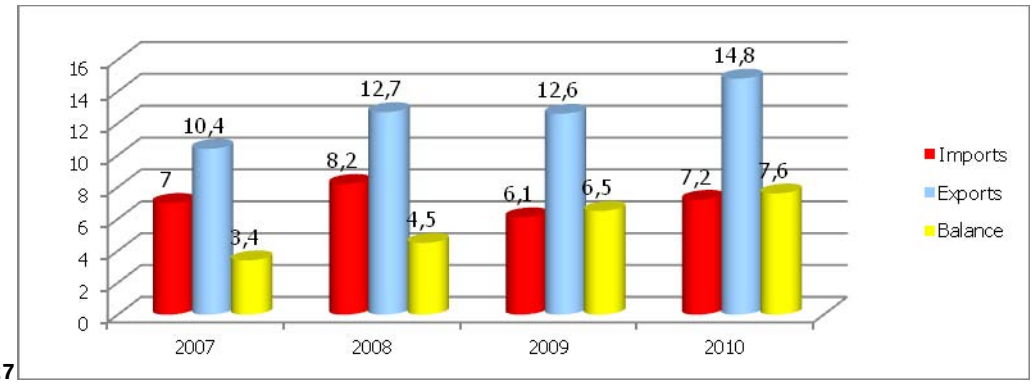
Trade between the EU and Egypt has risen substantially after the entry into force of the EU-Egypt Association Agreement in 2004. EU-Egypt co-operation is an important part of the European Neighbourhood Policy (ENP). Egypt has also engaged with the EU in negotiating an ENP Action Planthat was adopted in March 2007 for a period of three to five years. It provides a common framework for strengthening relations between the EU and Egypt.

The ENP supports political and economic cooperation between Egypt and the EU and is the framework for financial assistance from the EU to Egypt. The European Neighbourhood and Partnership Instrument (ENPI) is endowed with €11.9 billion for 2007-2013. The ENPI financial envelope for Egypt under the National Indicative Programme 2007-2010 is €558 million. The programme is geared towards supporting the achievement of key policy objectives as outlined in the Action Plan. On the basis of the Country Strategy Paper, it pursues three priorities: **1)** supporting Egypt's reforms in the areas of democracy, human rights and justice, **2)** developing the competitiveness and productivity of the Egyptian economy, and **3)** ensuring the sustainability of the Egyptian development with better management of human and natural resources.

In 2008 EU-Egypt trade increased significantly, accounting for € 20.66 billion. Egypt's exports to the EU rose by 13.1% and EU exports to Egypt in the same period increased by 22.2%. In 2009, in account of the impact of the global crisis, the trend reversed in comparison to 2008 and EU imports

from Egypt decreased by 26%, while exports by 0.9%. In 2010, the situation has been reversed and trade trends are revealing an increase both in imports and in exports from Egypt to EU 27. More precisely, imports have increased by 12,5% and exports by 14,8%. Global trade, in 2009, decreased by almost 10% (€18.6bn). In 2010, EU imports from Egypt were dominated by energy (54%), followed by textiles and clothes (10.8%). EU exports to Egypt consisted mainly of machinery (39,9%) and chemicals (15,7%), figures increased in relation to those of 2009. The EU remains the first trading partner with 33% of total trade volume share that, in 2010, amount to € 21,65 billion.

Figure 3.1: Trade in goods - Egypt and the EU 27



Source: Eurostat, Statistical Regime 4 – 2010

The total EU 27 imports from Egypt amount for €7.205 million representing a 0,5% share of total EU imports in 2010. Mineral fuels, lubricants and related materials (SITC 3) is the major import category of products representing a 47,9% share of total imports and amounting for €3.425 million. Manufactured goods (SITC 6) is the second major category of products accounting for 15,5% of total imports. Food and live animals (SITC 0) is the 5th most important category of products imported to EU 27 from Egypt amounting for €521 million and accounting for 7,2% of total imports. The following table (Table 3.1), is presenting the rank of imports according to the value of EU 27 imports from Egypt in 2009 AND 2010 according to the SITC Rev 3 Classification.

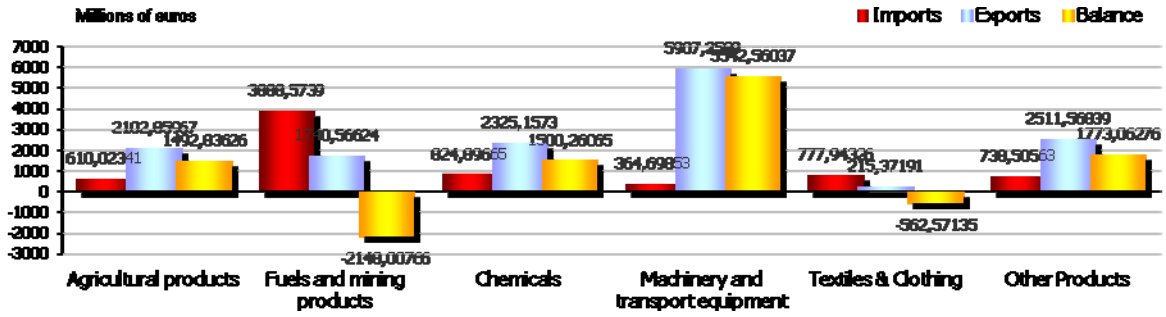
Table 3.1: EU 27 imports from Egypt (2009)

SITC Codes	SITC Sections	Value (Millions of euro)		Share of Total (%)		Share of total EU Imports	
		2009	2010	2009	2010	2009	2010
SITC T	TOTAL	6.112	7.205	100%	100%	0,50%	0,50%
SITC 3	Mineral fuels, lubricants and related materials	3.120	3.452	51%	47,9%	1,10%	0,9%
SITC 6	Manufactured goods classified chiefly by material	635	1.116	10,40%	15,5%	0,60%	0,7%
SITC 5	Chemicals and related prod, n.e.s.	611	825	10%	11,4%	0,60%	0,6%
SITC 8	Miscellaneous manufactured articles	586	593	9,60%	8,2%	0,30%	0,3%
SITC 0	Food and live animals	519	521	8,50%	7,2%	0,80%	0,7%
SITC 7	Machinery and transport equipment	274	365	4,50%	5,1%	0,10%	0,1%
SITC 2	Crude materials, inedible, except fuels	144	209	2,40%	2,9%	0,30%	0,3%
SITC 9	Commodities and transactions n.c.e.	46	30	0,80%	0,4%	0,10%	0,1%
SITC 1	Beverages and tobacco	6	5	0,10%	0,1%	0,10%	0,1%
SITC 4	Animal and vegetable oils, fats and waxes	1	1	0,00%	0,0%	0,00%	0,0%

Source: EUROSTAT (Comext, Statistical regime 4 2010)

The following figure, (Figure 3.2), shows the balance of trade for the main trading categories of products among EU 27 and Egypt. According to that, agricultural products have a positive balance of trade.

Figure 3.2: EU 27 Merchandise trade with Egypt by product (2010)



Source: Eurostat (Comext, Statistical regime 4) - SITC Rev. 3: Agricultural products: 0, 1, 2, 4, excl. 27, excl. 28; Fuels and mining products: 3, 27, 28, 68; Chemicals: 5; Machinery and transport equipment: 7; Textiles & Clothing: 65, 84 - 2010

In 2010, the exports of Egyptian agricultural products to the EU totalized 637.5 million Euros in value, 2% more than in 2009. The products subject to free access to the EU market represented 66.5% of the total; an additional 15% was represented by products benefiting from duty-free and quota-free treatment for an export season that in fact does not overlap with EU production (e.g. tomatoes,

courgettes, artichokes and table grapes).

The major agricultural exporting products for Egypt are vegetables and fruits (fresh table grapes, potatoes, sweet oranges, beans, onions and strawberries). The average share of vegetables and fruits during the last ten years is 5,01% over the total exports. Between the years 2007 and 2008 the amount of exports decreased by 4,5%. Instead in 2009 the amount of exports increased by 17,1% compared to 2008 and by 11,8 compared to 2007. Other major exporting agricultural products are cereals and cereal preparations accounting for 0,33% of total exports and sugars (SITC 06) accounting for 0,11% of total exports in 2009.

Table 3.2: Main agricultural exports of Egypt to EU 27

Egypt	Total	04. Cerals and ceral preparations	05. Vegatbles and fruits	06. Sugars, sugar preparations and honey	% of 04 to total exports	% of 05 to total exports	% of 06 to total exports
1999	2.542.373.922	15.836.613	110.915.089	20.366.810	0,62%	4,36%	0,80%
2000	3.522.807.397	7.840.028	103.257.973	18.643.193	0,22%	2,93%	0,53%
2001	3.243.017.858	25.543.683	131.378.102	27.168.164	0,79%	4,05%	0,84%
2002	3.334.583.705	14.300.189	167.155.113	21.900.601	0,43%	5,01%	0,66%
2003	3.576.714.497	14.757.075	175.330.527	10.572.368	0,41%	4,90%	0,30%
2004	4.234.621.111	28.281.502	240.201.647	6.952.521	0,67%	5,67%	0,16%
2005	5.230.286.442	29.194.977	297.117.019	9.470.692	0,56%	5,68%	0,18%
2006	7.653.612.765	40.495.509	318.449.656	13.748.811	0,53%	4,16%	0,18%
2007	7.034.904.165	32.030.745	417.321.761	15.790.467	0,46%	5,93%	0,22%
2008	8.234.301.407	21.776.108	398.374.936	15.432.070	0,26%	4,84%	0,19%
2009	6.112.355.058	20.443.061	466.836.053	6.901.435	0,33%	7,64%	0,11%

Source: Eurostat, trade since 1995 by SITC rev 3, authors calculations - 2009

Egypt is ranked in the 36th place in total EU imports and in the 26th place concerning the imports of primary products for 2010. Agricultural products are ranked in the 38th place 3 places down since 2009. Food is ranked in the 34th place and is amounting of €538,9 million and accounts for a 8,8% share in total and a 0,7% share of total EU imports.

Table 3.3: Rank of Egypt in EU 27 trade (2009) – Primary products

SITC Rev.3 Product Groups	Rank	Millions of euro	Share in Total	Share of total EU Imports
TOTAL	**36**	**7.204,60**	**100,00%**	**0,50%**
1000 - Primary products	**26**	**4.498,6**	**62,4%**	**0,8%**
1100 - Agricultural products	38	610,0	8,5%	0,5%
1110 - Food	37	539,6	7,5%	0,6%
1111 - Fish	76	5,0	0,1%	0,0%
1112 - Other food products and live animals	34	534,7	7,4%	0,7%
1120 - Raw materials	44	70,4	1,0%	0,3%
1200 - Fuels and mining products	20	3.888,6	54,0%	0,9%
1210 - Ores and other minerals	33	126,1	1,8%	0,4%
1220 - Fuels	16	3.452,5	47,9%	0,9%
1221 - Petroleum and petroleum products	18	2.346,5	32,6%	0,8%
1222 - Other fuels	11	1.106,0	15,4%	1,1%
1230 - Non ferrous metals	20	309,9	4,3%	0,8%

Source: EUROSTAT (Comext, Statistical regime 4 - 2010)

Driven by an increasing demand, EU's exports of agricultural products to Egypt have witnessed more than 30% annual growth in the past 3 years. Following the entry into force of the EU-Egypt Agreement on agricultural, processed agricultural, fish and fisheries products, in June 2010, the bilateral trade in agricultural goods gained momentum for further development.

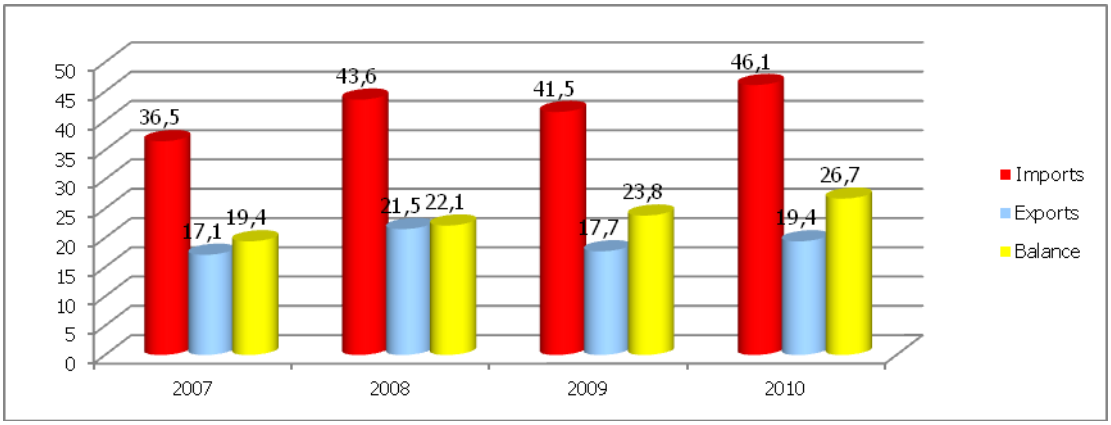
Currently, some 88% of EU's exports of agricultural goods benefit from free access to the Egyptian market. The main products that haven't been liberalized are pork meat products, alcoholic beverages, tobacco and cigarettes.

In 2010, the EU exports of agricultural products to Egypt amounted to more than 1.5 billion Euros, from 1.17 billion in 2009. The top exported products were wheat, beans, fish (mackerel), cotton, seed potatoes, tobacco and milk.

3.2 Egypt and the world

Egypt's total exports to the world amount €17,7 bn in 2009 while the total imports from the world (excluding intra EU trade) amount for €41,5 bn (Figure 3.3). The volumes of trade compared with those of 2008 have been slightly reduced as a result of the global crisis. More specifically, imports have fallen by 4,9% while exports have fallen by 17% (Table 3.4). The main exporting products of Tunisia to the world are textiles and textile articles (TDC 11) and machinery and mechanical appliances (TDC[6] 16). As far as it concerns the 2010 marketing year, we notice a significant increase both in export and import volumes. Exports for Egypt to the world in 2010 have increased compared to those of 2008 by 13,4%.

Figure 3.3: Trade in goods – Egypt and the World



Source: Eurostat, Statistical Regime 4 - 2010

Table 3.4: Egypt trade with the world – millions of Euro, %

Period	Imports	Variation (%, y-o-y)	Exports	Variation (%, y-o-y)	Balance	Trade
2004	22.288		9.789		-12.499	32.077
2005	26.518	**19,0**	12.549	**28,2**	-13.968	39.067
2006	31.444	**18,6**	16.458	**31,1**	-14.986	47.902
2007	36.445	**15,9**	17.131	**4,1**	-19.314	53.575
2008	43.722	**20,0**	21.486	**25,4**	-22.236	65.208
2009	32.056	**-26,7**	16.459	**-23,4**	-15.596	48.515
2010	46.058	**43,7**	19.403	**17,9**	-26.656	65.461

Source: Eurostat (Comext, Statistical regime 4 - 2010)

Mineral fuels, lubricants and related materials (SITC section 3) accounted for 44% of Egypt's exports in 2008 (Table 3.5). Other major commodity groups included manufactured goods classified chiefly by material (SITC section 6) and chemical and related products, n.e.s (SITC section 5) representing 18.7 and 11.5 percent of total exports. Top partners for exports in 2008 were Italy (10.3% of total

6 TDC Sections, harmonized system

exports), India (6.3% of total exports) and Netherlands (5.6% of total exports) (Table 3.7).

Table 3.5: Egypt's exports to the World by SITC sections (2009) – values in million US$, growth and shares in percentage

SITC Sections[7]	2008	Avg. Growth rates %		2008 share
		2004-2008	2007-2008	
Total	26.223,8	34,9	62,9	100,0
0+1	2.559,4	36,6	105,8	9,8
2+4	1.275,8	14,0	157,4	4,9
3	11.533,0	35,5	37,2	44,0
5	3.019,3	61,7	309,1	11,5
6	4.911,0	31,5	153,3	18,7
7	1.208,1	80,7	2.023,7	4,6
8	1.579,5	46,2	219,1	6,0
9	137,7	-26,1	-94,9	0,5

Source: UN Comtrade, 2009

Major export and import partner of Egypt is the EU 27. According to Eurostat, statistical regime 4, Egypt is exporting to EU 27 €5.537,5 million and is importing €13.895,4 million accounting for the 33,4% of total imports from the world. As it is shown in column three "The Major Trade Partners", EU 27, accounts for €19.432,9 millions and amounts for the 32,7% of total trade of Egypt. United States with 10%, China with 9,7%, Turkey with 5% and Saudi Arabia with 3,8% of total imports, are the major import partners. On the exports side, United States with 7,9%, India with 2,8%, Saudi Arabia with 5,5%, and Syria with 5,3% of total exports are the main export partners. Egypt, has bilateral trade relationships with Syria as far as it concerns the MPCs as it is ranked as the 5^{h} main export country for Egypt after EU 27. Turkey, is also an important trade partner both for imports and exports as it is ranked as the 5th main trade partner for Egypt.

[7] SITC 1-Beverages and Tobacco, SITC 2 – Crude Materials, Inedible Except Fuels, SITC 3 – Mineral Fuels, Lubrications and Related Materials, SITC 4 – Animal and Vegetable Oils, Fats and Waxes, SITC 5 – Chemical and Related prod, nes, SITC 6 – Manufacturing Goods Classified Chiefly by Material, SITC 7 – Machinery and Transport Equipment, SITC 8 – Miscellaneous Manufactured Articles, SITC 9 – Commodities and Transactions n.c.e.

Table 3.6: Egypt's trade with main partners (2009)

The Major Imports Partners				The Major Export Partners			The Major Trade Partners		
Rk	Partners	Mio euro	%	Partners	Mio euro	%	Partners	Mio euro	%
	World (all)	41.571,4	100 %	World (all)	17.824,5	100 %	World (all)	59.395,9	100 %
1	EU27	13.895,4	33,4 %	EU27	5.537,5	31,1 %	EU27	19.432,9	32,7 %
2	U. S.	4.164,2	10,0 %	U. S.	1.414,5	7,9 %	U. S.	5.578,8	9,4 %
3	China	4.026,2	9,7 %	India	1.192,3	6,7 %	China	4.204,5	7,1 %
4	Turkey	2.092,2	5,0 %	S. Arabia	985,4	5,5 %	S. Arabia	2.559,4	4,3 %
5	S. Arabia	1.573,9	3,8 %	Syria	941,2	5,3 %	Turkey	2.509,1	4,2 %
6	Russia	1.385,7	3,3 %	S. Korea	762,6	4,3 %	India	2.283,4	3,8 %
7	Brazil	1.117,0	2,7 %	Jordan	561,1	3,1 %	S. Korea	1.835,5	3,1 %
8	India	1.091,2	2,6 %	Turkey	416,9	2,3 %	Syria	1.574,9	2,7 %
9	Japan	1.076,2	2,6 %	Un. A. Emirates	342,9	1,9 %	Russia	1.518,7	2,6 %
10	S. Korea	1.072,9	2,6 %	Sudan	321,8	1,8 %	Japan	1.277,2	2,2 %

Source: Eurostat (Comext, Statistical regime 4 - 2009)

Table 3.7: Egypt's exports by principal countries and SITC sections in 2009 – value in million US$, percentage of country total

Country	Total	Shares by SITC sections (%)								
		0+1	2+4	3	5	6	7	8	9	Total
World	26.223,8	9,8	4,9	44,0	11,5	18,7	4,6	6,0	0,5	100,0
Italy	2.708,6	5,3	2,7	45,9	9,6	31,0	1,2	3,9	0,4	100,0
India	1.659,1	0,1	5,8	91,8	0,8	1,2	0,1	0,1	0,2	100,0
Netherlands	1498,5	4,8	0,8	50,4	35,6	5,4	0,4	2,6	0,1	100,0
Spain	1.488,6	1,5	1,7	75,1	6,9	10,6	1,0	2,8	0,4	100,0
Bunkers	1.302,9	0,0	0,0	100,0	...	...	...	...	...	100,0
USA	1.281,3	2,4	2,4	49,0	8,6	13,2	0,4	23,9	0,1	100,0
Saudi Arabia	1.251,6	28,1	28,1	4,6	4,8	37,3	12,7	8,3	0,8	100,0
United Kingdom	929,3	16,5	16,5	14,3	8,5	20,3	16,1	21,8	0,2	100,0
Japan	874,6	1,0	1,0	95,9	0,0	1,8	0,5	0,1	0,0	100,0
Libya	807,2	22,1	22,1	0,4	10,4	38,3	12,7	8,9	0,8	100,0

Source: UN Comtrade, 2009

On 25 February 2004, Egypt signed the Agadir Agreement with Jordan, Morocco and Tunisia. This committed all parties to removing substantially all tariffs on trade between them and to harmonising their legislation with regard to standards and customs procedures. It entered into force in July 2006. The effective implementation started in April 2007 with the creation of the Agadir Technical Unit in Amman. Egypt has also a free trade agreement in force with Turkey since March 2007 and, more recently, with EFTA countries. During the 8th Euromed Trade Ministerial Conference (December 2009), Ministers supported the conclusion of the single regional convention on preferential rules of origin for the Pan-Euro-Mediterranean area, which will replace the current network of protocols and will allow the inclusion of the Western Balkans into the Pan-Euro-Mediterranean system.

Chapter 4.

Trade profiles: Turkey

4.1 Turkey and the EU

The EU and Turkey enjoy a deep trade relationship. Indeed, the EU ranks by far as number one in both Turkey's imports and exports while Turkey ranks 7th in the EU's top import and 5th in export markets.

In addition to the Custom Union with the EU, Turkey has signed Free Trade Agreements with EFTA, Israel, the former Yugoslav Republic of Macedonia, Croatia, Bosnia-Herzegovina, Tunisia, Morocco, the Palestinian Authority, Syria, Egypt, Georgia and Albania.

In 1963, Turkey signed an Association Agreement with the European Union to promote trade and economic relations. By the Association Council Decision of 6 March 1995, the Customs Union came into force on 31 December 1995. The Customs Union covers all industrial goods but does not address agriculture (except processed agricultural products), services or public procurement. In 1996 a free trade area was established between Turkey and the European Union for products covered by the European Coal and Steel Community. Decision 1/98 of the Association Council covers trade in agricultural products.

In addition to providing for a common external tariff for the products covered, the Customs Union foresees that Turkey is to align to the *acquis communautaire* in several essential internal market areas, notably with regard to industrial standards.

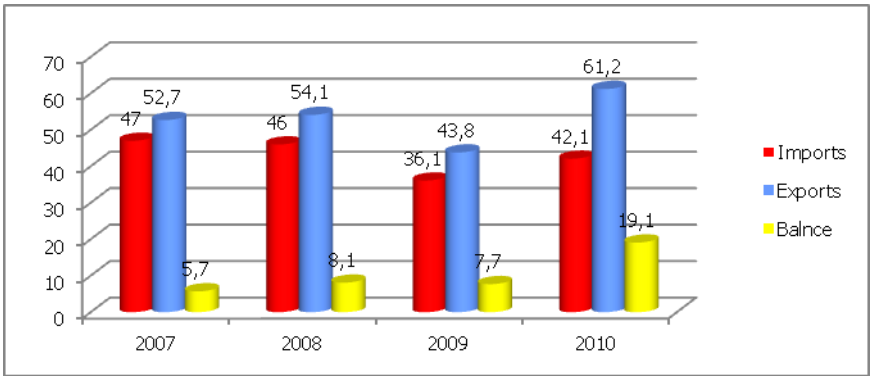
Finally, Turkey is also member of the Euro-Mediterranean partnership and as such should conclude free trade agreements with all other Mediterranean partners, with a view to the creation (by 2010) of a Euro-Mediterranean free trade area.

At the Helsinki summit in December 1999 Turkey was given the status of a candidate country. The December 2004 Brussels European Council concluded that Turkey sufficiently fulfils the Copenhagen political criteria to open accession negotiations. Negotiations started on 3 October 2005 when the Council adopted a Negotiating Framework.

The Commission's objective of "extending and deepening" the Customs Union (CU) was endorsed by EU Member States at the December 2002 Copenhagen Council. Subsequently, the Council has agreed on negotiating guidelines on the liberalisation of services and public procurement. Several rounds of negotiations have so far taken place. In other areas, such as the requirement to align with the Community's preferential customs regimes, the EU is encouraging Turkey to make further advances.

In 2008 EU-Turkey trade increased significantly, accounting for € 100,1 billion. Turkey's exports to the EU fall by 2,1 % and EU exports to Turkey in the same period increased by 1,3%. In 2009, in account of the impact of the global crisis, the trend reversed in comparison to 2008 and EU imports from Turkey decreased by 20%, while exports by 21,7% (Figure 4.1). Global trade decreased by almost 27% (€17,2bn). In 2009, EU imports from Turkey were dominated by machinery (38,2%), followed by textiles and clothes (24,7%). In 2010, imports from the EU have increased and reached a 42,1% of the total trade while exports to EU account to 61,2% increased in comparison to 2009 by 31,2 %. EU exports to Turkey consisted mainly of machinery (42,4%) and chemicals (18,4%) (Table 4.1 and Figure 4.2). The EU remains the first trading partner with 42,9% of total trade volume share that, in 2009, amount to € 74,02 billion.

Figure 4.1: Trade in goods - Turkey and EU 27



Source: Eurostat (Comext, Statistical regime 4 - 2010)

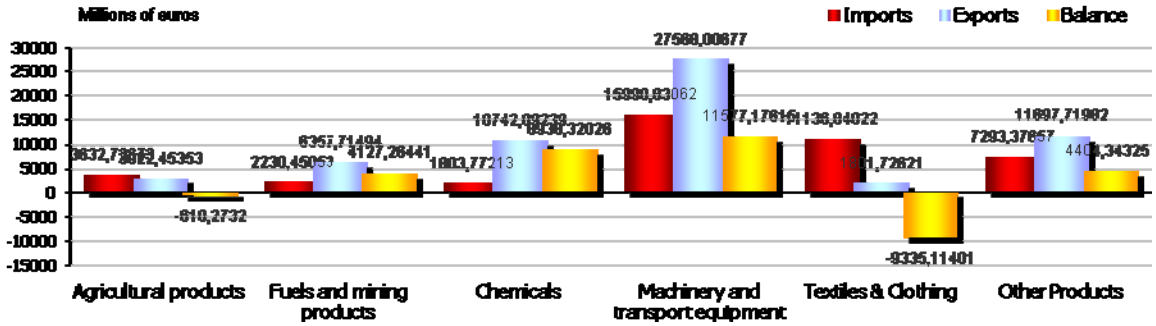
According to Table 4.1, in 2010 food and live animals (SITC 0) amount for €1.295 million and account for a 3.6% share of total EU 27 imports from Turkey.

Table 4.1: EU 27 Imports from Turkey (2009 - 2010)

SITC Codes	SITC Sections	Value (Millions of euro)		Share of Total (%)		Share of total EU Imports	
		2009	2010	2009	2010	2009	2010
SITC T	TOTAL	36.086	42.088	100,00%	100,0%	3,00%	2,8%
SITC 3	Mineral fuels, lubricants and related materials	13.792	15.991	38,20%	38,0%	4,00%	3,6%
SITC 6	Manufactured goods classified chiefly by material	8.914	10.224	24,70%	24,3%	5,00%	5,0%
SITC 5	Chemicals and related prod, n.e.s.	7.361	8.987	20,40%	21,4%	6,50%	5,7%
SITC 8	Miscellaneous manufactured articles	2.622	3.136	7,30%	7,5%	4,00%	4,2%
SITC 0	Food and live animals	1.295	1.804	3,60%	4,3%	1,30%	1,3%
SITC 7	Machinery and transport equipment	615	1.068	1,70%	2,5%	1,50%	1,7%
SITC 2	Crude materials, inedible, except fuels	357	395	1,00%	0,9%	0,10%	0,1%
SITC 9	Commodities and transactions n.c.e.	213	169	0,60%	0,4%	4,40%	2,4%
SITC 1	Beverages and tobacco	144	158	0,40%	0,4%	0,40%	0,6%
SITC 4	Animal and vegetable oils, fats and waxes	20	26	0,10%	0,1%	0,40%	0,4%

Source: Eurostat (Comext, Statistical regime 4 - 2010)

Figure 4.2: EU 27 Merchandise trade with Turkey by product (2009)



Source: Eurostat (Comext, Statistical regime 4) - SITC Rev. 3: Agricultural products: 0, 1, 2, 4, excl. 27, excl. 28; Fuels and mining products: 3, 27, 28, 68; Chemicals: 5; Machinery and transport equipment: 7; Textiles & Clothing: 65, 84 - 2010

The major agricultural exporting products for Turkey are vegetables and fruits (SITC 05). The average share of vegetables and fruits during the last eleven years is 6,47% over the total exports. Between the years 2007 and 2009 the amount of exports for vegetables and fruits increased by 7,74%. Other major exporting agricultural products are cereals and cereal preparations (SITC 04) accounting for 0,30% of total exports and meat and meat preparations (SITC 01) accounting for 0,01% of total exports in 2009.

Table 4.2: Main agricultural exports of Turkey to EU 27

TURKEY	Total Exports	01. Meat and meat preparations	04. Cereals and cereals preparations	05. Vegetables and fruits	% of 01 to total exports	% of 04 to total exports	% of 05 to total exports
1999	15.958.098.232	3.708.214	36.933.985	1.508.075.325	0,02%	0,23%	9,45%
2000	18.740.248.693	6.047.463	66.486.256	1.505.766.184	0,03%	0,35%	8,03%
2001	22.084.711.627	6.477.262	75.872.757	1.716.662.926	0,03%	0,34%	7,77%
2002	24.590.514.718	7.923.039	65.433.276	1.577.584.209	0,03%	0,27%	6,42%
2003	27.257.208.209	6.247.894	63.865.283	1.527.986.523	0,02%	0,23%	5,61%
2004	32.733.450.929	5.053.680	71.367.830	1.924.036.678	0,02%	0,22%	5,88%
2005	36.082.000.164	4.744.118	69.695.164	2.382.846.229	0,01%	0,19%	6,60%
2006	41.719.794.105	4.148.887	92.935.162	2.325.789.635	0,01%	0,22%	5,57%
2007	46.966.780.885	3.899.505	78.188.818	2.301.846.937	0,01%	0,17%	4,90%
2008	45.989.681.405	7.728.989	97.564.992	2.315.375.967	0,02%	0,21%	5,03%
2009	36.086.293.156	5.327.645	109.156.513	2.123.742.552	0,01%	0,30%	5,89%

Source: Eurostat, trade since 1995 by SITC rev 3, authors calculations

Turkey is ranked in the 7th place in total EU imports and in the 23rd place concerning the imports of primary products. Agricultural products are ranked in the 8th place. Moreover, food is ranked in the 6th place and is amounting of €3.362,7 million and accounts for a 8% share in total and a 3,6% share of total EU imports.

Table 4.3: Rank of Turkey in EU trade (2010) – Primary products

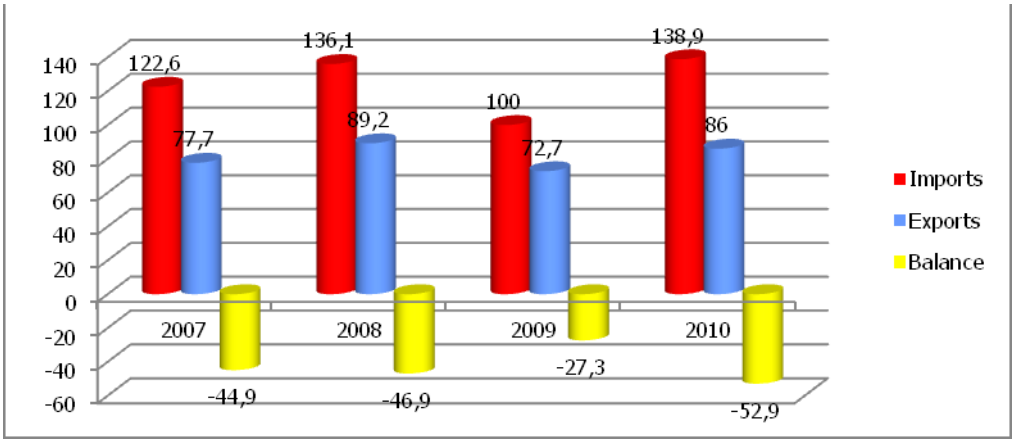
SITC Rev.3 Product Groups	Rank	Millions of euro	Share in Total	Share of total EU Imports
TOTAL	**7**	**42.088,0**	**100,0%**	**2,8%**
1000 - Primary products	**23**	**5.863,2**	**13,9%**	**1,0%**
1100 - Agricultural products	8	3.632,7	8,6%	3,1%
1110 - Food	6	3.362,7	8,0%	3,6%
1111 - Fish	21	199,4	0,5%	1,2%
1112 - Other food products and live animals	5	3.163,3	7,5%	4,1%
1120 - Raw materials	21	270,0	0,6%	1,2%
1200 - Fuels and mining products	30	2.230,5	5,3%	0,5%
1210 - Ores and other minerals	13	765,4	1,8%	2,2%
1220 - Fuels	43	395,0	0,9%	0,1%
1221 - Petroleum and petroleum products	36	317,5	0,8%	0,1%
1222 - Other fuels	30	77,5	0,2%	0,1%
1230 - Non ferrous metals	10	1.070,1	2,5%	2,9%

Source: EUROSTAT (Comext, Statistical regime 4 - 2010)

4.2 Turkey and the world

Egypt's total exports to the world amount €72,7 bn in 2009 while the total imports from the world (excluding intra EU trade) amount for €100 bn. In year 2010, the trade balance for Turkey has increased negatively by 28,3%and has reached the highest levels of the last four years (Figure 4.3). The volumes of trade in 2009 compared with those of 2008 have been reduced as a result of the global crisis. More specifically, imports have fallen by 26,3% while exports have fallen by 18,3% (Figure 4.3).

Figure 4.3: Trade in goods – Turkey and the World



Source: Eurostat (Comext, Statistical regime 4 - 2010)

Table 4.4: Turkey trade with the world – million of Euro, %

Period	Imports	Variation (%, y-o-y)	Exports	Variation (%, y-o-y)	Balance	Trade
2005	92.781	20,0	59.144	17,0	-33.637	151.926
2006	109.531	18,1	67.628	14,3	-41.903	177.159
2007	122.266	11,6	77.459	14,5	-44.807	199.725
2008	135.412	10,8	88.988	14,9	-46.424	224.399
2009	99.755	-26,3	72.733	-18,3	-27.022	172.488
2010	138.887	39,2	86.019	17,5	52.868	224.906

Source: IMF (DoTS) - 2010

In 2009, Turkey's exports were composed of 28.2% of machinery and transport equipment (SITC section 7), 28.0% of manufactured goods classified chiefly by material (SITC section 6) and 17.0% of miscellaneous manufactured articles (SITC section 8) (see table 1). Major EU 27 partners for exports were Germany, France and United Kingdom (see table 4.6).

Table 4.5: Turkey's exports to the World by SITC sections (2009) – values in million US$, growth and shares in percentage

SITC Sections[8]	2009	Avg. Growth rates %		2009 share
		2005-2009	2008-2009	
Total	102.138,5	8,6	-22,6	100,0
0+1	10.059,3	8,5	0,1	9,8
2+4	2.650,6	11,1	-22,8	2,6
3	3.901,1	10,2	-48,2	3,8
5	4.836,7	14,6	-14,6	4,7
6	28.600,8	8,8	-29,5	28,0
7	28.803,5	7,6	-26,4	28,2
8	17.377,7	2,1	-15,8	17,0
9	5.908,9	52,0	18,5	5,8

Source: UN Comtrade, 2009

Main Turkish exports markets in 2007 were the EU (56.4%), Russia (4.4%), USA (3.9%), Romania (3.4%), United Arab Emirates (3.0%) and Iraq (2.6%). Textiles and transport equipment dominate EU imports from Turkey, both accounting for about 24% of the total. Other important imports are machinery (17.7%), and agricultural products (7.1%).

Imports into Turkey came from the following key markets: the EU (40.8%), Russia (14.0%), China (7.9%), USA (4.8%), Iran (3.9%) and Switzerland (3.1%). Main EU exports to Turkey are machinery (32.2%), transport material (18.6%) and chemical products (16.9%).

[8] SITC 1-Beverages and Tobacco, SITC 2 – Crude Materials, Inedible Except Fuels, SITC 3 – Mineral Fuels, Lubrications and Related Materials, SITC 4 – Animal and Vegetable Oils, Fats and Waxes, SITC 5 – Chemical and Related prod, nes, SITC 6 – Manufacturing Goods Classified Chiefly by Material, SITC 7 – Machinery and Transport Equipment, SITC 8 – Miscellaneous Manufactured Articles, SITC 9 – Commodities and Transactions n.c.e.

Table 4.6: Turkey's trade with main partners

The Major Imports Partners				The Major Export Partners			The Major Trade Partners		
Rk	Partners	Mio euro	%	Partners	Mio euro	%	Partners	Mio euro	%
	World (all)	99.754,9	100%	World (all)	72.732,9	100%	World (all)	172.487,8	100%
1	EU27	40.437,0	40,5%	EU27	33.590,1	46,2%	EU27	74.027,1	42,9%
2	Russia	14.102,6	14,1%	Iraq	3.685,1	5,1%	Russia	16.395,2	9,5%
3	China	9.053,9	9,1%	Switzerland	2.951,4	4,1%	China	10.185,0	5,9%
4	U. S.	6.149,5	6,2%	United States	2.452,6	3,4%	U. S.	8.602,1	5,0%
5	Iran	2.429,0	2,4%	Russia	2.292,6	3,2%	Switzerland	4.374,2	2,5%
6	Ukraine	2.267,7	2,3%	U. Arab Emirates	2.086,4	2,9%	Iraq	4.362,9	2,5%
7	S. Korea	2.230,7	2,2%	Egypt	1.902,0	2,6%	Iran	3.879,6	2,2%
8	Japan	1.994,0	2,0%	Iran	1.450,5	2,0%	Ukraine	3.003,9	1,7%
9	Algeria	1.466,9	1,5%	Libya	1.287,8	1,8%	Algeria	2.754,7	1,6%
10	Switzerland	1.422,8	1,4%	Algeria	1.287,7	1,8%	United Arab Emirates	2.559,5	1,5%

Source: Eurostat (Comext, Statistical regime 4)

Table 4.7: Turkey's exports by principal countries and SITC sections in 2009 – value in million US$, percentage of country total

Country	Total	Shares by SITC sections (%)								
		0+1	2+4	3	5	6	7	8	9	Total
World	102.138,5	9,8	2,6	3,8	4,7	28,0	28,2	17,0	5,8	100,0
Germany	9.791,2	10,4	1,0	0,8	2,7	20,5	30,1	33,5	1,0	100,0
France	6.209,8	5,4	0,4	0,2	1,4	12,1	62,1	18,2	0,2	100,0
United Kingdom	5.919,6	5,5	1,0	2,7	1,9	14,9	38,0	34,7	1,4	100,0
Italy	5.892,0	9,4	2,0	3,5	2,7	23,9	43,5	13,6	1,3	100,0
Itaq	5.126,1	22,9	3,6	3,4	6,2	35,3	17,9	10,7	0,0	100,0
Switzerland	3.937,0	2,8	0,3	0,4	1,1	4,4	3,2	3,3	84,6	100,0
USA	3.234,1	12,9	1,1	3,3	3,7	31,1	32,3	13,2	2,4	100,0
Russian Federation	3.202,4	24,5	2,0	2,8	9,2	30,1	19,3	11,2	0,8	100,0
United Arab Emirates	2.898,6	3,3	0,5	6,7	2,0	37,9	10,0	17,2	22,5	100,0
Spain	2.824,2	3,9	2,4	0,6	3,3	19,7	32,4	36,5	1,3	100,0

Source: UN Comtrade, 2009

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Databases:

- **FAOSTAT database http://apps.fao.org**
- **UNCTAD TRAINS database http://www.unctad.org/trains/index.htm**

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Chapter 1.
The Revealed Comparative Advantage in general

Comparative advantage underlies economists' explanations for the observed pattern of inter – industry trade. In theoretical models, comparative advantage is expressed in terms of relative prices evaluated in the absence of trade. Since these are not observed, in practice we measure comparative advantage indices (RCA) using the trade pattern to identify the sectors in which an economy has comparative advantage, by comparing the country of interests' trade profile with the world average.

The RCA index is defined as the ration of two shares. The numerator is the share of a country's total exports of the commodity of interest in its total exports. The denominator is share of world exports of the same commodity in total world exports. The range of value is between 0 and $+\infty$. A country is said to have a revealed comparative advantage if the value exceeds unity. The limitations faced by the RCA index is that is affected anything that distorts the trade pattern, e.g., trade barriers.

Chapter 2.
Measuring Revealed Comparative and Competitive Advantages

There mainly exist two prominent theories of trade based on comparative advantage: the Ricardian theory and the Heckscher-Ohlin (H-O) theory. The Ricardian theory assumes that comparative advantage arises from differences in technology across countries while the H-O theory suggests that technologies are the same across countries. Instead, the H-O theory attributes comparative advantage to cost differences resulting from differences in factor prices across countries. In brief, the predictions of orthodox (classical) trade theories are based on the principle of comparative advantage which derives from relative price determination, e.g. differences in pre-trade relative prices across countries, underlined by supply and demand factors.

According to the H-O theory, a country's comparative advantage is determined by its relative factor scarcity (e.g. its factor endowment ratios, relative to the rest of the world or a set of countries). However, it is well known that measuring comparative advantage and testing the Hecksher-Ohlin (H-O) theory have some difficulties (Balassa, 1989: 42-4) since relative prices under autarky are not observable. Given this fact, Balassa (1965) proposes that it may not be necessary to include all constituents effecting country's comparative advantage. Instead, he suggests that comparative advantage is "revealed" by observed trade patterns, and in line with the theory, one needs pre-trade relative prices which are not observable. Thus, inferring comparative advantage from observed data is named "revealed" comparative advantage (RCA). In practice, this is a commonly accepted method to analysing trade data. Balassa (1965) derives an index (called the Balassa Index) that measures a country's comparative advantage. The Balassa index tries to identify whether a country has a "revealed" comparative advantage rather than to determine the underlying sources of comparative advantage. However, since first suggested by Balassa (1965), the definition of RCA has been revised and modified such that an excessive number of measures now exist. Some studies measures RCA at the global level (see e.g. Vollrath, 1991), others at a sub-global / regional level (see Balassa's original index), and while some others evaluates the measurement as bilateral trade between two countries or trading partners (see e.g. Dimelis and Gatsios, 1995).

However, before Balassa introduced his famous RCA index in 1965, Liesner (1958) had already contributed to the empirical literature of RCA. In this sense, Liesner (1958) is the first empirical study in the area of RCA. The proposed simple measure of RCA by Leisner is the following:

$$RCA_1 = Xij / Xnj \qquad (1)$$

where X represents exports, i is a country, j is a commodity (or industry), and n is a set of countries (e.g. the EU).

A comprehensive / advanced measure of RCA was later on presented by Balassa (1965). This is a widely accepted and afterwards modified measure of RCA in the literature. It is expressed as follows:

$$RCA_2 = (Xij / Xit) / (Xnj / Xnt) = (Xij / Xnj) / (Xit / Xnt) \quad (2)$$

where X represents exports, i is a country, j is a commodity (or industry), t is a set of commodities (or industries) and n is a set of countries. RCA_2 measures a country's exports of a commodity (or industry) relative to its total exports and to the corresponding exports of a set of countries, e.g. the EU. A comparative advantage is "revealed", if $RCA_2 > 1$. If RCA_2 is less than unity, the country is said to have a comparative disadvantage in the commodity / industry. It is argued that the RCA_2 index is biased due to the omission of imports especially when country-size is important (Greenaway and Milner, 1993).

An alternative RCA index (RCA_3 of Equation 3) is computed in order to make reference to the "own" country trade performance only. This type of measurement of a country's RCA recognises the possibility of simultaneous exports and imports within a particular commodity / industry.

$$RCA_3 = (Xij - Mij) / (Xij + Mij) \quad (3)$$

In the case of Equation 3, the index ratio ranges from -1 (Xij = 0 and revealed comparative disadvantage) to +1 (Mij = 0 and revealed comparative advantage). However, regarding RCA_3, there exist ambiguities around zero values (Greenaway and Milner, 1993).

One can derive another version of RCA from Balassa (1965). The equation is as follows:

$$RCA_4 = (Xij / Xit) / (Mij / Mit) = (Xij / Mij) / (Xit / Mit) \quad (4)$$

where X and M represents exports and imports respectively. i is a country, j is a commodity (or industry), t is a set of commodities (or industries). A similar version of Equation 4 derived from Balassa (1965) is the following:[1]

$$RCA_5 = \ln (Xij / Xit) / (Mij / Mit) * 100 = \ln (Xij / Mij) / (Xit / Mit) * 100 \quad (5)$$

Vollrath (1991), on the other hand, offered mainly three alternative ways of measurement of a country's RCA. These alternative specifications of RCA are called *the relative trade advantage* (RTA), *the logarithm of the relative export advantage* (ln RXA), and *the revealed competitiveness* (RC). In this study, for the sake of being systematic, we call them as RCA_6, RCA_7, and RCA_8 respectively. It is clear that the advantage of presenting latter two indices (i.e. RCA_7 and RCA_8) is that they become symmetric through the origin. Positive values of Vollrath's three alternative measures of revealed comparative advantage reveal a comparative/competitive advantage whereas negative values indicate comparative/competitive disadvantage.

However, a problem of implementing these or similar RCA indices is that real (observed) trade patterns may be distorted by government interventions, thus causing misrepresentation of underlying

[1] Note that RCA3, RCA4 and RCA5 might be calculated either in global or bilateral/regional levels

comparative advantage. It is thus a concern that import restrictions, export subsidies and other protectionist policies of governments, to an extent, may distort RCA indices. Fertö and Hubbard (2003), in this respect, uses nominal assistance coefficients (NACs) estimated by the OECD by country and commodity to filter the effects of possible distortions in measuring Hungarian Agri-food sector RCAs visà- vis the EU. Greenaway and Milner (1993), on the other hand, suggests the employment of a price-based measure of RCA called "implicit revealed comparative advantage" (IRCA) to get rid of the distortion caused by the post-policy intervention.

Vollrath (1991) suggests that the RC index (RCA_8 in the present study) is preferable since supply and demand balance embodied in the index. Evaluating the shortcomings of Vollrath's three indices, Vollrath acknowledges that the RXA (relative export advantage) index which reduces the distortion effects is more commonly used in practice. It is important to point out that Balassa and Vollrath indices are based on different concepts and thus are not strictly comparable.

The relative trade advantage (RTA) (here RCA_6) is calculated as the difference between *relative export advantage* (RXA), which is the equivalent to the original Balassa index (RCA_2), and its counterpart, *relative import advantage* (RMA). It is important to note that the main difference of Vollrath's RXA from Balassa's original RCA_2 index is that it prevents from double-counting. In this study, the set of countries (n) is restricted to the EU 27 whereas the set of commodities (t) refers to all trade. Although double-counting is not eliminated, it does not cause a problem since we are using 'reasonably' low level of commodity aggregation.

$RCA6 = RTA = RXA - RMA$

where RXA = RCA2 = $(Xij/\ Xit) / (Xnj/\ Xnt)$ and

RMA = $(Mij/\ Mit) / (Mnj/\ Mnt)$

where *M* accounts for imports. In consequence;

$$RCA_6 = RTA = RXA - RMA = (Xij/\ Xit) / (Xnj/\ Xnt) - (Mij/\ Mit) / (Mnj/\ Mnt) \quad (6)$$

Vollrath's second RCA measure is the logarithm of the relative export advantage (here as RCA_7):

$$RCA_7 = ln\ RXA = ln\ RCA_2 \quad (7)$$

The third measure of Vollrath is the revealed competitiveness (RC) (here as RCA_8), expressed as:

$$RCA8 = RC = ln\ RXA - ln\ RMA \quad (8)$$

It is important to note that the original RCA measure, i.e. RCA_2, and its different variants presented in the present paper implicitly assume that the firms of the country i compete with domestic firms in a set of countries (e.g. the EU single market) rather than competing with firms exporting to the EU single market. However, if one assumes that firms of the country i compete with firms exporting to the EU market, then the original formula may be rearranged as in the following:

$RCA_9 = (Xij / Xit) / (Xwnj / Xwnt)$ (9)

where X represents exports, i is a country, j is a commodity (or industry), t is a set of commodities (or industries) and n is a set of countries. RCA_2 measures a country's exports of a commodity (or industry) relative to its total exports and to the corresponding exports of the world in to a set of countries, e.g. the EU.

Given that there exists a range of RCA alternative indices suggested and employed in the literature to measure comparative advantage, some inconsistent results may occur obtained by the use of different RCA indices. Interpretation of the RCA indices in the ordinal or cardinal senses is another field of dispute. Furthermore, the stability and the consistency of alternative measures of RCA have been called into questioned (e.g. Balance et al., 1987; Yeats, 1985; Hinloopen and Van Marrewijjk, 2001). It is therefore encouraged that the policy makers need cautious interpretation of RCA indices by especially underlining probabilities of revealing a comparative advantage or disadvantage.

Chapter 3.
Data and empirical findings

For the needs of our analysis we chose the classic RCA index (Ballasa's original index) presented in the earlier section:

It is expressed as follows:

$$RCA_2 = (Xij / Xit) / (Xnj / Xnt) = (Xij / Xnj) / (Xit / Xnt) \quad (2)$$

Where X represents exports of each of the selected MPC (Morocco, Tunisia, Egypt) and Turkey, i is a country, j is a commodity (or industry), t is a set of commodities (or industries) and n is a set of countries.

In order to calculate $RCA_{2,}$ in the sense of bilateral competitiveness of MPCs with respect to the EU 27, we used annual one and two digit SITC REV. 3 (Standard International Trade Classification) data covering exports and imports on the bilateral level for the period of 1999 – 2009 from the Eurostat both for the EU 27 and the MPCs.

The one digit SITC categories that have been used in our study are presented in the following box:

SITC	Description
0	Food and live animals
1	Beverages and tobacco
2	Crude materials, inedible, except fuels
3	Mineral fuels, lubricants and related materials
4	Animal and vegetable oils, fats and waxes
5	Chemicals and related products n.e.s
6	Manufactured good classified chiefly by material
7	Machinery and transport equipment
8	Miscellaneous manufactured articles
9	Commodities and transactions not classified elswhere

The one digit analysis will help us to identify the trade sectors with strong comparative advantage in the total trade of each MPC. Special attention will be given in the food and live animals, beverages and tobacco and animal and vegetable oils categories. We have excluded for the needs of our

analysis the rest of the primary product categories. Moreover, we have focused mainly in the agricultural production and agricultural trade.

Furthermore, our study aimed to identify the comparative advantage for a specific product or category of products. For that purpose a second database was build in order to help to the calculation of RCA for the two digits SITC categories.

The two digits SITC categories that have been used in our study are presented in the following box:

SITC	Description
0	**Food and live animals**
00	Live animals other than animals of division 03
01	Meat and meat preparations
02	Dairy products and birds' eggs
03	Fish (not marine mammals), crustaceans, mollusks and aquatic invertebrates and preparations thereof
04	Cereals and cereals preparations
05	Vegetables and fruit
06	Sugars, sugar preparations and honey
07	Coffee, tea cocoa, spices and manufactures thereof
08	Feeding stuff for animals
09	Miscellaneous edible products and preparations
1	**Beverages and tobacco**
11	Beverages
12	Tobacco and tobacco
4	**Animal and vegetable oils, fats and waxes**
41	Animal oils and fats
42	Fixed vegetable fats and oils, processed; waxes of animal or vegetables
43	Fixed vegetable fats and oils processed; waxes of animal or vegetable origin; inedible mixtures or preparations of animal or vegetable fats or oils, n.e.s.

The following are the basic points and outcomes on our RCA calculations for each MPC.

Chapter 4.
Morocco's Revealed Comparative Advantage

As it can be observed in the following table Morocco, has strong RCA index in the Machinery and transport equipment (SITC 7) and in the Miscellaneous manufactured articles (SITC 8). In the Food and live animals category (SITC 0) RCA is relatively higher compared with the other product categories. Moreover, Chemicals and related products (SITC 5) and Manufactured good classified chiefly by material (SITC 6) are also receiving a higher level of RCA index compared with the others but it is not > than 1.

Table 4.1: Morocco's RCA – One digit classification

SITC REV.3 One digit classification										
Morocco	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
1999	0,79	0,00	0,14	0,03	0,00	0,83	0,59	8,71	5,18	0,00
2000	0,63	0,00	0,11	0,07	0,00	0,66	0,66	4,93	4,29	0,00
2001	0,63	0,00	0,09	0,04	0,00	0,62	0,57	4,36	4,46	0,01
2002	0,70	0,00	0,09	0,02	0,00	0,53	0,56	4,65	4,35	0,01
2003	0,73	0,00	0,08	0,03	0,00	0,43	0,48	5,65	4,36	0,00
2004	0,63	0,00	0,08	0,03	0,00	0,52	0,54	5,54	3,72	0,00
2005	0,47	0,00	0,06	0,04	0,00	0,29	0,35	11,16	2,30	0,00
2006	0,55	0,00	0,08	0,04	0,00	0,36	0,39	4,66	2,79	0,00
2007	0,57	0,00	0,07	0,02	0,00	0,43	0,41	4,59	2,49	0,00
2008	0,51	0,00	0,10	0,02	0,00	0,52	0,31	4,01	2,15	0,01
2009	0,73	0,00	0,05	0,02	0,00	0,38	0,34	5,48	2,83	0,01

Source: Authors' calculations

In the two digits analysis, concerning the main agricultural products exported by Morocco, we notice that none is exceeding 1 which is prerequired to decide or not for the revealed comparative advantage. This is mainly because of the limitations of the RCA_2 index which can be affected by the size of the country under observation. For that reason and for the needs of our study we will consider the category of products as those with comparative advantage the ones that are receiving prices over 0,1. From the results, the Vegetables and fruit category (SITC 05) and the Fish (not marine mammals), crustaceans, mollusks and aquatic invertebrates and preparations thereof (SITC 03) are those with a significant RCA index. The rest of the categories are receiving positive but very close to 0 values.

Table 4.2: Morocco's RCA – Two digits classification

SITC REV. 3 Two digits classification																		
Morocco	**0.**	**00.**	**01.**	**02.**	**03.**	**04.**	**05.**	**06.**	**07.**	**08.**	**09.**	**1.**	**11.**	**12.**	**4.**	**41.**	**42.**	**43.**
1999	0,79	0,00	0,00	0,00	0,02	0,00	0,06	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
2000	0,63	0,00	0,00	0,00	0,02	0,00	0,04	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
2001	0,63	0,00	0,00	0,00	0,02	0,00	0,04	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
2002	0,70	0,00	0,00	0,00	0,02	0,00	0,05	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
2003	0,73	0,00	0,00	0,00	0,02	0,00	0,05	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
2004	0,63	0,00	0,00	0,00	0,01	0,00	0,05	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
2005	0,47	0,00	0,00	0,00	0,01	0,00	0,03	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
2006	0,55	0,00	0,00	0,00	0,01	0,00	0,04	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
2007	0,57	0,00	0,00	0,00	0,01	0,00	0,04	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
2008	0,51	0,00	0,00	0,00	0,01	0,00	0,04	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
2009	0,73	0,00	0,00	0,00	0,02	0,00	0,05	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00

Source: Authors' calculations

Chapter 5.
Tunisia's Revealed Comparative Advantage

According to the results of the RCA index, Tunisia is receiving high values in the categories of Machinery and transport equipment (SITC 7) and in the Miscellaneous manufactured articles (SITC 8). Chemicals and related products (SITC 5) and Manufactured good classified chiefly by material (SITC 6) are the 3rd and 4th ranked categories of products as far as it concerns RCA index. The Food and live animals category is receiving a relatively low value (0,11 in average) for all the years.

Table 5.1: Tunisia's RCA – One digit classification

SITC REV. 3 One digit classification										
Tunisia	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
1999	0,14	0,00	0,03	0,15	0,02	0,54	0,78	6,92	7,07	0,02
2000	0,13	0,00	0,03	0,22	0,02	0,53	0,78	6,96	6,99	0,02
2001	0,11	0,00	0,03	0,22	0,01	0,57	0,93	8,98	6,79	0,01
2002	0,11	0,00	0,03	0,25	0,00	0,63	0,92	8,17	7,03	0,01
2003	0,11	0,00	0,03	0,28	0,00	0,65	0,88	9,06	6,52	0,01
2004	0,10	0,00	0,03	0,31	0,02	0,64	0,99	9,45	5,67	0,01
2005	0,11	0,00	0,04	0,52	0,01	0,56	0,97	9,87	5,19	0,01
2006	0,10	0,00	0,04	0,55	0,01	0,51	1,07	10,69	4,71	0,01
2007	0,09	0,00	0,04	0,88	0,01	0,62	1,02	10,75	4,21	0,01
2008	0,10	0,00	0,06	1,06	0,01	0,72	0,99	10,60	3,92	0,01
2009	0,11	0,00	0,03	0,78	0,01	0,62	0,86	11,80	4,32	0,01

Source: Authors' calculations

As it is revealed, Tunisia has comparative advantage in Vegetables and fruit (SITC 05) category and in the Fixed vegetable fats and oils, processed; waxes of animal or vegetables category (SITC 42). Compared with the rest of the MPCs and Turkey, Tunisia is receiving the lowest RCA value in the Food and live animals category (SITC 0).

Table 5.2: Tunisia's RCA – Two digits classification

SITC REV. 3 Two digits classification																		
Tunisia	**0**	**00**	**01**	**02**	**03**	**04**	**05**	**06**	**07**	**08**	**09**	**1**	**11**	**12**	**4**	**41**	**42**	**43**
1999	0,14	0,00	0,00	0,00	0,00	0,00	0,01	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,02	0,00	0,02	0,00
2000	0,13	0,00	0,00	0,00	0,00	0,00	0,01	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,01	0,00	0,01	0,00
2001	0,11	0,00	0,00	0,00	0,00	0,00	0,01	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,01	0,00	0,00	0,00
2002	0,11	0,00	0,00	0,00	0,00	0,00	0,01	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
2003	0,11	0,00	0,00	0,00	0,00	0,00	0,01	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
2004	0,10	0,00	0,00	0,00	0,00	0,00	0,01	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,02	0,00	0,01	0,00
2005	0,11	0,00	0,00	0,00	0,00	0,00	0,01	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,01	0,00	0,01	0,00
2006	0,10	0,00	0,00	0,00	0,00	0,00	0,01	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,01	0,00	0,01	0,00
2007	0,09	0,00	0,00	0,00	0,00	0,00	0,01	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,01	0,00	0,01	0,00
2008	0,10	0,00	0,00	0,00	0,00	0,00	0,01	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,01	0,00	0,01	0,00
2009	0,11	0,00	0,00	0,00	0,00	0,00	0,01	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,01	0,00	0,00	0,00

Source: Authors' calculations

Chapter 6.
Egypt's Revealed Comparative Advantage

Egypt is the only MPC which is revealing clear comparative advantage in three categories of products, Manufactured good classified chiefly by material (SITC 6), Machinery and transport equipment (SITC 7), Miscellaneous manufactured articles (SITC 8). We must emphasise that SITC 8 during the period 2005-2009 is receiving values < 1 and that RCA index is not satisfied. In the case of SITC 7, it loses the comparative advantage in 2006 where is receiving value < 1.

Table 6.1: Egypt's RCA – One digit classification

SITC REV. 3 One digit classification										
Egypt	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
1999	0,28	0,00	0,10	0,99	0,00	0,55	2,56	2,86	1,76	0,03
2000	0,14	0,00	0,07	0,83	0,00	0,49	2,23	3,21	1,19	0,02
2001	0,20	0,00	0,08	0,65	0,00	0,74	2,33	3,11	1,27	0,02
2002	0,22	0,00	0,07	0,73	0,00	0,73	2,10	2,28	1,14	0,01
2003	0,20	0,00	0,07	0,68	0,00	0,82	2,14	3,50	1,35	0,01
2004	0,22	0,00	0,06	0,65	0,00	0,52	2,36	2,46	1,04	0,01
2005	0,19	0,00	0,04	0,68	0,00	0,46	1,83	2,37	0,75	0,01
2006	0,13	0,00	0,03	0,76	0,00	0,51	1,42	0,97	0,53	0,01
2007	0,17	0,00	0,03	0,55	0,00	0,65	1,79	1,13	0,60	0,01
2008	0,13	0,00	0,03	0,59	0,00	0,72	1,30	1,13	0,53	0,01
2009	0,23	0,00	0,03	0,73	0,00	0,94	0,97	1,29	0,74	0,01

Source: Authors' calculations

There is only one category of products (Vegetables and fruit (SITC 05)) with a significant RCA value for Egypt in the two digits classification.

Table 6.2: Egypt's RCA – Two digits classification

SITC REV.3 Two digits classification																		
Egypt	**0**	**00**	**01**	**02**	**03**	**04**	**05**	**06**	**07**	**08**	**09**	**1**	**11**	**12**	**4**	**41**	**42**	**43**
1999	0,28	0,00	0,00	0,00	0,00	0,00	0,02	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
2000	0,16	0,00	0,00	0,00	0,00	0,00	0,02	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
2001	0,24	0,00	0,00	0,00	0,00	0,01	0,02	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
2002	0,26	0,00	0,00	0,00	0,00	0,00	0,03	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
2003	0,23	0,00	0,00	0,00	0,00	0,00	0,03	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
2004	0,25	0,00	0,00	0,00	0,00	0,00	0,03	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
2005	0,23	0,00	0,00	0,00	0,00	0,00	0,03	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
2006	0,18	0,00	0,00	0,00	0,00	0,00	0,02	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
2007	0,25	0,00	0,00	0,00	0,00	0,00	0,04	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
2008	0,21	0,00	0,00	0,00	0,00	0,00	0,03	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
2009	0,35	0,00	0,00	0,00	0,00	0,00	0,05	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00

Source: Authors' calculations

Chapter 7.
Turkey's Revealed Comparative Advantage

Turkey is also revealing comparative advantage in three categories of products Manufactured good classified chiefly by material (SITC 6), Machinery and transport equipment (SITC 7), Miscellaneous manufactured articles (SITC 8). Especially for the SITC 7 we should notice a continues increase in the RCA index during the period 1999-2009. The average increase per year is 4,8%. Only in 2009 the RCA index decreased by 4% because of the economic situation and the global economic crisis.

Table 7.1: Turkey's RCA – One digit classification

Turkey	0	1	2	3	4	5	6	7	8	9
1999	0,46	0,02	0,06	0,02	0,00	0,35	3,37	10,04	4,25	0,01
2000	0,37	0,02	0,06	0,04	0,00	0,38	3,58	10,48	4,16	0,01
2001	0,35	0,01	0,04	0,03	0,00	0,37	3,48	11,64	4,04	0,01
2002	0,30	0,01	0,04	0,03	0,00	0,40	3,16	12,64	4,23	0,01
2003	0,26	0,01	0,04	0,02	0,00	0,40	3,12	13,46	4,03	0,01
2004	0,25	0,01	0,04	0,03	0,00	0,39	3,23	15,29	3,46	0,01
2005	0,26	0,01	0,04	0,06	0,00	0,39	3,03	15,77	3,14	0,01
2006	0,23	0,01	0,06	0,11	0,00	0,45	3,21	15,92	2,81	0,01
2007	0,21	0,01	0,06	0,07	0,00	0,46	3,44	16,32	2,66	0,01
2008	0,24	0,01	0,05	0,15	0,00	0,53	3,17	16,58	2,41	0,01
2009	0,31	0,01	0,04	0,05	0,00	0,65	2,68	15,90	2,79	0,01

Source: Authors' calculations

As far as it concerns the agricultural production, Turkey has a significant RCA index only in the category Vegetables and fruit (SITC 06). This is mainly because of the limitations of the RCA index as it has been previously mentioned. The limitations in the case of Turkey are probably because of the majority of agricultural products that are exported from Turkey.

Table 7.2: Turkey's RCA – Two digits classification

Turkey	0	00	01	02	03	04	05	06	07	08	09	1	11	12	4	41	42	43
1999	0,46	0,00	0,00	0,00	0,00	0,00	0,05	0,00	0,00	0,00	0,00	0,02	0,00	0,00	0,00	0,00	0,00	0,00
2000	0,37	0,00	0,00	0,00	0,00	0,00	0,04	0,00	0,00	0,00	0,00	0,02	0,00	0,00	0,00	0,00	0,00	0,00
2001	0,35	0,00	0,00	0,00	0,00	0,00	0,04	0,00	0,00	0,00	0,00	0,01	0,00	0,00	0,00	0,00	0,00	0,00
2002	0,30	0,00	0,00	0,00	0,00	0,00	0,04	0,00	0,00	0,00	0,00	0,01	0,00	0,00	0,00	0,00	0,00	0,00
2003	0,26	0,00	0,00	0,00	0,00	0,00	0,03	0,00	0,00	0,00	0,00	0,01	0,00	0,00	0,00	0,00	0,00	0,00
2004	0,25	0,00	0,00	0,00	0,00	0,00	0,03	0,00	0,00	0,00	0,00	0,01	0,00	0,00	0,00	0,00	0,00	0,00
2005	0,26	0,00	0,00	0,00	0,00	0,00	0,03	0,00	0,00	0,00	0,00	0,01	0,00	0,00	0,00	0,00	0,00	0,00
2006	0,23	0,00	0,00	0,00	0,00	0,00	0,03	0,00	0,00	0,00	0,00	0,01	0,00	0,00	0,00	0,00	0,00	0,00
2007	0,21	0,00	0,00	0,00	0,00	0,00	0,03	0,00	0,00	0,00	0,00	0,01	0,00	0,00	0,00	0,00	0,00	0,00
2008	0,24	0,00	0,00	0,00	0,00	0,00	0,03	0,00	0,00	0,00	0,00	0,01	0,00	0,00	0,00	0,00	0,00	0,00
2009	0,31	0,00	0,00	0,00	0,00	0,00	0,04	0,00	0,00	0,00	0,00	0,01	0,00	0,00	0,00	0,00	0,00	0,00

Source: Authors' calculations

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Databases:

- **FAOSTAT database** http://apps.fao.org
- **UNCTAD TRAINS database** http://www.unctad.org/trains/index.htm

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Chapter 1.
Introduction to ARIMA models

Autoregressive Integrated Moving Average (ARIMA) model was introduced by Box and Jenkins (hence also known as Box – Jenkins Model) for forecasting a variable. ARIMA method is an extrapolation method for forecasting and, like any other such method, it requires only the historical time series data on the variable under forecasting. Among the extrapolation methods this one is of the most sophisticated method, for it incorporates the features of all such methods, does not require the investigator to choose the initial values of any variable and values of various parameters a priori and it is robust to handle any data pattern. As one would expect, this is quite a difficult model to develop and apply as it involves transformation of the variable, identification of the model, estimation through non-linear method, verification of the model and derivation of forecasts.

ARIMA econometric modeling takes into account historical data and decomposes it into an Autoregressive (AR) process, where there is a memory of past events (e.g. the interest rate this month is related to the interest rate the last month, and so forth, with a decreasing memory lag); an Integrated (I) process, which accounts for stabilizing or making the data stationary and ergodic, making it easier to forecast; and a Moving Average (MA) of the forecast errors, such that the longer the historical data, the more accurate the forecasts will be, as it learns over time. The ARIMA models therefore have three model parameters, one for the AR(p) process, one for the I(d) process, and one for the MA(q) process, all combined and interacting among each other and recomposed into the ARIMA (p,d,q) model.

There are many reasons why an ARIMA model is superior to common time – series analysis and multivariate regressions. The common finding in time series analysis and multivariate regression is that the error residuals are correlated with their own lagged values. This serial correlation violates the standard assumption of regression theory that disturbances are not correlated with other disturbances. The primary problems associated with serial correlation are:

- Regression analysis and basic time series analysis are no longer efficient among different linear estimations. However, as the error residuals can help to predict current error residuals, we can take advantage of this information to form a better prediction of the dependent variable using ARIMA.
- Standard errors are computed using the regression and time series formula are not correct and are generally understand. If there are lagged dependent variables set as the regressors, regression estimates are biased and inconsistent but can be fixed using ARIMA.

ARIMA(p,d,q) models are the extension of the AR model that uses three components for modeling the serial correlation in the time series data. The first component is the Autoregressive (AR) term. The AR(p) model uses the p lags of the time series in the equation. An AR(p) model has the form: $y=\alpha_1 y_{t-}$

$_1+...+\alpha_p y_{t-p} + e_t$. The second component is the integration (d) order term. Each integration order corresponds to differencing the time series. I(1) means differencing the data once. I(d) means differencing d times. The third component is the Moving Average term. The MA(q) model uses the q lags of the forecast errors to improve the forecast. An MA(q) model has the form: yt= et+b1t-1+…+bqet-q. Finally an ARMA(p.q) model has the combined form: $y_t=\alpha_1 y_{t-1}+...+\alpha_p y_{t-p} + e_t + b_1 e_{t-1} +...+b_q e_{t-q}$.

In interpreting the results of an ARIMA model, most of the specifications are identical to the multivariate regression analysis. However, there are several additional sets of results specific to the ARIMA analysis. The first is the addition of Akaike information Criterion (AIC) and Schwartz Criterion (SC), which are often used in ARIMA model selection and identification. That Is, AIC and SC are used to determine if a particular model with a specific set of p, d and q parameters is a good statistical fit. SC imposes a greater penalty for additional coefficients that the AIC but generally, the model with the lowest AIC and SC values should be chosen. Additional tools that will be used are the Root Mean Square (RMSE), the test of excessive runs up and down (RUNS), test for excessive runs above and below median (RUNM), Box-Pierce test for excessive autocorrelations (AUTO), test for difference in mean 1st half to 2nd half (MEAN) and the test for difference in variance 1st half to 2nd half (VAR). Finally, an additional set of results called the autocorrelation (AC) and partial autocorrelation (PAC) in the ARIMA report.

Finding the right ARIMA model takes practice and experience. The tools mentioned in the previous paragraph are highly useful diagnostic tools to help identify the correct model specification. Finally the ARIMA parameter results are obtained using sophisticated optimization and iterative algorithms, which means that although the functional forms look like those of multivariate regression, they are not the same. ARIMA is a much more computationally intensive and advanced econometric approach.

Chapter 2.
Theoretical Basis of Time-Series Analysis

A time series is a set of values of a continuous variable Y (Y_1, Y_2, ...,Y_n), ordered according to a discrete index variable t (1, 2, ..., n). The term time-series comes from econometric studies in which the index variable refers to intervals of time measured in a suitable scale. However, it must be clearly stated that this direct reference to time is not required: actually, any different meaning can be attributed to the index variable, provided that it is able to order the Y values. In general, in a given time series the following can be recognized and separated[1]:

1. a regular, long-term component of variability, termed trend, that represents the whole evolution pattern of the series;
2. a regular, short-term component whose shape occurs periodically at intervals of s lags of the index variable, currently known as seasonality, because this term is also derived by applications in economics;
3. an AR(p) autoregressive component of p order, which relates each value Z_t =:Y_t – (trend and seasonality) to the *p* previous *Z* values, according to the following linear relationship

$$Z_t = \varphi_1 Z_{t-1} + \varphi_2 Z_{t-2} + ... + \varphi_p Z_{t-p} + \varepsilon_t \quad (1)$$

Where $\varphi_j{}^i$ (i=1,...p) are parameters to be estimated and ε_t is a residual term; and

4. a MA(q) moving average component of q order, which relates each Z_t value to the q residuals of the q previous Z estimates

$$Z_t = \varepsilon_t - \theta_1 \varepsilon_{t-1} - \theta_2 \varepsilon_{t-2} - ... \theta_q \varepsilon_{t-q} \quad (2)$$

Where θ_i (i=1,..q) are parameters to be estimated. The theory of time series analysis has developed a specific language and a set of linear operators. According to Box and Jenkins (1), a highly useful operator in time-series theory is the lag or backward linear operator (B) defined by $BZ_t=Z_{t-1}$

Consider the result of applying the lag operator twice to a series:

$$B(BZ_t) = BZ_{t-1} = Z_{t-2}$$

Such a double application is indicated by B^2, and, in general, for any integer k, it can be written

$$B_k Z_t = Z_{t-k}$$

By using the backward operator, equation (1) can be rewritten as

$$Z_t = \varphi_1 Z_{t-1} - \varphi_2 Z_{t-2} + ... + \varphi_p Z_{t-p} = \varepsilon_t = \varphi(B) Z_t \quad (3)$$

Where φ(B) is the autoregressive operator of *p* order defined by

[1] Kendall, M. G., and A. Stuart. 1966. The advanced theory of statistics. Vol. 3. Design and Analysis and Time-Series. Charles Griffin & Co. Ltd., London, United Kingdom.

$$\varphi(B) = 1 - \varphi_1 B - \varphi_2 B^2 - \ldots \varphi_p B^p$$

Similarly equation (2) can be written as

$$Z_t = \varepsilon_t - \theta_1 \varepsilon_{t-1} - \theta_2 \varepsilon_{t-2} - \ldots \theta_q \varepsilon_{t-q} = \theta(B)\varepsilon_t \quad (4)$$

Where θ(B) indicates the moving average operator of *q* order defined by

$$\theta(B) = 1 - \theta_1 B - \theta_2 B^2 - \ldots - \theta_q B^q$$

The autoregressive and moving average components can be combined in an autoregressive moving average (ARMA) (p,q) model

$$Z_t = \varphi_1 Z_{t-1} + \varphi_2 Z_{t-2} + \ldots + \varphi_p Z_{t-p} + \varepsilon_t - \theta_1 \varepsilon_{t-1} - \theta_2 \varepsilon_{t-2} - \ldots \theta_q \varepsilon_{t-q}$$

or in a lag form

$$(1 - \varphi_1 B - \varphi_2 B^2 - \ldots \varphi_p B^p) Z_t = (1 - \theta_1 B - \theta_2 B^2 - \ldots - \theta_q B^q)\varepsilon_t$$

Finally,

$$\varphi(B) Z_t = \theta(B)\varepsilon_t \quad (5)$$

In a preliminary analysis of a series it is useful to independently evaluate the long- and short-term periodic components, which are essential to define the regular structure of the series. The trend component can be evaluated by fitting a regular function, a polynomial, or a more complicated general function. The seasonal component can be estimated by a seasonal decomposition procedure, which calculates a seasonal index based on the ratio of the observed values to the moving average. In the final stage of series modeling, however, both the trend and the seasonal component will be integrated in the ARMA (p, q) process (1). For the trend, such as integration is obtained by using the difference linear operator (∇), defined by

$$\nabla Y_t = Y_t - Y_{t-1} = Y_t - BY_t = (1-B)Y_t$$

A single application of the ∇ operator corrects the data for a linear increasing trend whereas its repeated use for *d* times corrects for a trend that can be fitted by *d*-order polynomial. The stationary series Z_t obtained as the d^{th} difference (∇^d) of Y_t,

$$Zt = \nabla^d Y_t = (1- B)^d Y_t$$

can be then modeled by an ARMA (p,q) process. The combined use of the ∇ operator and the ARMA (p, q) process results in an ARIMA (p, d, q) model. Furthermore, ARIMA can account for the seasonal component of s lag period, by using both correlations between Z_t and Z_{t-s} values and those between the corresponding residuals ε_t and ε_{t-s} . In mathematical terms, therefore, a seasonal ARIMA model is an ARIMA (p,d,q) model whose residuals ε_t can be further modeled by an ARIMA (P,D,Q)s structure with linear operators (P,D,Q) being functions of the B^s operator.

The operators of seasonal ARIMA model, defined as (p,d,q) x $(P,D,Q)_s$, can be expressed as follows:

AR(p) nonseasonal operator of p order, $\varphi(B) = 1 - \varphi_1 B - \varphi_2 B^2 - \ldots \varphi_p B^p$;

AR(p) seasonal operator of P order, $\varphi(B) = 1 - \varphi_1 B^s - \ldots - \varphi_P B^{Sp}$;

MA(q) nonseasonal operator of q order, $\theta(B) = 1 - \theta_1 B - \theta_2 B^2 - \ldots - \theta_q B^q$;

MA(Q) seasonal operator of Q order, $\theta(B) = 1 - \theta_1 B^s - \theta_2 B^{2s} - \ldots - \theta_Q B^{Qs}$; and difference operator of d order, $\nabla^d = (1-B)^d$

The Box-Jenkins methodology for analyzing and modeling time series is characterized by three steps:

1) Model identification, 2) parameter estimation, and 3) model validation.

Model identification defines the (p, d, q) orders of the AR and MA components, both seasonal and nonseasonal. In this step, fundamental analytical tool is the autocorrelation functions.

The autocorrelation function (ACF) and partial ACF (PACF) are very important for the definition of the internal structure of the analyzed series. The ACF ρ(k) at lag k of the Z_t series is the linear correlation coefficient between Z_t and Z_{t-k}, calculated for k =0, 1, 2...

$$\rho_k = \frac{Cov(Z_t, Z_{t-k})}{\sqrt{Var(Z_t)Var(Z_{t-k})}}$$

The PACF is defined as the linear correlation between Z_t and Z_{t-k}, controlling for possible effects of linear relationships among values at intermediate lags. Theoretically, both an AR (p) process and an MA (q) process should be associated with well-defined patterns of ACF and PACF, usually decreasing exponential or alternate in sign or decreasing sinusoidal patterns. A precise correspondence between ARMA (p, q) processes and defined ACF and PACF patterns is more difficult to recognize. When the order of at least one of the two components (AR or MA) is clearly detectable, however, the other can be identified by attempts in the following step of parameter estimation. Finally, the existence of a seasonal component of length *s* is underlined by the presence of a periodic pattern of period *s* in the ACF.

Once a suitable ARIMA (p, d, q) ×:(P,D,Q)s structure is identified, subsequent steps of parameter estimation and model validation must be performed. Parameter estimates are usually obtained by maximum likelihood, which is asymptotically correct for time series. Estimators are usually sufficient, efficient, and consistent for Gaussian distributions and are asymptotically normal and efficient for several non-Gaussian distribution families.

Validation of the goodness of fit of an ARIMA model can be developed according to the following steps:

1. Evaluation of statistical significance of parameters by the usual comparison between the parameter value and the standard deviation of its estimate. For a test statistic that is valid

only asymptotically, a parameter whose value exceeds twice its standard error can be considered significant.

2. Analysis of the ACF of residuals. In this step, residuals (εt) are considered as a new time series, and ACF and PACF are estimated to be sure that values at lag k >:0 are not statistically different from zero.

For prediction purposes, ARIMA models are different from the analytical functions of time: Z_t =f (t), because ARIMA forecasting uses previous values of the series and errors in the previous estimates. Actually, this peculiarity of ARIMA forecasting is valid in the short term because parameters of the model cannot account, in the long term, for changes in the dynamics of the series.

Chapter 3.
Building ARIMA model for exports on selected agricultural products for the MPCs

Main purpose of this study is to provide a quantitative outlook of agricultural markets for the next decades and the main factors explaining their evolution. For this purpose we use ARIMA modeling in order to forecast future exports on the main exporting agricultural products for the MPCs.

For the need of this study we selected a group of products that are in compliance with the related tasks of Work Package 3 as well as to the tasks of WP4 and WP5 as it is defined from the technical annex of the SUSTAINMED program.

The data was collected and downloaded from the EUROSTAT database of the European Union. The harmonized classification system was used in order to facilitate policy makers with a tool and a data set that can be used in a broader perspective. A four digit categorization of the products was used in order to access more details for the import and export values of the selected products. At this point we should mention that as at the six digit classification for oranges (080510-Oranges)) the data was not available from the external trade database, a four digit classification (0805-Citrus fruit, fresh or dried) was finally used concerning the export chain for the MPCs.

More specifically, the data collected concerns the following domestic and export chains:

- 15. Animal or Vegetable Fats, Oils and Waxes

  1509. Olive oil and its fractions, not chemically modified
- 08. Edible Fruits and Nuts, Peel of Citrus/Melons

  0805. Citrus Fruit, Fresh or Dried
- 07. Edible Vegetables

  0702. Tomatoes Fresh or Chilled
- 10. Cereals

  1001. Wheat and Meslin

Data for each MP country was collected for selected products in relation to their importance in the balance of trade. As a result of this, citrus were concerned as a major exporting product for Morocco, Tunisia, Egypt, Syria and Turkey. Olive oil (1509) data was collected for Tunisia, Syria and Turkey, tomatoes (0702) trade data was collected for Turkey, and wheat (1001) for Egypt and Morocco. These products are presented in detail in the following table.

Table 3.1: Selected categories of agricultural products according to the Harmonised classification (HS2 - HS4)

Morocco	**0805.** Citrus Fruit, fresh or dried	**1001.** Wheat	
Tunisia	**0805.** Citrus Fruit, fresh or dried	**1509.** Olive Oil and its Fractions, not Chemically Modified	
Egypt	**0805.** Citrus Fruit, fresh or dried	**1001.** Wheat	
Syria	**0805.** Citrus Fruit, fresh or dried	**1509**. Olive Oil and its Fractions, not Chemically Modified	
Turkey	**0805.** Citrus Fruit, fresh or dried	**1509.** Olive Oil and its Fractions, not Chemically Modified	**0702.** Tomatoes, Fresh or Chilled

Source: Eurostat - 2010

Main purpose of this chapter is to identify future trends in trade patterns for the aforementioned selected products and countries. For this reason the ARIMA methodology presented in previous sections is consider the most suitable as it can forecast future values for imports and trends and therefore to give information about the changes in trade trends.

As we have earlier stated that development of ARIMA model for any variable involves three steps: identification, estimation and verification. Each step is presented in the analysis below concerning the selected products.

Chapter 4.

Forecasting future trends in trade for Olive Oil and its Fractions, not Chemically Modified (1509)

The main exporter of olive oil is Tunisia in the order of 114.000 tons per year (although the respective figures can vary quite strongly between 20.000 tons in a “bad” year (2002) and to 180.000 in a “good” year). With a limited number of Tunisian brands (which are almost exclusively destined for the domestic market), it is not surprising that most produce is exported in bulk form. Most of that exported olive oil, is shipped either to Italy or Spain. The rest is exported to American and Asian countries) where it is either processed (refined) or just blended with domestic oil.

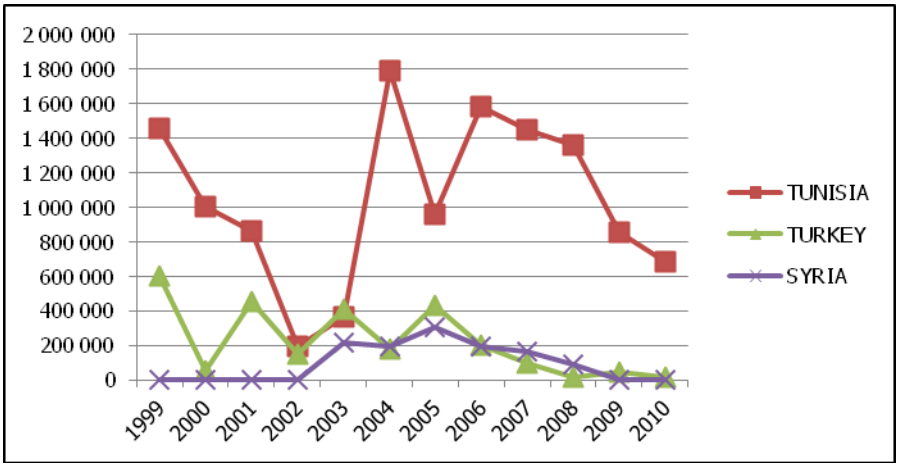
Turkey is a producer as well as a consumer, as is the case of all countries producing the olive oil, and consumes about 60,000 tons of olive oil per year. Per capita, Greece consumes 21 kg of olive oil, Italy consumes 11 kg, Spain consumes 10 kg, Tunisia consumes 10 kg, Syria consumes 6.2 kg, Portugal consumes 5 kg and Turkey consumes 1 kg, by making it the smallest consumer of olive oil among producing countries.

In Turkey, like in Tunisia, olive cultivation methods (at least agricultural methods applied) remain rather traditional. Absence or disruption of irrigation, pruning and fertilization and combination of olive cultivation with animal husbandry (grazing sheep), as well as traditional harvesting methods (using long poles but absence of nets) are among the basic problems of olive cultivation in Turkey.

Syrian olive oil export structures are weak with a limited number of small scale exporters, which are used to handle bulk quantities for olive oil exports, directed to importers in other countries. As result there is no central organization to coordinate and support export marketing, thus foreign marketing skills are limited.

Figure 4.1 presents trends in exports for the three Mediterranean countries. All countries during the last three years are facing a strong decline to the volume of exports. Tunisia’s exports to EU 27 have declined by 56,9% since 2006 with an average of 18% decline per year. The same trend is followed by Turkey and Syria with and annual decline of 7,4% and 9,4% respectively.

Figure 4.1: Exports of Olive Oil and its Fractions to EU 27 – Tunisia, Syria and Turkey



Source: EU27 Trade Since 1988 By HS2-HS4 [DS-016894] – 2010

Model Identification:

For the forecast method of future trends we used monthly data derived from the EUROSTAT database for the period 1999 (1st month) - 2011 (6th month). ARIMA model is estimated only after transforming the variable under forecasting into a stationary series. The stationary series is the one whose values vary over time only around a constant mean and constant variance. There are several ways to ascertain this. The most common method is to check stationarity through examining the graph or time plot of the data. In the case of olive the data is non stationary. Non stationarity in mean is corrected through appropriate differencing of the data. Three different models were developed in respect to the three different countries (Tunisia, Syria and Turkey).

Forecasting TuOliv – Olive Oil exports for Tunisia:

In order to construct the model a multiplicative method for seasonal adjustment have been used resulting to the selected forecasting model: ARIMA(1,1,1)x(2,1,2)12.

The data cover 144 time periods. Currently, an autoregressive integrated moving average (ARIMA) model has been selected. This model assumes that the best forecast for future data is given by a parametric model relating the most recent data value to previous data values and previous noise. Each value of TuOliv has been adjusted in the following way before the model was fit:

(1) Simple differences of order 1 were taken.

(2) Seasonal differences of order 1 were taken.

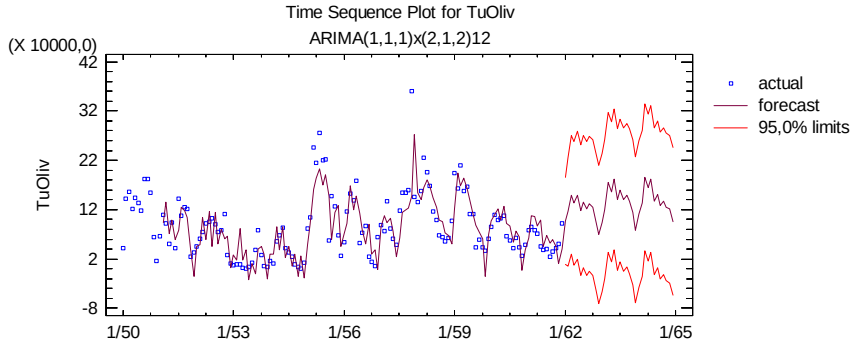
Model parameters were estimated using the STATGRAPHICS package. Results of estimation are reported in the following table.

Table 4.1 ARIMA Model Summary for TuOliv

Parameter	*Estimate*	*Stnd. Error*	*t*	*P-value*
AR(1)	0,68145	0,087063	7,82709	0,000000
MA(1)	0,946932	0,0321248	29,4766	0,000000
SAR(1)	0,742379	0,0949316	7,82015	0,000000
SAR(2)	-0,317303	0,0776323	-4,08726	0,000078
SMA(1)	1,77189	0,0467488	37,9022	0,000000
SMA(2)	-0,815343	0,0433013	-18,8295	0,000000

Source: Authors calculations

Figure 4.2: Time Sequence Plot for TuOlive exports



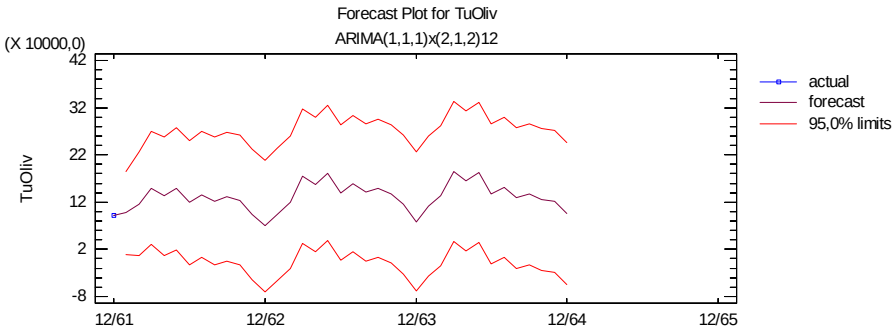
Source: Authors calculations

Forecasting future trends for TuOliv:

ARIMA models are developed basically to forecast the corresponding variable. There are two kinds of forecasts: sample period forecasts and post-sample period forecasts. The former are used to develop confidence in the model and the latter to generate genuine forecasts for use in planning and other purposes. The ARIMA model can be used to yield both these kinds of forecasts.

The sample period forecasts are obtained simply by plugging the actual values of the explanatory variables in the estimated equation. The following figure reports the forecasted values of TuOliv exports and 95% confidence limit.

Figure 4.3 Forecasted TuOliv exports for 36 periods (months)



Source: Authors calculations

Conclusions:

From the forecast available data by using the developed model, it can be seen that forecasted exports of TuOliv are following a positive trends for the next three forecasted years. At the end of the third year Olive Oil exports will have been increased by 16%. This is revealing a dynamic sector and an important export product for Tunisia. Olive Oil and its Fractions can be a promising product for the future sustainable development of agricultural exports for Morocco.

Forecasting TurOliv – Olive Oil exports for Turkey:

In order to construct the model a multiplicative method for seasonal adjustment have been used resulting to the selected forecasting model: ARIMA(2,1,1)x(1,0,2)12.

The data cover 144 time periods. Currently, an autoregressive integrated moving average (ARIMA) model has been selected. This model assumes that the best forecast for future data is given by a parametric model relating the most recent data value to previous data values and previous noise. Each value of TurOliv has been adjusted in the following way before the model was fit:

(1) Simple differences of order 1 were taken.

(2) Seasonal differences of order 1 were taken.

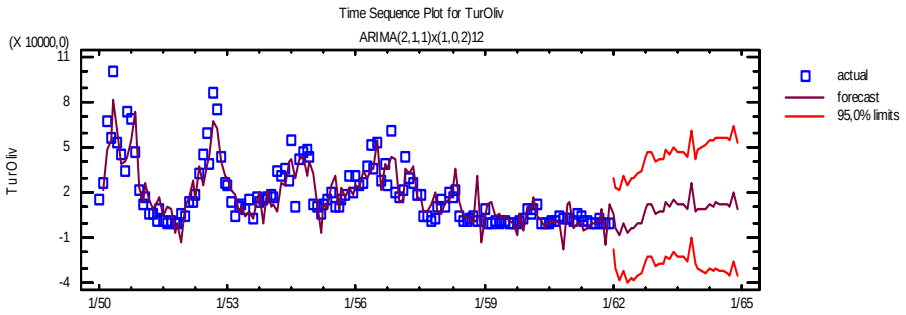
Model parameters were estimated using the STATGRAPHICS package. Results of estimation are reported in the following table.

Table 4.2: ARIMA Model Summary for TurOliv

Parameter	*Estimate*	*Stnd. Error*	*t*	*P-value*
AR(1)	0,537042	0,0871695	6,1609	0,000000
AR(2)	0,24889	0,0870866	2,85796	0,004930
MA(1)	0,998772	0,000697151	1432,65	0,000000
SAR(1)	0,586756	0,0710764	8,25528	0,000000
SMA(1)	0,666521	0,0545654	12,2151	0,000000
SMA(2)	-0,839523	0,0334132	-25,1255	0,000000

Source: Authors calculations

Figure 4.4: Time Sequence Plot for TurOliv exports



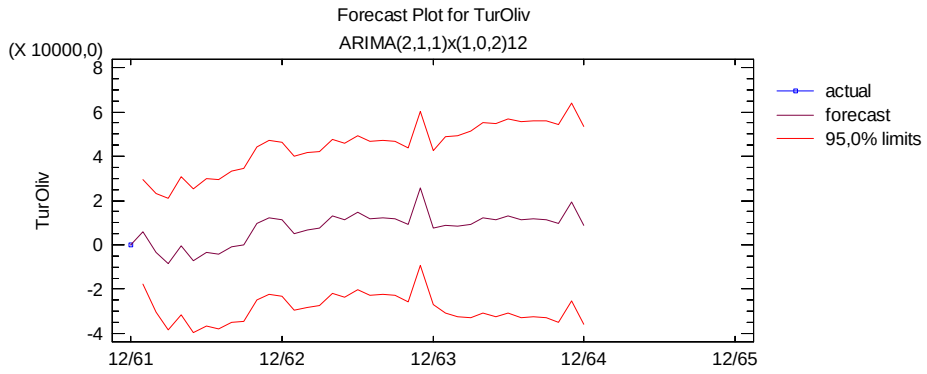
Source: Authors calculations

Forecasting future trends for TurOliv:

ARIMA models are developed basically to forecast the corresponding variable. There are two kinds of forecasts: sample period forecasts and post-sample period forecasts. The former are used to develop confidence in the model and the latter to generate genuine forecasts for use in planning and other purposes. The ARIMA model can be used to yield both these kinds of forecasts.

The sample period forecasts are obtained simply by plugging the actual values of the explanatory variables in the estimated equation. The following figure reports the forecasted values of TurOliv exports and 95% confidence limit.

Figure 4.5 Forecasted SyOliv exports for 36 periods (months)



Source: Authors calculations

Conclusions:

Forecasting analysis of the future trends for Turkey's exports of olive oil to EU27 proves a strong tendency for increasing export volumes. This is expected as new trees entering the production and also because plantations of the past are becoming mature and ready to harvest. Moreover, an increase in yield is noticed and this is because of the use of new and innovative technologies. As a result, exports of olive oil according to the forecasted results will be increased by 10% over the period of the three years.

Forecasting SyOliv – Olive Oil exports for Syria:

In order to construct the model a multiplicative method for seasonal adjustment have been used resulting to the selected forecasting model: ARIMA(0,0,2)x(2,0,2)12 with constant.

The data cover 144 time periods. Currently, an autoregressive integrated moving average (ARIMA) model has been selected. This model assumes that the best forecast for future data is given by a parametric model relating the most recent data value to previous data values and previous noise. Each value of SyOliv has been adjusted in the following way before the model was fit:

(1) Simple differences of order 1 were taken.

(2) Seasonal differences of order 1 were taken.

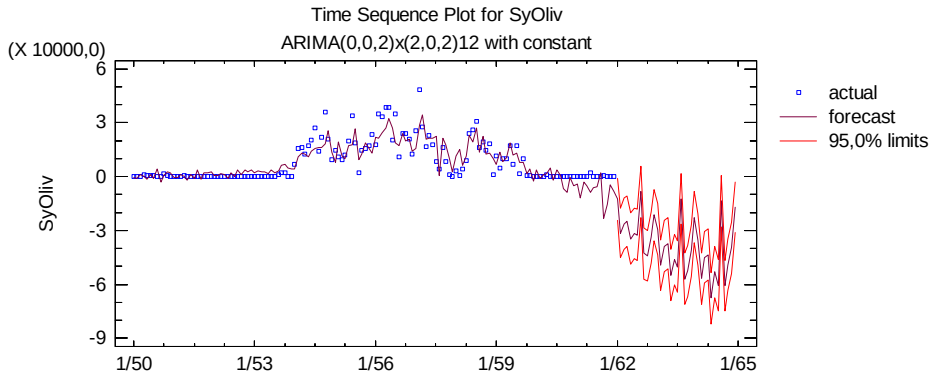
Model parameters were estimated using the STATGRAPHICS package. Results of estimation are reported in the following table.

Table 4.3: ARIMA Model Summary for SyOliv

Parameter	*Estimate*	*Stnd. Error*	*t*	*P-value*
MA(1)	-0,607315	0,0854001	-7,11141	0,000000
MA(2)	-0,307875	0,0843562	-3,6497	0,000373
SAR(1)	2,14415	0,0213196	100,572	0,000000
SAR(2)	-1,41017	0,0213335	-66,1009	0,000000
SMA(1)	2,1485	0,0181126	118,619	0,000000
SMA(2)	-1,39227	0,0195625	-71,1705	0,000000
Mean	4694,37	1265,33	3,70998	0,000301
Constant	1248,78			

Source: Authors calculations

Figure 4.6: Time Sequence Plot for SyOliv exports



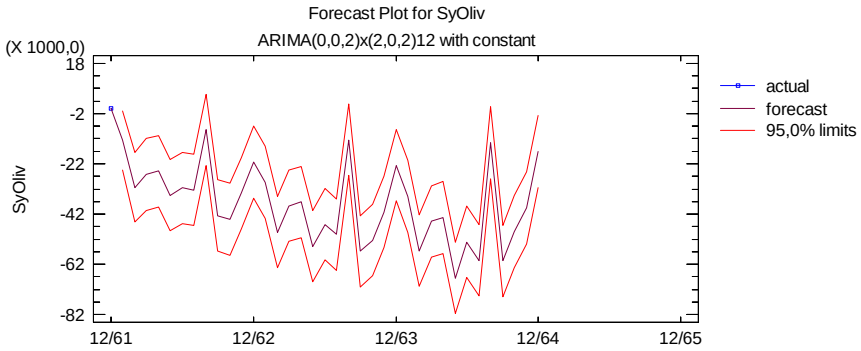
Source: Authors calculations

Forecasting future trends for SyOliv:

ARIMA models are developed basically to forecast the corresponding variable. There are two kinds of forecasts: sample period forecasts and post-sample period forecasts. The former are used to develop confidence in the model and the latter to generate genuine forecasts for use in planning and other purposes. The ARIMA model can be used to yield both these kinds of forecasts.

The sample period forecasts are obtained simply by plugging the actual values of the explanatory variables in the estimated equation. The following figure reports the forecasted values of SyOliv exports and 95% confidence limit.

Figure 4.7 Forecasted SyOliv exports for 36 periods (months)



Source: Authors calculations

Conclusions:

The results show a decline in Syria's exports for the next three years. Future, research should consider the reasons for this decline and also input more explanatory and predictor variables into the model. Taken into consideration only the flow of exports (time series) in order to develop the model, we exclude other variables and factors that might influence the trade trends. This limitation is known and has been consider by the authors. But as it is aforementioned, this study mainly focus on predicting future tendencies in order to inform other tasks in the work package 3 of SUSTAINMED.

Chapter 5.

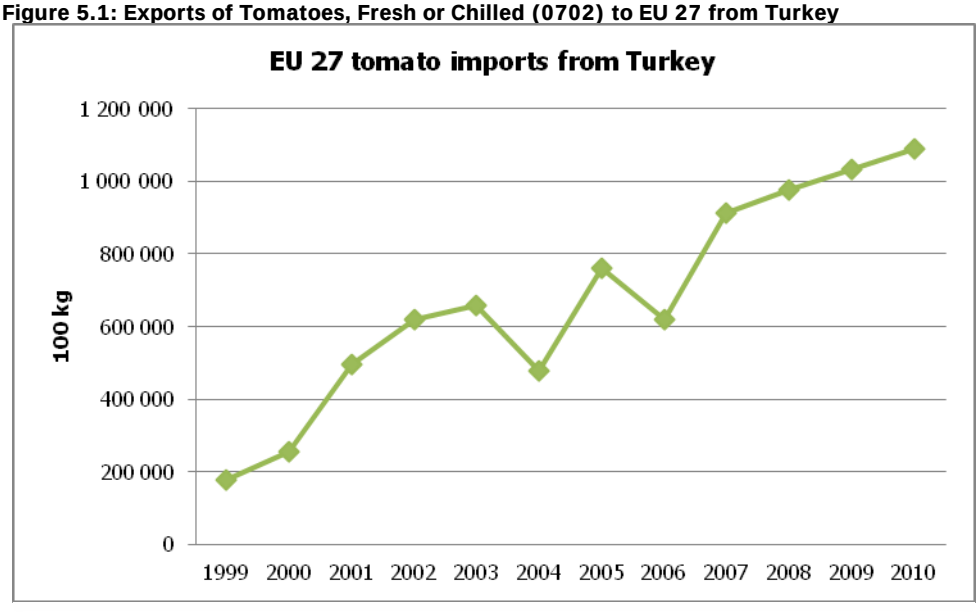
Forecasting future trends in trade for Tomatoes, Fresh or Chilled (0702)

Tomato production in Turkey has several advantages thanks to very suitable ecological conditions, a strong domestic consumption of fresh vegetables and a young rapidly growing population. But the country has some important problems too, such as structural matters faced in production, inadequate organization, little compliance of the cultivation methods to the rules of good agriculture practices (GAP), the complexity of marketing channels for vegetable and high post-harvest production losses. All these aspects result into low incomes of producers and low foreign trade shares.

Wholesalers have an important role in the marketing of fresh vegetables and fruits. Processed amounts in industry vary from year to year and have been around 2 million ton (15-20% of total production) recently. Export, though, is rather low: only a quarter million ton. Taking into account the rather big losses occurring between the stage of production and the consumer (approximately 20-40% of production does not reach the consumer), an estimated 4-6 million ton fresh tomato has been available at the domestic market in the last 10 years. Sales in domestic market are mostly performed by wholesalers and persons called trader-wholesaler. The domestic trade in vegetables is characterised by the (long) length of the marketing channel, the highly perishable nature of vegetables, being a product ready to eat, and the inefficiency of producer unions to act as a marketing organization.

Turkey is the fourth biggest exporting country in the world, after Spain, Mexico and Netherlands, accounting for approximately 400.000 ton in 2008. The country's tomato exports to the EU 27 is 1.008 tons. This value increased regularly from 1999 onwards.

Figure 5.1: Exports of Tomatoes, Fresh or Chilled (0702) to EU 27 from Turkey



Source: EU27 Trade Since 1988 By HS2-HS4 [DS-016894] – 2010

Forecasting TuTom – Tomatoes, Fresh or Chilled exports for Turkey:

In order to construct the model a multiplicative method for seasonal adjustment have been used resulting to the selected forecasting model: ARIMA(0,0,1)x(1,0,2)12 with constant. Moreover, the data was transformed with the mathematical adjustment method Box-Cox with power = 0,270274 and addend = 0,0

The data covered 144 time periods. Currently, an autoregressive integrated moving average (ARIMA) model has been selected. This model assumes that the best forecast for future data is given by a parametric model relating the most recent data value to previous data values and previous noise. Each value of SyOliv has been adjusted in the following way before the model was fit:

(1) Simple differences of order 1 were taken.

(2) Seasonal differences of order 1 were taken.

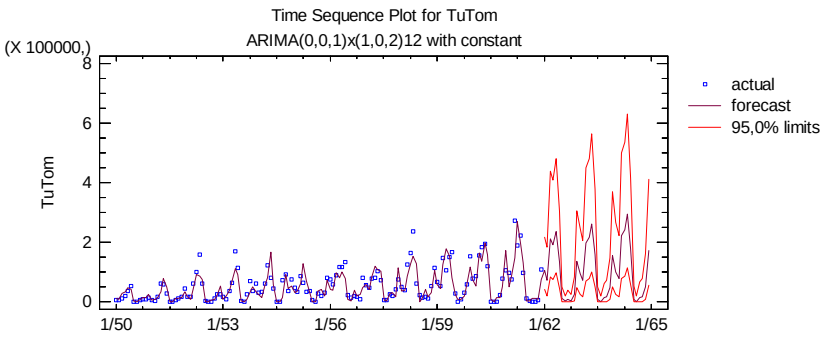
Model parameters were estimated using the STATGRAPHICS package. Results of estimation are reported in the following table.

Table 5.1: ARIMA Model Summary for TuTom

MA(1)	-0,644455	0,0908553	-7,09321	0,000000
SAR(1)	-0,213688	0,088341	-2,4189	0,016871
SMA(1)	1,04342	0,0146974	70,9938	0,000000
SMA(2)	0,549416	0,0925876	5,93401	0,000000
Mean	0,276143	0,0928512	2,97404	0,003470
Constant	-1806,2			

Source: Authors calculations

Figure 5.2: Time Sequence Plot for TuTom exports



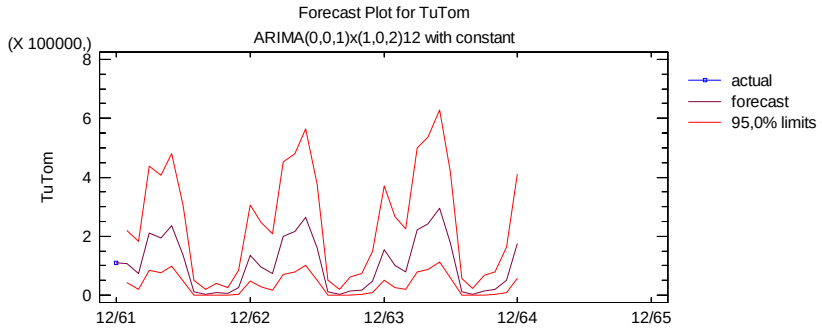
Source: Authors calculations

Forecasting future trends for TuTom:

ARIMA models are developed basically to forecast the corresponding variable. There are two kinds of forecasts: sample period forecasts and post-sample period forecasts. The former are used to develop confidence in the model and the latter to generate genuine forecasts for use in planning and other purposes. The ARIMA model can be used to yield both these kinds of forecasts.

The sample period forecasts are obtained simply by plugging the actual values of the explanatory variables in the estimated equation. The following figure reports the forecasted values of TuTom exports and 95% confidence limit.

Figure 5.3: Forecasted SyOliv exports for 36 periods (months)



Source: Authors calculations

Conclusions:

The results show that exports of Tomatoes, Fresh or chilled for Turkey will follow the same trends and proportion for the next three years with a slightly increase by the end of year three. The model fits well to the data and can give satisfactory forecasted results.

ARIMA(0,0,1)x(1,0,2)12 with constant

The P-value for the MA(1) term is less than 0,05, so it is significantly different from 0. The P-value for the SAR(1) term is less than 0,05, so it is significantly different from 0. The P-value for the SMA(2) term is less than 0,05, so it is significantly different from 0. The P-value for the constant term is less than 0,05, so it is significantly different from 0. The estimated standard deviation of the input white noise equals 15.014,6.

Tomato exports of Turkey is highly seasonal and generally takes place between February and June. Over the year export reaches the lowest level in July when production in open field is bottoms out.

Exports are low between July and November and show an increasing tendency in the months onwards to reach the highest level between May-June.

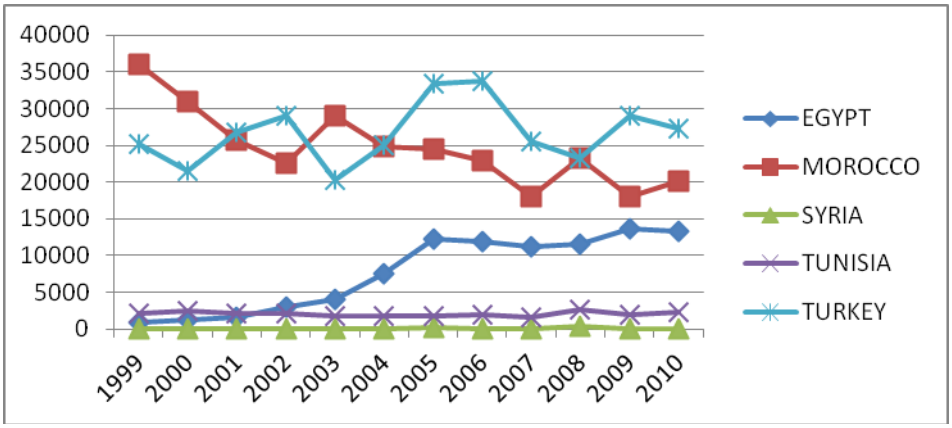
Chapter 6.

Forecasting future trends in Citrus Fruits, Fresh or Dried (0805)

Citrus fruits are the first fruit crop in international trade in terms of value. There are two clearly differentiated markets in the citrus sector: fresh citrus fruits market, with a predominance of oranges, and processed citrus products market, mainly orange juice. A major development over the last two decades of the was the growth in trade in small citrus fruits, which include tangerines, clementines, mandarines and satsumas, at the expense of fresh oranges. This is due to the evolution of consumer preferences. Consumption of citrus fruit juices has also increased, thanks to preferences for convenience and healthy products, improvements in quality, competitive prices, promotional activity and technological advances in processing, storage and packaging. This increase boosted citrus juice production and international juice trade.

The following graph presents the trends in exports of Citrus Fruit, Fresh or Dried to EU 27 by the MPCs. In 1999 the main exporter of citrus fruits was Morocco which in the last few years is facing a serious reduction in the volume of exports but still remains in the second place after. Turkey's exports to EU 27 are characterised by a fluctuation over the last ten years sharing the top with Morocco. The country with the most important increase in the volumes of exports is Egypt which since 1999 has increase its total exports to EU 27 by 7,37%. The export volumes for Tunisia and Syria remained stable for the last ten years without any important fluctuations.

Figure 6.1: Exports of Citrus Fruit, Fresh or Dried to EU 27 by the MPCs



Source: EU27 Trade Since 1988 By HS2-HS4 [DS-016894] – 2010

The relations between the EU and Turkey is considerably significant for the citrus trade in Turkey. Looking to the export counts of the bigger exporters we can see that not only Europe is a final destination but also the Middle East and the rest of Asia. About 30% if the total fresh produce export

of Turkey is citrus. Turkey's fresh fruit export ratio over production is five percent, while the ratio for the citrus fruit is 20%. This depicts how important the economic value of citrus fruit exportation is, from the view point of foreign money input to Turkey.

The volume of fresh fruit exports amounted to 1,3 million tons in 2010. Citrus led the list with a significant share of 69,9 %. Lemon ranks first in total citrus fruit exports with 286.213 tons. Turkish lemons are available throughout the year due to natural and modern cold storage facilities. Major export varieties are Interdonato and Lamas. The export figures for the other varieties are as follows; soft citrus (252.489 tons), orange (165.739 tons) and grapefruit (126.065 tons).

80% of Turkey's citrus fruit is grown on the Mediterranean Coast and takes an important place in the country's fresh fruit and vegetable exportation. Turkey's citrus orchards dwell on approximately 70.000 hectares and the main production areas are Mersin, Adana and Hatay which are in the region of Cukurova.

Morocco's citrus exports for the 2010 season are 2 million tons, increased by 11% compared to exports in the 2009 season.

Exports of small citrus fruits in 2009/2010 totaled at 322,393 MT, an increase of 10 percent over exports in the previous year. This was mostly due to a 13 percent increase in Clementine exports, which offset the decline in exports of other small citrus fruits.

The European Union (EU) was the lead destination for Morocco's citrus exports in 2009/10, replacing Russia as the top market. Citrus exports to the EU countries rose 10 percent, with the Netherlands, the UK and France, respectively, representing top destinations. Problems with Spain's citrus crop in 2010r have provided an opportunity for Morocco to increase its exports to EU countries.

Moroccan citrus industry is under continuous changes, imposed by the high competition in the foreign markets and the increasing demand and requirements of the consumer for quality produce. Some of these changes concern variety profile and the implementation of new techniques and technologies in order to reduce production cost, increase yield and improve fruit quality.

Export volumes for Egyptian Citrus Fruit to EU 27 have more than doubled during the past five years. More precisely since 2004 exports have increased by 75,6%. In 2010 Egypt exported 1,3 million tons of citrus fruits.

The main varieties of citrus grown in Egypt are navel orange (34,5%), mandarin (26,8%), Valencia orange (14,9%), limes (10,7%), Balady orange (8,6%), Succari orange (2,9%) and other citrus (1,6%0.

Major importing countries of Egyptian citrus fruits are S. Arabia (39%), Russia (16%), EU 27 (15%), Ukraine (12%), Iran (8%) Sudan (4%) and other countries (6%).

Forecasting EgyCi – Citrus Fruit, Fresh or Dried exports for Egypt:

In order to construct the model a multiplicative method for seasonal adjustment have been used resulting to the selected forecasting model: ARIMA(1,1,1)x(2,0,1)12.

The data covered 144 time periods. Currently, an autoregressive integrated moving average (ARIMA) model has been selected. This model assumes that the best forecast for future data is given by a parametric model relating the most recent data value to previous data values and previous noise. Each value of MorCi has been adjusted in the following way before the model was fit:

(1) Simple differences of order 1 were taken.

Model parameters were estimated using the STATGRAPHICS package. Results of estimation are reported in the following table.

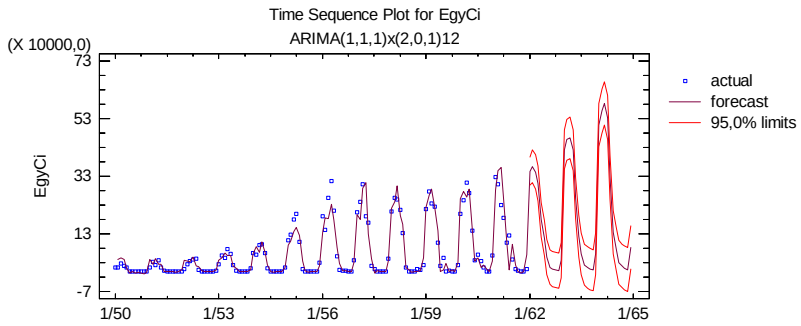
Table 6.1: ARIMA Model Summary for EgyCi

Parameter	*Estimate*	*Stnd. Error*	*t*	*P-value*
AR(1)	0,596378	0,0726069	8,2138	0,000000
MA(1)	0,999213	0,00180401	553,885	0,000000
SAR(1)	1,7779	0,0408549	43,5175	0,000000
SAR(2)	-0,702778	0,0566426	-12,4072	0,000000
SMA(1)	1,15935	0,0396239	29,2589	0,000000

Source: Authors calculations

The P-value for the AR(1) term is less than 0,05, so it is significantly different from 0. The P-value for the MA(1) term is less than 0,05, so it is significantly different from 0. The P-value for the SAR(2) term is less than 0,05, so it is significantly different from 0. The P-value for the SMA(1) term is less than 0,05, so it is significantly different from 0. The estimated standard deviation of the input white noise equals 24612,6.

Figure 6.2: Time Sequence Plot for EgyCi exports



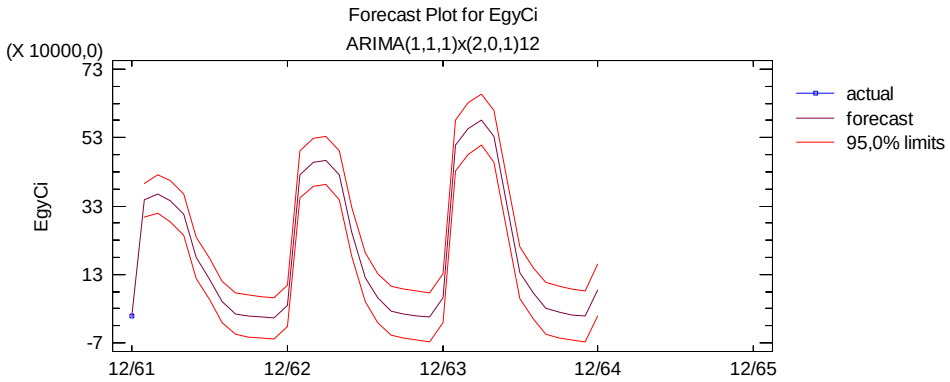
Source: Authors calculations

Forecasting future trends for EgyCi:

ARIMA models are developed basically to forecast the corresponding variable. There are two kinds of forecasts: sample period forecasts and post-sample period forecasts. The former are used to develop confidence in the model and the latter to generate genuine forecasts for use in planning and other purposes. The ARIMA model can be used to yield both these kinds of forecasts.

The sample period forecasts are obtained simply by plugging the actual values of the explanatory variables in the estimated equation. The following figure reports the forecasted values of EgyCi exports and 95% confidence limit.

Figure 6.3: Forecasted EgyCi exports for 36 periods (months)



Source: Authors calculations

Forecasting MorCi – Citrus Fruit, Fresh or Dried exports for Morocco:

In order to construct the model a multiplicative method for seasonal adjustment have been used resulting to the selected forecasting model: ARIMA(0,0,2)x(0,1,1)12 with constant.

The data covered 144 time periods. Currently, an autoregressive integrated moving average (ARIMA) model has been selected. This model assumes that the best forecast for future data is given by a parametric model relating the most recent data value to previous data values and previous noise. Each value of MorCi has been adjusted in the following way before the model was fit:

(1) Simple differences of order 1 were taken.

Model parameters were estimated using the STATGRAPHICS package. Results of estimation are reported in the following table.

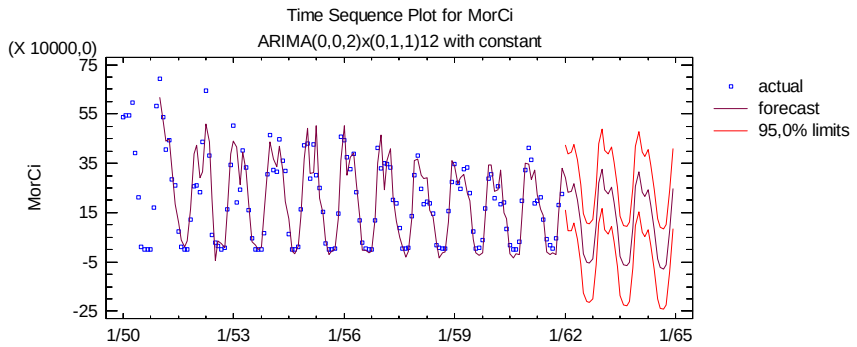
Table 6.2: ARIMA Model Summary for MorCi

Parameter	*Estimate*	*Stnd. Error*	*t*	*P-value*
MA(1)	-0,634435	0,0896483	-7,07694	0,000000
MA(2)	-0,253303	0,0888531	-2,85081	0,005085
SMA(1)	0,856858	0,0350141	24,4718	0,000000
Mean	-11281,1	3626,14	-3,11105	0,002299
Constant	-11281,1			

Source: Authors calculations

The P-value for the MA(2) term is less than 0,05, so it is significantly different from 0. The P-value for the SMA(1) term is less than 0,05, so it is significantly different from 0. The P-value for the constant term is less than 0,05, so it is significantly different from 0. The estimated standard deviation of the input white noise equals 66710,7.

Figure 6.4: Time Sequence Plot for MorCi exports



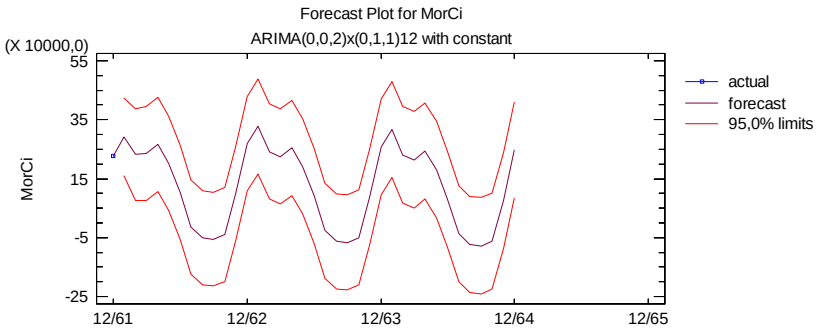
Source: Authors calculations

Forecasting future trends for MorCi:

ARIMA models are developed basically to forecast the corresponding variable. There are two kinds of forecasts: sample period forecasts and post-sample period forecasts. The former are used to develop confidence in the model and the latter to generate genuine forecasts for use in planning and other purposes. The ARIMA model can be used to yield both these kinds of forecasts.

The sample period forecasts are obtained simply by plugging the actual values of the explanatory variables in the estimated equation. The following figure reports the forecasted values of MorCi exports and 95% confidence limit.

Figure 6.5: Forecasted MorCi exports for 36 periods (months)



Source: Authors calculations

Forecasting TurCi – Citrus Fruit, Fresh or Dried exports for Morocco:

In order to construct the model a multiplicative method for seasonal adjustment have been used resulting to the selected forecasting model: ARIMA(1,0,0)x(0,1,1)12.

The data covered 144 time periods. Currently, an autoregressive integrated moving average (ARIMA) model has been selected. This model assumes that the best forecast for future data is given by a parametric model relating the most recent data value to previous data values and previous noise. Each value of TurCi has been adjusted in the following way before the model was fit:

(1) Simple differences of order 1 were taken.

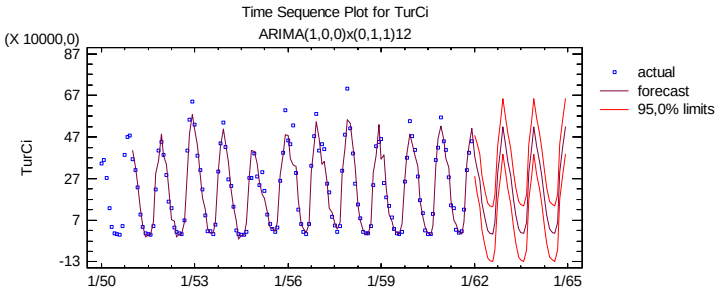
Table 6.3: ARIMA Model Summary for TurCi

Parameter	*Estimate*	*Stnd. Error*	*t*	*P-value*
AR(1)	0,663309	0,0680207	9,75157	0,000000
SMA(1)	0,905261	0,0294108	30,7799	0,000000

Source: Authors calculations

The P-value for the AR(1) term is less than 0,05, so it is significantly different from 0. The P-value for the SMA(1) term is less than 0,05, so it is significantly different from 0. The estimated standard deviation of the input white noise equals 50086,9.

Figure 6.6: Time Sequence Plot for TurCi exports



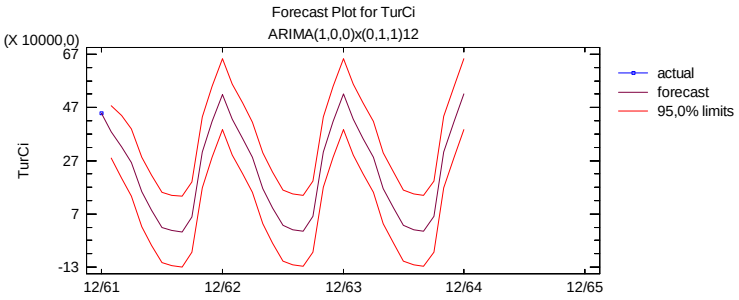
Source: Authors calculations

Forecasting future trends for TurCi:

ARIMA models are developed basically to forecast the corresponding variable. There are two kinds of forecasts: sample period forecasts and post-sample period forecasts. The former are used to develop confidence in the model and the latter to generate genuine forecasts for use in planning and other purposes. The ARIMA model can be used to yield both these kinds of forecasts.

The sample period forecasts are obtained simply by plugging the actual values of the explanatory variables in the estimated equation. The following figure reports the forecasted values of TurCi exports and 95% confidence limit.

Figure 6.7: Forecasted TurCi exports for 36 periods (months)



Source: Authors calculations

Conclusions:

All three models are fitting well to the data and have given us validate estimations for the future trends of Citrus Fruti, Fresh or Dried exports. From the forecasted exports we conclude that exports have the tendency to follow the same trends and the same seasonal patterns like the past. Trade

volumes in the future will remain at the same levels with a slight increase after the second forecasted year. This is a proof of how important the Citrus fruit sector is for all the Mediterranean region.

In the case of Egypt, an average increase of 20% per year will lead to a final increase of 60% compared to the production of 2010. This is in compliance with the forecasted results of Soliman (2010) where he predicted a sharply increase to the forecasted exports of Fruit and Vegetables for Egypt for a ten year period.

Morocco's exports seem to decrease by an annual average of 5% reaching a final decrease in total exports about 13% at the end of year three. Even though the model is not using the last two seasons for its estimation (export data for 2009 and 2010) as it keeps these for the validation of the estimated model forecasted exports are following negative trend but with small changes in the exported volumes.

As far as it concerns Turkey's exports to EU 27 forecasted volumes are predicting a slight increase for the next three years. This refers to an annual increase 0f 2, 7% reaching at the end of the third year a total 5,5% compared to the export volume of 2010.

Chapter 7.

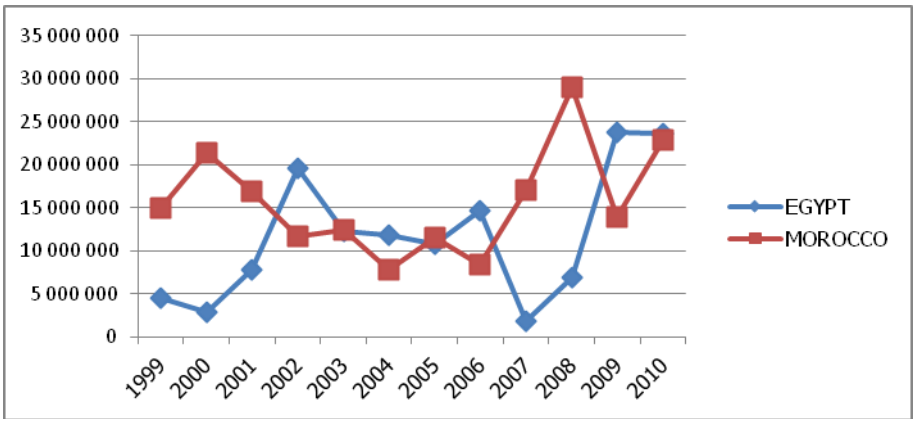
Forecasting future trends in Wheat and Meslin (1001)

Egypt's Wheat production accounted for 8.523.000 MT in 2009 (FAO Commodities by country). The same year imports from EU reached 23. 623 MT. Egypt is the largest importer of wheat in the world over the last decade (Soliman, et al., 2003).

Morocco's total cereal production in 2009/10 to reach a record level of 10.2 million tons, compared with an average of 6 million in the past decade (FAO Commodities by country). Morocco's grain harvest swings sharply due to cyclical droughts, with cereals crops have varied from around 2 million tons to 9.6 million tons in the past 50 years, according to official figures.

The following figure is showing the trends in imports from EU 27 for Morocco and Egypt. As it can be noticed, imports for both countries during the last 4 years have increased significantly. It should also be noticed that both countries are net importers of Wheat and Meslin (1001).

Figure 7.1. EU 27 exports of Wheat and meslin to Egypt and Morocco



Source: EU27 Trade Since 1988 By HS2-HS4 [DS-016894] – 2010

Forecasting EgyWh – Wheat and Meslin imports from EU 27 for Egypt:

In order to construct the model a multiplicative method for seasonal adjustment have been used resulting to the selected forecasting model: ARIMA(1,0,0)x(1,0,2)12 with constant.

The data cover 149 time periods. Currently, an autoregressive integrated moving average (ARIMA) model has been selected. This model assumes that the best forecast for future data is given by a parametric model relating the most recent data value to previous data values and previous noise. Each value of EgyWh has been adjusted in the following way before the model was fit.

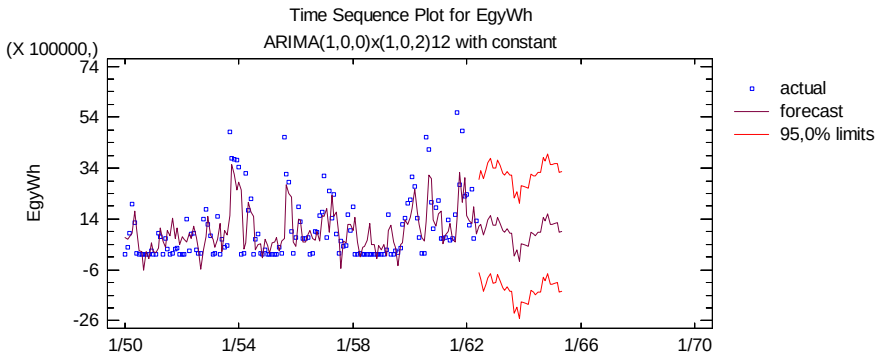
Table 7.1: ARIMA Model Summary for EgyWh

Parameter	*Estimate*	*Stnd. Error*	*t*	*P-value*
AR(1)	0,583417	0,0713252	8,17968	0,000000
SAR(1)	-0,655399	0,157658	-4,15708	0,000055
SMA(1)	-0,780761	0,180249	-4,33157	0,000028
SMA(2)	0,174885	0,124001	1,41035	0,160593
Mean	879532,	181842,	4,8368	0,000003
Constant	606534,			

Source: Authors calculations

The P-value for the AR(1) term is less than 0,05, so it is significantly different from 0. The P-value for the SAR(1) term is less than 0,05, so it is significantly different from 0. The P-value for the constant term is less than 0,05, so it is significantly different from 0. The estimated standard deviation of the input white noise equals 928887.

Figure 7.2: Time Sequence Plot for EgyWh exports



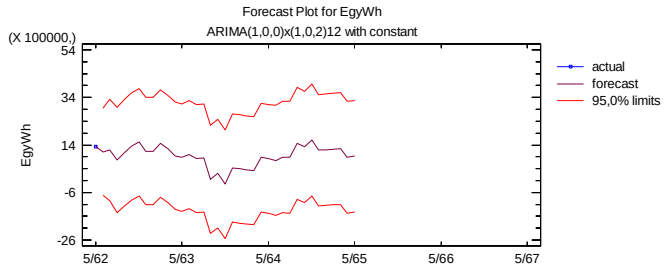
Source: Authors calculations

Forecasting future trends for EgyWh:

ARIMA models are developed basically to forecast the corresponding variable. There are two kinds of forecasts: sample period forecasts and post-sample period forecasts. The former are used to develop confidence in the model and the latter to generate genuine forecasts for use in planning and other purposes. The ARIMA model can be used to yield both these kinds of forecasts.

The sample period forecasts are obtained simply by plugging the actual values of the explanatory variables in the estimated equation. The following figure reports the forecasted values of EgyWh exports and 95% confidence limit.

Figure 7.3: Forecasted EgyWh exports for 36 periods (months)



Source: Authors calculations

Forecasting MorWh – Wheat and Meslin imports from EU 27 for Morocco:

In order to construct the model a multiplicative method for seasonal adjustment have been used resulting to the selected forecasting model: ARIMA(1,0,0)x(2,0,1)12 with constant.

The data cover 149 time periods. Currently, an autoregressive integrated moving average (ARIMA) model has been selected. This model assumes that the best forecast for future data is given by a parametric model relating the most recent data value to previous data values and previous noise. Each value of MorWh has been adjusted in the following way before the model was fit.

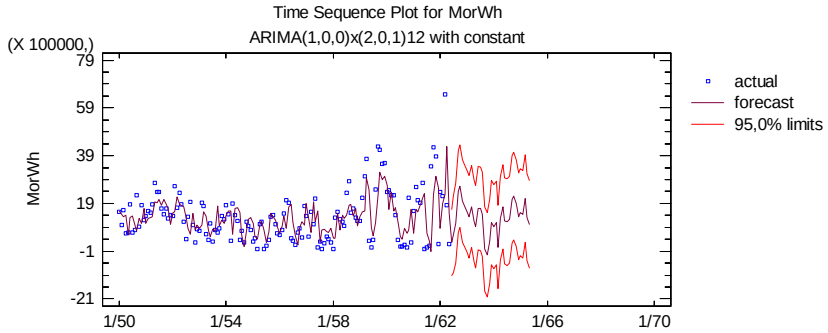
Table 7.2: ARIMA Model Summary for EgyWh

Parameter	*Estimate*	*Stnd. Error*	*t*	*P-value*
AR(1)	0,59835	0,0704711	8,49071	0,000000
SAR(1)	-0,735733	0,0971583	-7,57252	0,000000
SAR(2)	-0,167407	0,101581	-1,64801	0,101530
SMA(1)	-0,914325	0,0407978	-22,4112	0,000000
Mean	1,29626E6	149878,	8,64873	0,000000
Constant	990855,			

Source: Authors calculations

The P-value for the AR(1) term is less than 0,05, so it is significantly different from 0. The P-value for the SMA(1) term is less than 0,05, so it is significantly different from 0. The P-value for the constant term is less than 0,05, so it is significantly different from 0. The estimated standard deviation of the input white noise equals 699372.

Figure 7.4: Time Sequence Plot for EgyWh exports



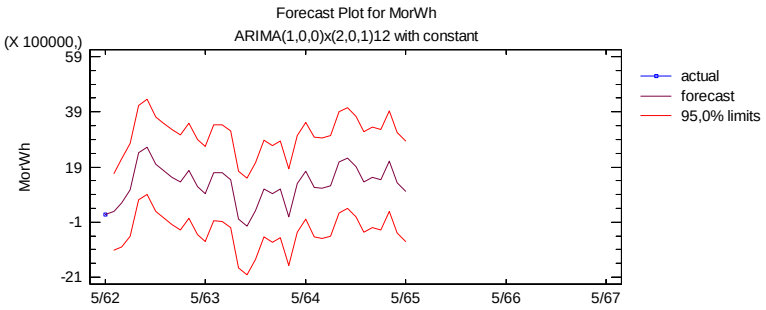
Source: Authors calculations

Forecasting future trends for MorWh:

ARIMA models are developed basically to forecast the corresponding variable. There are two kinds of forecasts: sample period forecasts and post-sample period forecasts. The former are used to develop confidence in the model and the latter to generate genuine forecasts for use in planning and other purposes. The ARIMA model can be used to yield both these kinds of forecasts.

The sample period forecasts are obtained simply by plugging the actual values of the explanatory variables in the estimated equation. The following figure reports the forecasted values of MorWh exports and 95% confidence limit.

Figure 7.5: Forecasted MorWh exports for 36 periods (months)



Source: Authors calculations

Conclusions:

From the forecasted table we can conclude that imports from EU 27 for Morocco will keep the same trend as the past values and will be increased in an average of 22% per with a final increase of 0,05%. This is due to the decrease of the last period of forecast where import values are decreased because of seasonality by 54%.

In the case of Egypt the trend is reversed where imports of Wheat and Meslin (1001) from the EU 27 are decreasing. According to the forecasted results, the total reduction between the actual and the forecasted value for Egypt is 11, 8%.

Conclusions

ARIMA model offers a good technique for predicting the magnitude of any variable. Its strength lies in the fact that the method is suitable for any time series with any pattern of change and it does not require the forecaster to choose a priori the value of any parameter. Its limitations include its requirement of a long time series. Often it is called a "Black Box" model. Like any other method, this technique also does not guarantee perfect forecasts. Nevertheless, it can be successfully used for forecasting long time series data and provide us with the required information for the future trade trends in MPCs.

The analysis of the comparative advantage with the use of the RCA index revealed the most important categories of exported products for each MPC. This was a useful guide for the decision of which categories of agricultural products should the ARIMA methodology forecast for each country.

Data for each MP country was collected for selected products in relation to their importance in the balance of trade. As a result of this, citrus were concerned as a major exporting product for Morocco, Tunisia, Egypt, Syria and Turkey. Olive oil (1509) data was collected for Tunisia, Syria and Turkey, tomatoes data (0702) was collected for Turkey, and wheat (1001) for Egypt and Morocco. These products are presented in detail in the following table.

Table 3.1: Selected categories of agricultural products according to the Harmonised classification (HS2 - HS4)

Morocco	**0805.** Citrus Fruit, fresh or dried	**1001.** Wheat	
Tunisia	**0805.** Citrus Fruit, fresh or dried	**1509.** Olive Oil and its Fractions, not Chemically Modified	
Egypt	**0805.** Citrus Fruit, fresh or dried	**1001.** Wheat	
Syria	**0805.** Citrus Fruit, fresh or dried	**1509**. Olive Oil and its Fractions, not Chemically Modified	
Turkey	**0805.** Citrus Fruit, fresh or dried	**1509.** Olive Oil and its Fractions, not Chemically Modified	**0702.** Tomatoes, Fresh or Chilled

Source: Eurostat - 2010

Forecasted exports of Tunisian olive oil are predicted to follow a positive trend for the next three years. At the end of the third year Olive Oil exports will have been increased by 16%. This is revealing a dynamic sector and an important export product for Tunisia. Olive Oil and its Fractions can be a promising product for the future sustainable development of agricultural exports for Morocco.

Forecasting analysis of the future trends for Turkey's exports of olive oil to EU27 proves a strong tendency for increasing export volumes. This is expected as new trees entering the production and also because plantations of the past are becoming mature and ready to harvest. Moreover, an increase in yield is noticed and this is because of the use of new and innovative technologies. As a

result, exports of olive oil according to the forecasted results will be increased by 10% over the period of the three years.

The results of the analysis show a decline in Syria's olive oil exports for the next three years. Future, research should consider the reasons for this decline and also input more explanatory and predictor variables into the model. Taken into consideration only the flow of exports (time series) in order to develop the model, we exclude other variables and factors that might influence the trade trends. This limitation is known and has been considered by the authors. But as it is aforementioned, this study mainly focus on predicting future tendencies in order to inform other tasks in the work package 3 of SUSTAINMED.

Tomato exports of Turkey are highly seasonal and generally take place between February and June. Over the year export reaches the lowest level in July when production in open field is bottoms out. Exports are low between July and November and show an increasing tendency in the months onwards to reach the highest level between May-June. The model used for the forecasted results fits well to the data and reveals the same trends and proportions of exports for the next three years with a slightly increase by the end of year three.

In the case of citrus exports all three models are fitting well to the data and have given us validate estimations for the future trends of Citrus Fruti, Fresh or Dried exports. From the forecasted exports we conclude that exports have the tendency to follow the same trends and the same seasonal patterns like the past. Trade volumes in the future will remain at the same levels with a slight increase after the second forecasted year. This is a proof of how important the Citrus fruit sector is for the entire Mediterranean region.

In the case of Egypt, an average increase of 20% per year will lead to a final increase of 60% compared to the production of 2010. This is in compliance with the forecasted results of Soliman (2010) where he predicted a sharply increase to the forecasted exports of Fruit and Vegetables for Egypt for a ten year period.

Morocco's exports seem to decrease by an annual average of 5% reaching a final decrease in total exports about 13% at the end of year three. Even though the model is not using the last two seasons for its estimation (export data for 2009 and 2010) as it keeps these for the validation of the estimated model forecasted exports are following negative trend but with small changes in the exported volumes.

As far as it concerns Turkey's exports to EU 27 forecasted volumes are predicting a slight increase for the next three years. This refers to an annual increase 0f 2, 7% reaching at the end of the third year a total 5,5% compared to the export volume of 2010.

Finally, as far as it concerns forecasted values for wheat we can conclude that imports from EU 27 for Morocco will keep the same trend as the past values and will be increased in an average of 22% per

year with a final increase of 0,05%. This is due to the decrease of the last period of forecast where import values are decreased because of seasonality by 54%.

In the case of Egypt the trend is reversed where imports of Wheat and Meslin (1001) from the EU 27 are decreasing. According to the forecasted results, the total reduction between the actual and the forecasted value for Egypt is 11, 8%.

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Databases:

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ABBREVIATIONS

ARIMA: **Autoregressive Integrated moving Average**

ADF: **Augmented Dickey-Fuller**

AR: **Autoregressive**

CEP: **Comparative Export Performance**

CIHEAM: **Centre for Advanced Mediterranean Agronomic Studies**

DW: **Durbin-Watson Statistic**

EU: **European Union**

MA: **Moving Average**

MPC: **Mediterranean Partner Countries**

RCA: **Revealed Comparative Advantage**

Chapter 1.
The Current Situation of the Agricultural Sector in Turkey

Table 1.1 presents main macro indicators regarding agricultural sector in Turkey. There has been a decrease in the share of agricultural sector in overall GDP from %14.8 to %8.5 over the period of 1995-2007. A similar trend is observed in the share of economically active agricultural population as well (from %46.6 to %35) however agricultural sector is still quite important in absorbing the unemployed people in the rural areas. The fall in share of agricultural trade can be one of the reasons behind the fall in agricultural income. While agricultural exports have increased almost about %100 over the period, its share in total trade has gone down to %8 from %19. The share of agricultural imports in total decreased from %6.5 to %1.8 in the same period. In general, Turkey's trade account gives deficit of about %5-7 (as share of GNP) particularly in the strong growth periods but in agricultural sector Turkey is a net exporter. Recently though, Turkey became a net importer in meat, feed products and cereals. Turkey's main agricultural exports are in fruit and vegetables.

Table 1.1. Main Macroeconomic Indicators Regarding Agricultural Sector

Period	Agricultural, GDP (Million USD) A	Share of A in GDP (%)	Economically Active Agricultural Population (000) B	Share of B in Active Population (%)	Agricultural Exports (Million USD) C	Share of C in Total Exports (Million USD)	Agricultural Imports (Million USD) D	Share of D in Total Imports (Million USD)
1995	25,840	14.80	10,406	46.66	3,231	0.19	1,777	0.07
1996	27,662	14.40	10,372	45.67	3,579	0.19	1,960	0.06
1997	29,328	13.00	10,079	44.28	4,542	0.19	1,996	0.05
1998	31,347	12.90	10,180	43.52	4,167	0.17	1,778	0.04
1999	24,973	10.70	10,276	42.97	3,853	0.15	1,632	0.04
2000	31,255	10.80	9,539	41.23	3,739	0.12	1,654	0.03
2001	20,661	9.40	9,574	40.65	4,227	0.12	1,153	0.02
2002	27,759	11.40	9,613	40.23	3,719	0.10	1,335	0.03
2003	30,026	11.15	9,279	39.08	3,946	0.09	1,650	0.03
2004	33,661	10.71	9,172	37.57	4,634	0.09	1,690	0.02
2005	41,163	10.62	9,028	36.52	5,848	0.10	1,510	0.02
2006	39,260	9.37	8,942	36.39	5,856	0.09	1,610	0.02
2007	40,346	8.53	8,746	35.01	6,350	0.08	2,260	0.02

Chapter 2.
Main Indicators Regarding Agricultural Trade in the Mediterranean Region

The world average for the share of agricultural GDP is about %3 percent while it is still about %10 in southern Mediterranean countries. Share of agricultural employment in the world is still about %40 but this is mostly due to the high agricultural employment in various Asian and African countries (almost about %60). While share of agricultural exports reaches to about %17 in Latin American countries in general it is about %8 in the world and it is between %1-3 in southern Mediterranean countries. In the Mediterranean region Turkey is one of important actors particularly in production of grapes, olive/oil, cereals, fruits and vegetables and even in production of fish, meat and milk product (CIHEAM, 2009). In the last fifty years, the share of exports in production of USA and western Europe has increased significantly while it stayed almost constant in developing countries. The share of processed agricultural products has also increased up to %70 in total agricultural exports.

In 2006 the volume of agricultural trade between Europe and Mediterranean has reached to 200 billion Euros. About one third of this volume in the region is actually the trade with Turkey. While the EU's export to southern Mediterranean is about 114 billion Euros, the EU's import from the same group is about 86 billion Euros. These amounts represent about %10 and %40 of total trade of the EU and Mediterranean respectively. This share is lower for Egypt and Israel (about %29), higher for Turkey (about %51) and even higher for Tunisia and Morocco (almost %70). Table 3.2 presents the agricultural trade balance of the Mediterranean Partner Countries (MPC). Except in fruits and vegetables which is mostly due to Turkey's production amount, MPC gives deficit in agricultural trade of all commodity groups.

Table 2.1. Trade Balance in Agricultural Products of MPCs

Products	Average of 2004-06 (exports-imports) (Million USD)
Fruits and Vegetables	4,299
Cereals	-5,910
Eggs and Dairy Products	-1,443
Feed Products	-1,400
Oils	-1,261
Sugar, Honey	-1,235

Oilseeds	-1,202
Coffee, Tea, Spices	-1,201
Tobacco and Beverages	-838
Meat	-827
Agricultural Trade Balance	-12,212

Source: Rastoin J. (2009), s.208.

Chapter 3.
Developments in Turkey´s Agricultural Exports to the MPCs

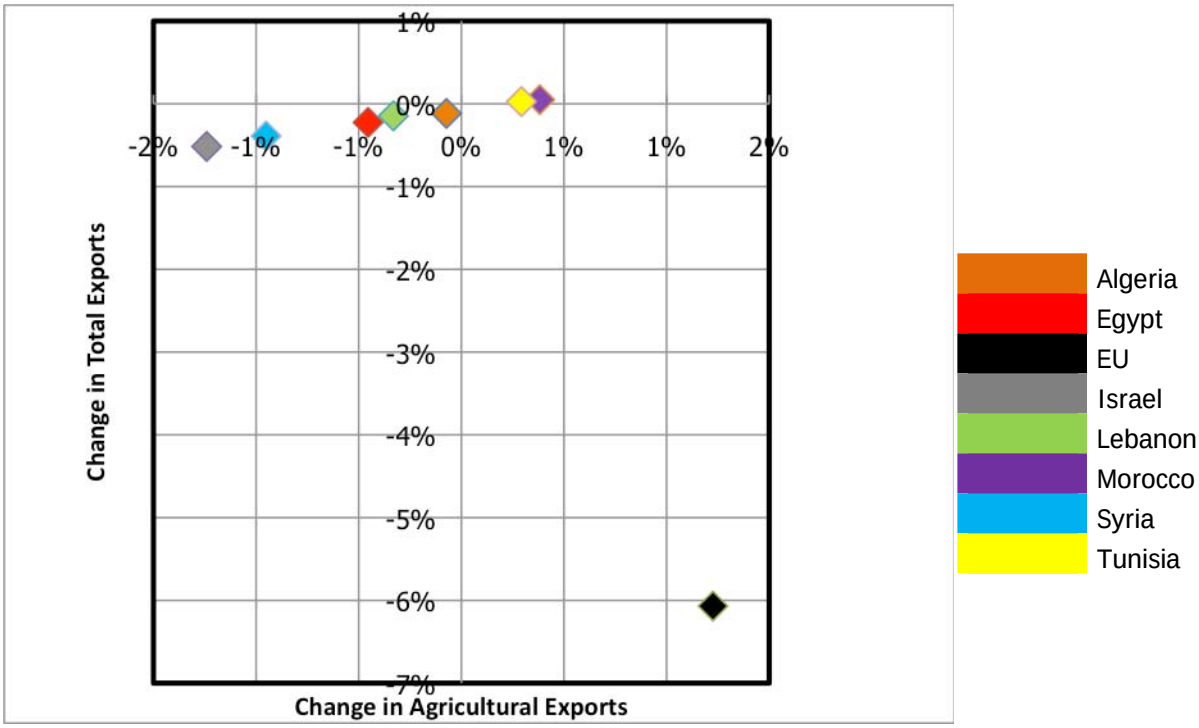
Turkey's agricultural trade with the EU and MPCs are shown in Table 3.1. From 1996 to 2006 Turkey's agricultural exports to these countries have increased but shares of countries in total have fallen in most cases. The only two countries that have slightly increased their share in exports of Turkey are Morocco and Tunisia. This finding applies for total exports as well. The increase in exports to Russia and Middle East countries in the same period might be one of the reasons behind the experienced trend with MPCs.

Table 3.1. Turkey's Agricultural Exports to the MPCs

	Agricultural Exports (000 USD)		Share in Agricultural Exports			Share in Total Exports		
Countries	**1996**	**2006**	**1996**	**2006**	**Change**	**1996**	**2006**	**Change**
Algeria	56,944	111,998	0.85%	0.78%	-0.07%	0.25%	0.13%	-0.12%
Egypt	81,336	109,432	1.21%	0.76%	-0.45%	0.35%	0.13%	-0.22%
EU	3,439,196	7,572,743	51.31%	52.53%	1.23%	14.92%	8.85%	-6.07%
Israel	168,205	182,843	2.51%	1.27%	-1.24%	0.73%	0.21%	-0.52%
Lebanon	49,541	58,815	0.74%	0.41%	-0.33%	0.21%	0.07%	-0.15%
Morocco	8,222	72,799	0.12%	0.51%	0.38%	0.04%	0.09%	0.05%
Syria	125,851	133,522	1.88%	0.93%	-0.95%	0.55%	0.16%	-0.39%
Tunisia	12,389	68,870	0.18%	0.48%	0.29%	0.05%	0.08%	0.03%

While share of total exports to MPCs have not changed significantly the share of the EU has fallen significantly from about %15 to %9. The share in agricultural exports to the EU has increased from %51.3 to %52.5. Figure 3.1 presents the change in exports of Turkey with the EU and MPCs.

Figure 3.1. Turkey's Changing Export Shares to the EU and MPCs



In Annex Table A1 and A2 the EU's share in Turkish agricultural sub-sector exports and imports are presented respectively over the period of 1995-2009. Textile and fruits-vegetables are the main exportable sub-sectors to the EU market. These are followed by beverages, meat preparations and sugar. In the case of imports, beverages, meat preparations have the largest share in imports from the EU which are followed by sugar and dairy products. Similarly the export (Annex Figures A1-A10) and import (Annex Figures A11-A20) share trends are also provided for the same period for MPCs. It is observed that neither of the MPCs has more than %1 share in exports from Turkey in neither of the sub-sectors. This applies for imports of MPCs from Turkey as well.

Chapter 4.
Comparative Advantage of Turkish Agricultural Sector

In this section revealed comparative advantage (RCA) of Turkish agricultural sub-sectors are calculated by using the RCA index of Balassa (1965) which is grounded in conventional trade theory. The index is given in formula 1 and in this formula *x* represents exports, *i* is a country (Turkey), *j* is a commodity (sub-sectors), *t* is a set of commodities (total exports) and *n* is a set of countries (world). *B* is observed trade patterns and it measures a country's exports of a commodity relative to its total exports and to the corresponding export performance of a set of countries. If *B>1*, then a comparative advantage is revealed.

$$B = \left(\frac{x_{ij}}{x_{it}} \right) / \left(\frac{x_{nj}}{x_{nt}} \right) \qquad 1$$

Table 3.4 and Figure 4.1 present the calculated RCA values in exports of 10 agricultural sub-sectors in Turkey in the period of 1995-2009. The table reveals that textiles and fruits-vegetable are two sectors for which Turkey has comparative advantage during the whole period. Some advantage is observed in both in cereals and tobacco products but it is quite low compared to other two sectors. The comparative advantage in all these four sectors seems to deteriorate in the early 2000s but by the end of 2004 improvement begins. It is believed the deterioration is due to the required technical adjustments after accession the Customs Union with the EU, and improvement is due to the widening of export markets and improvement in the quality.

Figure 4.1. Revealed Comparative Advantage of Turkish Agricultural Sub-Sectors

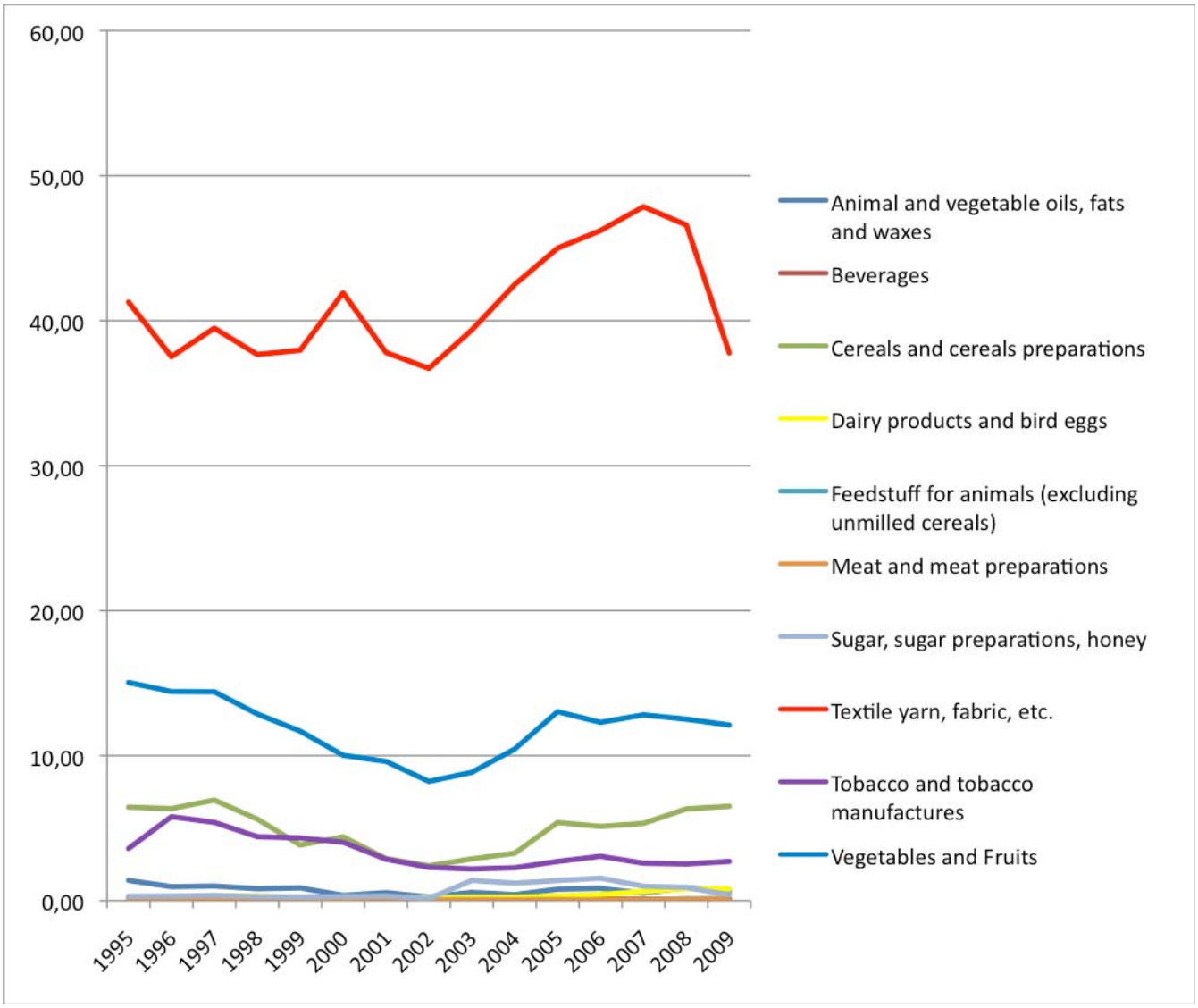


Table 4.1. Revealed Comparative Advantage of Turkish Agricultural Sub-Sectors

	Turkey-RCA														
	1995	**1996**	**1997**	**1998**	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**
Animal & vegetable oils	1,4	1,0	1,0	0,8	0,9	0,4	0,6	0,3	0,6	0,4	0,8	0,8	0,5	0,9	0,7
Beverages	0,2	0,3	0,2	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1
Cereals & preparations	6,4	6,4	6,9	5,6	3,8	4,4	2,9	2,4	2,9	3,3	5,4	5,1	5,3	6,3	6,5
Dairy products & eggs	0,2	0,3	0,4	0,3	0,2	0,2	0,3	0,2	0,2	0,2	0,3	0,4	0,6	0,8	0,8
Feedstuff for animals	0,1	0,1	0,03	0,02	0,03	0,1	0,1	0,04	0,04	0,03	0,04	0,02	0,03	0,1	0,1
Meat & preparations	0,1	0,1	0,1	0,1	0,04	0,04	0,1	0,03	0,04	0,04	0,1	0,04	0,1	0,1	0,1
Sugar, preparations, honey	0,3	0,3	0,4	0,3	0,23	0,3	0,3	0,1	1,4	1,2	1,4	1,6	1,0	0,9	0,4
Textile yarn, fabric, etc.	41,3	37,5	39,5	37,7	38,0	41,9	37,8	36,7	39,4	42,5	45,0	46,2	47,9	46,6	37,8
Tobacco & manufactures	3,6	5,8	5,4	4,4	4,3	4,03	2,9	2,3	2,2	2,3	2,7	3,1	2,6	2,5	2,7
Vegetables and Fruits	15,1	14,4	14,4	12,8	11,7	10,0	9,6	8,2	8,9	10,5	13,0	12,3	12,8	12,5	12,1

Table 4.2 presents the comparative export performance (CEP) values in 10 agricultural sub-sectors in Turkey for the period of 2000-2009. The formula to calculate CEP is given in equation 2. In equation 2, *x* stands for exports. The subscript *j* refers to the country (Turkey), subscript *w* to the region (Mediterranean countries) and subscript *I* to the product (sub-sectors) groups, respectively. If CEP is equal to unity or more this means that the particular sector have a greater share in total exports of the individual country than they have in the Mediterranean countries as a whole.

$$CEP = \left(\frac{x_{Ij}}{x_{Iw}} \right) / \left(\frac{\sum_{I=1}^{n} x_{Ij}}{\sum_{I=1}^{n} x_{Iw}} \right) \qquad 2$$

The table reveals that in the Mediterranean region Turkey's comparative export performance is particularly better in vegetables-fruits and textile sub-sectors. These are followed by sugar preparations, cereals, tobacco and animal-vegetable oils. In general, there has been a decline in export performance though, since mid-2000's. Feedstuff, beverages and dairy products are the sub-sectors in which Turkey doesn't have a better export performance compared to other Mediterranean regions.

Table 4.2. Comparative Export Performance in Turkish Agricultural Sub-Sectors

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Animal & vegetable oils	1,3	2,3	0,8	4,4	1,1	1,9	1,8	1,1	1,5	1,5
Beverages	0,5	0,4	0,4	1,6	0,8	0,8	0,7	0,7	0,7	0,6
Cereals & preparations	2,1	1,7	1,3	3,5	1,5	2,2	2,0	1,7	1,4	1,9
Dairy products & eggs	0,1	0,2	0,2	0,5	0,2	0,2	0,3	0,4	0,4	0,5
Feedstuff for animals	0,3	0,5	0,2	0,6	0,1	0,2	0,1	0,1	0,3	0,3
Meat & preparations	0,1	0,1	0,1	0,4	0,1	0,2	0,1	0,2	0,2	0,4
Sugar, preparations, honey	3,3	3,8	2,4	6,3	2,1	1,4	1,4	2,0	2,2	1,8
Textile yarn, fabric, etc.	5,8	5,5	5,3	13,5	4,8	5,0	4,9	4,7	4,4	4,6
Tobacco & manufactures	1,5	1,1	0,8	1,8	0,6	0,7	0,7	0,5	0,5	0,6
Vegetables and Fruits	7,7	7,6	6,2	15,8	5,9	6,4	5,4	4,7	4,1	4,5

Chapter 5.
Quantitative Outlook of Agricultural Markets in Turkey

In this section time series analyses, ARIMA models, are utilized to predict future points in production and export series of various commodities. ARIMA (autoregressive integrated moving average) models can represent a wide range of time series data, and are used generally in computing the probability of a future value lying between any two limits. ARIMA models form an important part of the Box-Jenkins approach to time-series modeling. For more information see Box and Jenkins (1976).

To carry out the analyses the sample size of a series should be at least 35-40 and even for some scholars the minimum required size is 45-50. Therefore, the prediction in production and exports of some commodities could not be achieved due to lack of data. The predictions for the rest of the commodities and methodology used to predict is explained below.

5.1. Production series

At the first step, unit root tests (ADF-augmented Dickey-Fuller) were carried out on each series using three different models which were the model with constant term; with constant term and trend variable; without constant term and trend variable. The test results of each model for each series can be provided upon request. All the original series were found to have unit root and therefore are stationary but their first difference was found to be stationary which showed that the series are cointegrated in first degree. The correlograms of the original and first difference series were also drawn to check for the stationarity and these can be provided as well upon request. In this way in the ARIMA (p, d, q) model d was found to be equal to 1.

At the second step, AR (p) and MA (q) values were found by giving values between 0 and 2 for each of them (except in one case). The best model is expected to provide statistically significant p and q values at the same time ($p<0.10$) and a significant model (prob $F<0.05$). In addition, a (DW) Durbin-Watson statistic value around 2 is also expected to avoid autocorrelation. Among the models with the expected test statistics, the one with the highest R^2 and log-likelihood ratio, and lowest standard error, Akeike and Shwarts criterion are chosen. Diagnostics of different models can be provided upon request. The resulting ARIMA models for the commodities were found to be-

ARIMA (2,1,1): lemons and limes
ARIMA (2,1,0): oranges
ARIMA (1,1,1): tobacco, unmanufactured
ARIMA (2,1,0): tomatoes
ARIMA (2,1,1): olive oil, virgin
ARIMA (3,1,3): cow milk, whole fresh.

Lemons and limes-ARIMA (2,1,1)
Dependent Variable: D(P1)
Method: Least Squares
Date: 06/07/11 Time: 18:38
Sample (adjusted): 1964 2009
Included observations: 46 after adjustments
Convergence achieved after 42 iterations
MA Backcast: OFF (Roots of MA process too large)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	13260.46	42929.98	0.308886	0.7589
AR(1)	0.662958	0.220876	3.001497	0.0045
AR(2)	0.303184	0.174813	1.734337	0.0902
MA(1)	-1.285002	0.273774	-4.693656	0.0000

R-squared	0.365977	Mean dependent var	15319.80
Adjusted R-squared	0.320690	S.D. dependent var	59210.35
S.E. of regression	48801.33	Akaike info criterion	24.51184
Sum squared resid	1.00E+11	Schwarz criterion	24.67086
Log likelihood	-559.7724	Hannan-Quinn criter.	24.57141
F-statistic	8.081229	Durbin-Watson stat	2.170977
Prob(F-statistic)	0.000231		

Inverted AR Roots	.97	-.31
Inverted MA Roots	1.29	
	Estimated MA process is noninvertible	

Oranges-ARIMA (2,1,0)
Dependent Variable: D(P2)
Method: Least Squares
Date: 06/21/11 Time: 00:58
Sample (adjusted): 1964 2009
Included observations: 46 after adjustments
Convergence achieved after 4 iterations

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	29240.87	6690.077	4.370783	0.0001
AR(1)	-0.541143	0.157953	-3.425965	0.0014
AR(2)	-0.313869	0.158056	-1.985811	0.0535

R-squared	0.220880	Mean dependent var	31142.17
Adjusted R-squared	0.184642	S.D. dependent var	93112.25
S.E. of regression	84077.73	Akaike info criterion	25.57986
Sum squared resid	3.04E+11	Schwarz criterion	25.69912
Log likelihood	-585.3369	Hannan-Quinn criter.	25.62454
F-statistic	6.095236	Durbin-Watson stat	1.898271
Prob(F-statistic)	0.004672		

Inverted AR Roots	-.27+.49i	-.27-.49i

Tobacco, unmanufactured-ARIMA (1,1,1)
Dependent Variable: D(P3)
Method: Least Squares
Date: 06/21/11 Time: 01:10
Sample (adjusted): 1963 2009
Included observations: 47 after adjustments
Convergence achieved after 46 iterations
MA Backcast: 1962

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-2346.699	2295.304	-1.022391	0.3122
AR(1)	0.723631	0.116636	6.204175	0.0000
MA(1)	-0.970726	0.048585	-19.97979	0.0000

R-squared	0.138772	Mean dependent var	-101.9787
Adjusted R-squared	0.099626	S.D. dependent var	48918.05
S.E. of regression	46417.38	Akaike info criterion	24.39044
Sum squared resid	9.48E+10	Schwarz criterion	24.50853
Log likelihood	-570.1753	Hannan-Quinn criter.	24.43488
F-statistic	3.544934	Durbin-Watson stat	2.270991
Prob(F-statistic)	0.037376		

Inverted AR Roots	.72
Inverted MA Roots	.97

Tomatoes-ARIMA (2,1,0)
Dependent Variable: D(P4)
Method: Least Squares
Date: 06/21/11 Time: 01:29
Sample (adjusted): 1964 2009
Included observations: 46 after adjustments
Convergence achieved after 5 iterations

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	204837.8	29130.99	7.031613	0.0000
AR(1)	-0.435620	0.133254	-3.269090	0.0021
AR(2)	-0.505882	0.138537	-3.651593	0.0007

R-squared	0.306050	Mean dependent var	207404.3
Adjusted R-squared	0.273773	S.D. dependent var	449878.0
S.E. of regression	383381.2	Akaike info criterion	28.61444
Sum squared resid	6.32E+12	Schwarz criterion	28.73370
Log likelihood	-655.1321	Hannan-Quinn criter.	28.65912
F-statistic	9.482063	Durbin-Watson stat	2.084861
Prob(F-statistic)	0.000388		

Inverted AR Roots	-.22-.68i	-.22+.68i

Olive oil, virgin-ARIMA (2,1,1)
Dependent Variable: D(P5)
Method: Least Squares
Date: 06/21/11 Time: 01:36
Sample (adjusted): 1964 2009
Included observations: 46 after adjustments
Convergence achieved after 20 iterations
MA Backcast: 1963

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	354.5906	590.6681	0.600321	0.5515
AR(1)	-0.204716	0.120741	-1.695493	0.0974
AR(2)	0.666100	0.123072	5.412274	0.0000
MA(1)	-0.984338	0.026953	-36.52087	0.0000

R-squared	0.882635	Mean dependent var	904.3478
Adjusted R-squared	0.874252	S.D. dependent var	89151.76
S.E. of regression	31614.04	Akaike info criterion	23.64353
Sum squared resid	4.20E+10	Schwarz criterion	23.80254
Log likelihood	-539.8012	Hannan-Quinn criter.	23.70310
F-statistic	105.2864	Durbin-Watson stat	2.007852
Prob(F-statistic)	0.000000		

Inverted AR Roots	.72	-.92
Inverted MA Roots	.98	

Cow milk, whole fresh-ARIMA (3,1,3)
Dependent Variable: D(P6)
Method: Least Squares
Date: 06/21/11 Time: 01:51
Sample (adjusted): 1965 2009
Included observations: 45 after adjustments
Convergence achieved after 200 iterations
MA Backcast: OFF (Roots of MA process too large)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	139237.8	14933.94	9.323581	0.0000
AR(1)	-0.697325	0.147719	-4.720613	0.0000
AR(2)	-0.899496	0.219722	-4.093789	0.0002
AR(3)	-0.831118	0.154079	-5.394087	0.0000
MA(1)	0.506500	0.367823	1.377020	0.1766
MA(2)	1.731042	0.342896	5.048298	0.0000
MA(3)	0.566381	0.368247	1.538046	0.1323

R-squared	0.514120	Mean dependent var	137315.6
Adjusted R-squared	0.437402	S.D. dependent var	438482.2
S.E. of regression	328890.3	Akaike info criterion	28.38687
Sum squared resid	4.11E+12	Schwarz criterion	28.66791
Log likelihood	-631.7046	Hannan-Quinn criter.	28.49164
F-statistic	6.701435	Durbin-Watson stat	1.887075
Prob(F-statistic)	0.000067		

Inverted AR Roots	.06+1.00i	.06-1.00i	-.83
	Estimated AR process is nonstationary		
Inverted MA Roots	-.08+1.29i	-.08-1.29i	-.34
	Estimated MA process is noninvertible		

Table 5.1: Predicted Series-Production

	Lemons and limes	Oranges	Tobacco, unmanufactured	Tomatoes	Olive oil, virgin	Cow milk, whole, fresh
1961	70,440	177,836	101,407	1,120,000	119,500	4,830,000
1962	74,409	188,051	89,793	1,140,000	56,370	5,212,500
1963	78,876	257,380	132,183	1,205,000	102,000	5,231,200
1964	37,180	252,900	193,668	1,250,000	121,900	5,404,100
1965	78,500	300,000	132,374	1,281,700	60,000	5,434,000
1966	84,500	310,000	164,197	1,320,500	155,000	5,749,900
1967	90,000	380,000	189,259	1,330,000	80,000	5,933,200
1968	130,000	476,000	163,038	1,346,910	159,000	5,886,400
1969	121,494	414,100	146,592	1,558,860	54,000	5,830,500
1970	126,000	445,000	149,861	1,810,000	118,000	5,722,600
1971	141,500	460,000	173,861	1,900,000	51,500	5,834,400
1972	149,200	466,600	179,799	2,000,000	176,000	5,920,200
1973	122,375	470,000	149,120	2,050,000	53,300	6,156,800
1974	265,000	500,000	203,487	2,150,000	130,000	6,297,200
1975	290,000	540,000	199,935	2,300,000	94,000	6,474,000
1976	277,500	545,000	323,963	2,750,000	178,000	6,705,400
1977	325,000	650,000	247,952	2,900,000	75,100	6,958,100
1978	243,000	656,000	292,563	3,300,000	180,000	7,199,500
1979	280,000	680,000	216,585	3,500,000	60,000	7,591,400
1980	283,000	679,000	228,349	3,550,000	170,000	7,710,600
1981	290,000	675,000	168,024	3,600,000	55,000	7,909,600
1982	311,000	656,000	207,735	3,700,000	160,000	7,183,200
1983	300,000	730,000	233,843	3,700,000	40,000	6,948,700
1984	317,500	761,000	177,529	4,000,000	80,000	7,767,550
1985	188,000	505,000	170,491	4,900,000	70,000	7,994,270
1986	310,000	750,000	158,480	5,000,000	120,000	8,133,680
1987	340,000	700,000	184,712	5,000,000	55,000	8,109,880
1988	360,000	740,000	219,063	5,250,000	90,000	8,156,100
1989	335,000	740,000	269,888	5,750,000	35,000	7,973,240
1990	357,000	735,000	296,008	6,000,000	80,000	7,960,640
1991	429,000	830,000	240,881	6,200,000	60,000	8,616,520
1992	420,000	820,000	334,276	6,450,000	56,000	8,715,020
1993	440,000	840,000	338,796	6,150,000	50,000	8,904,350
1994	470,000	920,000	186,954	6,350,000	160,000	9,128,820
1995	418,000	842,000	204,440	7,250,000	45,000	9,275,310
1996	401,000	890,000	225,216	7,800,000	200,000	9,465,620
1997	270,000	740,000	286,414	6,600,000	40,000	8,914,180
1998	390,000	970,000	250,556	8,290,000	180,000	8,832,000
1999	520,000	1,100,000	243,468	8,956,000	55,000	8,966,000
2000	460,000	1,070,000	200,280	8,890,000	185,000	8,732,040
2001	510,000	1,250,000	144,786	8,425,000	65,000	8,489,080
2002	525,000	1,250,000	152,856	9,450,000	160,000	7,490,630
2003	550,000	1,250,000	112,158	9,820,000	80,000	9,514,320
2004	600,000	1,300,000	133,913	9,440,000	145,000	9,609,330
2005	600,000	1,445,000	135,247	10,050,000	115,000	10,026,200
2006	710,401	1,535,810	98,137	9,854,880	137,000	10,867,300
2007	651,767	1,426,970	74,584	9,945,040	142,700	11,279,300
2008	672,452	1,427,160	93,403	10,985,400	99,500	11,255,200
2009	783,587	1,689,920	85,000	10,745,600	143,600	11,583,300
2010	791,222	1,601,912	96,926	10,721,455	100,230	11,596,581
2011	830,427	1,621,307	104,907	11,250,977	138,675	12,190,894
2012	859,182	1,692,677	110,034	11,430,214	102,107	12,119,737
2013	890,580	1,702,210	113,095	11,481,952	135,392	12,101,035
2014	920,563	1,728,892	114,662	11,766,434	104,411	12,161,436

5.2. Export series

The same methodology was applied in predicting the export series however due to lack of data the predictions could be done only for tobacco (unmanufactured), tomatoes and olive oil (virgin). All the tests and alternative models for each commodity can be provided upon request. The resulting ARIMA models for the commodities were found to be-

ARIMA (1,1,1): tobacco, unmanufactured
ARIMA (1,1,1): tomatoes
ARIMA (2,1,1): olive oil, virgin

Tobacco, unmanufactured-ARIMA (1,1,1)
Dependent Variable: D(E3)
Method: Least Squares
Date: 06/21/11 Time: 17:23
Sample (adjusted): 1964 2010
Included observations: 47 after adjustments
Convergence achieved after 14 iterations
MA Backcast: 1963

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	20528185	3117818.	6.584151	0.0000
AR(1)	0.362342	0.143821	2.519397	0.0155
MA(1)	-0.968841	0.044347	-21.84676	0.0000

R-squared	0.288165	Mean dependent var	20528185
Adjusted R-squared	0.255808	S.D. dependent var	1.76E+08
S.E. of regression	1.52E+08	Akaike info criterion	40.57179
Sum squared resid	1.01E+18	Schwarz criterion	40.68989
Log likelihood	-950.4372	Hannan-Quinn criter.	40.61623
F-statistic	8.906018	Durbin-Watson stat	1.974691
Prob(F-statistic)	0.000565		

Inverted AR Roots	.36
Inverted MA Roots	.97

Tomatoes-ARIMA (1,1,1)
Dependent Variable: D(E4)
Method: Least Squares
Date: 06/21/11 Time: 17:28
Sample (adjusted): 1964 2010
Included observations: 47 after adjustments
Convergence achieved after 29 iterations
MA Backcast: 1963

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.68E+08	3.29E+09	0.051170	0.9594
AR(1)	0.991854	0.166940	5.941393	0.0000
MA(1)	-0.687077	0.278012	-2.471389	0.0174

R-squared	0.367415	Mean dependent var	10146013
Adjusted R-squared	0.338662	S.D. dependent var	26310823
S.E. of regression	21396675	Akaike info criterion	36.65707
Sum squared resid	2.01E+16	Schwarz criterion	36.77517
Log likelihood	-858.4412	Hannan-Quinn criter.	36.70151
F-statistic	12.77796	Durbin-Watson stat	1.994765
Prob(F-statistic)	0.000042		

Inverted AR Roots	.99
Inverted MA Roots	.69

Olive oil, virgin-ARIMA (2,1,1)
Dependent Variable: D(E5)
Method: Least Squares
Date: 06/21/11 Time: 17:33
Sample (adjusted): 1965 2010
Included observations: 46 after adjustments
Convergence achieved after 63 iterations
MA Backcast: OFF (Roots of MA process too large)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1397531.	2362329.	0.591591	0.5573
AR(1)	-1.242456	0.155144	-8.008397	0.0000
AR(2)	-0.302121	0.158520	-1.905883	0.0635
MA(1)	1.239033	0.094166	13.15797	0.0000

R-squared	0.649839	Mean dependent var	1397518.
Adjusted R-squared	0.624828	S.D. dependent var	57427349
S.E. of regression	35175003	Akaike info criterion	37.67251
Sum squared resid	5.20E+16	Schwarz criterion	37.83152
Log likelihood	-862.4677	Hannan-Quinn criter.	37.73208
F-statistic	25.98163	Durbin-Watson stat	1.979138
Prob(F-statistic)	0.000000		

Inverted AR Roots	-.33	-.91
Inverted MA Roots	-1.24	
	Estimated MA process is noninvertible	

Table 5.2: Predicted Series-Exports

	Lemons and limes, fresh or dried	Orange, fresh or dried	Tobacco and tobacco manufactures, unmanufactures	Tomatoes, fresh	Olive Oil	Milk and cream, fresh
1962			192,339,576	821	14,024,736	
1963			133,518,356	11,149	12,810,841	
1964			180,268,680	1,538	3,768,168	
1965			179,060,752	649	11,497,745	
1966			215,115,632	1,022	2,214,211	
1967			235,956,984	1,887	6,845,181	
1968			189,634,576	6,715	798,437	
1969			162,911,056	503	12,681,174	
1970			157,162,576	11,008	243,925	
1971			171,829,128	272	949,557	
1972			261,771,272	1,996	2,879,592	
1973			265,758,040	3,151	47,824,956	
1974			408,971,232	4,063	15,105,746	
1975			366,435,760	33,918	17,703,920	
1976			502,589,568	22,034	2,807,319	
1977			351,645,968	73,406	35,258,584	
1978			450,517,024	1,046,861	8,744,819	
1979			353,941,984	4,638,596	38,808,936	
1980			467,485,040	7,073,168	5,638,743	
1981			790,161,088	19,233,552	73,798,648	
1982			696,685,856	19,529,912	28,525,200	189,749
1983			475,584,672	23,865,648	80,481,824	521,825
1984			433,324,960	27,552,872	26,244,336	239,970
1985	28,186,412	13,430,338	660,596,736	30,257,390	29,805,982	574,439
1986	27,380,298	10,819,412	542,049,696	33,285,424	31,229,512	490,072
1987	29,789,376	12,579,515	629,764,640	29,806,284	45,008,688	587,048
1988	24,754,964	21,394,104	535,246,112	113,238	32,539,802	570,221
1989	35,444,736	32,008,312	958,895,186	12,702,313	50,822,798	2,627,751
1990	51,261,708	29,239,616	860,849,366	12,557,448	4,687,870	437,985
1991	52,282,050	22,489,549	1,135,484,284	29,279,308	21,267,673	1,146,255
1992	52,822,802	12,676,757	642,041,235	12,428,959	18,942,589	779,663
1993	42,976,033	19,533,789	836,586,246	33,907,123	12,022,993	319,705
1994	64,615,309	37,245,400	818,800,876	41,930,350	20,975,299	393,927
1995	63,819,092	31,283,790	625,955,456	36,835,296	120,605,672	617,712
1996	59,658,812	29,071,212	1,172,050,752	38,949,976	74,357,560	1,731,457
1997	29,420,220	19,763,240	1,247,258,560	55,550,992	87,107,616	1,709,693
1998	58,000,276	29,229,900	1,107,638,048	57,052,476	74,928,040	1,044,242
1999	103,783,317	57,714,530	1,040,578,989	18,901,960	169,851,573	1,456,074
2000	67,508,119	30,550,394	859,754,201	37,482,824	30,194,475	1,814,903
2001	74,995,517	46,506,869	789,681,312	48,913,798	135,675,662	3,717,103
2002	85,199,180	55,590,501	670,476,855	69,956,457	46,365,473	4,036,450
2003	80,063,411	59,067,828	747,784,132	88,692,613	163,505,557	7,457,130
2004	99,211,400	51,572,835	877,651,829	109,563,312	135,000,490	11,049,163
2005	169,394,681	75,917,581	1,058,306,683	145,773,219	304,812,670	23,773,727
2006	153,316,866	99,249,009	1,188,267,222	174,283,608	185,035,350	45,234,394
2007	194,534,647	91,842,871	1,092,871,915	297,176,427	142,034,172	60,972,815
2008	202,874,063	95,679,359	1,132,296,728	388,584,087	77,203,652	58,956,880
2009	277,741,110	169,097,449	1,248,159,719	406,504,651	100,376,461	51,243,867
2010	312,954,799	156,726,019	1,098,343,042	476,873,744	68,053,979	63,064,649
2011			1,137,391,614	536,897,575	99,256,521	
2012			1,164,630,517	597,802,212	73,810,143	
2013			1,187,590,279	659,580,480	99,555,348	
2014			1,208,999,527	722,225,264	78,812,060	
2015			1,229,846,959	785,729,503	100,362,656	

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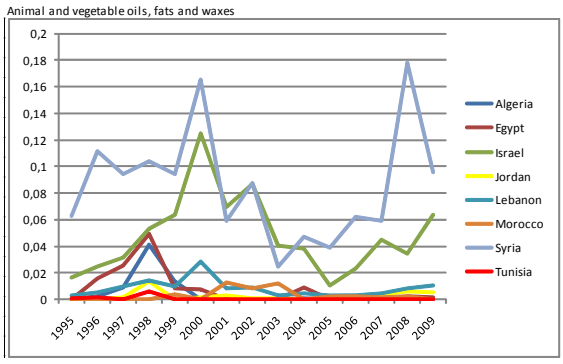
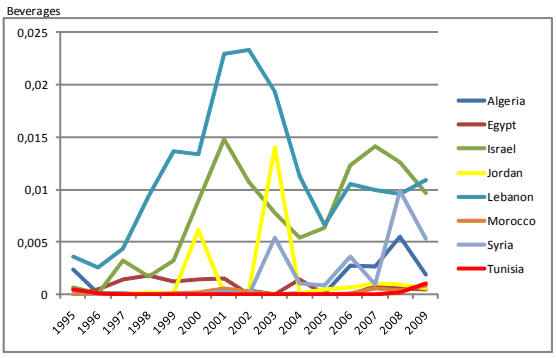
Annexes

Table A1. Share of the EU in Turkey's Agricultural Exports

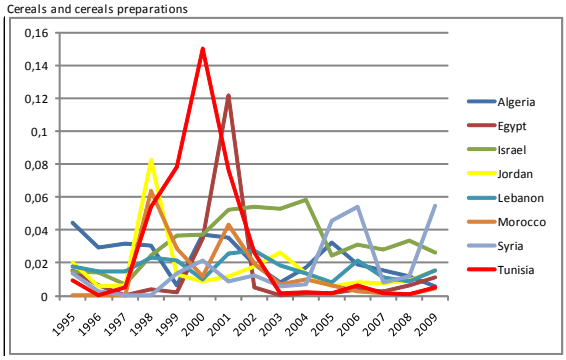
Years	Animal and vegetable oils, fats and waxes	Beverages	Cereals and cereals preparations	Dairy products and bird eggs	Feedstuff for animals (excluding unmilled cereals)	Meat and meat preparations	Sugar, sugar preparations, honey	Textile yarn, fabric, etc.	Tobacco and tobacco manufactures	Vegetables and Fruits
1995	15,79%	22,21%	10,52%	10,01%	24,31%	21,15%	21,15%	59,02%	36,87%	65,01%
1996	25,49%	20,88%	10,02%	13,84%	19,96%	20,81%	20,81%	56,35%	26,57%	66,75%
1997	22,78%	32,92%	8,39%	16,14%	48,74%	18,22%	18,22%	55,33%	32,90%	63,32%
1998	41,32%	49,39%	9,90%	22,01%	97,56%	22,70%	22,70%	57,84%	38,35%	67,21%
1999	52,92%	70,61%	17,25%	45,70%	96,87%	24,33%	24,33%	59,55%	42,51%	76,14%
2000	19,37%	63,62%	22,75%	16,83%	31,44%	17,58%	17,58%	58,15%	35,82%	65,81%
2001	56,07%	64,16%	20,64%	25,49%	15,45%	12,75%	12,75%	59,01%	26,90%	63,28%
2002	40,75%	67,33%	22,49%	14,18%	41,28%	33,89%	33,89%	55,49%	39,69%	64,39%
2003	44,91%	49,55%	17,97%	10,72%	53,03%	34,61%	34,61%	56,95%	40,82%	62,85%
2004	35,73%	42,14%	18,33%	6,45%	72,55%	37,56%	37,56%	55,15%	38,43%	66,68%
2005	51,71%	38,98%	10,52%	8,01%	56,43%	40,57%	40,57%	53,95%	41,88%	68,51%
2006	20,65%	46,73%	15,50%	5,47%	71,88%	31,64%	31,64%	55,93%	41,81%	62,10%
2007	18,97%	48,73%	11,63%	4,53%	51,18%	38,12%	38,12%	54,45%	36,16%	61,57%
2008	8,63%	45,57%	10,92%	3,87%	39,99%	39,67%	39,67%	51,12%	38,03%	56,96%
2009	8,46%	46,36%	11,35%	4,10%	16,21%	36,36%	36,36%	50,85%	30,49%	54,06%

Figures A1-A10: Share of Mediterranean Countries in Turkey's Agricultural Exports

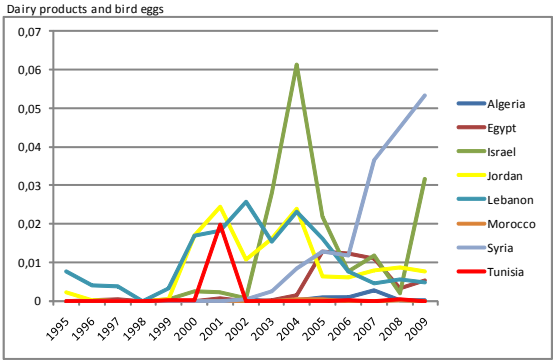




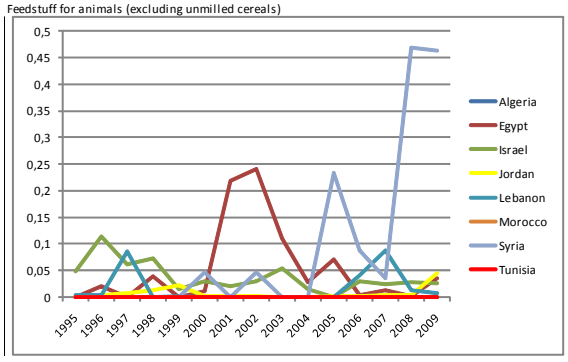
Cereals and cereals preparations



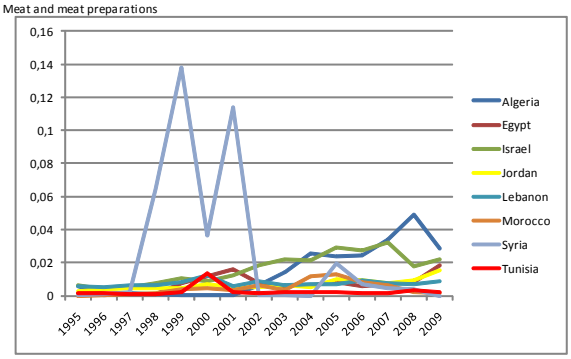
Dairy products and bird eggs



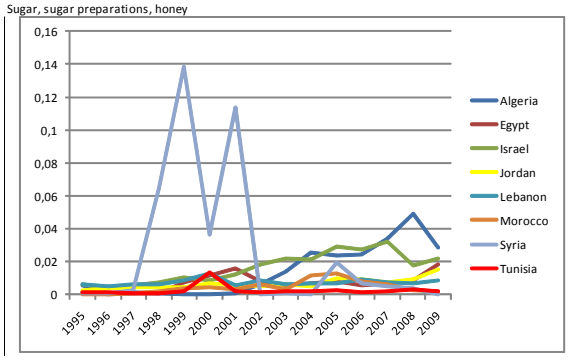
Feedstuff for animals (excluding unmilled cereals)



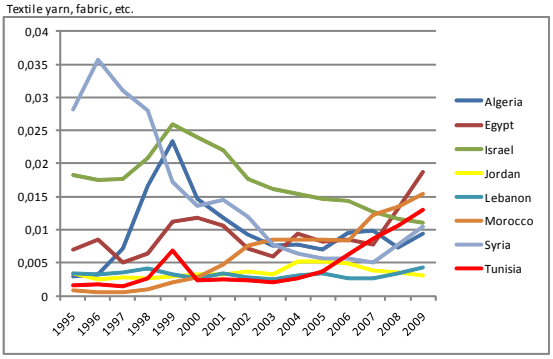
Meat and meat preparations



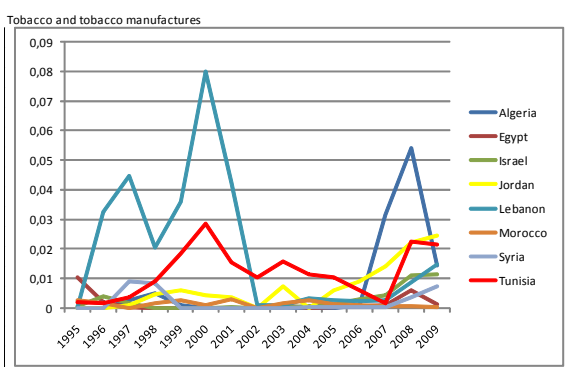
Sugar, sugar preparations, honey



Textile yarn, fabric, etc.



Tobacco and tobacco manufactures



Vegetables and Fruits

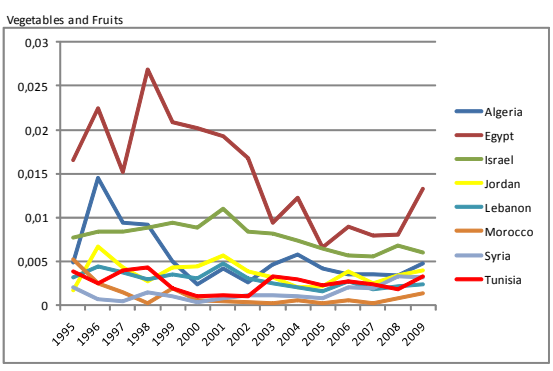
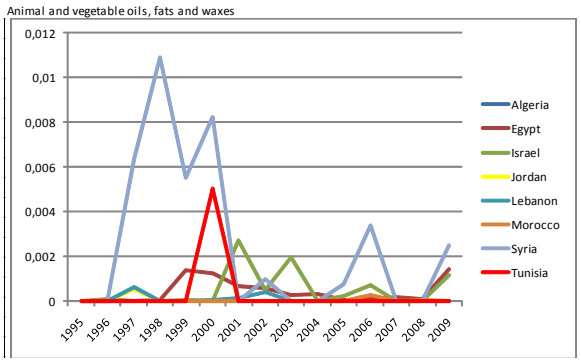
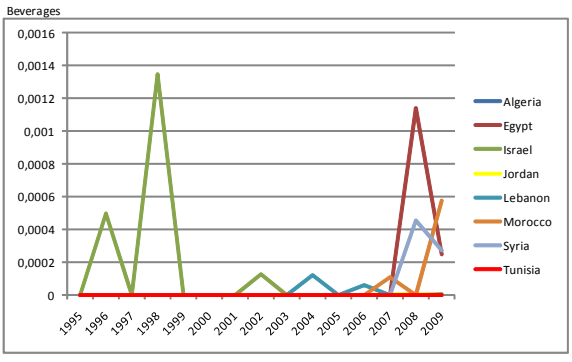


Table A2. Share of the EU in Turkey's Agricultural Imports

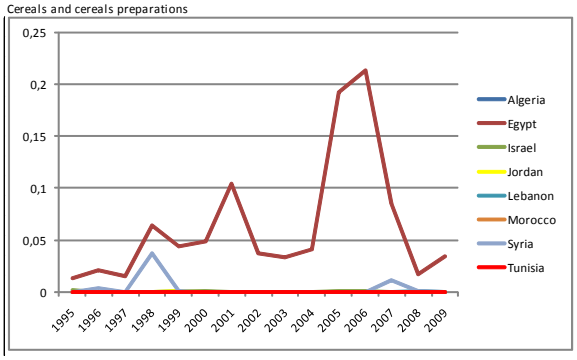
Years	Animal and vegetable oils, fats and waxes	Beverages	Cereals and cereals preparations	Dairy products and bird eggs	Feedstuff for animals (excluding unmilled cereals)	Meat and meat preparations	Sugar, sugar preparations, honey	Textile yarn, fabric, etc.	Tobacco and tobacco manufactures	Vegetables and Fruits
1995	29,08%	95,30%	36,22%	79,93%	33,97%	86,30%	67,87%	32,72%	5,27%	25,95%
1996	19,36%	94,12%	34,25%	81,72%	14,34%	94,36%	53,59%	43,98%	5,00%	25,85%
1997	30,65%	86,17%	20,22%	78,45%	10,92%	63,39%	79,86%	48,27%	6,96%	12,00%
1998	25,03%	82,63%	34,63%	84,26%	15,77%	96,10%	79,54%	45,37%	9,73%	20,27%
1999	29,17%	83,78%	36,34%	88,02%	20,00%	76,74%	73,21%	49,84%	3,69%	27,83%
2000	26,01%	86,89%	31,18%	75,41%	19,09%	39,90%	71,70%	46,13%	3,65%	16,98%
2001	17,97%	91,82%	20,70%	79,44%	15,10%	55,48%	71,30%	48,38%	4,56%	14,85%
2002	17,04%	90,75%	32,97%	93,17%	21,55%	78,84%	53,54%	42,39%	13,65%	29,60%
2003	17,27%	80,47%	25,01%	82,98%	16,14%	87,67%	52,33%	39,61%	19,84%	30,59%
2004	19,01%	80,11%	21,50%	72,70%	13,45%	88,86%	51,33%	37,13%	31,24%	36,43%
2005	17,71%	83,51%	42,63%	69,79%	19,67%	74,25%	44,30%	34,66%	39,33%	32,77%
2006	6,64%	87,21%	36,59%	53,64%	27,30%	92,35%	55,44%	32,48%	41,77%	29,22%
2007	7,87%	89,11%	25,39%	53,07%	15,40%	73,69%	39,07%	27,86%	32,82%	25,68%
2008	4,12%	87,24%	23,56%	50,97%	13,19%	55,75%	40,54%	27,84%	30,20%	14,04%
2009	3,31%	85,82%	28,86%	50,56%	15,54%	83,61%	51,87%	26,06%	33,46%	15,85%

Figures A11-A20: Share of Mediterranean Countries in Turkey's Agricultural Imports

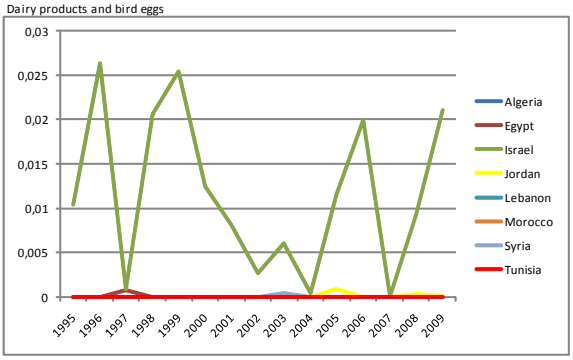




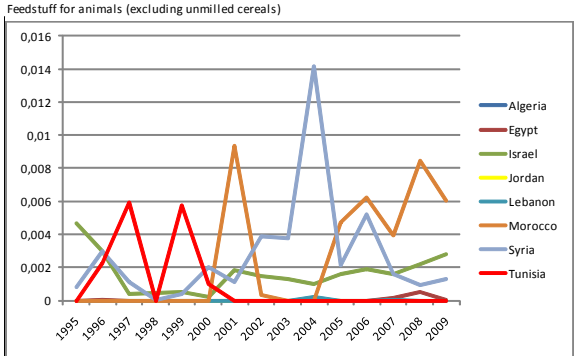
Cereals and cereals preparations



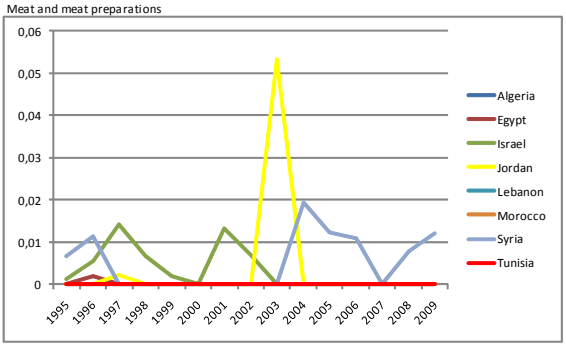
Dairy products and bird eggs



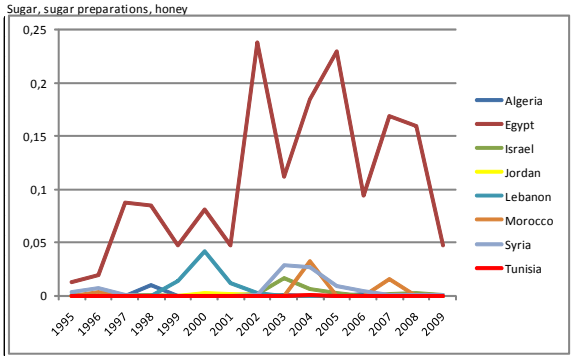
Feedstuff for animals (excluding unmilled cereals)



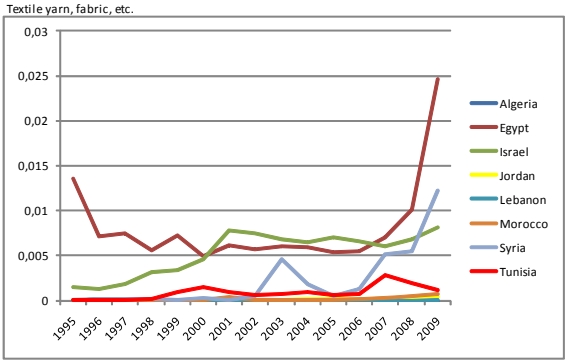
Meat and meat preparations



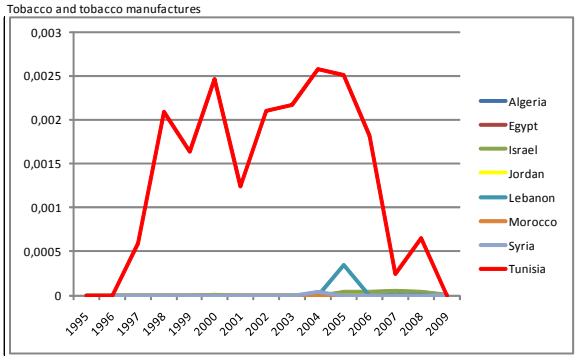
Sugar, sugar preparations, honey



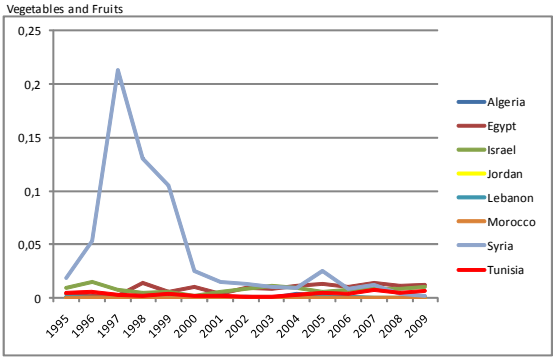
Textile yarn, fabric, etc.



Tobacco and tobacco manufactures



Vegetables and Fruits



Project number
245233

Project title
SUSTAINMED
Sustainable agri-food systems and rural development in the Mediterranean Partner Countries

Call identifier
FP7-KBBE-2009-3

Funding scheme
Collaborative Project

Deliverable D10

Annex 5. Assessing Trade Preferences for Moroccan Fruits and Vegetables with Preferential Entry Price

Due date of the deliverable: September 2011
Actual submission date: September 2011

Start date of the project: March 2010 **Duration**: 36 months

Organisation name of the lead contractor for this deliverable:

Project co-funded by the European Commission within the Seventh Framework Programme (2010-2013)		
Dissemination Level		
PU	Public	√
PP	Restricted to other programme participants (including the Commission Services)	√
RE	Restricted to a group specified by the consortium (including the Commission Services)	√
CO	Confidential, only for members of the consortium (including the Commission Services)	√

Work package: 3

Lead participant name: UPV

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Abstract:

This paper investigates the monetary transfer associated with the preferential entry prices that some EU partners enjoy. First, we have calculated the value of the preference margin granted to Morocco for tomatoes and clementines. We have then simulated the impact of the trade liberalization for Fruits and Vegetables (F&V), which would result from a WTO agreement, on such value, considering different alternatives of variation in the EP system. The results indicate that currently the preferential EP is of significant relevance in the case of tomatoes and has less relevance for clementines. Also, results show that the ad valorem tariff exoneration, agreed upon simultaneously to the reduced EP, is significant for both products. With regard to the erosion of trade preferences, its magnitude crucially depends on the final regime adopted for these F&V: If tomatoes are declared a sensitive product, the erosion may be overcome by the possibility of increasing the volumes exported by Morocco to the EU. On the contrary, a deeper tariff cut without an increase in the quantities traded would result in significant losses for Moroccan exporters of the two goods.

Keywords

Entry prices; trade preferences; Euro-Mediterranean trade; fruits and vegetables.

Mots clé

Prix d'entrée; préférences commerciales; commerce Euro-Méditerranéen; fruits et légumes

CONTENTS

LIST OF TABLES

Chapter 1. Introduction

The EU grants a number of trade preferences to certain agricultural products imported from several Southern Mediterranean Countries (SMC), under the framework of the Euro-Mediterranean Agreements. There is a group of indicators based on trade flows that are used to assess the scope of trade preferences. Indeed, different researches have calculated the Product Coverage, the Utilization Rate, the Preference Margin and the Value of Preference Margin (VPM) for some instances of trade under preferential conditions.

Specifically, the VPM accounts for the monetary value of the potential revenues transferred from the donor to the preference-receiving country in the form of reduced tariffs. Therefore, this indicator is directly used when the border protection consists of tariffs.

In the case of some Fruits and Vegetables (F&V), the EU applies a different protection measure called the entry price (EP) system. Under the framework of the Euro-Mediterranean Agreements, a particular type of preferential concession involves reduced EP for a limited number of products. In these cases, the direct application of the VPM to these products may lead to poor estimates. Thus, in this paper an indicator of the value of the aforementioned concession, called "Value of Preference Margin with Reduced EP" (VPM_{EP}), has been calculated to assess the potential transfers granted by the EU to Morocco in clementines and tomatoes.

As discussed in section 4, this indicator may also be used to assess the erosion of trade preferences. Hence, we have defined two different scenarios representing possible multilateral agreement that vary the current EP system and then compared the corresponding results.

The paper is organized as follows: Section 2 summarizes the EP system and examines the current cases of reduced EP granted to Morocco; Section 3 discusses the methodology developed to assess the preferences for such cases; Section 4 applies the results of the indicator to the current situation; the erosion of preferences as a result of a change in the EP system is calculated in Section 5; and the last section of the paper highlights the main findings and conclusions drawn from the analysis.

Chapter 2. The EP system and Moroccan preferences

Since 1995, the EU protects some of its domestic production of F&V through the EP system. This system is implemented for "sensitive" products (which are often crucial SMC exports) like tomatoes, cucumbers and citrus fruits. In certain cases, the EP system is applied on a seasonal basis, and the rest of the year the "usual" tariff system is in use.

Swinbank and Ritson (1995) and Tangermann (1996) have discussed the EP system and how it differs from its predecessor. The system consists of a two-tiered tariff: When the border price of exports to the EU is above a certain level, called the trigger EP, they are levied by an ad valorem tariff; whereas exports priced below the trigger EP must pay a supplementary specific tariff after being levied by the aforementioned ad valorem tariff. The amount of the specific tariff depends on the relationship between the trigger EP and the border price for the shipment: The cheaper the product, the higher the specific tariff levied, the aim being to prevent the entry of cheap products that may distort EU markets. Thus, when the ratio [border price/trigger EP] ranges between 92% and 100%, the specific tariff equals the difference between them (rounded in 2% steps). If the rate is less than 92%, the specific tariff levied is the maximum tariff equivalent (MTE) for the product according to WTO commitments.

Cioffi and dell'Aquilla (2004) analyzed the effects of the EP system on apple, tomato and orange exports from different countries to the EU and affirmed, among other conclusions, that the MTE acts virtually as a prohibitive tariff and that the system could stimulate non-competitive behavior among traders and introduces incentives to collusive arrangements in order to obtain larger portions of the preference rent. In this line of research, Chemnitz and Grethe (2005) discussed the organization of the Moroccan tomato export sector, concluding that there is a relatively high degree of collusion to appropriate the so-called "EP quota rent" or preference rent.

This rent exists because, in several cases, SMC have agreed in their Euro-Mediterranean Agreements to a reduction of the trigger EP for their exports to the EU. This reduced EP is both country and product specific and usually applies to only a certain quantity of the product, the entry price quota. The reduced EP represents a trade advantage for preference-receiving countries, in addition to the ad valorem tariff exemption also granted in these cases. Table 1 depicts the cases where reduced EP is currently in force for Morocco.[i] Garcia-Alvarez-Coque (2002) discusses the agricultural trade liberalization between the EU and the SMC.

Table 2.1: Moroccan products to which a reduced entry price applies

Product	MFN EP (€/100kg)	Reduced EP (€/100kg)	Period of the preference	EP quota (t)
Fresh or chilled tomatoes	Ranges from 62.6 to 112.6	46.1	01.10 to 31.05	Different monthly quotas
Cucumbers	Ranges from 48.1 to 110.5	44.9	01.11 to 31.05	5,600
Globe artichokes	94.3	57.1	01.11 to 31.12	500
Zucchini	Ranges from 48.8 to 69.2	42.4	01.10 to 31.01 and 01.04 to 20.04	20,000
Fresh oranges	35.4	26.4	01.12 to 31.05	300,000
Fresh clementines	64.9	48.4	01.11 to the end of February	130,000

Source: Commission Regulation (EC) No 1549/2006 and Euro-Mediterranean Agreement with Morocco

Chapter 3. Theoretical approach: the monetary value of preferences

The methodology used in this paper corresponds to the assessment of the scope of preferences by using indicators based on trade flows. This type of indicators allow to obtain assessment on the coverage, the level of utilization, the deepness and the value of preferences. In this field, we are assessing the value of preferences under a specific case of concession.

The starting point is considering that preferential exporters can take advantage of the border concession through two alternatives, or a combination of them (Grethe and Tangermann, 1998): A product with the same border price as a Most-Favored Nation (MFN) product can be sold at EU markets cheaper than its competitors, increasing market share; alternatively, a product sold in destination markets at the same price as a MFN product represents a higher price received by preferential exporters.

Under this approach, the specific indicator is the VPM. By definition, it is the difference in prices received by preferential and non-preferential exporters multiplied by the quantity that is exported under these conditions, as equation (1) shows.

$$VPM = (P_P - P_{MFN})q_P \quad (1)$$

Where P_P is the price received by preferential exporters, P_{MFN} is the price received by MFN exporters and q_P is the quantity exported by the preferential country.

The monetary value calculated using (1) corresponds to the tariff revenue forgone by the donor country. Also, it corresponds to the calculation in monetary terms of the potential value of benefits to a preference-receiving country for a particular product (Yamazaki, 1996).

The term “potential” indicates the assumption that all the rents from preferential access accrue to the exporter country. Grethe et al. (2005) indicate that the actual appropriation of the rent crucially depends on the allocation of the rights to export under the preferential regime. Additionally, the indicator assumes the full level of utilization of the preferential scheme, which sometimes may not be fully used due to the costs of acceding to the preferences, as happens when strict rules of origin are in effect (Alexandraki and Lankes, 2004; Brenton and Manchin, 2003). Another factor affecting the actual value of the transfer is the rent dissipation occurring under certain circumstances (Skully, 1999).

Another characteristic of the VPM is its static nature; as it uses trade flows belonging to a given period, it may not account for the changes in trade flows occurring when exporters adapt themselves to variations in the preferential regime.

While some researches (Grethe et al., 2005; Tangermann, 1996) apply the VPM for all the agricultural products, including F&V, some of these products have the EP system as specific border measure and, as indicated in the previous section, specific preferential concessions include reduced EP. Jean et al. (2008) indicate that their calculations of the ad valorem equivalent (AVE) for F&V may be underestimated due, among others, to the existence of the EP. Then, using the AVE in equation (1) may lead to poor estimates of the transfer in the case of products affected by the EP system.

When there are reduced EP, Martinez-Gomez (2008) proposes a modification of this indicator to consider the cases where entry prices are in force. This new indicator is calculated as in (2).

$$VPM_{EP} = (s_{MFN} - s_P)q_P + (d_{MFN} - d_p)q_p P_p - \left(\frac{t_{MFN} - t_p}{1 + t_{MFN}}\right) d_{MFN} q_P P_P \quad (2)$$

S_i indicates specific tariffs, d_i indicates ad valorem tariffs, and t_i is the AVE for the whole measure.

The indicator presented in (2) keeps the above-mentioned characteristics, and its added value lies in that it might be useful to properly assess the overall extent of the concession and also to compare the relevance of the reduced EP relative to the ad valorem tariff cut.

In (2), three addends appear. The first corresponds to the gain originated by the specific tariff cut, which in turn is caused by the reduced EP due to the functioning of the system. This addend is labeled as the specific gain. The second addend is labeled as the ad valorem gain, since it is due to the ad valorem tariff reduction granted.

A third addend, or interaction term, corresponds to the preference margin rate -as defined in OECD (2005)- for the AVE multiplied by the preferential trade value weighted by the MFN ad valorem tariff. This interaction diminishes the VPM_{EP} since a negative sign precedes it, and it appears as it impossible to fully disentangle the two different tariff components of the EP system. For comparison purposes, in the next sections we will distribute this addend between the other two addends proportionally to their respective values.

As shown in section 2, the reduced EP is an uncommon concession and often limited to certain volumes. One might presume that the reduced EP is of utmost relevance in monetary terms as tariff

revenue forgone and/or as a protective measure of domestic producers. Consequently, the next section assesses the monetary value of the reduced EP for some Moroccan F&V by using the VPM_{EP}.

The indicators based on trade flows correspond to an alternative approach to other methodologies widely used in literature to deal with trade preferences. The different approaches are mutually complementary and, as a whole, their results may help to get a comprehensive picture of the scope and implications of trade preferences.

Literature provides with two other main types of methodologies representing trade under preferential conditions. One refers to ex-ante simulation models. Among them, Partial Equilibrium (PE) models allow for a detailed representation of policy measures that may be of crucial importance in the case of F&V. A recent contribution by Garcia-Alvarez-Coque et al. (2009) simulated the impact of eliminating the EP system for tomatoes with a detailed PE model. Among the Computable General Equilibrium (CGE) models, Kuiper (2004) reviewed eleven different applied models that quantify the impact of the Euro-Mediterranean Association Agreements, but only one of the models (Chemingui and Thabet, 2001) took F&V specifically into account in its scenarios. Two contributions, by Bunte (2005) and Lorca et al. (2000) defined multi-commodity models including some F&V.

Another alternative refers to the use of ex-post econometric models, among which gravity specification has taken a prominent role in the literature. Examples of F&V trade under preferential conditions include Emlinger et al. (2008), Martí-Selva and Garcia-Alvarez-Coque (2007). Aiello et al. (2008) analyze the evidence on the impact of non-reciprocal trade preferences granted by developed countries to exports from developing countries, with mixed results depending on the aggregation level. Philippidis and Sanjuán (2007) simulate the removal of different types of trade barriers faced by Moroccan agro-food exports to the EU, combining the gravity approach with a CGE model. The gravity model is used to estimate the current level of non-tariff barriers (NTB), while the CGE allows for the examining of the long-term effects of the removal of both tariffs and NTB. Related to the topic discussed in the present paper, they consider one aggregate sector as “vegetables, fruits and nuts” and there is no clear indication of considering the entry price as NTB or tariff.

Chapter 4. Empirical application

Tomatoes and clementines exported from Morocco to the EU-25 have been chosen to illustrate the VPM_{EP} approach. We have chosen these products among the six with reduced EP because of their major weight in trade value compared to the other products, and also because of the differences between the two products in the use of the reduced EP by Moroccan exporters, as will be shown later. Oranges present a similar trade value as clementines, but as their export prices are always well above the reduced EP, there is no use at all of the reduced EP. For artichokes, cucumbers and zucchini, trade values are relatively small in comparison with the other products.

Data on EU-25 extra imports of tomatoes and clementines have been gathered from COMEXT using the average of the values for the marketing years 2006/2007 and 2007/2008 as quantities and values used in formula (2). In the case of tomatoes, actual trade flows exceed the monthly EP quotas in almost all the periods. As these excesses do not enjoy the reduced EP, we have considered the quotas as the quantities introduced in the formula, also adjusting proportionally the trade values reported.

The periods of reduced EP indicated in table 4.1 have been split into shorter periods because of sudden changes in border prices from EU partners and also due to changes in the EP system stemming from variations in the trigger EP or in the ad valorem tariff component. Therefore, monthly (or shorter) periods are the base of the analysis, and will be labeled as “months” in the paper. As it will be shown in the next paragraphs, this period-by-period procedure may be necessary to identify different patterns in the use of trade preferences over a marketing year for the same product.

With regard to border prices, daily Standard Import Values (SIV) were collected from the TARIC database corresponding to these months. Their averages were calculated and used as proxies of the border prices. Then, the two tariffs of the EP system were employed in our calculations and applied to these border prices.

It may be worthwhile to stress that, by using SIV as proxies of the border price, we are assuming naïve behavior on the part of exporters: The calculation of the tariff to be paid only takes into account the classification of the products according to the SIV. In fact, this is a simplification adopted to illustrate a less favorable position for traders in tariff terms, since under situations of high specific tariffs it is expected that traders would prefer to be levied under the other two alternatives, which the EP Regulation allows for this purpose. These other alternatives for calculating the levies to each shipment are i) the fob price of the products in their country of origin plus the costs of insurance and freight up to the EU borders, or ii) the customs value minus the duty.

Additionally, as Goetz and Grethe (2007) indicate, it could happen that the SIV calculated are affected by the trigger EP, in the sense that exporters might increase border price in order to avoid undercutting such trigger and, in turn, get levied by the specific tariff. By analyzing a comprehensive data set of SIV, these authors identify Moroccan tomatoes as one of the cases in which this behavior might happen.

While this fact is certainly relevant for simulation purposes, it does not seem to be as significant in the calculations carried out here. If traders altered border prices in this sense, they would be adapting themselves to the commercial policy and deciding how much of the preferential benefits to take. The result of this decision is therefore incorporated into the value calculated for the indicator.

As shown in Table 4.1, transfers to Morocco in tomatoes and clementines account for almost 53 million Euros, most going to tomatoes. Comparing the relevance of the two gains, about 70% correspond to the specific gain (35 million Euros) and the rest corresponds to the ad valorem gain.

Table 4.1: VPM_{EP} for Morocco, tomatoes and clementines (€)

	VMP_{EP}	***Specific gain***	***Ad valorem gain***
Tomatoes	46,008,149	36,557,201	9,450,948
Clementines	6,899,882	918,267	5,981,616
Total	**52,908,031**	**37,475,467**	**15,432,563**

Source: Calculations based on Commission Regulation (EC) No 1549/2006, Euro-Mediterranean Agreements and COMEXT as well as TARIC data

For fresh tomatoes, the reduced EP is of utmost relevance: While the total tariff revenue forgone by the EU accounts for more than 46 million Euros, about 36.5 million Euros correspond to the specific gain and close to 9.5 million are due to the ad valorem tariff exoneration. Total transfer accounts for 35.5% of the value of trade for this product within EP monthly quotas.

The significant value of the specific gain is due to the fact that, in 7 out of 10 periods in the marketing year, no specific tariff was paid with the preferential treatment and the MTE should have been paid if Moroccan products were treated as MFN. This means that Moroccan border prices were below MFN trigger EP and above preferential trigger EP. The tariff savings measured by the specific gain account for over 7 million Euros in most of these months, specifically in winter months (December to March). Only in November was the amount of the specific tariff the same under the two alternative regimes (preferential and MFN), as Moroccan border prices were below 92% of the preferential trigger EP and paid the MTE. Another remarkable period was the first fortnight of May when Morocco did not

experience any gain from the reduced EP since its border prices were above MFN trigger EP. Additionally, as the May monthly quota was exhausted in a fortnight, exports did not benefit from the reduced EP in the second part of the month. Table 4.2 shows the period-by-period numeric results for this case in the months with reduced EP.

Table 4.2: Period-by-period VPM_{EP} for Moroccan tomatoes (€).

	VMP_{EP}	***Specific gain***	***Ad valorem gain***
January	9,541,163	7,751,266	1,789,897
February	9,469,934	7,990,672	1,479,262
March	9,585,996	7,822,829	1,763,167
April	4,834,534	3,842,359	992,175
1 to 14 May	203,121	0	203,121
15 to 31 May	0	0	0
October	2,378,204	1,756,154	622,051
November	839,522	0	839,522
1 to 20 December	8,150,931	6,582,513	1,568,419
21 to 31 December	1,004,742	811,408	193,335
Total	**46,008,149**	**36,557,201**	**9,450,948**

Source: Calculations based on Commission Regulation (EC) No 1549/2006, Euro-Mediterranean Agreement and COMEXT as well as TARIC data

For clementines, preferences account for over 9 million euros, which is over 16% of the trade value. In the overall VPM_{EP}, the specific gain accounts for a low share, since only in one period were Moroccan border prices below MFN EP and above the preferential EP. In all the other months, border prices were above MFN trigger EP, indicating a low utilization of the reduced concession. Table 4.3 depicts the results of the calculations.

Table 4.3: Period-by-period VPM_{EP} for Moroccan clementines (€).

	VMP_{EP}	***Specific gain***	**Ad valorem *gain***
January	2,043,671	0	2,043,671
February	860,193	0	860,193
November	1,149,459	0	1,149,459
December	2,846,558	918,267	1,928,292
Total	**6,899,882**	**918,267**	**5,981,616**

Source: Calculations based on Commission Regulation (EC) No 1549/2006, Euro-Mediterranean Agreement and COMEXT as well as TARIC data

Chapter 5. The erosion of trade preferences

The change in the value of the preference margin has been used as an indicator of the erosion of preferences by a number of authors, the seminal work on the subject done by Yamazaki (1996). More recent examples can be found in Bureau et al. (2007) and Grethe et al. (2005), the latter concerning this issue for SMC.

5.1 Definition of scenarios

As no document has been circulated regarding the changes in the EP system after the World Trade Organization (WTO) trade talks, two scenarios have been outlined to illustrate alternative outcomes for the system. These scenarios assume a definition of "tariff cut" departing from the draft "modalities" paper circulated by the agriculture talks' chairperson C. Falconer in December 2008.

In scenario 1, it is assumed that the EU would include products protected by the EP system as "sensitive products" with regard to the eventually agreed tariff cut. In that case, the actual tariff reduction for EP products would be 25%.[ii] The implication is that ad valorem tariffs and the MTE are reduced by this percentage, and the trigger EP is lowered by the same monetary amount as the MTE, consistent with the framework adopted in the Uruguay Round. Additionally, the definition of sensitive products requires the opening of (additional) tariff-rate quotas, in this case 3.5% of the domestic consumption. In practical terms, for the assessment carried out in this paper, we have used actual trade flows in the calculations and have imagined that monthly quotas, currently binding for Moroccan tomatoes, are no longer binding.

In scenario 2, products are not defined as sensitive and, therefore, a 50% cut to the ad valorem tariffs and the MTE is agreed upon. As in the previous scenario, the trigger EP is lowered by the same monetary amount as the MTE. In this case, no change is made to the EP quotas with respect to the current situation.

The Euro-Mediterranean Agreement with Morocco indicates that preferential EP "*shall be reduced in the same proportions and at the same pace as the EP bound in the WTO*" if bound EP is lowered as a result of a WTO agreement. This "anti-erosion" provision has been considered for the two scenarios.

5.2 Results

Table 5.1 shows that scenario 2 depicts a clear erosion of preferences, while the results for scenario 1 are mixed. In scenario 1, the VPM_{EP} for tomatoes increases, as trade flows are not constrained by the EP quota. If Moroccan trade flows kept the same volumes as current quotas, erosion would be certain. The ability of Moroccan exporters to take advantage of the WTO quotas for sensitive products is therefore crucial in this aspect. A recent simulation by Garcia-Alvarez-Coque et al. (2009) suggests that, under such conditions, Moroccan sales to the EU would see a boost compared to EU sales and the sales from rest of the world partners. For clementines, as current volumes are not constrained by the quotas, the boost in sales would not happen. Therefore, the reduction of the ad valorem MFN tariffs is what would determine the level of erosion of preferences.

Table 5.1: Erosion of preferences under the two scenarios. VPM_{EP} in €

	Current VPM_{EP}	**Scenario 1 VPM_{EP}**	**Scenario 2 VPM_{EP}**
Tomatoes	46,008,149	55,484,969	34,898,768
Clementines	6,899,882	5,483,718	3,690,258
Total	**52,908,031**	**60,968,687**	**38,589,026**
Rate [scenario to current value] (%)		115.24%	72.94%

Source: Calculations based on Commission Regulation (EC) No 1549/2006, Euro-Mediterranean Agreement and COMEXT as well as TARIC data

In scenario 2, a higher degree of erosion for clementines is expected following the previous reasoning, while for tomatoes there is no evidence supporting increases in volume provided that no WTO quota has been set. Additionally, the anti-erosion provision mentioned above does not represent an outstanding compensation for Moroccan exporters, as currently they only undercut reduced EP in two periods. In all the other periods, lowering the reduced EP seems of little practical relevance.

Tangermann (2002) discusses some alternatives that would bind preferences. He states that defining preferences relative to MFN tariffs, rather than defining them in absolute terms, would (at least partially) guard against preference erosion, which would result from any further reductions to the MFN tariffs.

The aforementioned “anti-erosion” provision included in the Association Agreement seems to follow this alternative. Nevertheless, the results indicate that in the case of a more complicated system like the EP, erosion seems to be unavoidable without compensations in terms of preferential volumes.

Conclusions

In this paper we have assessed the value of the preferences that involve reduced EP by using a method that allows comparing the reduction of the specific component of the EP system (in turn linked with the reduced trigger EP) with the reduction of the ad valorem tariff.

When applying this methodology to Moroccan tomatoes and clementines, the first finding is that there are big differences in the utilization of such a priori relevant preference: For clementines it has little practical relevance; while for tomatoes, most of the preferential gains stem from the reduced EP. In contrast, the elimination of the ad valorem tariff remains very relevant, in monetary terms, for the two products.

A period-by-period assessment also shows some differences in the marketing year for the same product. Most of the gains for tomatoes take place in winter months, with lower gains in spring.

Another relevant finding for tomatoes refers to the restrictiveness of the EP quotas. Since actual trade flows are well above them, they limit the gains obtained through the reduced EP.

Regarding the erosion of preferences after changes in the EP system, the main conclusion is that the designation of tomatoes as a sensitive product may benefit Morocco, provided that market and commercial policy conditions allow it to obtain larger portions of the WTO quotas. If the product were not declared sensitive, a certain degree of erosion would take place. In the case of clementines, the finding is more straightforward: the deeper the tariff cut, the higher the erosion.

From these findings, two main conclusions arise. One has to do with Morocco's interest in keeping the EP system, an interest that may depend on the product at stake. In the case of clementines, the results reported here indicate that they take little advantage of the reduced EP, and their preferential rents stem mostly from the ad valorem tariff reduction.

For tomatoes, the situation is different and Moroccan exporters probably prefer the maintenance of the system, provided that they can increase the quantities traded under preferential conditions.

Hence, linked to the previous conclusion, the second conclusion highlights the possibility of re-negotiating the Euro-Mediterranean agreements regarding the changes implemented in the EP system. In light of these results, a cross-compensation among products (widening the access for tomatoes) could be positive for Morocco.

Finally, some tasks remain ahead after this analysis. The first is to explore other likely outcomes of the changes in the EP system: One could be the elimination of the system, another could be to fix current trigger EP and only change MTE and ad valorem tariffs. In addition, the three alternative levels of tariff reduction for sensitive products and the treatment of subsequent quotas may deserve a more thorough analysis. More information on the possible outcomes for the EP system would be helpful to define more clearly the possible scenarios.

The second task ahead is to investigate the underutilization of the reduced EP taking place in clementines: One may assume rigidities in the cost structures, in both production and exportation.

The third task refers to the ability of exporters to actually capture the rents calculated here. This type of research requires a deep knowledge of the structure of the exporter's sector and investigating export prices to alternative markets.

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[i] While this paper is written, the negotiations between the EU and Morocco to modify the agricultural protocol of their Euro-Mediterranean Agreement are virtually concluded. It is not in force, though.

[ii] In turn, it is one half of the "general" tariff cut agreed for some products. As our calculations indicate that AVE MFN tariffs for the two products are 16% (clementines) and 19.9% (tomatoes) in the period 2004-2007, we have assumed the 50% percentage of reduction.

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ABBREVIATIONS

AMTM	**Akdeniz University Mediterranean Trade Model**
CES	**Constant elasticity of substitution**
CET	**Constant elasticity of transformation**
CGE	**Computable general equilibrium**
EU	**European Union**
I-O	**Input-output matrix**
LES	**Linear expenditure system**
MPC	**Mediterranean partner countries**
ROW	**Rest of the world**
SAM	**Social accounting matrix**
UNCTAD	**United Nations Conference on Trade and Development**

Chapter 1.
Introduction

This report summarizes the specifics of empirical modeling capacity of Turkish team that can be used for modeling impacts of bilateral and multilateral trade liberalization in selected agricultural markets and resulting affects on income distribution in Turkey.

To model the trade policy impacts the two instruments that Turkish team has are 1) an econometric Armington type trade model; 2) a partial equilibrium, multi-country, Armington type agricultural bilateral trade model. To model the income distribution affects in Turkey, again the team has two instruments which are 1) a social account matrix that diversifies households into urban and rural areas and with respect to status in the job; and which has an agricultural focused sectoral disaggregation in the input-output matrix; 2) a static CGE model for Turkey that utilizes the SAM and I-O above.

Chapter 2.
The econometric Armington trade model

The Armington Model is designed to be used to assess the implications of trade liberalization between Turkey and the EU on the trade flow between Turkey and the EU, Turkey and South Mediterranean countries, and Turkey and ROW.

Particularly two different Armington models are planned to be constructed. One is for the imports of Turkey and the other one is for the imports of the EU. Each model will have the same cross section country groups so that both the import and the export trade implications of bilateral and multilateral trade agreements of the EU and Turkey can be simulated since the imports of Turkey (EU) are the exports of the countries excluding Turkey (EU).

Below a general model setup of the Armington model is presented. The model will be estimated using fixed or random effect panel data techniques. Having estimated the required parameters, the model will allow us to simulate the trade implications of price changes such as tariff reductions and removals.

The Armington model assumes imperfect substitution among goods from different geographical origins. The model uses a CES aggregation function which implies that the substitution of imports between any two pairs of importing partners are identical. According to the choice of the CES functional form, two different specifications can be considered. The *non-nested* specification (Shiells C. R. and Reinert K. A., 1993, p.303) that assumes imports from regions or countries, as well as competing domestic production all enter the sub-utility function for a sector:

$$U_i = \left[\sum_k b_{ki} M_{ki}^{-\rho_i} \right]^{-\frac{1}{\rho_i}} \qquad (1)$$

where $\sum_k b_{ki} = 1$, ρ_i is a constant greater than -1 and $\rho_i = \frac{1-\sigma_i}{\sigma_i}$. Note that, ρ_i is the CES exponent and σ_i is the elasticity of substitution where $0 < \sigma_i < \infty$.[1] In this CES functional form, M_{ki} includes the quantity of domestic production for good *i*, as well. Traditionally, CGE modelers assume that domestic production substitutes with an aggregate of imports from all sources.

The second alternative that Shiells *et al* (1993) called *nested* specification assumes that imports from different sources are differentiated products. In other worlds, in this alternative formulation, M_{ki} does

[1] If $\sigma_i = 0$, then the products are perfect complements, if $\sigma_i = \infty$ then thw products are perfect substitutes.

not include the quantity of domestic production for good *i*. This second form is generally used in order to analyze the preferential trade arrangements and/or customs unions. This nested specification is exactly what we have adopted in our study.

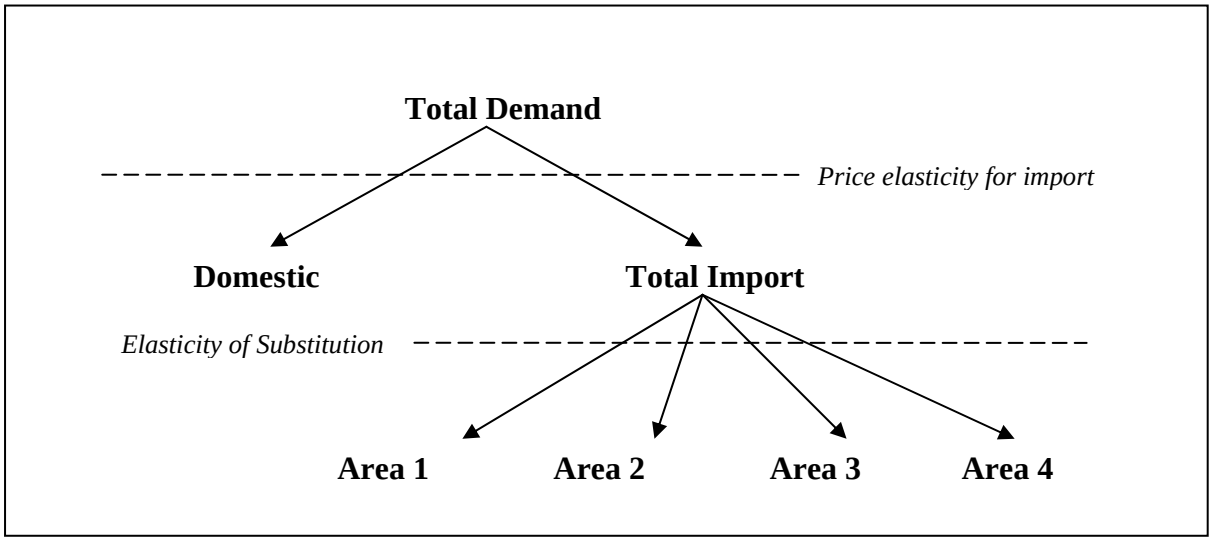
Hence our model has the utility function of:

$$U_i = \left[\sum_k b_{ki} M_{ki}^{-\frac{\sigma_i - 1}{\sigma_i}} \right]^{\frac{\sigma_i}{\sigma_i - 1}} \qquad (2)$$

Notice that in equation 2, k represents the trading partner, M_{ki} is the quantity of imports of product "*i*" originating from "*k*", b_{ki} is a constant representing the level of preference for imports originating from "*k*".

Armington model imposes a *two-step budgeting* procedure. In the first stage, the importer decides how much of a particular commodity to import. In this stage the decision is determined according to the *import demand function, M_i,* of the importer country, in other words, by the *price elasticity for total import* demand for product *i*; η_i. In the second stage given the total amount imported, the importer decides how much to import from each supplier. This decision is based on the elasticity of substitution, σ_i .

Chart 1. Armington structure



Solving the consumer utility function given in equation 2 produces the following equation which determines import volume by sector and region of origin, M_{ki}, where P_{ki} is the partner specific import price including tariffs, $P_{ki} = P_{ki}(1+t)$ where t is tariff rate.

$$M_{ki} = \alpha_{ki}^{o} M_i \left[\frac{p_{ki}}{P_i} \right]^{-\sigma_i} \tag{3}$$

where $P_i = \sum_k \alpha_{ki}^0 P_{ki}$ is the index of import prices representing a price for total imports from all origins, and α_{ki}^0 is the quantity market share of country k in the base year. Note that Hickman and Lau (1973, p.351) showed that if we normalize our prices to unity in the base period, then, one can show that $\alpha_{ki}^0 = \frac{M_{ki}^0}{M_i^0}$. In this case equation 3 can be rewritten as

$$\left[\frac{\alpha_{ki}}{\alpha_{ki}^o} \right] = \left[\frac{p_{ki} / p_{ki}^0}{P_i / p_i^0} \right]^{-\sigma_i} \tag{4}$$

where $\alpha_{ki} = M_{ki} / M_i$.

Armington (1969, p.174) showed that if we take the differential of both side of $P_i = \sum_k \alpha_{ki}^0 P_{ki}$, we obtain

$$\frac{dP_i}{P_i} = \sum_k S_{ki}^o \frac{dP_{ki}}{P_{ki}} \tag{5}$$

where $S_{ki}^o = \frac{M_{ik}^0}{M_i^0} . \frac{P_{ik}}{P_i}$. Note that, in our study we assume that the price changes will result from tariff changes, so we can write $\frac{dP_{ki}}{P_{ki}} = \frac{t_{ki}^{new} - t_{ki}^{old}}{1 + t_{ki}^{old}}$. In addition, taking the differential of equation 3, Armington (1969, p.174) showed also that

$$\frac{dM_{ki}}{M_{ki}} = \underbrace{\frac{dM_i}{M_i}}_{\text{(Effect 1)}} + \underbrace{\sigma_i \left[\frac{dP_i}{P_i} - \frac{dP_{ki}}{P_{ki}} \right]}_{\text{(Effect 2)}} \tag{6}$$

where $\frac{dM_i}{M_i} = -\eta_i \frac{dP_i}{P_i}$. The first term represents the growth of the market for M_{ki} because of the price change. Following Chevassus-Lozza and Unguru (2001, p.12) and Eruygur and Cakmak (2005), this effect tells that the change in total imports will be distributed according to the initial share of each partner. The second term represents the effect of relative price changes, that is, this is the *substitution effect*. This second term allows us to estimate the trade diversion and to determine the winners and losers of trade substitution. This is the *effect of substitutions* between partner countries.

The equation that we used for estimation is 4. If we take the natural logarithm of 4, we get:

$$\ln\left[\frac{\alpha_{ki}}{\alpha_{ki}^{o}}\right] = -\sigma_i . \ln\left[\frac{p_{ki} / p_{ki}^{0}}{P_i / p_i^{0}}\right] \qquad (7)$$

In order to estimate this equation, we use the *fixed* and *random effect models* of *panel data*. We will carry out Hausman tests in order to choose the preferred model for each product, *i*. Our approach is similar to that of Chevassus-Lozza and Unguru (2001). The main difference is the fact that in this study Hausman tests will be carried out in order to decide to *fixed* or *random effect models* of panel data, since in some cases random effect model can be preferred to fixed model. Chevassus-Lozza and Unguru (2001) used fixed effect model for all cases. Notice that the estimations are performed adding a *trend term* (*trend*) to (7) both in fixed effect and random effect specifications.

For the panel data estimation, the cross section dimension is regions, *k*, in other words, country groups submitted to the same duty regime. The cross section elements planned to be included in our study are *k*=EU15, EU10, USA, MPC (Mediterranean Partner Countries), China, Latin America, and ROW. The time series dimension is *t,* where *t=1,2,…,T.*. The model will be estimated for each agro-food product group or individual products, *i*=1,2,…*N*.

The common external tariff data will be obtained from UNCTAD database at 8 digits of the Combined Nomenclature. The Turkish tariff data is obtained from TurkStat at 8 digits. The tariff rates will be converted to ad-valorem equivalents (AVE) if necessary. Price elasticity measures of import, η_i **,** will be estimated using the simple specification of:

$$\ln M_i = \text{constant} - \eta_i \ln P_i \qquad (8)$$

Chapter 3.
Partial equilibrium, multi-country, Armington type agricultural trade model-AMTM

Akdeniz University Mediterranean Trade Model (AMTM) is a partial equilibrium, multi-country, multi-commodity agricultural trade model which models bilateral trade in Armington fashion. It is a medium-to long-term model which carries out sequential simulations by solving each year one by one[2]. So, in a sense it is a dynamic solution which provides the path of the solution from base year (2008) till the end of the period. Currently, seven agricultural products and six countries are covered in the model (Table 1) but more countries and commodities can be integrated to the modeling platform.

Table 3.1. Country and commodity coverage of the AMTM

Country	Commodity
-EU	-Apple
-Turkey	-Apricot
-Algeria	-Grape
-Morocco	-Olives
-Oher partner countries	-Orange
-ROW	-Tomatoes
	-Potatoes

Each country is linked to world market by using a standard structure, a standard equation set. Parameters and the data set create the main difference in this structure. Due to this standard structure it is relatively easier to follow effects of shocks and to interpret the empirical findings. The parameters are synthetic and obtained from relevant literature.

Domestic production and imports are considered as imperfect substitutes and to model trade, Armington specification is used which differentiates goods with respect to geographical origin. In this way bilateral trade between any pair of countries is modeled. For each country and commodity there are five behavioral equations and one trade identity. Exports are derived by using the trade identity. Behavioral equations are shown through equations 10 to 14 and variable definitions are as follows:

[2] Each year uses the solution values of preceeding year to solve the current year.

pr : price	tm : ad valorem tariffs
qp : supply	inc : income
qd : demand	pop : population
qm : imports	i : importer country
qx : exports	j : exporter country
qc : consumption	w : world
sb : subsidies	n : commodity

Country/commodity based domestic price is a function of world price and importer price is specified for each bilateral relationship as a function of domestic price, import tariffs and export subsidy (equations 9, 10).

$$pr_{in_1} = f(pr_{wn_1}) \quad (9)$$

$$pr_{ijn_1} = f(pr_{jn_1}, tm_{ijn_1}, sb_{jn_1}) \quad (10)$$

Supply is specified as a function of own and cross prices and demand is determined by all bilateral prices, domestic price in the exporter and population and income level in the importer country (equations 11, 12 respectively).

$$qp_{in_1} = f(pr_{in_1}, pr_{in_2}, ..., pr_{in_n}) \quad (11)$$

$$qd_{ijn_1} = f(pr_{ijn_1}, pr_{jn_1}, inc_i, pop_i) \quad (12)$$

Country/commodity based imports are equal to sum of all imports from all partners which are shown by bilateral demand variables in equation 13. Exports are derived by using the identity in equation 14.

$$qm_{in_1} = f(qd_{ij_1n_1}, qd_{ij_2n_1}, ..., qd_{ij_nn_1}) \quad (13)$$

$$qx + qc = qp + qm \quad (14)$$

Chapter 4.
Household diversified social accounting matrix with agriculture focused input-output matrix

These social accounting (SAM) and input output (I-O) matrices were previously built to carry out multiplier analyses particularly to assess the impact of various policies on rural economy. The first difference compared to what other scholars use in Turkey is that land is included in factors of production and labor force is classified into two groups as skilled and unskilled. Secondly, raw agricultural and food industry are disaggregated to present various sub-sectors explicitly. Thirdly, household account is separated into rural and urban areas and in each area households are grouped under five classes with respect to their status in the job.

We suggest that if the change in agricultural trade feed back to SAM, the nation-wide income effect can be calculated for urban and rural areas and for various employment statuses by utilizing the direct/indirect and open/closed loop multipliers.

Chapter 5.
Static computable general equilibrium model for Turkey

This is a static computable general equilibrium (CGE) model which employs the above SAM and I-O. The model is calibrated to year 2002 and industries use constant returns to scale technology in a perfectly competitive environment.

In the supply side firms employ a nested production structure. Two stage CES functions characterize the producer behavior and firms determine factor demand under profit maximization problem. CES is applied first to calculate value added, based on factor use. Intermediate demand is determined by using Leontief type production technology. Domestic intermediate products are differentiated from imported goods through CES function as well in Armington fashion. Final output is also a Leontief function of intermediate demand and value added. Later, by using CET total output is distributed to domestic and export markets. The demand side is modeled using Stone-Geary expenditure system (LES) and to model trade, Armington specification is used which differentiates goods with respect to geographical origin.

There are three different product markets which are imperfectly substitutes to each other: domestic market, export and import markets. Under the assumption that Turkey is a “small country” in international trade, prices of export and import goods are given by the world market. Domestic price is set a CES function of import and domestic prices. Export price is given by the world market and converted by exchange rate. Import price is given by the world market as well but a tariff rate and value added tax is applied at border. Standard, neoclassical savings-investment equilibrium is used to close the model.

We suggest resolving the model with the new “changed” agricultural trade derived from the bilateral/multilateral trade liberalization exercise. However, due to the small size of anticipated trade changes in the agricultural commodity markets, insignificant amount of changes are expected in the model outcomes. The other option is to simulate the impacts of Turkey’s changing unilateral import tariffs on income distribution. However, this will create another challenge as such, trade impacts derived from this exercise cannot be comparable to the impacts derived in the bilateral/multilateral trade liberalization exercise. In addition, insignificant inter-sectoral changes and income effects will be the expected outcome.

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Annex 7. Comparison of agricultural protocols

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Comments on specific products

Color code:	Rising imports	Agreement in force. Reference quantity	Sensitive products	New agreement	Agreement in force Art, 3: Subject to entry price		Agreement in force. Article 1, paragraph 6: indicated quantity belongs to 2007 and following
CN code	**Description**	**Used quotas? ('00-'10)**	**Quotas in force (tonnes)**	**New quotas (tonnes)**	**Annual average of imports ('00-'10)**	**Expected increase in imports**	**Comments about imports**
ex 0701 90 50	Potatoes	No	134 400	-	41 104	No	Bearish trend
0703 10	Onions	No	8 960	-	1 740	No	Cyclic rising tendency
0702 00 00	Tomatoes, fresh or chilled, from 1 October to 31 May		Article 2	Article 3	237082	Yes	Exports toward the EU doubled in 7 years
0702 00 00	Tomatoes, fresh or chilled, from 1 June to 30 September						
0703 10 90	Shallots, fresh or chilled	No	1000	-	40	No	
0703 20 00	Garlic, fresh or chilled	No	1120	1500	600	No	Bearish trend
0703 90 00	Leeks and other alliaceous vegetables, fresh or chilled	Yes (years 07/09)	1120	-	855	Yes	Strong imports of late years, besides does not exist reduction ad valorem for excess quota.
ex 0704	Cabbages, cauliflowers, kale, kohlrabi and other similar edible brassicas, fresh or chilled, excluding Chinese cabbage	Yes (from 2005)	560	-	674	Yes	Strong imports of late years (surpassing the quota in a 200 %) but decaying in last two . Besides reduction for quota does not exist
ex 0704 90 90	Chinese cabbage, fresh or chilled	Yes	224	-	455	No	Bearish trend, it has even been placed underneath the quota of late years.
0705 11 00	Cabbage lettuce (head lettuce), fresh or chilled	Yes	200	-	253	Yes	Cyclic rising tendency.
0705 19 00	(2) Lettuce (Lactuca sativa), fresh or chilled (excluding head lettuce)	Yes, from 2006	3000	–	3099	Yes	High raise of the exports towards EU from 2004
0705 29 00	(2) Chicory (Chicorium spp.), with the exception of witloof chicory (Chicorium intybus var.foliosum) fresh or chilled						
0706 10 00	(2) Carrots and turnips, fresh or chilled						
0706 90	(2) Salad beetroot, salsify, celeriac, radishes and similar edible roots, fresh or chilled						
0707 00 05	Cucumbers, fresh or chilled, from 1 November to 31 May	No	6200	15000	3260	Yes, long-term, ocasionally	As his importing evidences cycles it's probable that in the long term the current 6200 tons in use get to get solved punctually.
0707 00 90	Gherkins, fresh or chilled	No	100	-	3	No	
0709 10 00	Artichokes, fresh or chilled, from 1 November to 31 December	No	500	-	68,23	No	The bigger importing took place in the 2006 (250 tons) equivalent to middle of the quota.
0709 40 00	Celery other than celeriac, fresh or chilled	No	10080	-	54	No	In the series there exist years in the ones that no exportation toward the EU has not produced itself.
0709 70 00	Spinach, New Zealand spinach and orache spinach (garden spinach), fresh or chilled	No	10080	-	70	No	In the series there exist years in the ones that no exportation toward the EU has not produced itself.
0709 90 70	Courgettes, fresh or chilled, from 1 October to 20 April	Yes	20000	50000	31684	Yes	The quota in force carry years going too far
ex 0710	Frozen vegetables other than peas and other fruits of the genus Capsicum or of the genus Pimenta	No	11200	-	Uned than 4000	No	The data of imports refer to the whole sub-departure 0710 which does not coincide with the denomination of the tariff item, that it should be determined according to the NC and the descriptive text.
0711 40 00 0711 51 00 0711 59 00 0711 90 30 0711 90 50 0711 90 80 0711 90 90	Cucumbers and gherkins, mushrooms, truffles, sweet corn, onions, other vegetables (excluding pimentos) and mixtures of vegetables, provisionally preserved (for example, by sulphur dioxide gas, in brine, in sulphur water or in other preservative solutions), but unsuitable in that state for consumption	No	672	-	500	No	These products are independendientes of the quotas (for example mushrooms) and little cucumbers do not have a boss of defined importing.
ex 0712	Dried vegetables, excluding onions and olives	No	2240	-	246	No	The flow keeps constant although with a light bearish trend.
0805 10 20	Fresh oranges, from 1 December to 31 May	No	306800	-	136278	No	A product is whose exportation toward the EU it has diminished constantly
ex 0805 20 10	Fresh clementines, from 1 November to the end of February	No	143700	175000	85 676	No	His tendency is lightly for a fall and does not cover up the quota in force.

0808 20 90	Quinces, fresh	No	1000	-	is less than a tenth	No	
0809 10 00	Apricots, fresh	No	3920	-	192	No	Imports very low
0809 20	Cherries, fresh	No	3920	-	3,63	No	
0809 30	Peaches, including nectarines, fresh	No	3920	-	2889	No	Short-term impact is not foreseen but he can increase because imports have been very near to exceed the quota. Data about entry prices to study them do not exist.
0810 10 00	Strawberries fresh, from 1 November to 31March	There's no quota (liberalized)	-	Unlimited	20 466	No	His status does not change a protocol to another one
0810 10 00	Strawberries fresh, from 1 April to 30 April	Yes	100	3600		Yes	In the months of April and May seems to have bearish trend but not March, that is liberalized, so that it is estimated that imports will balance between the three months.
0810 10 00	Strawberries fresh, from 1 April to 30 April	quota doesn't exist (MFN)	-	1000		Yes	
0810 50 00	Kiwi fruit, fresh, from 1 January to 30 April	No	280	-	1,8	No	

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Annex 8. AVE fruit and vegetable

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Please see ZIP file:

Annex 8. AVE Fruit and Vegetables.zip

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Annex 9. Egyptian agricultural trade pattern and competitiveness

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Chapter 1.
Introduction

As the globalization Era that has recently enveloped all world countries the domestic markets of each country has also been strongly amalgamated into the international market. Accordingly, the implications of the international trade on the domestic agricultural trade of each country have significantly emerged. However the extend of amalgamation and interaction, would mainly depend upon the trade pattern of that country. These patterns are subject to the influence of domestic as well as international trade policies and factors directly related to crops and the production of goods that can affect the trade of agricultural products.

Therefore, the main objectives of this study are the identification of Egypt's major trade partners, the analysis of the Egypt comparative advantages in agricultural trade, the competitiveness of the Egyptian agricultural exports with respect to the international markets, i.e. to how extend the Egyptian agricultural sector has a greater or lower share in total agricultural exports than they have in the world as a whole, and finally a quantitative outlook of agricultural markets.

The law of comparative advantage refers to the ability of a party (an individual, a firm, or a country) to produce a particular good or service at a lower opportunity cost than another party. It is the ability to produce a product with the highest relative efficiency given all the other products that could be produced. Comparative advantage explains how trade can create value for both parties even when one can produce all goods with fewer resources than the other. The net benefits of such an outcome are called gains from trade.

Chapter 2.
Data base and analytical procedures

The study used the data available on trade flows of Egypt and the whole world exports and imports of the concerned commodity groups from the Food Organization of the United Nations (FAO), in addition to the time series set of economically active population and the workers in agriculture sector. The time series set of the GDP was extracted from the data base of the Egyptian Ministry of Economic development. The exchange rate of EGP (Egyptian pound)/US$ was derived from the bulletin of the Egyptian Central Bank.

2.1. Changing Agricultural Trade Patterns

The selected agricultural indicators used for analyzing the changes in the agricultural trade patterns are calculated for Egypt using (Equation 1 up to Equation 4) for the period 1995-2008.

Equation 1 $$R_{aggdpi} = \frac{(V_{agi})}{(GDPi)} \%$$

Equation 2 $$R_{agexi} = \frac{(V_{agexi})}{(MXEi)} \%$$

Equation 3 $$R_{agimi} = \frac{(V_{agimi})}{(MIMi)} \%$$

Equation 4 $$R_{agempi} = \frac{(N_{agwri})}{(ECPAi)} \%$$

Where:

R_{aggdpi} = Share of agriculture in GDP % in the year i

R_{agexi} = Share of agriculture in merchandise exports in the year i

R_{agimi} = Share of agriculture in merchandise imports in the year i

R_{agempi} = Share of agriculture employment in Economically Active Population in the year i

V_{agi} = Value of agricultural output in the year i

GDP_i = GDP in the year (i)

V_{agexi} = Value of agricultural exports in the year i

MEX_i = Value of Merchandise Exports in the year i

V_{agimi} = Value of agricultural imports in the year i

MIM_i = Value of Merchandise Imports in the year i

N_{agwri} = Number of Agricultural Workers in the year i

$ECPA_i$ = Total Economically Active Population in the year i

The average approximate annual growth rate of the concerned variables was estimated from (Equation 5)

Equation 5 $(r) = [\{Ln (X_t) – LN(X_0)\}/T] \%$

Where:

r = Average annual Growth Rate between the base year 0 and the concerned year t,

x = the concerned variable

t = the concerned year of the time series set,

0 = refers to the base year of the time series set,

T = the number of years included in the time series set.

2.2. Analysis of Comparative Advantage

If the classical Revealed Comparative Advantage (RCA) Index, (Equation 6) formulated by Balassa (1965), is greater than one indicates a comparative advantage and if RCA <1 depicts a comparative disadvantage Vollarth, (1987; 1989) examined trends of international competitiveness in agriculture, basing the analysis upon a concept called Revealed competitiveness advantage using other global trade intensity measures than RCA. “Vollarth” identified (RCA) as Relative Export advantage (RXA), (Equation 7). The Logarithm of the Revealed export advantage Ln (TXA) identifies the relative export advantage (Equation 8). The counterpart of RXA is the Relative Import Advantage Index (RMA), (Equation 9). The Relative Trade Advantage (RTA) considers both exports and imports relative advantages, (Equation 10). The Revealed Competitiveness (RC), (Equation 11) considers the logarithm of both the relative export advantage and the relative import advantage.

The Logarithm of the Relative export advantage Ln (TXA) is the unambiguous economic interpretation of Revealed comparative advantage (RCA) as being equivalent to deviations of actual from expected trade. As with Balassa’s Relative export share definition of revealed comparative advantage (RCA), the other three revealed-Competitiveness Advantage indices differentiate countries that enjoy a relative advantage in a particular commodity from those that do not. Whereas, positive RTA, Ln (RXA) and RC reveal a comparative advantage, a negative value reveals a comparative disadvantage. Eliminating country and commodity double counting in world trade from all indices make clear distinction between a specific commodity and all other commodities and between a specific country and the rest of the world (Chang, Ha-Joon, (2002, 2008).

Ln (RXA) may be preferable than RCA or even RTA and RC, because the former is less susceptible to “policy induced distortions”. On the other hand RTA and RC are adhere more closely to actual

comparative advantage than Ln (RXA) when abstracting from distortion influence. Importance of RTA and RC stems from using export and import data and therefore, embody both the relative demand and relative supply dimensions. Besides, RTA and RC consist with the real world economic phenomenon of two ways trade. However, RC is preferable to RTA at high levels of commodity aggregation. In this case RC balances the supply and demand dimensions of comparative advantage equally. Even though, the main precautions associated with using RC are: (a) The extreme sensitivity to small values of exports and imports of the specified commodity, (b) When the two ways trade does not exist as the case of no imports, then RC would be not identified or equals to zero when there is no exports. To wrap up, RTA index is preferable than RC in two cases: (a) At low levels of commodity aggregation, (b) RTA does not require a country existence of exporting and importing the same commodity. This is because RTA weights the Revealed Comparative Advantage by the relative importance of RXA and RTA. Therefore, The RTA behavioral patterns are not dominant by extremely small export or import values of the specific commodity. The estimation of the comparative advantage and competitiveness advantage indices are based upon trade patterns of Egypt of the set of data presented in (Table 2 up to Table 11).

Equation 6 $$RCA = (X_{ij}/X_{it})/(X_{nj}/X_{nt})$$

Equation 7 RXA = RCA

Equation 8 Ln (RXA) = Ln (RCA)

Equation 9 $$RMA = (M_{ij}/M_{it})/(M_{nj}/M_{nt})$$

Equation 10 $$RTA = RXA - RMA$$

Equation 11 $$RC = \ln RXA - \ln RMA$$

Where:

X represents exports value in (000) US$,

M represents imports value in (000) US$,

i is the specified country (Egypt),

j is the specified commodity,

t is the total set of commodities exports –

n is a set of comparable Market(s); (World)

Then:

x_{ij} = Exports value in (000) US$ of Commodity j of Egypt

x_{it} = Exports value of the total set of commodities exports from Egypt minus the specified commodity

x_{nj} = Exports value of the specified commodity of the World market

x_{nt} = value of the total set of commodities exports minus the specified commodity export in the world market

2.3. The trade specialization and competitiveness of Egypt

The study is focusing on the trade specialization and competitiveness of Egypt with respect to the markets receiving its agricultural exports. Therefore, the index form (CEP), (Equation 12) will be calculated accordance with Reveal Comparative Advantage (RCA) index as explained by (Equation 6)

CEP index value unity means that the particular sectors have a greater (lower) share in total exports of the individual country than they have in the world as a whole. It points out a relative advantage or disadvantage in the export of these products (Donges, 1982). It should be mentioned that the CEP index is based only on export shares. This way, any possible distortions because of trade policy interventions to the imports in the revealed comparative advantage index can be eliminated.

Equation 12 $$CEP = (X_{ij}/X_{Tw})/(\sum_{i=1}^{n} X_{ij}/\sum_{i=1}^{n} X_{Tw}$$

Where:

X stands for exports value in (000) US$,

The subscript j refers to the country in question, which is Egypt in this study,

The Subscript w refers to the world market,

The subscript i refers to the 10 agricultural product groups in this study, (table 2 up to table 11).

2.4. The Quantitative Outlook of Agricultural Markets

To approach the study's objective on a quantitative outlook of agricultural markets for the next decades and the main factors explaining their evolution, a time series analysis model was generated in order to predict future points in the series (Autoregressive Integrated Moving Average (ARIMA) model. It is one of the popular forecasting models.

2.5. Concepts of ARIMA Method

Autoregressive Integrated Moving Average (ARIMA) model was introduced by "Box and Jenkins". Therefore, it is also known as "Box Jenkins Model" for forecasting a variable. It is an extrapolation method for forecasting. Therefore, it requires the historical time series data on the variable under forecasting. Among the extrapolation methods this one is of the most sophisticated method. It incorporates the features of all other methods. However, it does not require from the investigator a priori choice for the initial values of any variable or the values of various parameters. It is robust to handle any data pattern (Abraham and Ledolter, 1983).

Even though, such model involves transformation of the variable, identification of the model, estimation through non-linear method, verification of the model and derivation of forecasts, there are many reasons why an ARIMA model is superior to common time–series analysis and multivariate regressions (Box and McGregor, 1974)

The common problem in time series analysis and multivariate regression is that the error residuals are correlated with their own lagged values (Chatfield, 1996)). This serial correlation violates the standard assumption of the regression model, that disturbances are not correlated with other disturbances. Therefore, the regression analysis and basic time series analysis are no longer efficient among different linear estimations. As the error residuals helps to predict current error residuals, it is an advantage to form a better prediction of the dependent variable using ARIMA. If there are lagged dependent variables set as regressors, regression estimates are biased and inconsistent but can be fixed using ARIMA (Box and Reinsel, 1994). Moreover, ARIMA model takes into account the seasonality of the data.

In words, the ARIMA procedure analyzes and forecasts equally spaced unvaried time series data, transfer function data and intervention data, using the Autoregressive Integrated Moving-Average (ARIMA) or autoregressive moving-average (ARMA) model (Makradakis,, Wheelwright and McGhee, 1983)).

2.6. ARIMA Model

An “ARIMA” model predicts a value in a response time series as a linear combination of its own past values, past errors (also called shocks or innovations), and current and past values of other time series, (Judge, et al, 1985). Then a difference between regression models in which Yi is explained by regressors X_1 X_2 X_3 .... X_k, and time series as type of “BJ” models is that regressors can be explained by lagged values, and the stochastic error terms (Gujarati, 2004)

The time series models are analyzed based on the assumption that the time series considered are weakly stationary. Therefore, the noise (or residual) series for an ARMA model must be stationary. Both the expected values of the series and its auto-covariance function must be independent of time. In short, the mean and variance for a weakly stationary time series are constant and their covariance is invariant. However, it is known that many economic time series are not stationary (Nelson, 1973), i.e. they are integrated (if a time series is integrated of order 1, i.e., if “I (1)”, their first differences are “I (0)” i.e. stationary, (Brockwell, et al,. 2002). Therefore, whether to differentiate a time series “d” times to make it stationary and then apply the model ARMA (p, q), you can say that the original time series is ARIMA (p, d, q), (Chatfield, 1996).

The order of an ARIMA model is usually denoted by the notation (Equation 13)

Equation 13 ARIMA (p, d, q),

Where:

P = the order of the autoregressive part

D = the order of the differencing

Q = the order of the moving-average process

If no differentiations are done (d = 0), the models are usually referred to as (Equation 14)

Equation 14 ARMA (p, q)

Since the IDENTIFY statement specified d = 1, and the final estimate statement specified p= 1 and q = 1, the model to be used in analysis of the time series of RCA Index for the Egyptian Agricultural Export products is; (Equation 15)

Equation 15 ARIMA (1, 1, 1)

The method proposed by "Box and Jenkins, (BJ)" is customarily partitioned in three stages: identification, estimation and diagnostic checking. At the identification stage a tentative ARIMA model is specified for the data generating process on the basis of the autocorrelation pk and partial autocorrelation. For a given sample $y_{1...}$ y_t, the former can be estimated by (Equation 16)

Equation 16 pk = $$\frac{\sum_{t=1}^{T-k}(yt - \bar{y})(yt+k - \bar{y})}{\sum_{t=1}^{T}(yt - \bar{y})^2}$$

Where:

$\bar{y}$ = the sample mean.

An alternative, asymptotically equivalent estimate for pk is (Equation 17).

Equation 17 $$r_k = \frac{T}{T-K} r_k$$

An estimate of the kth partial autocorrelation coefficient ψkk can be obtained by using the Yule-Walker equations. Alternatively, ψkk can be estimated by LS using the linear model, (Brockwell, and Davis,(2002).

Equation 18 $y_t^* = \psi_{k1}\, y^*_{t-1} + \ldots\ldots\ldots + \psi kk\, y^*t\text{-}k + \nu_t$

Where:

$y_t^* = y_t - \bar{y}$.

To identify integer's p, d, q the following result can be used:

1 If the autocorrelation do not die out rapidly, this indicates non-stationary and differentiating (usually not more than once or twice) and it is suggested until stationary is obtained. Then an ARMA model is identified for differentiating the series

(a) For an MA (q) process, the autocorrelation pk = 0 for k > q and the partial autocorrelation taper off.

(b) For an AR(p), the partial autocorrelation $\psi_{kk} = 0$ for $k > p$ and the autocorrelations taper off.

2 If neither the autocorrelations nor the partial autocorrelations have a cutoff point, an ARMA model may be adequate. The AR and MA degree have to be inferred from the particular pattern of the autocorrelations and partial autocorrelations.

3 Also, if a seasonal ARIMA model is adequate this has to be inferred from the autocorrelations and partial autocorrelations. However, the specification of a tentative ARIMA model by visually inspecting the estimates of these quantities requires some experience.

4 Once the orders of tentative model are specified, its parameters can be estimated.

5 Finally the adequacy of the model may be checked for example by analyzing the residuals or by over fitting the obtained model (Abraham, 1983).

Chapter 3.
Results and discussion

3.1. Changing Agricultural Trade Patterns

Even though Egyptian agricultural output increased from 10157 million US$ in 1995 to 25662 million US$ in 2008, i.e. at annual growth rate of around 7%, its share in the Egyptian GDP ranges from 17% to 14% with an annual average of 16% over that period, (Table 1) because the GDP growth rate during that period was higher, i.e., about 8%. Agricultural exports share in the Egyptian merchandise exports has declined from 11% in the year 1995 up to 7% in the year 2008 with an annual overage 9% along the same period. Such decline of agricultural sector share in the Egyptian exports was also due to lower growth rate of about 9% a year while the total merchandise exports grew at 13%. The share of agricultural imports in total merchandise imports has also declined from 29% in 1995 to about 18% in 2008. However, the coverage rate of agricultural exports to agricultural imports has increased over the studied period from 16% to more than 21%. The Table 1 shows that the role of agriculture in employment has declined. The share of agricultural employment in the total economically active population declined from 35% in the year 1995 to less than 26% in the year 2008, with an annual average of 31%. This because the size of agricultural workers was growing at less than 0.5% while that of total economically active population was around 2.7% along the period (1995-2008).

3.2. The Analysis of the Egypt Comparative Advantages in Agricultural Trade

The Analysis of The Egypt Comparative Advantages has dealt with the Agricultural Trade of the following commodity groups: Meat and meat preparations, Dairy products and bird eggs, Cereals and cereals preparations, Vegetables and Fruits, Sugar, sugar preparations, honey, Feeding stuff of animals, Beverages, Tobacco, Oils and fats, Textile fiber and their wastes.

The study has not restricted the estimated measure of the comparative advantage to only the classical RCA, it applied other more elaborated indices, in order to avoid unfavorable conclusions due to policy distortions and/or the export (supply) pattern and the Import (demand) pattern of the specified commodities. The relative export advantage index, Ln (RXA), may be preferable than RCA or even the relative trade advantage, RTA and the revealed competitiveness index, RC, because the former is less susceptible to “policy induced distortions”. On the other hand RTA and RC are adhere more closely to actual comparative advantage than Ln (RXA) when abstracting from distortion influence. Importance of RTA and RC stems from using export and import data and therefore embody both the relative demand and relative supply dimensions. Besides, RTA and RC consist with the real world economic phenomenon of two ways trade. However, RC is preferable to RTA at high levels of commodity aggregation. In this case RC balances the supply and demand dimensions of comparative advantage equally. The RC should not be used when there are small values of exports and imports of

the specified commodity, or in the case of no imports as RC would be not identified or when there is no exports, it equals to zero. RTA index is preferable than RC at low levels of commodity aggregation, and when either the exports or imports of a commodity is not exist.

The analysis investigated the results on base of: If the Relative Export Advantage (RXA) Index of a certain commodity group is greater than one and/or other competitiveness indices are of positive value, then Egypt has a comparative (competitiveness) advantage in such group of agricultural products, other wise (RXA <1, or other indices are of negative values), indicate that Egypt has disadvantage in exporting such commodity group to the world market.

Investigation of results of estimated indices is presented in (Table 13 up to Table 22). In lights of these criteria, there are only four agricultural products groups out of ten, where Egypt has competitiveness (comparative) advantage in the world market. These four groups are: Textile and Fibers, Fruits and Vegetables, Cereals and cereal preparations and Sugar and honey.

Surprisingly, that Egypt is net importer of sugar cane, while there is a revealed competitiveness in exports of such group to the world market (Table 17), where the RXA ranged from 1 to 2.5. However, the astonishment will disappear fast, when we know that all sugar products exports from Egypt are under Sugar Confectionery and no exports of real pure sugar, (Soliman and Mashhour,2000). It should be mentioned that the competitiveness of such group in the world market was not in all concerned time series. It was only over nine years (2000-2008).

Similarly, the cereals and cereal preparation group has shown a competitiveness over the whole concerned period, but two years 1995 and 2008 (Table 15). However, Egypt is the largest importer of wheat in the world over the last decade. In addition Egypt import large amount of corn for poultry and livestock feeding. However the competitiveness advantage of Egypt in cereals export implies the impact of the importance of Egypt in rice export (Soliman, et al., 2003).

On the other hand, the analysis showed that Egypt has extraordinary high competitiveness in other two agricultural products groups. These are Textile and fiber crops and Fruits and Vegetables. The RXA ranged from 6 to 28 for textile and fiber crops and from 1.5 to 7 for fruits and Vegetables, (Table 8), (Table 5), respectively. The main textile and fiber crops for export is the Egyptian cotton (Soliman and Owaida, 2005) and the main exported fruits and vegetables are oranges potatoes, tomatoes and onion (Soliman and Gaber, 2004).

3.3. Egyptian Agricultural Export Competitiveness in the World Market

Trade specialization in the sense of the Revealed Comparative Advantage (RCA) of Balassa (1965), (Equation 6) reflects sectorial competitiveness. However, there is a wide range of modifications commonly used in the economic literature. The specialization indicator used here (CEP) , (Equation 12) is a modification of the classical RCA index, which is often referred to as the ratio of export shares. It reveals the relative comparative advantage of an industry within a country by comparing

the share of that particular industry in the country's total exports to the share of that industry in total world exports at a certain point in time.

Modified RCA Balassa's index called (CEP) has a minimum value of 0 and a maximum value of infinity. If CEP> 1 for a certain commodity group, Egypt has a comparative advantage in that agricultural products group as compared to the World. If CEP for a certain commodity group < 1, there is a comparative disadvantage of Egypt in that concerned agricultural products group.

3.4. A Quantitative Outlook of Agricultural Markets

This section provides a quantitative outlook of agricultural markets for the next decade. For this purpose a time series analysis model was generated in order to predict future points in the series (Autoregressive Integrated Moving Average (ARIMA) model. The model was used for selected group of agricultural exportable products. The selection based on the RXA results focusing on such agricultural commodity groups that showed comparative advantage (RXA > 1). The analysis in the previous sections of this study showed that these groups are (Fruits and Vegetables), (Textile and Fibers), (Cereals and Cereal preparations) and (Sugar and Honey). Even though, these four groups showed RXA index >1 associated with Positive coefficient of each of other estimated indices: (Ln RXA), (RTA) and (RC), there was a wide variation of RXA values among these four groups and RXA was not > 1 for all concerned years (1995-2008).

3.4.1. Forecast ARIMA Model for Egypt competitiveness in Textile and Fibers Exports

The best fitted ARMA model applied for Egyptian Textile and Fiber Exports was (0, 0, 1), The model parameters were shown in (Table 23). The model function is shown in (Equation 19), which was used to forecast the values of the relative advantage index for textile and fibers exports of Egypt till the year 2018. Forecasted and actual values with confidence limits are shown (Table 24) and (Figure 1). Forecasting results implies that the relative export advantage of Egypt to the world market seem to decrease over the forthcoming decade..

Equation 19 RXA = 15.204 + 0.562 εt-

3.4.2. Forecast ARIMA Model for Egypt competitiveness in Fruits and Vegetables Exports

The best fitted ARMA model applied for Egyptian Fruits and Vegetables Exports was (0, 1, 1). The model parameters were shown in (Table 25). The model function is shown in (Equation 20), which was used to forecast the values of the relative advantage index for fruits and vegetables exports of Egypt till the year 2018. Forecasted and actual values with confidence limits are shown (Table 26) and (Figure 2). Forecasting results implies that the relative export advantage of Egypt in Fruits and Vegetables to the world market seem to sharply increase over the forthcoming decade

Equation 20 RXA= 0.3784 + 1.000 ε_{t-1}

3.4.3. Forecast ARIMA Model for Egypt competitiveness in Cereals and cereal Preparations

The best fitted ARMA model applied for Egyptian Cereals and Cereal Preparations exports was (1, 0, 1). The model parameters were shown in (Table 27). The model function is shown in (Equation 21), which was used to forecast the values of the relative advantage index for Cereals and Cereal Preparations exports of Egypt till the year 2018. Forecasted and actual values with confidence limits are shown (Table 28) and (Figure 3). Forecasting results implies that the relative export advantage of Egypt in Cereals and Cereal Preparations to the world market seem to sharply increase over the forthcoming decade

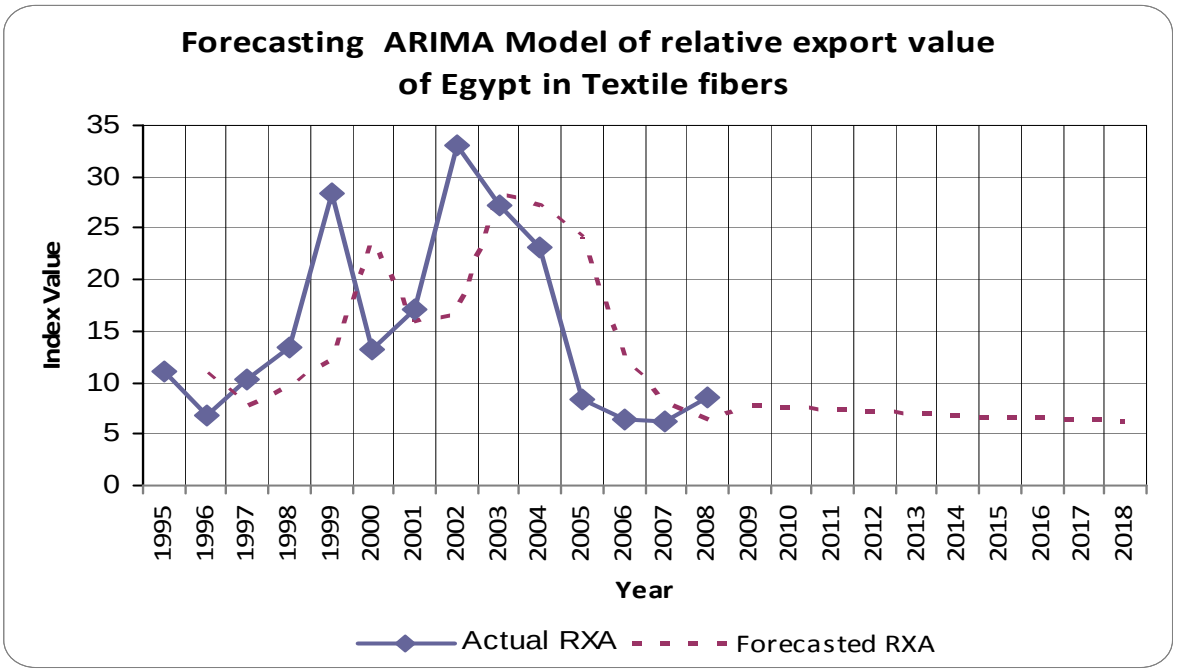
Equation 21 $RXA = 1.7312 + 0.2702\ RXA_{t-1} - 0.1343\ RXA_{t-2} - 0.8051\ RXA_{t-3}$

3.4.4. Forecast ARIMA Model for Egypt competitiveness in Sugars and Honey

The best fitted ARMA model applied for Egyptian Sugars and Honey exports was (1, 1, 2). The model parameters were shown in (Table 29). The model function is shown in (Equation 22), which was used to forecast the values of the relative advantage index for sugar and honey exports of Egypt till the year 2018. Forecasted and actual values with confidence limits are shown (Table 30) and (Figure 4). Forecasting results implies that the relative export advantage of Egypt in Sugar and Honey to the world market seem to slightly increase over the forthcoming decade, with moderate fluctuations.

Equation 22 $RXA = 0.0643 - 0{,}8990\ RXA_{t-1} + 1.1555\ \varepsilon_{t-1} + 1.000\ \varepsilon_{t-1}$

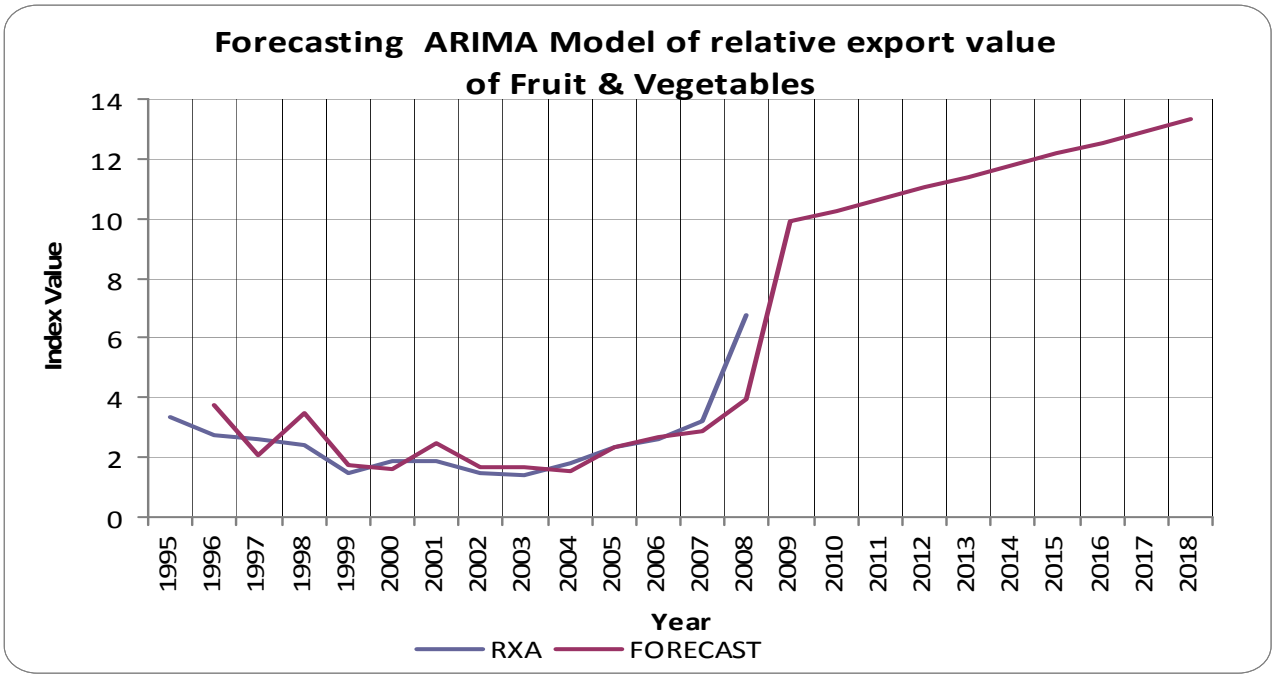
Figure 1. Forecasting ARIMA Model of relative export value of Egypt in Textile fibers



Source: Drawn from (

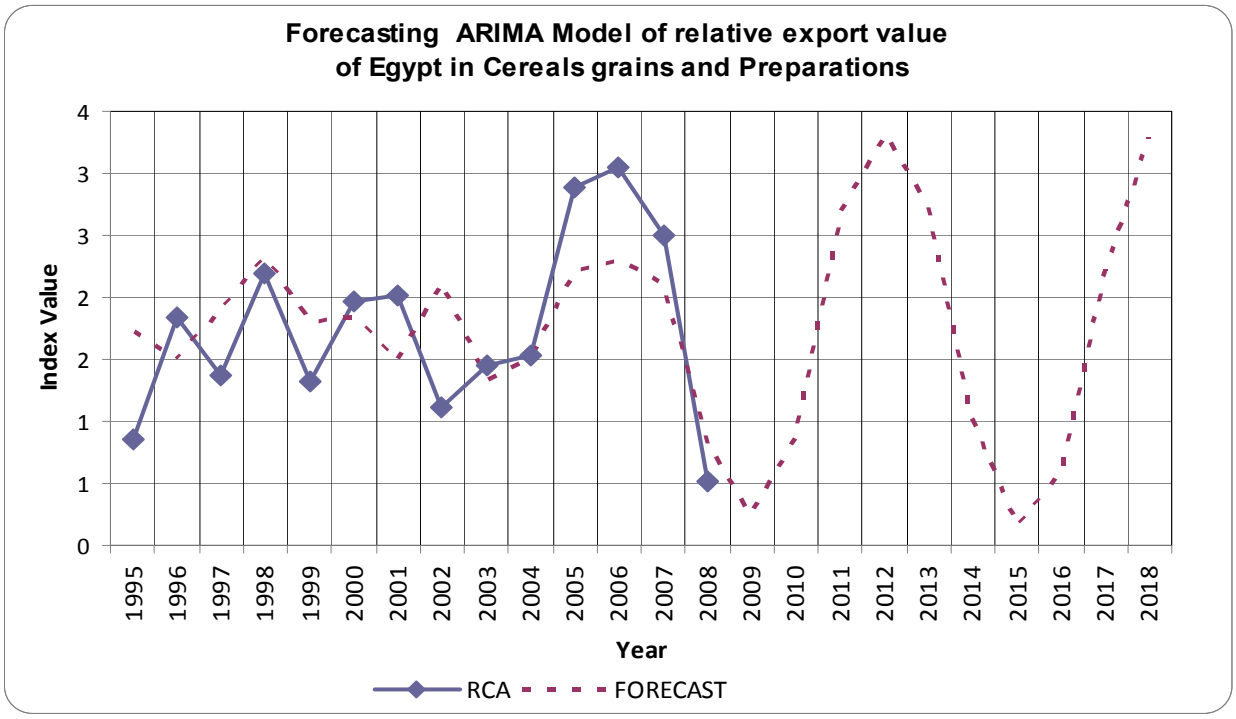
Table Table 24)

Figure 2. Forecasting ARIMA Model of relative export value or Fruit & Vegetables



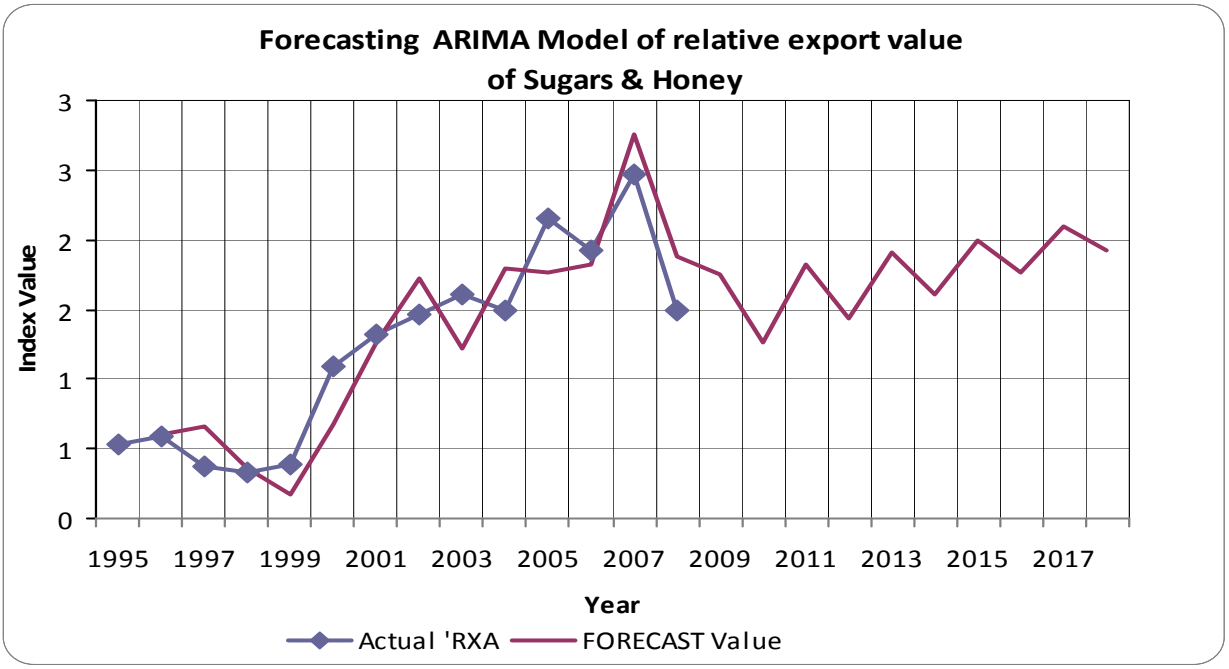
Source: Drawn from (Table 26)

Figure 3. Forecasting ARIMA Model of relative export value of Egypt in Cereals grains and Preparations



Source: Drawn from (Table 28)

Figure 4. Forecasting ARIMA Model of relative export value of Sugars & Honey



Source: Drawn from (Table 30)

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Annex

Table 1. Role of Agriculture in Egyptian Economy

Year	Total GDP Million US$(2)	% (agriculture Output)/GDP	Total Exports Million US$ (3)	% (agricultural exports)/ Total	Total Imports Million US$ (3)	% (agricultural imports)/ Total	Total Economically Active Population (000)	%(Employed in Agriculture)/ total
1995	59749	17%	4957	11%	11739	29%	18531	35%
1996	70896	16%	4609	11%	14107	27%	18850	34%
1997	78684	16%	5345	8%	15565	22%	19169	33%
1998	81063	17%	5128	11%	16899	21%	19489	33%
1999	87463	17%	4445	13%	17008	22%	20559	32%
2000	94492	16%	6388	8%	17861	20%	20935	31%
2001	91371	16%	7068	9%	16441	20%	21242	31%
2002	86049	16%	6643	12%	14644	23%	22136	30%
2003	82548	16%	8205	11%	14821	18%	22828	30%
2004	78171	15%	10453	13%	17975	17%	23504	29%
2005	90682	14%	13833	8%	24193	16%	24160	28%
2006	112254	14%	18455	6%	30441	13%	24757	28%
2007	124324	15%	19224	8%	37100	15%	25559	27%
2008	160,388	16%	26,224	7%	48,382	18%	26,213	26%
Annual Average	92,724	16%	10,070	9%	21,227	19%	21,995	31%

Source; Compiled and Calculated from:

(1) Egyptian Ministry of Economic Development (2010) “Economic Indicators”, http://www.mop.gov.eg/English/map_E.html

(2) Xe (the World favorite Currency Site, (2010) , http://www.xe.com/ict/?basecur=USD&historical=true&month=7&day=10&year=2008&sort_by=name&image.x=44&image.y=14

(3) FAOSTAT | © FAO Statistics Division (2011) | January 2011 http://faostat.fao.org/site/550/DesktopDefault.aspx?PageID=550

(4) Using (Equation 1 Up to Equation 4)

Table 2. Egypt Trade of Meat, Meat Preparations and live animals

Year	Exports (000) US$			Imports(000) US$		
	Egypt	% of World	World	Egypt	% of the World	World
1995	7,206	0.013%	56,913,234	367,094	0.65%	56,322,976
1996	9,662	0.017%	57,859,136	255,070	0.45%	56,860,488
1997	12,199	0.022%	55,654,533	276,744	0.51%	54,142,394
1998	8,621	0.017%	52,077,214	336,299	0.64%	52,401,652
1999	5,325	0.010%	51,967,860	440,133	0.85%	52,009,544
2000	4,544	0.009%	53,005,023	484,194	0.90%	54,002,940
2001	7,215	0.013%	54,470,355	344,107	0.63%	55,006,593
2002	7,065	0.013%	55,866,535	347,683	0.61%	57,015,329
2003	10,946	0.017%	64,829,693	221,732	0.34%	64,915,093
2004	15,451	0.021%	74,846,324	228,847	0.31%	74,043,627
2005	11,205	0.013%	85,847,863	353,105	0.42%	83,133,566
2006	5,897	0.006%	92,025,899	526,317	0.59%	89,741,394
2007	7,351	0.007%	106,815,388	627,265	0.60%	105,013,952
2008	8,138	0.006%	129,662,913	487,728	0.39%	125,215,550
Annual average	8,630	0.012%	70,845,855	378,308	0.54%	69,987,507

Source; FAO, Food and Agricultural Organization of the United Nations, FAOSTAT, TRADE, TRADESESTAT, CROPS and LIVESTOCK PRODUCTS and LIVE ANIMALS (http://faostat.fao.org/site/535/default.aspx#ancor), http://faostat.fao.org/site/604/default.aspx#ancor,

Table 3. Egypt Trade Dairy Products and Eggs

Year	Exports (000) US$			Imports(000) US$		
	Egypt	% of World	World	Egypt	% of World	World
1995	2,757	0.01%	29,655,792	168,963	0.57%	29,888,050
1996	4,202	0.01%	29,990,191	181,182	0.61%	29,507,834
1997	4,704	0.02%	28,625,399	149,489	0.54%	27,889,263
1998	4,129	0.01%	28,187,317	168,020	0.61%	27,716,339
1999	16,252	0.06%	26,701,533	223,186	0.82%	27,383,207
2000	5,879	0.02%	26,622,119	179,897	0.68%	26,567,272
2001	5,850	0.02%	28,037,558	142,506	0.52%	27,630,802
2002	11,521	0.04%	27,300,560	130,250	0.47%	27,706,850
2003	22,888	0.07%	33,733,752	123,899	0.37%	33,881,767
2004	25,708	0.06%	40,269,811	122,233	0.31%	39,658,967
2005	41,606	0.10%	42,811,574	170,038	0.41%	41,793,725
2006	34,947	0.08%	45,439,154	124,246	0.28%	44,833,217
2007	41,234	0.07%	59,294,008	174,836	0.30%	57,863,213
2008	86,015	0.13%	67,925,730	486,199	0.73%	66,163,539
Annual average	21,978	0.060%	36,756,750	181,782	0.50%	36320288.9

Source; FAO, Food and Agricultural Organization of the United Nations, FAOSTAT, TRADE, TRADESESTAT, CROPS and LIVESTOCK PRODUCTS, http://faostat.fao.org/site/535/default.aspx#ancor

Table 4. Egypt Trade of Cereals and Preparations

Year	Exports (000) US$			Imports(000) US$		
	Egypt	% of World	World	Egypt	% of World	World
1995	61,082	0.11%	57,806,302	1,310,491	2.11%	62,240,042
1996	122,829	0.18%	66,793,430	1,719,790	2.39%	71,846,503
1997	76,395	0.13%	60,384,889	1,257,261	1.99%	63,021,262
1998	140,262	0.25%	56,755,885	1,246,710	2.10%	59,301,746
1999	95,363	0.18%	53,837,013	1,292,501	2.21%	58,462,422
2000	116,773	0.22%	52,915,891	1,291,291	2.24%	57,639,515
2001	143,375	0.27%	54,070,728	1,301,527	2.26%	57,651,906
2002	110,631	0.19%	57,643,452	1,439,876	2.34%	61,550,485
2003	158,567	0.24%	65,014,179	1,160,211	1.67%	69,638,745
2004	236,151	0.31%	76,191,989	1,115,640	1.35%	82,343,206
2005	326,572	0.42%	77,583,852	1,664,642	2.01%	82,889,958
2006	318,884	0.37%	86,689,161	1,549,669	1.69%	91,925,570
2007	423,760	0.35%	119,410,518	2,591,437	2.10%	123,623,997
2008	150,113	0.09%	158,138,025	3,587,431	2.12%	169,460,293
Annual average	177,197	0.238%	74,516,808	1,609,177	2.03%	79,399,689

Source; FAO, Food and Agricultural Organization of the United Nations, FAOSTAT, TRADE, TRADESTAT, CROPS and LIVESTOCK PRODUCTS, http://faostat.fao.org/site/535/default.aspx#ancor

Table 5. Egypt Trade of Fruits and Vegetables

Year	Exports (000) US$			Imports(000) US$		
	Egypt	% of World	World	Egypt	% of World	World
1995	206799	0.29%	70204772	160,588	0.21%	76,137,530
1996	174119	0.24%	72704822	169,406	0.21%	79,600,993
1997	140453	0.20%	69616339	167,422	0.22%	76,047,149
1998	180849	0.26%	70688470	181,224	0.23%	77,443,957
1999	135448	0.19%	71288590	246,996	0.31%	78,816,467
2000	138215	0.20%	67450722	217,827	0.29%	74,970,684
2001	170416	0.25%	69350226	246,646	0.32%	76,405,518
2002	178256	0.24%	75202060	270,972	0.33%	81,106,186
2003	214298	0.24%	90272109	225,091	0.23%	98,217,317
2004	344250	0.34%	101426426	241,600	0.22%	110,620,915
2005	380217	0.34%	112858479	314,153	0.26%	118,710,123
2006	377658	0.31%	123549843	285,700	0.22%	132,442,147
2007	602043	0.40%	150891302	350,771	0.22%	156,820,175
2008	1016856	0.61%	167996763	572,053	0.32%	176,976,986
Annual average	304,277	0.324%	93,821,495	260,746	0.26%	101,022,582

Source; FAO, Food and Agricultural Organization of the United Nations, FAOSTAT, TRADE, TRADESTAT, CROPS and LIVESTOCK PRODUCTS, http://faostat.fao.org/site/535/default.aspx#ancor

Table 6. Egypt Trade of Sugar and Honey (000) US$

Year	Exports (000) US$			Imports(000) US$		
	Egypt	% of World	World	Egypt	% of World	World
1995	12778	0.07%	19317462	219,125	1.08%	20,232,511
1996	13320	0.07%	19737204	260,580	1.23%	21,228,278
1997	7115	0.04%	19296196	358,289	1.80%	19,890,983
1998	8394	0.04%	18726006	293,547	1.57%	18,707,092
1999	8966	0.05%	16329621	277,697	1.60%	17,394,482
2000	20784	0.14%	15196903	73,870	0.47%	15,711,972
2001	33202	0.19%	17038485	116,786	0.64%	18,178,948
2002	42626	0.25%	17022968	117,017	0.65%	17,931,872
2003	53058	0.28%	18910852	77,282	0.38%	20,273,756
2004	66816	0.32%	21082748	68,387	0.31%	22,411,990
2005	89739	0.37%	24493548	152,640	0.59%	26,059,271
2006	85157	0.28%	30558315	155,703	0.49%	31,966,876
2007	122405	0.40%	30584120	146,171	0.44%	33,156,817
2008	80320	0.25%	31832728	399725	1.13%	35257798
Annual average	46,049	0.215%	21,437,654	194,059	0.85%	22,743,046

Source; FAO, Food and Agricultural Organization of the United Nations, FAOSTAT, TRADE, TRADESTAT, CROPS and LIVESTOCK PRODUCTS, http://faostat.fao.org/site/535/default.aspx#ancor

Table 7. Egypt Trade of Beverages

Year	Exports (000) US$			Imports(000) US$		
	Egypt	% of World	Egypt	% of World	Egypt	% of World
1995	3042	0.01%	31,070,287	1238	0.004%	29794554
1996	1986	0.01%	32,633,526	667	0.002%	31167381
1997	2124	0.01%	33,478,613	2889	0.009%	32442591
1998	2238	0.01%	33,282,970	1314	0.004%	33502004
1999	1713	0.00%	34,806,463	924	0.003%	35246795
2000	3733	0.01%	35,951,906	911	0.003%	34521800
2001	1098	0.00%	34,744,639	650	0.002%	35814376
2002	1847	0.00%	38,981,246	452	0.001%	39077125
2003	4750	0.01%	46,682,957	698	0.002%	46525796
2004	3590	0.01%	55,867,627	1024	0.002%	52978840
2005	4525	0.01%	59,682,718	773	0.001%	56436463
2006	3152	0.00%	64,226,139	1229	0.002%	63467372
2007	2634	0.00%	76,266,269	6540	0.009%	76719715
2008	14868	0.02%	81,804,521	8855	0.011%	82667969
Annual average	3,664	0.008%	16,872	2,012	0.004%	46,454,484

Source; FAO, Food and Agricultural Organization of the United Nations, FAOSTAT, TRADE, TRADESTAT, CROPS and LIVESTOCK PRODUCTS, http://faostat.fao.org/site/535/default.aspx#ancor

Table 8. Egypt Trade of Textile Fibers (000) US$

Year	Exports (000) US$			Imports(000) US$		
	Egypt	% of World	World	Egypt	% of World	World
1995	166388	0.95%	17,490,487	59504	0.308%	19335059
1996	101021	0.64%	15,779,530	67864	0.379%	17892420
1997	116455	0.76%	15,424,063	22761	0.130%	17513478
1998	163118	1.28%	12,738,302	20466	0.143%	14304445
1999	243728	2.33%	10,454,988	18718	0.154%	12122875
2000	141818	1.23%	11,527,001	12039	0.092%	13063742
2001	196826	1.77%	11,110,381	28876	0.231%	12477005
2002	343996	3.17%	10,851,384	12642	0.117%	10820637
2003	385406	2.85%	13,511,620	21651	0.166%	13005816
2004	501580	3.09%	16,239,668	103338	0.626%	16517852
2005	195473	1.25%	15,627,701	60143	0.377%	15936120
2006	147685	0.86%	17,248,333	78100	0.434%	17985668
2007	171694	0.94%	18,197,432	76845	0.425%	18069012
2008	204587	1.32%	15,466,927	153817	0.839%	18331540
Annual average	219,984	1.527%	14,404,844	52,626	0.339%	15,526,834

Source; FAO, Food and Agricultural Organization of the United Nations, FAOSTAT, TRADE, TRADESTAT, CROPS and LIVESTOCK PRODUCTS, http://faostat.fao.org/site/535/default.aspx#ancor

Table 9. Egypt Trade of Tobacco

Year	Exports (000) US$			Imports(000) US$		
	Egypt	% of World	World	Egypt	% of World	World
1995	351	0.00%	22424779	141998	0.684%	20757315
1996	217	0.00%	25946941	173787	0.775%	22421995
1997	31	0.00%	26213243	163513	0.701%	23341685
1998	34	0.00%	24572315	220495	0.989%	22286933
1999	862	0.00%	22128158	236090	1.055%	22374658
2000	5352	0.02%	22357967	267552	1.224%	21852280
2001	3403	0.02%	20755394	237021	1.047%	22629305
2002	392	0.00%	20374031	218759	0.972%	22496856
2003	1053	0.00%	21732789	188619	0.775%	24330520
2004	181	0.00%	23972057	226137	0.818%	27631556
2005	336	0.00%	26062859	180327	0.618%	29157412
2006	3748	0.01%	27258190	211232	0.702%	30109629
2007	347	0.00%	29058716	231139	0.720%	32114166
2008	347	0.00%	33230346	295050	0.843%	35014763
Annual average	1,190	0.005%	24,720,556	213,694	0.839%	25,465,648

Source; FAO, Food and Agricultural Organization of the United Nations, FAOSTAT, TRADE, TRADESTAT, CROPS and LIVESTOCK PRODUCTS, http://faostat.fao.org/site/535/default.aspx#ancor

Table 10. Egypt Trade of Fodder &Feeding stuff

Year	Exports (000) US$			Imports(000) US$		
	Egypt	% of World	World	Egypt	% of World	World
1995	10155	0.06%	18070575	132463	132463	19513981
1996	8795	0.04%	21369139	132463	132463	22731853
1997	11859	0.05%	22069424	132463	132463	23182602
1998	5473	0.03%	18720682	132463	132463	21015139
1999	5197	0.03%	17417320	132463	132463	18941484
2000	3172	0.02%	18354877	132463	132463	20140549
2001	817	0.00%	19918965	132463	132463	21728237
2002	1041	0.01%	20706366	132463	132463	22654958
2003	774	0.00%	23971423	132463	132463	25811768
2004	7484	0.03%	27327625	132463	132463	31298146
2005	8116	0.03%	27977368	132463	132463	30580500
2006	4308	0.01%	30321795	132463	132463	33106586
2007	7667	0.02%	38936686	132463	132463	42683726
2008	7160	0.01%	51332820	132463	132463	56878646
Annual average	5,858	0.023%	25,463,933	132463	132463	19513981

Source; FAO, Food and Agricultural Organization of the United Nations, FAOSTAT, TRADE, TRADESTAT, CROPS and LIVESTOCK PRODUCTS, http://faostat.fao.org/site/535/default.aspx#ancor

Table 11. Egypt Trade of Oils and Fat

Yea r	Exports (000) US$			Imports(000) US$		
	Egypt	% of World	World	Egypt	% of World	World
1995	160	0.010%	1584952	22864	1.371%	1667444
1996	158	0.012%	1367378	22864	1.513%	1511294
1997	742	0.055%	1354392	24676	1.741%	1417633
1998	10	0.001%	1415519	39443	2.546%	1549445
1999	29	0.003%	1137712	19202	1.411%	1360685
2000	21	0.002%	1002207	6835	0.584%	1170524
2001	29	0.003%	949788	1503	0.141%	1063382
2002		0.0%	1158175	747	0.062%	1203607
2003	19	0.001%	1341368	42	0.003%	1421982
2004		0.0%	1753171	141	0.008%	1763684
2005		0.000%	1598710	779	0.047%	1643722
2006	191	0.011%	1677455	144	0.008%	1708952
2007	17	0.001%	2258494	102	0.005%	2242704
2008	28	0.001%	3359463	551	0.017%	3314591
Annual average	128	0.008%	1,568,485	9,992	0.607%	1,645,689

Source; FAO, Food and Agricultural Organization of the United Nations, FAOSTAT, TRADE, TRADESTAT, CROPS and LIVESTOCK PRODUCTS, http://faostat.fao.org/site/535/default.aspx#ancor

Table 12. Annual average of Agricultural Trade Value (000) US$ of Egypt and The World (1995-2008)

Commodity Group	Exports (000) US$			Imports(000) US$			Egypt
	Egypt	Of the World	World	Egypt	of the World	World	% (Export/ Import)
Textile Fibers	220	1.53	14,405	53	0.34	15,527	418
Fruits and Vegetables	304	0.32	93,821	261	0.26	101,023	117
Cereals	177	0.24	74,517	1,609	2.03	79,400	11
Sugar and Honey	46	0.22	21,438	194	0.85	22,743	24
Dairy Products and Eggs	22	0.06	36,757	182	0.50	36,320	12
Fodder &Feeding stuff	6	0.02	25,464	132	132463	19,514	4
Meat, Meat Preparations and live animals	9	0.01	70,846	378	0.54	69,988	2
Oils and Fat	0	0.01	1,568	10	0.61	1,646	1
Beverages	4	0.01	17	2	0.00	46,454	182
Tobacco	1	0.01	24,721	214	0.84	25,466	1
Total Commodity Groups	789	3.19	363,553	3,035	11.92	418,080	26

Source: Compiled and Calculated from : (Table 2 Up to Table 11)

Table 13. Egypt Revealed comparative advantage in Meat, Meat Preparations and Live Animals

Year	RCA	Ln RXA	RMA	ln RMA	RTA	RC	CEP
1995	0.106	-2.245	0.884	-0.123	-0.778	-2.122	0.105
1996	0.152	-1.884	0.529	-0.637	-0.377	-1.247	0.149
1997	0.233	-1.456	0.669	-0.402	-0.436	-1.054	0.227
1998	0.129	-2.051	0.812	-0.208	-0.683	-1.843	0.127
1999	0.074	-2.609	1.036	0.036	-0.963	-2.645	0.073
2000	0.069	-2.680	1.125	0.118	-1.057	-2.798	0.068
2001	0.089	-2.415	0.813	-0.207	-0.724	-2.208	0.088
2002	0.073	-2.616	0.810	-0.211	-0.737	-2.405	0.073
2003	0.096	-2.349	0.661	-0.414	-0.566	-1.935	0.095
2004	0.096	-2.340	0.627	-0.466	-0.531	-1.873	0.095
2005	0.074	-2.608	0.701	-0.356	-0.627	-2.253	0.073
2006	0.043	-3.153	1.152	0.142	-1.109	-3.295	0.043
2007	0.040	-3.212	0.997	-0.003	-0.957	-3.209	0.040
2008	0.037	-3.308	0.469	-0.758	-0.432	-2.550	0.036

Source: Calculated from (Table 2) Using (Equation 6 Up to Equation 12)

Table 14. Revealed comparative advantage of Egypt in Dairy Products and Eggs

Year	RXA	Ln RXA	RMA	Ln RMA	RTA	RC	CEP
1995	0.072	-2.630	0.766	-0.267	1.589	-2.363	0.077
1996	0.118	-2.136	0.756	-0.279	2.418	-1.857	0.125
1997	0.161	-1.825	0.718	-0.332	1.026	-1.493	0.170
1998	0.106	-2.246	0.773	-0.257	1.324	-1.989	0.112
1999	0.418	-0.873	0.994	-0.006	1.705	-0.867	0.434
2000	0.166	-1.797	0.827	-0.190	1.570	-1.607	0.175
2001	0.131	-2.031	0.672	-0.398	1.141	-1.633	0.139
2002	0.231	-1.467	0.624	-0.471	1.911	-0.996	0.242
2003	0.365	-1.009	0.725	-0.322	2.545	-0.687	0.380
2004	0.281	-1.269	0.639	-0.448	1.758	-0.821	0.295
2005	0.528	-0.639	0.683	-0.381	1.932	-0.258	0.544
2006	0.495	-0.704	0.518	-0.658	0.495	-0.046	0.511
2007	0.389	-0.944	0.487	-0.720	0.389	-0.224	0.406
2008	0.724	-0.323	0.941	-0.061	-0.217	-0.262	0.736

Source: Calculated from (Table 3) Using (Equation 6 Up to Equation 12)

Table 15. Revealed comparative advantage of Egypt by Cereals and Cereal Preparations

Year	RCA	Ln RXA	RMA	Ln RMA	RTA	RC	CEP
1995	0.858	-0.154	4.164	1.426	-3.306	-1.580	0.873
1996	1.845	0.613	4.674	1.542	-2.828	-0.929	1.644
1997	1.376	0.319	3.751	1.322	-2.375	-1.003	1.310
1998	2.189	0.783	3.699	1.308	-1.510	-0.525	1.893
1999	1.316	0.274	3.670	1.300	-2.355	-1.026	1.262
2000	1.975	0.680	3.840	1.346	-1.865	-0.665	1.752
2001	2.009	0.697	4.356	1.472	-2.348	-0.774	1.771
2002	1.119	0.113	4.835	1.576	-3.715	-1.463	1.100
2003	1.444	0.367	5.157	1.640	-3.714	-1.273	1.366
2004	1.532	0.426	4.017	1.390	-2.485	-0.964	1.432
2005	2.895	1.063	5.303	1.668	-2.409	-0.605	2.356
2006	3.052	1.116	4.797	1.568	-1.745	-0.452	2.442
2007	2.499	0.916	5.862	1.768	-3.363	-0.853	2.070
2008	0.512	-0.669	3.987	1.383	-3.475	-2.052	0.552

Source: Calculated from (Table 4) Using (Equation 6 Up to Equation 12)

Table 16. Revealed comparative advantage of Egypt in Fruits and Vegetables

Year	RXA	Ln RXA	RMA	Ln RMA	RTA	RC	CEP
1995	3.344	1.207	0.253	-1.373	3.091	2.580	2.434
1996	2.719	1.000	0.231	-1.464	2.488	2.464	2.140
1997	2.600	0.956	0.263	-1.335	2.337	2.290	2.088
1998	2.410	0.880	0.264	-1.332	2.146	2.212	1.960
1999	1.463	0.381	0.336	-1.092	1.128	1.473	1.354
2000	1.858	0.620	0.315	-1.155	1.543	1.775	1.626
2001	1.889	0.636	0.383	-0.960	1.507	1.597	1.642
2002	1.470	0.386	0.406	-0.901	1.064	1.287	1.359
2003	1.430	0.358	0.413	-0.884	1.017	1.242	1.329
2004	1.776	0.575	0.416	-0.877	1.360	1.452	1.569
2005	2.321	0.842	0.405	-0.903	1.916	1.745	1.886
2006	2.585	0.950	0.368	-0.999	2.217	1.948	2.030
2007	3.227	1.172	0.329	-1.112	2.898	2.284	2.327
2008	6.735	1.907	0.372	-0.989	6.363	2.896	3.518

Source: Calculated from (Table 5) Using (Equation 6 Up to Equation 12)

Table 17. Revealed comparative advantage of Egypt in Sugar and Honey

Year	RCA	Ln RXA	RMA	ln RMA	RTA	RC	CEP
1995	0.536	-0.624	1.531	0.426	-0.996	-1.050	0.547
1996	0.593	-0.522	1.584	0.460	-0.991	-0.982	0.603
1997	0.372	-0.990	2.655	0.976	-2.283	-1.966	0.382
1998	0.334	-1.097	2.142	0.762	-1.809	-1.859	0.343
1999	0.382	-0.962	2.041	0.714	-1.659	-1.676	0.391
2000	1.091	0.087	0.570	-0.562	0.520	0.649	1.086
2001	1.321	0.279	0.850	-0.162	0.471	0.441	1.302
2002	1.465	0.382	0.884	-0.123	0.581	0.505	1.436
2003	1.610	0.476	0.762	-0.272	0.848	0.748	1.571
2004	1.494	0.402	0.639	-0.448	0.855	0.849	1.465
2005	2.146	0.764	1.005	0.005	1.141	0.758	2.051
2006	1.928	0.656	0.937	-0.065	0.991	0.722	1.850
2007	2.463	0.901	0.728	-0.317	1.735	1.219	2.334
2008	1.492	0.400	1.485	0.395	0.007	0.005	1.467

Source: Calculated from (Table 7Using (Equation 6 Up to Equation 12)

Table 18. Revealed comparative advantage of Egypt in Total Beverages

Year	RXA	Ln RXA	RMA	Ln RMA	RTA	RC	CEP
1995	0.076	-2.581	0.005	-5.237	0.070	2.655	0.081
1996	0.051	-2.980	0.002	-5.996	0.048	3.016	0.054
1997	0.061	-2.794	0.011	-4.488	0.050	1.694	0.066
1998	0.048	-3.041	0.005	-5.366	0.043	2.325	0.052
1999	0.032	-3.435	0.003	-5.836	0.029	2.401	0.035
2000	0.076	-2.580	0.003	-5.816	0.073	3.236	0.082
2001	0.019	-3.944	0.002	-6.116	0.017	2.172	0.021
2002	0.025	-3.696	0.001	-6.548	0.023	2.853	0.027
2003	0.052	-2.953	0.003	-5.892	0.049	2.939	0.057
2004	0.027	-3.610	0.004	-5.586	0.023	1.976	0.030
2005	0.039	-3.251	0.002	-6.146	0.037	2.895	0.042
2006	0.030	-3.514	0.003	-5.683	0.026	2.169	0.033
2007	0.018	-3.994	0.013	-4.345	0.005	0.351	0.020
2008	0.098	-2.320	0.013	-4.370	0.086	2.050	0.106

Source: Calculated from (Table 7, using (Equation 6 Up to Equation 12)

Table 19. Revealed comparative advantage of Egypt in Total Textile Fibers

Year	RCA	ln RXA	RMA	ln RMA	RTA	RC	CEP
1995	11.053	2.403	0.412	-0.887	10.641	3.290	7.860
1996	6.902	1.932	0.464	-0.768	6.438	2.700	5.722
1997	10.330	2.335	0.171	-1.767	10.159	4.102	7.816
1998	13.499	2.603	0.179	-1.718	13.320	4.320	9.810
1999	28.398	3.346	0.183	-1.698	28.215	5.045	16.612
2000	13.232	2.583	0.110	-2.207	13.122	4.789	9.766
2001	17.173	2.843	0.301	-1.201	16.872	4.044	11.835
2002	33.036	3.498	0.155	-1.864	32.880	5.362	18.176
2003	27.193	3.303	0.330	-1.109	26.863	4.412	15.971
2004	23.182	3.143	1.343	0.295	21.839	2.848	14.274
2005	8.312	2.118	0.641	-0.445	7.671	2.562	7.002
2006	6.477	1.868	0.834	-0.182	5.643	2.050	5.685
2007	6.142	1.815	0.705	-0.349	5.437	2.165	5.503
2008	8.649	2.157	1.081	0.078	7.568	2.080	7.689

Source: Calculated from (Table 8) Using (Equation 6 Up to Equation 12)

Table 20. Revealed comparative advantage of Egypt in Tobacco

	RXA	ln RXA	RMA	ln RMA	RTA	RC	CEP
1995	0.012	-4.399	0.939	-0.063	-0.927	-4.337	0.013
1996	0.007	-4.953	0.970	-0.031	-0.962	-4.922	0.007
1997	0.001	-6.764	0.953	-0.048	-0.952	-6.717	0.001
1998	0.001	-6.907	1.303	0.264	-1.302	-7.172	0.001
1999	0.026	-3.637	1.310	0.270	-1.284	-3.907	0.028
2000	0.182	-1.706	1.562	0.446	-1.380	-2.152	0.190
2001	0.105	-2.257	1.431	0.358	-1.326	-2.615	0.110
2002	0.011	-4.554	1.349	0.300	-1.339	-4.853	0.011
2003	0.026	-3.648	1.612	0.477	-1.586	-4.125	0.027
2004	0.003	-5.698	1.805	0.591	-1.802	-6.289	0.003
2005	0.007	-4.972	1.065	0.063	-1.058	-5.034	0.007
2006	0.088	-2.429	1.376	0.319	-1.288	-2.748	0.091
2007	0.007	-5.000	1.213	0.193	-1.206	-5.193	0.007
2008	0.006	-5.136	1.087	0.083	-1.081	-5.219	0.006

Source: Calculated from (Table 9) Using (Equation 6 Up to Equation 12)

Table 21. Revealed comparative advantage of Egypt in total Fodder & Feeding stuff

	RCA	Ln RXA	RMA	ln RMA	RTA	RC	CEP
1995	0.454	-0.789	0.932	-0.071	-0.478	-0.718	0.464
1996	0.357	-1.030	1.138	0.130	-0.781	-1.159	0.368
1997	0.544	-0.608	1.395	0.333	-0.850	-0.941	0.556
1998	0.217	-1.530	1.606	0.474	-1.390	-2.004	0.224
1999	0.206	-1.582	1.449	0.371	-1.244	-1.953	0.213
2000	0.132	-2.026	1.939	0.662	-1.807	-2.688	0.137
2001	0.026	-3.645	2.246	0.809	-2.220	-4.454	0.027
2002	0.028	-3.593	2.155	0.768	-2.127	-4.361	0.029
2003	0.017	-4.059	2.550	0.936	-2.533	-4.995	0.018
2004	0.122	-2.107	2.273	0.821	-2.152	-2.928	0.127
2005	0.157	-1.854	1.382	0.323	-1.225	-2.177	0.162
2006	0.091	-2.400	0.963	-0.038	-0.872	-2.362	0.094
2007	0.110	-2.204	1.032	0.031	-0.922	-2.236	0.115
2008	0.077	-2.558	0.403	-0.908	-0.326	-1.650	0.081

Source: Calculated from (Table 10) Using (Equation 6 Up to Equation 12)

Table 22. Revealed comparative advantage of Egypt in Vegetal and animal Oils and Fats

Year	RXA	Ln RXA	RMA	Ln RMA	RTA	RC	CEP
1995	0.083	-2.487	1.908	0.646	-1.824	-3.133	0.083
1996	0.103	-2.273	1.915	0.650	-1.812	-2.923	0.103
1997	0.567	-0.568	2.410	0.880	-1.844	-1.448	0.567
1998	0.005	-5.222	3.384	1.219	-3.379	-6.441	0.005
1999	0.018	-4.011	1.736	0.552	-1.718	-4.563	0.018
2000	0.017	-4.099	0.720	-0.329	-0.703	-3.770	0.017
2001	0.020	-3.895	0.187	-1.677	-0.167	-2.218	0.020
2002			0.084	-2.480	-0.084	2.480	
2003	0.008	-4.839	0.006	-5.129	0.002	0.290	0.008
2004			0.017	-4.082	-0.017	4.082	
2005			0.081	-2.517	-0.081	2.517	
2006	0.075	-2.584	0.016	-4.127	0.059	1.542	0.076
2007	0.004	-5.431	0.008	-4.888	-0.003	-0.543	0.004
2008	0.005	-5.333	0.021	-3.856	-0.016	-1.477	0.005

Source: Calculated from (Table 11) Using (Equation 6 Up to Equation 12)

Table 23. Estimated Parameters of Relative Export Advantage Index of Egypt in Textile Fibers

Variable	Estimated Coefficient.	Standard Error.	T -value	Pr > l t l
MA0,1	-0.562	0.2404	-2.34	0.0376
MU	15.204	3.2662	4.65	0.0006

Source: Estimated from data in (Table 19)

Table 24. Forecasts for the Export Comparative Advantage Index of Egypt in Textiles and Fiber Crops

Year	Actual RXA	Forecasted RXA	Slandered Error	95% Confidence limits		RESIDUAL
				Minimum	Maximum	
1995	11.05		9.509	-7.775	29.500	
1996	6.90	10.86	9.509	-10.832	26.443	-3.960
1997	10.33	7.81	9.509	-9.196	28.079	2.524
1998	13.50	9.44	9.509	-6.451	30.824	4.058
1999	28.40	12.19	9.509	5.089	42.364	16.212
2000	13.23	23.73	9.509	-2.696	34.580	-10.495
2001	17.17	15.94	9.509	-1.996	35.280	1.231
2002	33.04	16.64	9.509	9.675	46.951	16.393
2003	27.19	28.31	9.509	8.674	45.950	-1.120
2004	23.18	27.31	9.509	5.495	42.770	-4.130
2005	8.31	24.13	9.509	-6.143	31.132	-15.821
2006	6.48	12.49	9.509	-10.688	26.587	-6.018
2007	6.14	7.95	9.509	-12.187	25.089	-1.807
2008	8.65	6.45	9.509	-10.787	26.488	2.1977
2009		7.85	9.509	-7.775	29.500	-3.960
2010		7.66	11.737	-15.345	30.665	
2011		7.47	13.605	-19.197	34.135	
2012		7.28	15.246	-22.604	37.161	
2013		7.09	16.727	-25.697	39.872	
2014		6.90	18.087	-28.553	42.346	
2015		6.71	19.351	-31.222	44.634	
2016		6.52	20.538	-33.739	46.770	
2017		6.32	21.660	-36.128	48.778	
2018		6.13	22.727	-38.409	50.677	

Source: Estimated using (Equation 19)

Table 25. Estimated Parameters of Relative Export Advantage Index of Egypt in Fruits and vegetables

Variable	Estimated Coefficient.	Standard Error.	T -value	Pr > I t I
MA1,1	"- 1.000"	0.02217	4.51	0.0009
Constant	0.3784	0.4795	0.79	0.4467

Source: Estimated from Data of (Table 16)

Table 26. Forecasts for the Export Comparative Advantage Index of Egypt in Fruits and Vegetables

Year	Actual RXA	Forecasted RXA	Slandered Error	95% Confidence limits		RESIDUAL
				Minimum	Maximum	
1995	3.34					
1996	2.72	3.72	0.998	1.766	5.679	-1.0034
1997	2.60	2.09	0.998	0.138	4.051	0.5058
1998	2.41	3.48	0.998	1.528	5.441	-1.0743
1999	1.46	1.71	0.998	-0.242	3.671	-0.2512
2000	1.86	1.59	0.998	-0.366	3.547	0.2678
2001	1.89	2.50	0.998	0.548	4.461	-0.6153
2002	1.47	1.65	0.998	-0.304	3.609	-0.1820
2003	1.43	1.67	0.998	-0.290	3.624	-0.2368
2004	1.78	1.57	0.998	-0.385	3.529	0.2046
2005	2.32	2.36	0.998	0.403	4.316	-0.0383
2006	2.59	2.66	0.998	0.705	4.618	-0.0760
2007	3.23	2.89	0.998	0.931	4.844	0.3397
2008	6.73	3.95	0.998	1.989	5.902	2.7892
2009		9.90	0.998	7.946	11.859	
2010		10.28	2.232	5.906	14.656	
2011		10.66	2.995	4.789	16.529	
2012		11.04	3.600	3.983	18.093	
2013		11.42	4.116	3.348	19.484	
2014		11.79	4.575	2.828	20.761	
2015		12.17	4.992	2.390	21.957	
2016		12.55	5.376	2.014	23.089	
2017		12.93	5.735	1.690	24.170	
2018		13.31	6.073	1.406	25.211	

Source: Estimated Using (Table 20)

Table 27. Estimated Parameters of Relative Export Advantage Index of Egypt in Cereals

Variable	Estimated Coefficient.	Standard Error.	T -value	Pr > l t l
RA1,1	0.2702	0.2932	0.92	0.3783
AR1,2	-0.1343	0.3064	0.44	0.6705
AR1,3	-0.8051	0.3618	-2.23	0.0503
MU	1.7312	0.1151	15.04	<0.0001

Source: Estimated from Data of (Table 15)

Table 28. Forecasts for the Export Comparative Advantage Index of Egypt in Cereals

Year	Actual RXA	Forecasted RXA	Slandered Error	95% Confidence limits		RESIDUAL
				Minimum	Maximum	
1995	0.86	1.73	0.631	0.495	2.967	-0.873
1996	1.85	1.50	0.631	0.259	2.731	0.350
1997	1.38	1.88	0.631	0.643	3.115	-0.503
1998	2.19	2.32	0.631	1.087	3.559	-0.134
1999	1.32	1.81	0.631	0.575	3.047	-0.495
2000	1.98	1.84	0.631	0.607	3.080	0.132
2001	2.01	1.48	0.631	0.248	2.720	0.525
2002	1.12	2.11	0.631	0.872	3.344	-0.989
2003	1.44	1.33	0.631	0.096	2.568	0.112
2004	1.53	1.51	0.631	0.276	2.748	0.020
2005	2.90	2.21	0.631	0.973	3.445	0.686
2006	3.05	2.30	0.631	1.067	3.540	0.748
2007	2.50	2.09	0.631	0.856	3.328	0.407
2008	0.51	0.82	0.631	-0.412	2.061	-0.312
2009		0.24	0.631	-1.001	1.471	
2010		0.87	0.653	-0.408	2.153	
2011		2.68	0.654	1.399	3.964	
2012		3.31	0.849	1.643	4.972	
2013		2.72	0.894	0.969	4.472	
2014		1.02	0.894	-0.731	2.774	
2015		0.14	1.015	-1.852	2.127	
2016		0.60	1.074	-1.506	2.704	
2017		2.21	1.074	0.106	4.315	
2018		3.30	1.158	1.027	5.565	

Source: Estimated Using (Equation 21)

Table 29. Estimated Parameters of Relative Export Advantage Index of Egypt in Sugar and Honey

Variable	Estimated Coefficient.	Standard Error.	T -value	Pr > I t I
AR1,1	- 0.8990	0.3620	-2.48	0.0348
MA1,1	- 1.1555	0.2332	-4.95	0.0008
MA1,2	-1.0000	0.4631	-2.16	0.0591
MU	0.0643	0.1278	0.50	0.6268

Source: Estimated from Data of (Table 17)

Table 30. Forecasts for the Export Comparative Advantage Index of Egypt in Sugars and Honey

Year	Actual RXA	Forecasted RXA	Slandered Error	95% Confidence limits		RESIDUAL
				Minimum	Maximum	
1995	0.54					
1996	0.59	0.60	0.334	-0.054	1.255	-0.007
1997	0.37	0.66	0.334	0.001	1.310	-0.283
1998	0.33	0.36	0.334	-0.296	1.012	-0.024
1999	0.38	0.18	0.334	-0.475	0.834	0.203
2000	1.09	0.67	0.334	0.017	1.326	0.420
2001	1.32	1.26	0.334	0.609	1.918	0.058
2002	1.47	1.72	0.334	1.068	2.377	-0.257
2003	1.61	1.22	0.334	0.563	1.872	0.392
2004	1.49	1.80	0.334	1.143	2.452	-0.304
2005	2.15	1.76	0.334	1.108	2.416	0.384
2006	1.93	1.82	0.334	1.168	2.477	0.106
2007	2.46	2.75	0.334	2.098	3.407	-0.289
2008	1.49	1.88	0.334	1.221	2.530	-0.384
2009		1.75	0.334	1.100	2.409	
2010		1.26	0.536	0.206	2.308	
2011		1.83	0.863	0.135	3.518	
2012		1.44	0.971	-0.467	3.341	
2013		1.91	1.170	-0.385	4.203	
2014		1.61	1.260	-0.863	4.076	
2015		2.00	1.411	-0.764	4.766	
2016		1.77	1.491	-1.154	4.691	
2017		2.10	1.615	-1.065	5.264	
2018		1.92	1.689	-1.387	5.235	

Source: Estimated Using (Equation 22)