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FIFTY WAYS TO LEAVE YOUR PROTECTION
COMPARING APPLIED MODELS OF THE
EURO-MEDITERRANEAN ASSOCIATION AGREEMENTS

MARIJKE KUIPER

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ABSTRACT

Recent increases in the number of multilateral and preferential trade agreements have sparked the development of applied models to quantify the impact of trade agreements. Outcomes generally support the theoretical notion that liberalising trade increases welfare. The increase in aggregate welfare is attained through a restructuring of the economy, with possible painful effects for certain economic sectors or parts of the population. The current debate on trade liberalisation focuses on the distribution of costs and benefits.

Applied models can provide an understanding of the distribution of costs and benefits. Their outcomes, however, are determined by the way in which the economy and the liberalisation measures are modelled. The aim of this study is to compare different ways of quantifying the impact of the Euro-Mediterranean Association Agreements (EMAAAs). Based on the assessment of key model features and analysed scenarios we assess to what extent existing studies address key policy issues related to the EMAAAs and identify directions for future research.

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1. Aim and scope

Recent increases in the number of multilateral and preferential trade agreements have sparked the development of applied models to quantify the impact of trade agreements. Outcomes generally support the theoretical notion that liberalising trade increases welfare. The increase in aggregate welfare is attained through a restructuring of the economy, with possible painful effects for certain economic sectors or parts of the population. The current debate on trade liberalisation focuses on the distribution of costs and benefits.

Applied models can provide an understanding of the distribution of costs and benefits. Their outcomes, however, are determined by the way in which the economy and the liberalisation measures are modelled. The aim of this study is to compare different ways of quantifying the impact of the Euro-Mediterranean Association Agreements (EMAAs). By limiting the analysis to a single type of agreement, we get an idea of the variety of ways in which an identical agreement is modelled. Reviewing 11 applied studies of the EMAAs, we find a wide variety of model structures and analysed scenarios, resulting in far more than 50 ways of modelling the EMAAs and their impact.

This wide variety begs the question of which approach is the 'right' one. We cannot provide an unequivocal answer to this question, since the most appropriate analysis depends on the specific research question addressed by the model. Using key policy and research issues for analysing the EMAAs from dell'Aquila and Kuiper (2003), however, we are able to assess in general terms to what extent existing models are able to deal with these key issues.

To get a clear view of the differences across models this study proceeds as follows. First, we identify a set of criteria to assess the general structure of the models. These criteria are a mixture of items covering the general structure of the model, data used and the way in which specific aspects of the EMAAs are modelled. Together these criteria capture the essence of how the impact of the EMAAs can be analysed using a specific model.

We then proceed by using these criteria to summarise 11 general equilibrium models applied to quantifying the impact of EMAAs. The scope of this study is restricted to

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general equilibrium models since these cover the whole economy. The EMAAs aim at establishing a Mediterranean free trade area, thus affecting all sectors of production. Liberalising all trade not only affects all production sectors, it also has implications for household consumption and government finances. General equilibrium models with their economy-wide coverage are the appropriate tool for analysing such structural changes, and are therefore the most frequently used tool to analyse the EMAAs. An additional benefit of limiting the analysis to a single type of model is that the theoretical basis is identical for all models, facilitating a comparison across models.

Comparison in terms of the assessment criteria provides a concise summary of the models included in this study. The third step is to compare the way in which the implementation of the EMAAs is modelled in each application. As with the model features, the key features of the analysed scenarios are identified for each study.

Based on the assessment of key model features and analysed scenarios we assess to what extent existing studies address key policy issues related to the EMAAs. From this discussion we identify directions for future research. These directions consist of analysing additional scenarios with existing models in order to suggest adaptations to existing models to attain greater policy-relevance.

The different steps described above correspond to the different parts in this study. Section 1 describes the assessment criteria, section 2 summarises the different models, section 3 analyses the modelling of the EMAAs and section 4 compares the findings of the different models. Section 5 concludes by identifying directions for future research.

2. Assessment criteria

In order to assess the models reviewed in this study, four groups of assessment criteria are defined. The first two groups of criteria are based upon criteria used in a model review by van Tongeren et al. (2001). These two groups of criteria cover general features related to the *model structure* and *data* used, which may be used to assess a wide array of models.

The second two groups of criteria relate to specific features that are relevant for modelling the EMAAs: features of the economies of the Mediterranean Partner Countries (MPCs) that affect the impact of the EMAAs and specifics of the EMAAs themselves. These two groups of criteria are derived from a literature survey of the EMAAs (dell'Aquila and Kuiper, 2003).

2.1 Model structure

The general structure of the models is summarised through the following set of criteria: geographical scope, supply side, demand side, factors, heterogeneity of goods, dynamics and closure.

The first four criteria describe the detail of the model. *Geographical scope* covers the countries and regions that are explicit in the model. *Supply side* covers the amount of detail at the supply side, i.e. the number of sectors and commodities distinguished. *Demand side* does the same at the demand side of the model, i.e. it describes the number of households demanding commodities. *Factors* describe the type of factors

distinguished by the model. Together these four criteria cover the main elements of a general equilibrium model. Differences in the amount of detail affect the analyses that can be performed with the model.

Whereas the first four criteria provide an easy basis on which to interpret descriptions of the elements included in the model, the last three criteria refer to different theoretical assumptions requiring some background in economic theory. Their treatment here will provide a short summary of a more elaborate discussion in van Tongeren et al. (2001).

Heterogeneity of goods refers to how intra-industry trade is handled by the model. Classical trade models assume homogeneity of goods, i.e. goods from different suppliers are perfect substitutes. This implies a ‘pooled’ approach to trade; since it does not matter who supplies a good there is no need to trace bilateral trade flows. Apart from a sensitivity of trade flows to changes in price wedges, in applied work significant intra-industry trade flows are observed. These cannot be explained with homogeneous goods, and therefore applied trade models assume products from different suppliers to be heterogeneous. Two methods of incorporating product heterogeneity are commonly used in applied models: the Armington assumption and endogenous product differentiation. There is a nascent debate on modelling firm behaviour directly.

The Armington assumption considers goods from different countries or regions to be imperfect substitutes in demand. This assumption has become a standard feature in applied trade models, incorporated by defining a (generally CES) preference function for domestic and foreign products. An implication of this assumption is that even small countries have some degree of market power, being the sole supplier of their exports.

Using the Armington assumption to model product differentiation has been criticised, among other things, for introducing an exogenous source of differentiation. A more recent alternative of modelling imperfect substitution is the introduction of monopolistic competition. Key to these models is the introduction of fixed costs that result in increasing returns to scale at the production side of the model, and introducing a preference for varieties at the demand side of the model (needed to avoid a monopoly of the most efficient supplier). The presence of scale economies means that only a limited number of producers can be active, implying that the assumption of perfect competition used in standard models needs to be dropped. These adjustments to the market structure complicate the analysis of trade policy, since changes in trade have a series of (possibly opposing) effects on domestic economies (available varieties, market power and scale of domestic production) (Francois and Roland-Holst, 1997).

Dynamics refers to the time perspective employed in the model. In a comparative static approach, adjustments over time are ignored, restricting the analysis to a comparison of equilibria with and without a shock applied. Adjustments over time can be accounted for in two ways, by recursively solving the model for subsequent time periods or through intertemporal models. Recursively dynamic models are solved for a single period after which stock variables are updated and the model is solved again. Decisions within a period do not account for effects in other periods, which may result in time-inconsistent behaviour. Intertemporal models account for all periods when making decisions in a single period, thus resulting in optimal behaviour within periods as well as over time.

Model *closure* refers in the first place to the mathematical requirement of having the same number of endogenous variables as equations. Apart from serving a mathematical necessity, deciding which variables are endogenous and which are exogenous reflects fundamental assumptions on the functioning of the economy. Changing the closure of a model has significant implications for the model results. Assuming full employment with wages adjusting to match demand and supply, for example, will yield different outcomes than assuming unemployment with fixed wages. Another example is the macroeconomic closure, i.e. the link between savings and investment, which reflects different theoretical perspectives. Investment can be fixed and savings adjust (Keynesian closure) or savings can be fixed (for example through fixed-savings propensities) and investment adjusting to match the savings level.

2.2 Data

Whereas the first category of criteria covers how models reflect economic theory, the second set of criteria summarises key information on the data used to develop the applied models: reference year, data for variables and data for parameters. For general equilibrium models a social accounting matrix (SAM) is customarily used for model calibration. Initial levels of (endogenous) *variables* are derived from a SAM, as well as some of the parameters needed to specify the behavioural equations of the model.

A SAM provides a snap-shot view of the economy, usually covering all economic activities in a single year. Since transactions vary between years, the *reference year* (or years in the case of a dynamic model) affects model results. Usually, only a single SAM is used to calibrate the general equilibrium model and therefore additional data sources are needed to specify all *parameters* (especially elasticities) of the model. Finally, data are needed to specify the *policies* that are simulated with the models.

2.3 MPC specifics

This study focuses on the way in which the impact of the EMAAs is quantified in applied models. Two key questions in this respect are to what extent the applications capture the essential features of the countries involved in the EMAAs, and to what extent the applications capture the essential features of the EMAAs. This section addresses the coverage of the country-specific features; modelling features of the EMAAs is discussed in section 3.4.

The EMAAs are part of the European-Mediterranean Partnership (EMP) launched at the Barcelona Conference in 1995. It represents a renewed involvement of the EU with its MPCs.¹ The partnership covers political, economic and social aspects, but establishment of a Mediterranean Free Trade Area (FTA) by 2010 is a focal point.

¹ The EMP gathers, besides EU members, three candidates to EU membership (Cyprus, Malta and Turkey) and nine countries negotiating new EuroMed Association Agreements (Tunisia, Morocco, Israel, Palestinian Authority, Jordan, Egypt, Lebanon, Algeria and Syria). Since the three EU-candidate countries are on a different track, this study is limited to the nine countries involved in the EMAAs but not aiming for EU membership.

The EU and the MPCs have different stakes in the EMP. The MPCs are a minor (potential) market for the EU. For the EU the establishment of the FTA should be seen more as part of its security strategy: increasing stability along its southern border by promoting economic growth and fostering links between the two regions. Another aspect of EU interest in the FTAs is limiting the flow migrants to Europe by encouraging economic growth in the MPCs. For the MPCs the EU is a major trading partner and the FTA would offer a major increase in trading opportunities. The EMP can also serve as a way of locking-in structural reforms of the MPC economies, which would be difficult to achieve otherwise. Whether the EMP will achieve its aims depends on the way the EMP is implemented and on other factors affecting the performance of MPC economies.

Based on an extensive literature survey (dell'Aquila and Kuiper, 2003) two sets of features can be identified that are important when modelling the impact of the EMAAs. The first set captures characteristics of the MPCs that affect the scope and impact of trade liberalisation: employment, agriculture, remittances, state role in production and the fiscal impact of liberalisation.

Trade liberalisation through the EMAAs is meant to spur economic growth desperately needed in the MPCs. A main reason for accelerating economic growth in the MPCs is the combination of current high unemployment levels with a still young population, resulting in a growing future workforce. *Unemployment* is thus a key feature of the MPCs and the impact of trade liberalisation on employment is an important focus of attention for MPC governments. High unemployment is also a major factor causing the flow of migrants to Europe.

As is not unusual for trade agreements, *agriculture* is the most contested part of the EMAAs. The MPCs tend to protect temperate-zone crops to reduce dependence on imports, while the EU is trying to bar MPC exports of typical Mediterranean products. Increasing production of Mediterranean products may be a way to absorb more labour in the MPCs. The way in which agriculture is modelled is therefore an important aspect of capturing the impact of the EMAAs. The extent to which a change agricultural production affects employment depends on the ease with which factors are substituted and the presence of factor markets.

A number of MPCs have a large inflow of foreign exchange from oil-related exports or remittances or both. This inflow of foreign exchange leads to 'Dutch disease' effects, affecting the economic structure of MPCs and the competitiveness of their economies. The presence of income from oil will be captured through the production sectors distinguished in the model, which forms part of the general model description features. *Remittances* are included as a separate indicator of MPC-specific features.

A second characteristic of MPC economies is a large degree of state involvement. The contribution of state-owned enterprises may be as much as 30% of GDP. Accounting for the *state role in production* is thus important for capturing the specific features of MPC economies.

Along with directly participating in production, MPC governments play an important role in the economy through bloated public sectors (creating a lot of employment) and interfering at both the supply and demand side of (agricultural) production (input

subsidies for producers, coupled with consumer subsidies on staple food). These activities require large government budgets that are to a great extent based on tariff income. The *fiscal impact* of liberalisation is thus a prime concern to assess the feasibility and impact of the EMAAs.

2.4 EMAA specifics

Section 3 takes a close look at the way in which the EMAAs are modelled. Just as with the specific features of the MPCs, the structure of the model affects the way in which the specifics of the EMAAs can be modelled. To capture the potential for modelling the EMAAs, a number of relevant model features can be identified: trade policies, trade barriers, asymmetric liberalisation, timing of liberalisation, hub-and-spoke structure and regional impact in the EU.

Both the EU and the MPCs apply a variety of trade policies to protect domestic producers from foreign competitors. These measures include items, such as ad-valorem tariffs, tariff-quotas, producer subsidies and complex systems of entry prices related to production seasons. The way of modelling *trade policies* determines the types of liberalisation that can be analysed with the model. Tariffs are modelled in a straightforward manner through price wedges. Owing to this approach non-tariff policies are also often included through tariff equivalents, measuring the impact of policies in terms of their price effects.

Apart from government policies explicitly aimed at shielding domestic producers, there may be other *trade barriers*, such as unclear and slow border clearing procedures, government controlled exports, multiple exchange rates, insufficient infrastructure and so on. These trade barriers may limit the impact of eliminating tariffs.

Whereas trade policies and trade barriers affect the impact of the EMAAs, these are in essence general features of trade models. They are included under the heading of EMAAs since their modelling affects the aspects of the EMAAs that can be analysed by the models. In addition to these general aspects of modelling trade, there are a number of features that are specific to the EMAAs.

Although in spirit aiming for a full liberalisation of Mediterranean trade, actual commitments achieved through the EMAAs are largely restricted to liberalising trade in manufactured products. Since manufactured goods from the MPCs have more or less unrestricted access to the EU since the 1970s, this amounts to an opening of the MPC markets for EU manufacturers. The result is a very *asymmetric liberalisation* across manufacturing and agriculture, as well as across the EU and MPCs.

Apart from being asymmetric, the liberalisation is also not implemented overnight but phased out with different commodities following a different time path. The common approach is to start with eliminating tariffs on intermediate goods, followed by a step-by-step elimination of tariffs on goods that are not domestically produced. With a time-lag, tariffs on domestically produced goods are gradually eliminated (Augier and Gasiorek, 2001, p. 7). This *timing across sectors* of liberalisation affects the distribution of costs and benefits of the liberalisation over time and over different sectors in the economy.

Another specific feature of the EMAAs is that they aim at achieving a Mediterranean free trade area, while consisting of bilateral agreements between the EU and individual MPCs. The EMAAs thus do not cover south-south liberalisation, resulting in a *hub-and-spoke structure*. In such a structure EU producers have access to all MPC markets, while MPC producers still face trade barriers when exporting to other MPCs. This gives EU producers an advantage over MPC producers and reduces the incentives to invest in production capacity in the MPCs.

Related to the bilateral nature of the EMAAs is the difference in timing of agreements across countries. For some MPCs, EMAAs were negotiated a number of years ago and are already taking effect. Other EMAAs are awaiting ratification, while in the case of Syria negotiations are still ongoing. The *timing of agreements across the MPCs* may affect the distribution of costs and benefits among MPCs.

A major reason for the asymmetric focus on liberalising trade in manufactured goods by the EMAAs is the differential impact on northern and southern EU members of liberalising agricultural trade with MPCs. Although the impact on the EU as a whole will be minimal, owing to the relatively small size of the MPC economies, the impact on specific regions (especially in the southern EU) could be considerable. Such *regional impacts within the EU* are the main cause of the lack of liberalisation of trade in Mediterranean agricultural products.

3. Main features of applied models

Using the assessment criteria discussed above, 11 general equilibrium models analysing the impact of the EMAAs have been compared. This section summarises their main features; the appendix describes each model in terms of the assessment criteria.

This model review is limited to general equilibrium models since the EMAAs involve structural changes in all parts of the economy. Apart from being general equilibrium models, the reviewed models should have been applied to analysing the EMAAs. World Trade Organisation (WTO) studies that include the MPCs (individually or as a region) are therefore excluded from the review. Based on these two criteria, a total of 13 models were originally considered for the review (Table 1).

Two of these 13 studies (Cockburn, 1998, p. 860 and the Morocco study in Bayar, 2001) do not provide enough detail on the models used to include them in the assessment, leaving 11 studies for the review. As indicated in Table 1, the applied models focus on Morocco, Egypt, Tunisia and Jordan. One study covers most of the MPCs (Augier and Gasiorek, 2001), but is limited to analysing industrial sectors.

Although all studies consider the impact of the EMAAs, the specific focus of their analysis differs as summarised in Table 1. Because of these differences the analysed scenarios also differ. We return to a comparison of scenarios in section 3. The remainder of this section considers the main features of the models and the extent to which these features allow an analysis of the key policy and research issues as identified in dell'Aquila and Kuiper (2003). The discussion will follow the grouping of assessment criteria from section 1.

Table 1. Studies included in the review

	<i>Reference</i>	<i>Focus</i>	<i>MPCs</i>
1	(Augier and Gasiorek, 2001)	Impact on welfare and factor markets	Egypt, Israel, Jordan/Syria, Morocco, Tunisia, Turkey
2	(Elshennawy, 2001)	Adjustment costs of trade liberalisation	Egypt
3	(Hosoe, 2001)	Impact of the Uruguay Round and the EMAA	Jordan
4	(Lucke and Lucke, 2001a)	Quantification of the effects of the EMAA	Jordan
5	(Lucke and Lucke, 2001b)	Quantification effects of the EMAA	Syria
6	(Feraboli, 2003)	Dynamic effects of the EMAA	Jordan
7	(Chemingui and Thabet, 2001)	Impact of trade liberalisation on rural livelihoods	Tunisia
8	(Hoekman et al., 2001)	Comparing the impact of tariffs, red-tape costs and improved efficiency	Egypt
9	(Löfgren et al., 2001)	Comparing the EMAA to unilateral liberalisation	Morocco
10	(Bayar, 2001)	Focus on the fiscal impact with three different country studies	Tunisia
11	Idem		Egypt
-	Idem		Morocco
-	(Cockburn et al., 1998)	Impact of imperfect competition on analysis of the EMAA	Tunisia

3.1 General model structure

Table 2 summarises the general features of the reviewed models. Most models consist of a single-country model, with trade flows to the EU distinguished from trade flows with other countries. Only two models are multi-regional models, one of which is a Global Trade Analysis Project (GTAP)-inspired model to which data on Egypt are added (Egypt is not included as a separate country in the GTAP database). The study by Augier and Gasiorek (2001) has the most extensive coverage of MPCs (see also Table 1). This coverage is limited, however, to the industrial sector, with agriculture aggregated with the non-industrial parts of the economy to one single competitive sector. The GTAP-inspired model focusing on Egypt treats crop and livestock production as separate sectors.

The tendency in the reviewed models is to treat agricultural production as a single sector, while disaggregating industrial production in several sectors. Two models are an exception to this trend. Chemingui and Thabet (2001) place similar weight on manufacturing and agriculture, distinguishing 57 sectors of which 26 are agricultural or food industries. Löfgren et al. (2001) put most weight on capturing changes in the agricultural sector, including 45 activities of which 35 are agricultural. This detail allows them to distinguish irrigated from rain-fed production, potentially allowing the inclusion of limited water availability in adjustments.

The two models with the most detail on agricultural production are also the only models including more than one representative household. Löfgren et al. (2001) distinguish four household types, based on location (urban-rural) and income (poor or non-poor). Chemingui and Thabet (2001) distinguish nine household types based on their agricultural income sources. The resulting groups receive the major part of their income from a single crop, revealing the impact of changes in production on income distribution. All other models follow the standard approach in general equilibrium models of including a single representative household to model private demand. Such an approach precludes an analysis of income distribution and poverty issues.

All models include at least capital and labour as factors of production. In addition, several models include land for agricultural production. Table 2 indicates the amount of detail for labour, since distinguishing different types of labour can allow a rough assessment of the distributional impact of policies, even with a single representative household. Labour provides the major source of income for most households, thus changes in demand for different types of labour provides an indication of changes in income-earning potential.

Table 2. General model features (number of models)

<i>Geographical scope</i>	- Single-country model	9
	- Multi-region models	2
<i>Supply side</i>	- Focus on industry	6
	- Focus on agriculture	2
	- Aggregated model	3
<i>Demand side</i>	- Single representative household	9
	- Multiple households	2
<i>Factors</i>	- Single type of labour	6
	- Labour by skill or education	5
<i>Heterogeneity of goods</i>	- Armington	10
	- Imperfect competition	1
<i>Dynamics</i>	- Static	6
	- Recursive dynamic	3
	- Forward-looking dynamic	2
<i>Current account closure</i>	- Variable exchange rate	10
	- Fixed exchange rate	1
<i>Saving-investment closure*</i>	- Fixed saving propensities	6
	- Fixed investment	2
	- Intertemporal optimization	2

*Augier and Gasiorek (2001) do not report their saving-investment closure.

Of the five models distinguishing different types of labour, all but one model distinguish two types of labour based on skill level. The exception is the model by

Chemingui and Thabet (2001), distinguishing five types of labour by skill and geographical mobility. In most models capital (and land, if included) is sector-specific, while labour is mobile. Some models fix capital only for specific sectors to reflect implicit resource constraints.

In terms of dealing with heterogeneity of goods the Armington approach dominates, with only the study by Augier and Gasiorek (2001) including imperfect competition. They model increasing returns to scale in all sectors, except for the aggregate sector representing the non-industrial parts of the economy. There is free entry and exit with firms producing differentiated goods for segmented country markets (this study uses a multi-regional model).

In terms of dynamics there is more variety in approaches. Use of static models dominates, but several models use a recursive approach to assess changes over time. Two models explicitly optimise over time. The study by Feraboli (2003) simplifies all other aspects of the model, aggregating all production into a single sector. The study by Elshennawy (2001) uses a six-sector model while also disaggregating labour by skill. A non-conventional feature of this study is the inclusion of adjustment costs in the analysis, accounting for the costs of reallocating resources within the economy through trade liberalisation.

In terms of closure there are four major features: labour market, government budget, current account, saving and investment closure. The labour market closure and way in which the government budget is treated is discussed below, since both elements capture MPC-specific features. When ‘closing’ the current account, the standard approach is to use a variable, real exchange rate and fixing the current account balance (thus fixing foreign borrowing). The only exception to this approach is the study by Augier and Gasiorek (2001), where both the exchange rate and the current account are fixed, and the competitive sector (i.e. the non-industrial part of the economy) maintains the balance on the current account.

The saving-investment closure shows more variety across models. The majority of the models opt for fixed saving propensities to which investment adjusts. Two models fix the investment at benchmark levels (Hoekman et al., 2001 and Hosoe, 2001), having savings adjust to maintain the saving-investment balance. Fixing saving propensities or investments is needed in static models that are not dealing with intertemporal maximisation. The two forward-looking dynamic models (Elshennawy, 2001 and Feraboli, 2003) include the saving-investment decision in the utility maximisation problem.

3.2 Data and reference years

Lack of data is an important issue for all models. The emphasis on Morocco, Egypt, Jordan and Tunisia can be attributed to availability of data for these countries. The study by Augier and Gasiorek (2001) with a wider country-coverage is built using industrial data. The source of consumption data is unclear, which is also the case for several other studies. A number of models make reference to GTAP data, although country-specific data are only available for Morocco in the GTAP database.

Other model parameters are either derived from the literature (frequently without mentioning the source) or arbitrarily chosen. This especially holds for the model with imperfect competition, which requires difficult-to-obtain data on scale economies and number of firms. Only a few studies report sensitivity analyses for key parameters, owing to the paucity of data.

Reference years vary from 1987 to 2005. The latter is a projected reference year constructed to account for the impact of the Uruguay round before analysing the impact of the EMAAs. The majority of studies use the mid-1990s as a reference point.

3.3 MPC-specific model features

The models included in this review are all used to analyse the impact of the EMAAs. Important for this analysis is whether the applied models capture essential features of the MPC economies. To this end five assessment criteria were identified in section 1. Table 3 summarises the number of models taking each of these criteria into account.

The currently high levels of unemployment coupled with a young population make creation of additional employment a key policy issue for MPCs. By changing the production structure, the EMAAs are expected to have an impact on the levels of employment. Of the reviewed models, only the study by Elshennawy (2001) accounts for the presence of unemployment. He assumes rigid wages in electricity and agriculture, while having full employment in all other sectors.

Table 3. MPC-specific model features (number of models)

<i>Employment</i>	- Full employment	10
	- Unemployment	1
<i>Agriculture</i>	- Not a separate sector	2
	- Single sector	5
	- Two to three agricultural sectors	2
	- Over 25 agricultural sectors	2
<i>Remittances</i>	- Not reported	8
	- Specifically mentioned	3
<i>State role in production</i>	- Not included	9
	- Accounted for	2
<i>Fiscal impact of EMAAs</i>	- Government budget not included in the model	1
	- Variable government deficits	3
	- Tax replacement by VAT	4
	- Tax replacement through lump-sum taxes	2
	- Variety of tax replacement schemes	1

The assumption of full employment also affects the assessment of the competitiveness of the MPC economies. Assuming full employment implies that an expansion of

production results in higher wages and thus less competitive prices, whereas a contraction results in the opposite effect. In the presence of unemployment either real or nominal wages are fixed, resulting in more rigid product prices. More rigid prices magnify the expansion and contraction of the economy. The models assuming full employment could therefore be expected to underestimate both gains and losses from the EMAAs, making the net impact of this bias indeterminate.

Agriculture is the most contested part of the agreements. Given the current patterns in production, a contraction in temperate-zone products and an expansion of Mediterranean products could be expected. Few of the reviewed models are capable of capturing such a differential impact. Two models aggregate agriculture with other sectors and are therefore unable to analyse the impact on agriculture. The majority of models aggregate agricultural production to a single sector. This allows analysis of the average impact on agriculture, but fails to capture shifts in production in response to a changing protection pattern. The two models distinguish two to three agricultural sectors, separating (food and non-food) crops from livestock. While offering some more detail, this distinction does not capture the impact of Mediterranean versus temperate-zone goods.

Two models included in this review focus explicitly on agriculture (Chemingui and Thabet, 2001 and Löfgren, 2000). Using a highly disaggregated specification of agriculture they are able to capture the effects of shifts in the pattern of protection, as well as the impact of limited water resources (irrigated and rain-fed production are distinguished as well).

Remittances play an important role in MPC economies. Most of the reviewed models do not report remittances; depending on the data used, these are presumably included in the current account. Three models separate remittances from other flows of money. The study by Löfgren et al. (2001) includes remittances in the household income. The studies by Lucke & Lucke, 2001a and 2001b for Syria and Jordan not only capture the flow of remittances, but also account for the role of the state in production. All other models use the standard, general equilibrium specification with the government obtaining income from taxes only.

The fiscal implications of the EMAAs are the last item in Table 3. Dependence on tariffs for government expenditures provides a serious impediment to the implementation of the EMAAs. One model does not include a government budget in the model, while three models allow increasing budget deficits. Of the seven models accounting for the fiscal repercussions of the EMAAs, four assume that changes in the value-added tax are used to cover the deficit, while another two models cover deficits with lump-sum taxes on consumers. The study by Feraboli (2003) analyses a variety of different schemes for closing the government budget. In this analysis, the selected tax replacement scheme determines the welfare implications of the EMAA compared with unilateral liberalisation.

3.4 EMAA-specific model features

The general model features discussed above determine whether EMAA-specifics can be incorporated. The ability to capture the asymmetric liberalisation of manufacturing and

agriculture depends on the sectoral disaggregation. Two models have a single productive sector and are therefore unable to capture this difference. All other models could be used for contrasting the impact of the current partial liberalisation of manufacturing with full liberalisation.

Only two models are dynamic, but all models could be solved recursively to analyse the time-path of liberalisation. Most models assume a complete one-time liberalisation, although in practice a step-by-step approach to liberalising industrial goods is used. This timing of liberalisation has implications for the welfare assessment of the agreements.

The regional scope determines whether models are able to capture the hub-and-spoke structure of the EMAAs, the impact of the different time-paths followed by the MPCs and the regional impact within the EU. Most models are single-country models only accounting for trade with the EU. By excluding production in the EU these models are unable to deal with any of the issues related to the way in which the EMAAs are set up, nor can they analyse the regional impact in the EU.

Of the two multi-regional models, Augier and Gasiorek (2001) separately model Mediterranean and non-Mediterranean EU countries. This allows analysis of different impacts across EU countries, but unfortunately this model does not distinguish an agricultural sector and is therefore unable to capture the impact on Mediterranean agricultural products. By distinguishing a variety of MPC countries this study could be used to analyse the impact of the hub-and-spoke structure and timing across MPCs. Nevertheless, this study does not analyse timing across MPCs – all countries are assumed to implement liberalisation at the same time. Given the presence of increasing returns to scale, it would be worthwhile to analyse the impact of the different time-paths on the distribution of welfare across MPCs.

The other multi-regional model of Egypt in Bayar (2001) does not distinguish between southern and northern EU countries and therefore cannot deal with the regional impact in the EU. Apart from Egypt, all other MPCs are aggregated into the rest of the Middle East and North Africa. This also includes non-MPCs, therefore limiting the conclusions that can be drawn from studying the hub-and-spoke structure and timing across MPCs.

3.5 A first assessment based on MPC- and EMAA-specific model features

Summarising the above discussion of model features it seems that most models use a standard, ‘one-size-fits-all’ general equilibrium approach. The focus of most models is on manufacturing, which limits the analysis of agriculture – the most contested part of the agreements. By mainly employing single-country models, issues related to the hub-and-spoke and different time-paths for MPCs cannot be analysed.

In terms of analysing the impact of the EMAAs, the studies focus on fiscal implications while ignoring the unemployment issue. The creation of additional employment will also be crucial for a rationalisation of government expenditures, given the current large wage bills. Future analyses would therefore benefit from incorporating unemployment.

Apart from assuming full employment, the majority of the models also follow a standard, general equilibrium approach in ignoring the role of the state in production. Since state enterprises may account for some 30% of GDP, this implies that an

important part of the government budget is missed in the analysis. Given the fiscal implications of the EMAAs, this would appear to be a rather important issue.

4. Comparing scenarios

By selection, all reviewed models analyse the impact of the EMAAs. Although the applied models focus on different countries, the EMAAs are designed along the same lines, allowing a comparison across studies. The second part of the appendix contains a short description of the scenarios analysed by the studies included in this review. While this study is limited to 11 studies, together they analyse over 80 different scenarios. To avoid getting bogged down in the details of the scenarios, we focus in this section on highlighting general tendencies (Table 4).

Table 4. General characteristics of scenarios in the reviewed studies

<i>Study number*</i>	<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>	<i>6</i>	<i>7</i>	<i>8</i>	<i>9</i>	<i>10</i>	<i>11</i>
<i>Countries:</i>											
Egypt	x	x						x			x
Jordan	x		x	x		x					
Morocco	x								x		
Syria	x				x						
Tunisia	x						x			x	
<i>Reduction of tariffs by MPCs:</i>											
Industrial imports from EU	x	x		x	x		x		x	x	x
All imports from EU		x	x	x	x	x	x	x	x	x	x
Non-discriminatory on all goods	x	x		x	x	x		x	x		
<i>Reductions of tariffs by EU:</i>											
All imports from MPCs		x	x				x	x			x
Industrial imports from MPCs	x	x					x				x

* Numbers refer to the numbers of the studies in Table 1.

The EMAAs involve a bilateral liberalisation of trade between the EU and MPCs. Only for industrial products have detailed schemes for eliminating tariffs been made. Since the MPCs already enjoy preferential access to EU markets, this implies a mostly unilateral liberalisation by the MPCs. Most studies therefore consider an elimination of tariffs on industrial imports from the EU. Despite the present preferential treatment of manufactured imports from the MPCs, four studies include an additional reduction in protection by the EU (mainly for the clothing sector). Of these four studies, three analyse the EU-Egypt EMAA and one analyses the EU-Tunisia EMAA. Other studies of Egypt and Tunisia do not include an additional liberalisation of access to the EU markets for manufactured goods.

Despite the current absence of a scheme for eliminating barriers to agricultural trade, all studies consider a discriminatory elimination by MPCs of all tariffs (for manufacturing and agriculture) in favour of the EU. In addition, seven studies also consider a non-discriminatory abolition of tariffs by MPCs. Comparing this non-discriminatory

scenario with preferential liberalisation of trade with the European Union allows an assessment of the issues of trade-diversion and trade-creation effects of the FTA.

In order to assess the welfare impacts of the FTA, liberalisation on the EU side needs to be accounted for as well. After all, one of the main reasons for engaging in an FTA is the prospect of mutual preferential market access. Interestingly, all studies assume that MPCs will take their share in liberalising agricultural trade, given the analysis of across-the-board tariff reductions by the MPCs. A reciprocal reduction in tariffs by the EU is not as uniformly expected. Of the eleven studies only six consider tariff reduction on the EU-side. None of the other five studies consider the absence of liberalisation on the EU side. Whatever the reasons for such an asymmetric approach to analysing the EMAAs, it calls for great caution when comparing modelling results across studies.

Since the EMAAs aim at establishing an FTA, thus implying a bilateral reduction in trade barriers, we focus the remainder of this section on the studies that account for a mutual reduction in trade barriers. For these six studies Table 5 summarises the reductions in tariffs used to capture the impact of the EMAAs.

Table 5. Modelling of tariff reductions (% reduction in tariffs and reference point)

<i>Study number*</i>	<i>1</i>	<i>2</i>	<i>3</i>	<i>7</i>	<i>8</i>	<i>11</i>
<i>Benchmark for simulations</i>	1993-95	1992	Post-Uruguay	Post-Uruguay	1996 Tariffs	2005 Projection
<i>Reduction of tariffs by MPCs:</i>						
Industrial imports from EU	100	100	80	100	100	100
Agricultural imports from EU	–	100	80	100	100	100
Non-discriminatory on all goods	nd	100	–	–	100	–
<i>Increase in export prices EU:</i>						
Industrial imports from MPCs	5 ¹	1	–	–	1	100
Agricultural imports from MPCs	–	2	80 ²	nd ³	2 ⁴	100

Notes: *Numbers refer to the numbers of the studies in Table 1; nd means not defined in the study; ¹ 50% reduction in NTBs is modelled as a 10% tariff; ² the scenario mentions an 80% reduction of tariffs on Jordan-EU trade, but offers no detail on the implementation of this shock in the single-country model; ³ the scenario description mentions a not-further quantified ‘slight reduction in preferential quotas’; ⁴ prices of clothing are also assumed to increase by 2%.

Since most of the reviewed models are single-country models of MPCs, the impact of tariff reductions by the EU is generally modelled as an increase in export prices. The Egyptian case study in Bayar (2001) is a multi-regional model and can thus reduce all tariffs by 100%. In the case of the study by Hosoe (2001), it is unclear how the 80% reduction in tariffs is modelled in this single-country application.

Although most of the studies included in Table 5 analyse a complete elimination of tariffs, different years are used as benchmark. Since reductions are defined in percentages, different benchmark years may affect the absolute size of the tariff changes. In this respect it is important whether the EMAA is assumed to be in force before or after implementing commitments from the Uruguay round.

Apart from problems with varying reference points, a more critical obstacle to comparisons across studies is the tendency to combine a variety of shocks in a single simulation. Table 5 only focuses on the general picture, indicating whether the mentioned shocks are considered in the studies. The actual scenario generally used consists of a mixture of different shocks (the appendix lists the analysed scenarios for each study). The model results then represent the net impact of the combination of shocks, without allowing the identification of the contributions of individual shocks. The variation in scenarios coupled with a variety of model specifications prohibits an assessment of the impact of the model structure on the findings.

In summary, a comparison of scenarios across studies reveals a wide variety of ways of modelling the EMAAs. Most puzzling is the implementation of a preferential but unilateral liberalisation by MPCs in five of the eleven studies included in this review, given that all studies intend to analyse an FTA. Of the studies analysing a mutual reduction in tariffs, differences in benchmarks and incomplete descriptions of scenarios prevent a clear view on the comparability of scenarios and thus of model results.

5. Matching key policy issues and existing studies

Variability in model structures and scenarios prohibits a consistent comparison of quantitative model results. In this last section we therefore focus on the policy and research questions identified in dell'Aquila and Kuiper (2003) and discussed in section 1. By combining the discussion of model elements from section 2 with the analysed scenarios from section 3, we can assess first of all whether existing studies answer key policy and research questions. Secondly, we identify directions of future research with existing models and to what extent changed model structures are needed.

5.1 MPC-specifics in existing studies

In terms of the *employment* issue the discussion can be kept short. All but one study assume full employment. This implies that one of the major features of the MPC economies, which also plays an important role in the political feasibility of implementing the reforms, is not captured by existing studies. Assuming full employment also implies that the issue of migration is not addressed by any of the models.

As far as *agriculture* is concerned, most studies do include agriculture as a single sector. This allows the analysis of a partial liberalisation only covering manufactured goods, versus establishment of an FTA covering all trade in the Mediterranean area. Although most studies include such partial versus complete liberalisation, the modelling of the liberalisation differs. In five of the eleven studies the MPCs are unilaterally eliminating their tariffs, with the EU maintaining its trade barriers. Given the existing preferential access for manufactured goods, this approach will have a limited impact on the results for manufacturing. In the case of agricultural goods, however, a major component of the EMAAs is ignored. Given the uncompetitive industrial sectors of the EMAAs (see also the discussion in dell'Aquila and Kuiper, 2003), improved marketing opportunities for competitive agricultural products is an important rationale for MPCs to engage in the EMAAs.

A second issue related to the agricultural sector is the distinction between Mediterranean and temperate-zone agricultural goods. Protection of Mediterranean products by the EU is mirrored by the protection of temperate-zone products by the MPCs. Elimination of the trade barriers will thus result in shifts in production in both the MPCs and the EU. A major impediment to the implementation of the EMAAs is the expected negative impact on Mediterranean regions in the southern EU member countries. The lowering of protection by the MPCs can be expected to require shifts in their agricultural production structure as well (currently production of temperate-zone agricultural goods is supported through subsidies). Aggregating agriculture into a single sector does not allow an analysis of these aspects of the EMAAs, which are of prime importance for the political feasibility of the EMAAs on the EU side, while also having implications for the analysis of rural incomes in MPCs.

Remittances and the *state role* in production have been identified as typical features of MPC economies that affect the competitiveness of the manufacturing sector in particular (see dell'Aquila and Kuiper, 2003 for a discussion). Despite a focus on manufacturing in most studies, these features are rarely mentioned: two studies account for both features, while one study does include remittances but not the role of the state in production.

Apart from missing important features of manufacturing in MPCs, ignoring the role of the state in production also affects the analysis of the *fiscal impacts* of the EMAAs. Analysis of the fiscal implications of the EMAAs is a key issue in a number of studies, analysed by comparing different tax replacement schemes. Given that the contribution of state production to GDP can be as high as 30% (as is the case in Jordan), ignoring this aspect of the government budget seems like a potentially serious omission in the analysis of the fiscal implications of the EMAAs.

5.2 EMAA-specifics in existing studies

In addition to MPC-specific features, section 1 also discussed characteristics of the EMAAs that affect their impact on MPC and EU economies. The above discussion of the way in which agriculture is modelled already points to the lack of distinction between northern and southern EU countries. Of the models included in this review only one distinguishes Mediterranean from northern EU countries. All other studies fail to capture the *regional impacts within the EU* by modelling the EU as a single entity.

Apart from aggregating the EU to a single entity, south-south integration is ignored by the majority of studies. A number of models do distinguish trade with Middle-Eastern or North African countries, but as with the EU these are generally aggregated into a single destination. In addition to combining different destinations, the classifications encompass both MPCs and other countries in the region. This aggregation prohibits the analysis of the *hub-and-spoke* structure resulting from the bilateral character of the EMAAs.

Aggregating (at best) only other MPCs in a single region, the reviewed studies cannot be used for analysing the impact of the different time-tracks with which the EMAAs are implemented by different MPCs. The study by Augier and Gasiorek (2001) is the only study with sufficient geographical disaggregation for such an analysis. Furthermore they

focus on the impact of increasing returns to scale, which would give early liberalisers a head-start over their regional competitors. Although analysis of this *timing across MPCs* is possible with their model specification, they assume all MPCs to liberalise at the same time.

A second timing issue is the *timing across sectors*. Again, only Augier and Gasiorek (2001) analyse this issue. A number of other models analyse a phased introduction of liberalisation, but only a distinction between agriculture and manufacturing is made. Differences in the timing of liberalisation between manufacturing sectors are ignored. This may affect the assessment of the welfare impacts of the studies, as well as the assessment of the political feasibility of completing the liberalisation as agreed upon in the EMAAs.

Two more general features of the EMAAs are left: modelling of *trade policies* and *non-tariff measures (NTBs)*. As discussed in section 3, despite analysing the same agreements, the quantitative tariff reductions may differ considerably, depending on the benchmark used in the simulations. Apart from the baseline, the scenarios tend to combine a variety of shocks, complicating the comparison across studies even if comparable tariff reductions are analysed.

Four of the reviewed studies also explicitly model a reduction in NTBs resulting from the EMAAs. NTBs are represented by tariffs, the level of which appears to be rather ad hoc, owing to the lack of data. In a number of cases the scenarios mention the abolition of NTBs, but without explicitly mentioning the way in which this is modelled.

6. Directions for future research

One general conclusion of the model review is that uncovering the model structure and the performed simulations is not an easy task. This implies that it is difficult to assess whether the preformed simulations capture the essential features of the EMAAs and whether the conclusions are warranted. In terms of options for future research, three types of future modelling work can be distinguished: different simulations with the current models, straightforward adaptations of existing models and more elaborated changes of existing models.

An initial, relatively easy-to-implement direction for future research would be the analysis of identical scenarios with existing models, to assess the extent to which the results are robust in different model structures. A more advanced analysis would also construct an identical baseline simulation as a reference point.

A second direction for future research is to adapt the ‘one-size-fits-all’ model structure used in the majority of the reviewed studies. Three changes that would be fairly easy to implement are:

- 1) replacing the assumption of full employment with a more realistic representation of unemployment;
- 2) disaggregating agricultural production to at least distinguishing Mediterranean and temperate-zone crops, and if possible also distinguishing rain-fed and irrigated production to account for constrained water availability; and

- 3) disaggregating trade with northern and southern European Union countries as a first step to capturing the various regional differences in the impact of the EMAAs.

A third direction for future research involves more elaborate model changes that would improve the extent to which the models capture MPC- and EMAA-specific features including:

- 1) disaggregating trade flows among MPCs to analyse south-south integration;
- 2) incorporating the role of the state in production;
- 3) including the impact of red-tape, slow border procedures and other impediments to trade;
- 4) including remittances in household income;
- 5) including migration flows between MPCs and the EU; and
- 6) disaggregating the single representative household in a number of representative household groups.

These extensions are more difficult to incorporate because of lack of data. The last item, distinguishing different types of households, has not been discussed as a specific feature for analysing the impact of the EMAAs. From the point of view of political stability, which is one of the major interests of the EU in establishing a Mediterranean FTA, assessing the distributional consequences of trade liberalisation is an important issue.

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Appendix

Model summaries

This appendix includes detailed descriptions of the models included in this review. The tables are structured along the lines of the assessment criteria discussed in section 1. In addition, some additional information on sensitivity analysis, software and availability of the models is included.

General information	
<i>Reference</i>	Augier and Gasiorok (2001)
<i>Institution</i>	University of Sussex
<i>Aim</i>	Analyse the welfare and factor the market impact of EuroMed agreements
<i>MPCs analysed</i>	Egypt, Israel, Jordan/Syria, Morocco, Tunisia, Turkey
General model structure	
<i>Geographical scope</i>	Multi-regional model: Cyprus/Malta, Egypt, Israel, Jordan/Syria, Morocco, Tunisia, Turkey, EU-Med, EU, ROW
<i>Supply side</i>	Ten industries derived from ISIC 3-digit level classification; one industry is food, beverages and tobacco; one composite sector for the rest of the economy (competitive sector)
<i>Demand side</i>	Single representative household per region
<i>Factors</i>	Capital, manual labour, non-manual labour
<i>Heterogeneity of goods</i>	Increasing returns of scale in industries; imperfect quantity competition; free entry and exit of firms
<i>Dynamics</i>	Static model, recursively solved in some scenarios
<i>Closure</i>	Fixed exchange rate, trade balance maintained by perfectly competitive sector; saving-investment closure is not reported
Data & software	
<i>Reference year(s)</i>	1995
<i>Variables</i>	COMTRADE data bank, UNIDO industrial database (unclear if SAM is used to check consistency of the data)
<i>Parameters</i>	Assumes EU scale-economies to be twice that of MPC scale-economies; parameters of imperfect competition are a mixture of literature and calibration; TRAINS database for initial tariffs
<i>Policies</i>	EuroMed Agreements; detailed data on the phasing of reforms for Morocco used to model the phasing of liberalisation in other MPCs
<i>Sensitivity</i>	Not reported
<i>Software</i>	Not reported
<i>Availability</i>	Not publicly available
MPC specifics	
<i>Unemployment</i>	Full employment
<i>Agriculture</i>	Aggregated with the rest of non-manufacturing sectors of the economy in a single sector
<i>Remittances</i>	Not reported (and unlikely to be included the given data sources used)
<i>State role in production</i>	Not reported (and unlikely to be included the given data sources used)
<i>Fiscal impact</i>	Government revenue fixed, fiscal impacts of liberalisation covered through lump-sum taxes
EMAA specifics	
<i>Trade policies</i>	Tariffs
<i>Trade barriers</i>	Barriers to EU markets modelled as 10% tariff
<i>Asymmetric liberalisation</i>	Simulations use data from EuroMed agreements thus accounting for asymmetric liberalisation by the MPCs
<i>Timing of liberalisation</i>	Phasing of liberalisation is analysed
<i>Hub-and-spoke structure</i>	Analysed through different scenarios with only bilateral or also South-South liberalisation
<i>Timing across MPCs</i>	Countries are assumed to be on the same time-path and adopting the same phasing scheme (derived from Moroccan data)
<i>Regional impact in the EU</i>	Distinguishes north and southern EU members as different regions, results for different regions not explicitly discussed

General information

<i>Reference</i>	Elshennawy (2001)
<i>Institution</i>	The American University (Cairo)
<i>Aim</i>	Analyse the impact of the EMAA with a specific focus on the adjustment costs of trade liberalisation
<i>MPCs analysed</i>	Egypt

General model structure

<i>Geographical scope</i>	Single-country model of Egypt, separating trade flows to the EU and ROW
<i>Supply side</i>	Six sectors: agriculture, oil, industry, construction, electricity, services
<i>Demand side</i>	Single representative household encompassing households and enterprises
<i>Factors</i>	Production labour, non-production labour, capital, land
<i>Heterogeneity of goods</i>	Armington
<i>Dynamics</i>	Dynamic/forward-looking
<i>Closure</i>	Intertemporal optimisation determines saving, investment and foreign borrowing; variable exchange rate

Data & software

<i>Reference year(s)</i>	1991-92
<i>Variables</i>	SAM for Egypt (source unclear)
<i>Parameters</i>	Literature combined with calibration procedures
<i>Policies</i>	Not reported
<i>Sensitivity</i>	Sensitivity to policy shocks addressed (translation of market access in export prices)
<i>Software</i>	Not reported
<i>Availability</i>	Not publicly available

MPC specifics

<i>Unemployment</i>	Rigid wages in the electricity sector and agriculture; full employment in all other sectors
<i>Agriculture</i>	Represented by a single sector
<i>Remittances</i>	Not included
<i>State role in production</i>	Not included
<i>Fiscal impact</i>	Government consumption and deficit are ignored

EMAA specifics

<i>Trade policies</i>	Import tariffs and export subsidies
<i>Trade barriers</i>	Non-tariff barriers hampering market access reflected in changes of export prices
<i>Asymmetric liberalisation</i>	Delay and exclusion of agricultural liberalisation explicitly addressed
<i>Timing of liberalisation</i>	Agricultural liberalisation occurs after four years (could be included as it is a dynamic model); also analyses unilateral liberalisation following preferential liberalisation
<i>Hub-and-spoke structure</i>	Not included
<i>Timing across MPCs</i>	Not included
<i>Regional impact in the EU</i>	Not included

General information

<i>Reference</i>	Hosoe (2001)
<i>Institution</i>	National Graduate Institute for Policy Studies (Japan)
<i>Aim</i>	Analyse the impact of the Uruguay round and FTA with the EU
<i>MPCs analysed</i>	Jordan

General model structure

<i>Geographical scope</i>	Single-country model of Jordan, separating trade flows with the EU and ROW
<i>Supply side</i>	Nine sectors: agriculture, energy, mining, textile and apparel, light manufacturing, chemical, non-metal mineral, other manufacturing
<i>Demand side</i>	Single representative household, investor
<i>Factors</i>	Land, labour, capital
<i>Heterogeneity of goods</i>	Armington
<i>Dynamics</i>	Static model
<i>Closure</i>	Current-account deficit fixed; investment fixed

Data & software

<i>Reference year(s)</i>	1987
<i>Variables</i>	IO table of Jordan combined with GTAP version 3 data (unclear how consumption data for Jordan are derived since Jordan is not explicit in GTAP)
<i>Parameters</i>	Presumably GTAP since only IO for Jordan is mentioned
<i>Policies</i>	FTA shock loosely based on tariff reductions in Tunisia
<i>Sensitivity</i>	Signs of sectoral output depend on elasticities
<i>Software</i>	Not reported
<i>Availability</i>	Not publicly available

MPC specifics

<i>Unemployment</i>	Full employment
<i>Agriculture</i>	Represented by a single sector
<i>Remittances</i>	Not included
<i>State role in production</i>	Not included
<i>Fiscal impact</i>	Zero government deficits maintained through lump sum taxes on households

EMAA specifics

<i>Trade policies</i>	Export subsidies, trade of services and quantitative measures apart from MFA are ignored in the model
<i>Trade barriers</i>	Not included
<i>Asymmetric liberalisation</i>	Uniform reduction in all import tariffs
<i>Timing of liberalisation</i>	FTA is assumed to take place after implementing UR
<i>Hub-and-spoke structure</i>	Not included
<i>Timing across MPCs</i>	Not included
<i>Regional impact in the EU</i>	Not included

General information

<i>Reference</i>	Lucke and Lucke (2001a)
<i>Institution</i>	University of Hamburg
<i>Aim</i>	Quantifying the effects of the EuroMed agreements for Jordan
<i>MPCs analysed</i>	Jordan

General model structure

<i>Geographical scope</i>	Single-country model of Jordan, separating trade flows of MENA, EU and ROW
<i>Supply side</i>	13 sectors: agriculture, mining and quarrying, food/beverages/tobacco, textiles/apparels/leather products, wood/paper/printing, petroleum/chemicals, rubber/non-metallic minerals, base metals/fabricated metals, other manufacturers, electricity/water, construction, services, government services
<i>Demand side</i>	Single representative household, government
<i>Factors</i>	Labour, (immobile) capital
<i>Heterogeneity of goods</i>	Armington
<i>Dynamics</i>	Static
<i>Closure</i>	Fixed savings propensities; fixed current-account balance

Data & software

<i>Reference year(s)</i>	1998
<i>Variables</i>	SAM constructed with national account data for 1998 and 1987 IO table
<i>Parameters</i>	Elasticities from literature
<i>Policies</i>	Not reported
<i>Sensitivity</i>	Sensitivity analysis on transformation and substitution elasticities did not yield qualitative differences
<i>Software</i>	GAMS/MPSGE
<i>Availability</i>	Not publicly available

MPC specifics

<i>Unemployment</i>	Full employment
<i>Agriculture</i>	Modelled as a single sector
<i>Remittances</i>	Remittances included as fixed transfers from abroad (does not account for labour use)
<i>State role in production</i>	Government service sector included (about 30% of GDP), assumed to produce non-traded goods; government income includes income from state enterprises
<i>Fiscal impact</i>	Different options of dealing with fiscal implications of liberalisation discussed, but not analysed with model

EMAA specifics

<i>Trade policies</i>	Import duties of Jordan (no export taxes or subsidies in the model)
<i>Trade barriers</i>	Assumed to not be significant
<i>Asymmetric liberalisation</i>	Scenarios separate agricultural and non-agricultural liberalisation
<i>Timing of liberalisation</i>	Not included
<i>Hub-and-spoke structure</i>	Liberalisation with MENA as a separate scenario
<i>Timing across MPCs</i>	Not included
<i>Regional impact in the EU</i>	Not included

General information

<i>Reference</i>	Feraboli (2003)
<i>Institution</i>	University of Hamburg
<i>Aim</i>	Establish dynamic effects of an FTA with the EU on Jordan
<i>MPCs analysed</i>	Jordan

General model structure

<i>Geographical scope</i>	Single-country model of Jordan, separating trade flows of EU, Arab countries and ROW
<i>Supply side</i>	One sector
<i>Demand side</i>	Single representative household
<i>Factors</i>	Capital, labour
<i>Heterogeneity of goods</i>	Armington
<i>Dynamics</i>	Dynamic/forward-looking
<i>Closure</i>	Fixed current-account balance; saving-investment solved through intertemporal maximisation

Data & software

Reference year(s)	1998
<i>Variables</i>	SAM from Lucke et al. (2001a)
<i>Parameters</i>	Elasticities and time preferences from literature
<i>Policies</i>	Average tariff reduction bases on schedule from Jordan EMAA
<i>Sensitivity</i>	Sensitivity analyses (unreported on which parameters) does not have qualitative effects
<i>Software</i>	GAMS
<i>Availability</i>	Not publicly available

MPC specifics

<i>Unemployment</i>	Full employment
<i>Agriculture</i>	Not explicit in model due to aggregation to a single sector
<i>Remittances</i>	Not included
<i>State role in production</i>	Text mentions government producing 30% of GDP but this is not accounted for in model (uses standard specification of income from taxes)
<i>Fiscal impact</i>	Dealt with through six different scenarios for dealing with the fiscal effects

EMAA specifics

<i>Trade policies</i>	Import duties on Jordan side (no export taxes or subsidies in the model)
<i>Trade barriers</i>	Not included
<i>Asymmetric liberalisation</i>	Aggregation of sectors does not allow modelling asymmetry
<i>Timing of liberalisation</i>	Gradual reduction in tariff over a period of 13 years (applied tariff is average tariff, thus accounting for the different pace in liberalisation across sectors over time)
<i>Hub-and-spoke structure</i>	Not included, but possible
<i>Timing across MPCs</i>	Not included, but possible
<i>Regional impact in the EU</i>	Not possible

General information

<i>Reference</i>	Lucke and Lucke (2001b)
<i>Institution</i>	University of Hamburg
<i>Aim</i>	Quantify the effects of the EuroMed agreements for Syria
<i>MPCs analysed</i>	Syria

General model structure

<i>Geographical scope</i>	Single-country model of Syria, separating trade flows of Arab states, EU, former socialist countries, US, Argentina/Brazil/Chile, Turkey, Japan and ROW
<i>Supply side</i>	11 sectors: agriculture, mining, public manufacturing, private manufacturing, utilities, construction, wholesale and retail trade, transport/communication, finance/insurance, social/personal services, government services
<i>Demand side</i>	Single representative household for Syria
<i>Factors</i>	Land, labour, (immobile) capital
<i>Heterogeneity of goods</i>	Armington
<i>Dynamics</i>	Static
<i>Closure</i>	Fixed savings propensities; fixed current-account balance

Data & software

<i>Reference year(s)</i>	1999
<i>Variables</i>	National accounts and IMF data used to construct a SAM
<i>Parameters</i>	Adapted version of Jordan's 1987 IO table; elasticities from literature
<i>Policies</i>	Not reported
<i>Sensitivity</i>	Not reported
<i>Software</i>	Not reported (presumably GAMS/MPSGE, given the Jordan model from the same authors)
<i>Availability</i>	Not publicly available

MPC specifics

<i>Unemployment</i>	Full employment
<i>Agriculture</i>	Represented by a single sector
<i>Remittances</i>	Remittances are included as (fixed) foreign payments to labour
<i>State role in production</i>	State production explicit in model
<i>Fiscal impact</i>	Different options of dealing with fiscal implications of liberalisation are discussed, but not analysed with the model

EMAA specifics

<i>Trade policies</i>	Import duties of Syria (no export taxes or subsidies in the model)
<i>Trade barriers</i>	Multiple exchange rate system explicit in model
<i>Asymmetric liberalisation</i>	Scenarios separate agricultural and non-agricultural liberalisation
<i>Timing of liberalisation</i>	Not analysed
<i>Hub-and-spoke structure</i>	Not analysed, but possible since Arab countries are a separate region
<i>Timing across MPCs</i>	Not possible since it is a single-country model
<i>Regional impact in the EU</i>	Not possible

General information	
<i>Reference</i>	Chemingui and Thabet (2001), Chemingui and Dessus (2001)
<i>Institution</i>	ERF (Cairo)
<i>Aim</i>	Analyse the impact of removal of trade barriers and internal agricultural support on rural livelihoods
<i>MPCs analysed</i>	Tunisia
General model structure	
<i>Geographical scope</i>	Single-country model of Tunisia, separating trade flows of EU and ROW
<i>Supply side</i>	57 sectors (of which 26 are agricultural or food industries)
<i>Demand side</i>	Nine household groups classified on agricultural income source: olives, field crops, fruits, vegetables, livestock, fishing, permanent workers, other agricultural income, non-agricultural income (note all households have non-agricultural income as well)
<i>Factors</i>	Labour: Five types by skill and geographical mobility Capital: Three types by vintage (old and new) and one by natural resources (no vintage) Land: Six types by permanence of cultivation, level of irrigation and suitability for different crop varieties
<i>Heterogeneity of goods</i>	Armington
<i>Dynamics</i>	Recursive (periods covering three years, linked through saving-investment relation)
<i>Closure</i>	Fixed current-account balance; fixed saving propensities
Data & software	
<i>Reference year(s)</i>	1992
<i>Variables</i>	Tunisia SAM for 1992; disaggregation of rural households based on 1994-95 farm survey by Ministry of Agriculture and household consumption data of the Tunisian statistical bureau
<i>Parameters</i>	Source of elasticities are not reported in this publication (maybe in an earlier model version)
<i>Policies</i>	Some from government publications, others have unreported sources
<i>Sensitivity</i>	On baseline assumptions of parameters
<i>Software</i>	Not reported
<i>Availability</i>	Not publicly available
MPC specifics	
<i>Unemployment</i>	Full employment
<i>Agriculture</i>	Detailed representation through 26 sectors and classification of households
<i>Remittances</i>	Not reported
<i>State role in production</i>	Not reported
<i>Fiscal impact</i>	Fixed government deficit (set in baseline scenario) with adjustments through VAT
EMAA specifics	
<i>Trade policies</i>	Production subsidies, tariff barriers of third parties
<i>Trade barriers</i>	Non-tariff barriers modelled as a tax
<i>Asymmetric liberalisation</i>	Agricultural and non-agricultural liberalisation separated
<i>Timing of liberalisation</i>	Implementation of GATT and industrial liberalisation of EMMA and reduction in EU tariff quotas incorporated in the baseline scenario; alternative scenarios include a timing of policies
<i>Hub-and-spoke structure</i>	Not possible
<i>Timing across MPCs</i>	Not possible
<i>Regional impact in the EU</i>	Not possible

General information

<i>Reference</i>	Hoekman et al. (2001)
<i>Institution</i>	World Bank
<i>Aim</i>	Explore the impact of FTAs with the EU and Arab League and potentially the US; focus on the relative importance of reducing tariffs, removing red-tape costs and improving the efficiency of the services sector
<i>MPCs analysed</i>	Egypt

General model structure

<i>Geographical scope</i>	Single-country model of Egypt, separating flows with the EU (including Turkey), Arab League, US, ROW
<i>Supply side</i>	38 sectors of which three are agricultural (vegetable products, foodstuff; vegetable products, non-food stuff; animal products)
<i>Demand side</i>	Single representative consumer
<i>Factors</i>	Labour, capital is immobile in several sectors (agriculture, mining, utilities, transport) to reflect resource constraints (water for agriculture)
<i>Heterogeneity of goods</i>	Armington
<i>Dynamics</i>	Static
<i>Closure</i>	Investment fixed at benchmark level; fixed current-account balance

Data & software

<i>Reference year(s)</i>	1994
<i>Variables</i>	Services broken down by region through assuming Arab League 40%, EU 25%, US 7%; 1998-99 IO table update to 1994
<i>Parameters</i>	Tariffs on intra-Arab trade set at 40% of MFN tariff to reflect existing preferential trade regimes; elasticities from literature; tariffs with Arab League set at 50% of MFN tariffs
<i>Policies</i>	EU FTA seems based on EMAA; Arab League and US based on assumptions
<i>Sensitivity</i>	Not reported
<i>Software</i>	Not reported
<i>Availability</i>	Not publicly available

MPC specifics

<i>Unemployment</i>	Full employment
<i>Agriculture</i>	Three different agricultural sectors
<i>Remittances</i>	Not reported
<i>State role in production</i>	Not reported
<i>Fiscal impact</i>	Fixed government deficit maintained through adjusting the goods and services tax on domestic and imported goods

EMAA specifics

<i>Trade policies</i>	Quotas modelled through tariffs
<i>Trade barriers</i>	NTBs represented by price wedges between home and foreign prices
<i>Asymmetric liberalisation</i>	Limited impact of EMAA with no improved access for agriculture
<i>Timing of liberalisation</i>	Not analysed
<i>Hub-and-spoke structure</i>	Possible, but not analysed
<i>Timing across MPCs</i>	Not possible
<i>Regional impact in the EU</i>	Not possible

General information

<i>Reference</i>	Löfgren et al. (2001)
<i>Institution</i>	IFPRI
<i>Aim</i>	Analyse the impact on rural development of the EMAA relative to unilateral liberalisation
<i>MPCs analysed</i>	Morocco

General model structure

<i>Geographical scope</i>	Single-country model of Morocco, separating flows with EU and non-EU
<i>Supply side</i>	45 activities, in which most of 35 are agricultural activities (differentiated by irrigated crops, irrigated livestock, rain-fed crops, rain-fed livestock, other agriculture)
<i>Demand side</i>	Four households: rural (poor, non-poor), urban (poor, non-poor)
<i>Factors</i>	Seven factors: land (irrigated, rain-fed, pasture), water, skilled labour, unskilled labour, capital; land and water in irrigated agriculture are immobile and can be left unused
<i>Heterogeneity of goods</i>	Armington; agricultural exports to the EU are modelled by a dual regime (demand decreases when prices increases; demand is fixed at base year level with price decrease → EU pays lowest possible price for fixed export levels)
<i>Dynamics</i>	recursively dynamic (capital stock updated based on investment; exogenous updating of labour supply, foreign savings, institutional payments and total factor productivity)
<i>Closure</i>	Fixed saving propensities; fixed current-account balance

Data & software

<i>Reference year(s)</i>	1994 for database; 1998 for model
<i>Variables</i>	SAM for 1994 constructed using different sources
<i>Parameters</i>	Calibrated on SAM and taken from literature
<i>Policies</i>	EMAA for FTA with the EU
<i>Sensitivity</i>	Not reported
<i>Software</i>	GAMS (mixed complementarity problem)
<i>Availability</i>	Not publicly available

MPC specifics

<i>Unemployment</i>	Full employment
<i>Agriculture</i>	Detailed modelling of production; water is included as a factor
<i>Remittances</i>	Households receive fixed remittances
<i>State role in production</i>	Not included
<i>Fiscal impact</i>	Value-added tax assures that the government savings target (fixed share of GDP) is met

EMAA specifics

<i>Trade policies</i>	Tariffs, upper bound on agricultural exports to the EU
<i>Trade barriers</i>	Not all domestic price deviations are accounted for by import duties
<i>Asymmetric liberalisation</i>	Very limited impact of the EMAA is assumed with no improved access for agriculture
<i>Timing of liberalisation</i>	Tariffs gradually eliminated over the 1999-2010 period
<i>Hub-and-spoke structure</i>	Not possible
<i>Timing across MPCs</i>	Not possible
<i>Regional impact in the EU</i>	Not possible

General information

<i>Reference</i>	Bayar (2001)
<i>Institution</i>	Ecomod, FEMISE
<i>Aim</i>	Assess the impact of the FTA with the EU and identify best tax reform to compensate government revenue loss
<i>MPCs analysed</i>	Tunisia

General model structure

<i>Geographical scope</i>	Single-country model Tunisia, separates flows to the EU, MENA, ROW
<i>Supply side</i>	22 sectors, one of which is agriculture and fishing (also separates food processing and beverages and tobacco as separate sectors)
<i>Demand side</i>	Single representative household
<i>Factors</i>	Labour, capital
<i>Heterogeneity of goods</i>	Armington assumption
<i>Dynamics</i>	Static model
<i>Closure</i>	Fixed saving propensities; fixed current-account balance

Data & software

<i>Reference year(s)</i>	1995
<i>Variables</i>	SAM build using IO table from the statistical office and literature on trade flows
<i>Parameters</i>	Not reported
<i>Policies</i>	Not reported
<i>Sensitivity</i>	Sensitivity of government revenue to elasticities of import substitution and export transformation
<i>Software</i>	GAMS/MPSGE
<i>Availability</i>	Not publicly available

MPC specifics

<i>Unemployment</i>	Full employment
<i>Agriculture</i>	Represented by a single sector
<i>Remittances</i>	Not included
<i>State role in production</i>	Not included
<i>Fiscal impact</i>	Government revenue adapts

EMAA specifics

<i>Trade policies</i>	Tariffs at Tunisian side only
<i>Trade barriers</i>	Not included
<i>Asymmetric liberalisation</i>	Manufacturing vs. full liberalisation analysed
<i>Timing of liberalisation</i>	Not included
<i>Hub-and-spoke structure</i>	Not analysed, but possible
<i>Timing across MPCs</i>	Not possible
<i>Regional impact in the EU</i>	Not possible

General information

<i>Reference</i>	Bayar (2001)
<i>Institution</i>	Ecomod, FEMISE
<i>Aim</i>	Evaluate the impact of an FTA with the EU on Egypt, with explicit attention for revenue replacement
<i>MPCs analysed</i>	Egypt

General model structure

<i>Geographical scope</i>	Multi-regional model of Egypt, North America, the EU, Turkey, the rest of the Middle East and North Africa and ROW
<i>Supply side</i>	26 sectors, with crops and livestock as separate sectors
<i>Demand side</i>	Representative household by region
<i>Factors</i>	Land, labour (skilled, unskilled), capital (immobile between regions), natural resources
<i>Heterogeneity of goods</i>	Armington
<i>Dynamics</i>	Static model
<i>Closure</i>	Fixed current-account balance; fixed saving propensities

Data & software

<i>Reference year(s)</i>	Data from 1997; reference year is 2005 (post-Uruguay) constructed with World Bank growth projections
<i>Variables</i>	GTAP database; Egyptian data from CAPMAS (Egyptian agency), Moroccan IO coefficients, trade and macro-data from the World Bank and GTAP
<i>Parameters</i>	GTAP database
<i>Policies</i>	Not reported
<i>Sensitivity</i>	Not reported
<i>Software</i>	GEMPACK
<i>Availability</i>	Egyptian SAM not available (unclear how linked to GTAP)

MPC specifics

<i>Unemployment</i>	Full employment
<i>Agriculture</i>	Represented through crop and livestock sector
<i>Remittances</i>	Not reported
<i>State role in production</i>	Not reported
<i>Fiscal impact</i>	Revenue replacement calculated by scenario as value-added tax

EMAA specifics

<i>Trade policies</i>	Tariffs and tariff equivalents for non-tariff barriers on service sector
<i>Trade barriers</i>	Model accounts for tariffs and non-tariff barriers
<i>Asymmetric liberalisation</i>	Analysed
<i>Timing of liberalisation</i>	Not analysed
<i>Hub-and-spoke structure</i>	Not analysed
<i>Timing across MPCs</i>	Not analysed
<i>Regional impact in the EU</i>	Not possible

Overview of analysed scenarios

<i>Study</i>	<i>Scenarios</i>
Augier and Gasiorek (2001)	<ol style="list-style-type: none"> 1) Benchmark scenario with a 100% reduction in tariffs by MPCs for imports of EU industrial goods 2) 100% tariff reduction + changes in productivity + improved MPC access to EU markets (NTB modelled as a 10% tariff, reduced by 50%) 3) MPCs employ EU common tariff + changes in productivity + improved MPC access to EU markets + 50% reduction in ROW tariffs on MPC imports 4) Phasing of liberalisation by sectors (unclear if simulation includes productivity changes)
Elshennawy (2001)*	<ol style="list-style-type: none"> 1) Unilateral trade liberalisation (all ROW import tariffs set to 0) 2) Preferential liberalisation excluding agriculture + improved access to EU industrial markets (1% increase in the world price of industrial exports) 3) Preferential liberalisation including agriculture + improved market access to the EU agricultural market (2% increase in world price) + improved access to EU industrial markets (1% increase in the world price of industrial exports); agricultural liberalisation is delayed to period 4. 4) Same as Scenario 3 but now the price of agricultural products increases by 8% 5) Scenario 3 + unilateral liberalisation in period 10 (all ROW import tariffs set to 0) 6) Scenario 4 + unilateral liberalisation in period 10 (all ROW import tariffs set to 0) 7) Same as Scenario 4 but agricultural liberalisation now takes place in period 1. 8) Same as Scenario 3 but agricultural liberalisation now takes place in period 1. 9) Preferential liberalisation including agriculture + improved market access to the EU agricultural market (2% increase in the world price) + improved access to EU industrial markets (1% increase in the world price of industrial exports); agricultural liberalisation is delayed to period 1; unilateral liberalisation in period 10 (all ROW import tariffs set to 0) 10) Same as Scenario 9 but now the price of agricultural products increases by 8% <p>*Note: Simulation 1-7 assumes rigid electricity wages, simulation 8-10 assume rigid agricultural and electricity wages; all 10 simulations are also done with flexible wages.</p>
Hosoe (2001)	<ol style="list-style-type: none"> 1) Uruguay: 24% reduction in import tariffs for Jordan, 36% reduction in import tariffs for the EU and ROW 2) FTA: 80% reduction in post-Uruguay tariffs on Jordan-EU trade
Lucke and Lucke (2001a)	<ol style="list-style-type: none"> 1) 50% decrease in import duties on agricultural imports from the EU 2) 100% decrease in import duties on agricultural imports from the EU 3) 100% decrease in import duties on non-agricultural imports from the EU 4) Scenarios 1 and 3 5) Scenarios 2 and 3 6) Scenario 5 + zero duties on imports from other MENA countries 7) Scenario 6 + zero duties on imports from ROW

 Lucke and Lucke (2001b)

- 1) 50% decrease on duties on agricultural imports from the EU
- 2) 100% decrease on duties on agricultural imports from the EU
- 3) 100% decrease on duties on non-agricultural imports from the EU
- 4) Scenarios 1 and 3
- 5) 100% decrease on duties on all imports from the EU
- 6) 100% decrease on duties on all imports from the EU, Arab and Turkey
- 7) 100% decrease on duties on all imports (including services)

Feraboli (2003)

All simulations are a gradual reduction in tariffs based on the average tariff schedule of the EMAA, with different assumptions on government transfers, government consumption, government revenue and reforming VAT or general sales tax. The same simulations are performed for FTA and unilateral liberalisations. The results are 12 (6*2) simulations.

Chemingui and Thabet (2001)

- 0) Baseline for 1992-2010: projects for GDP, population growth and government spending; GATT implementation (NTBs on agricultural products are removed in 1995, consolidated agricultural tariffs are reduced by 24% over the 1995-2004 period; agricultural subsidies are reduced by 13% in 1995-2004); EMAA implementation (tariffs on EU industrial products removed in 1998-2010, EU slightly reduces preferential quotas on Tunisian beverages, citrus fruits and vegetables between 1998-2010). All scenarios are defined and analysed in relation to the baseline.
- 1) abolition of tariffs on agricultural imports from the EU (25% in 2001; 50% in 2004; 75% in 2007; 100% in 2010).
- 2) Reduction in government support of agriculture (25% reduction in production and consumption subsidies in 2001; 50% in 2004; 75% in 2007 and 100% in 2010)
- 3) Reciprocal reform of EU-Tunisian agricultural trade: not defined
- 4) Multilateral reform of agricultural and industrial trade: not defined
- 5) Full liberalisation of agricultural world trade: price estimates for traded crops and products used; it is unclear if other scenarios still apply
- 6) Improving yields in agriculture: increase in productivity attained through public investments financed by an increasing VAT

Hoekman et al. (2001)

- 1) EMAA: Egypt removes all tariffs on EU imports (except on beverages and tobacco because of alcohol and health policies), EU removes tariffs (1% increase in EU export prices for all goods, except agriculture and clothing, where a 2% price increase occurs).
Arab FTA: elimination of intra-Arab tariffs (assumed to be initially 60% of statutory MFN rates).
 - 2) Scenario 1 + Egypt-US FTA: Egypt eliminates all tariffs on US imports and receives a 1% increase in export prices (8% for agricultural exports and clothing)
 - 3) Scenario 1 + WTO-plus with the US: elimination of tariffs and NTBs with the US
 - 4) Non-discriminatory unilateral elimination of tariffs and NTBs by Egypt
 - 5) Non-discriminatory unilateral elimination of tariffs and NTBs by Egypt, the EU, the Arab League and the US
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Löfgren et al. (2001)

- 1) AAEU: EMAA modelled as a gradual elimination of tariffs on industrial imports from the EU in 1999-2010
- 2) Tariff: scenario 1 + unification of tariffs at 29%
- 3) Tariff +NTB: scenario 2 + elimination of NTBs
- 4) Trade-lib: scenario 1 + unification of tariffs at 10% + elimination of NTBs
- 5) Transfer: scenario 4 + compensation to owners of rain-fed agricultural resources to compensate losses due to the EMAA
- 6) Skill-upgrade: scenario 4 + 5% increase in rural skilled labour in each period (from the share of rural unskilled)

Bayar (2001), Tunisia

- 1) Elimination of tariffs on manufactured imports from the EU
 - 2) Elimination of tariffs on all imports from the EU
- Additional scenarios analysed based on Scenario 2, with different ways of compensating loss of fiscal revenue (VAT, consumption tax and factors tax)

Bayar (2001), Egypt

- 0) Baseline: project development of global economy based on Uruguay Round and World Bank economic forecasts
 - 1) Full FTA: full free trade between the EU and Egypt
 - 2) Duty-free treatment for Egypt: full duty free access for Egyptian exports to EU
 - 3) Partial FTA: partial free trade between the EU and Egypt, excluding agriculture and food products
 - 4) Partial duty-free treatment for Egypt: partial duty-free access for Egyptian exports to the EU, excluding agriculture and food products
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ABOUT ENARPRI

ENARPRI is a network of European agricultural and rural policy research institutes formed for the purpose of assessing the impact of regional, bilateral and multilateral trade agreements concluded by the European Union or currently under negotiation, including agreements under the WTO, EU accession, Everything But Arms (EBA), EuroMed and Mercosur. It also addresses the wider issues of the multifunctional model of European agriculture and sustainable development of rural areas. Participants in the project include leading national institutes and research teams from 13 countries (11 EU member states and 2 accession countries).

AIMS

- Creation of an institutional structure linking key research institutes with major benefits for improved exchange of information and policy analysis both in the short and long run,
- Development of improved tools for impact assessment,
- More effective impact assessment of trade agreements on a variety of important social, economic, and environmental indicators and an assessment of multi-functionality, and
- Clearer analysis of the need for EU policy adjustments.

PARTNER INSTITUTES

- **CEPS**, Centre for European Policy Studies (Belgium)
- **FAL**, Federal Agricultural Research Centre (Germany)
- **FOI**, Danish Research Institute of Food Economics (Denmark)
- **IEEP**, Institute for European Environmental Policies (UK)
- **INEA**, Istituto Nazionale di Economia Agraria (Italy)
- **INRA**, Institut National de la Recherche Agronomique (France)
- **IRWIR PAN**, Institute of Rural and Agricultural Development/Polish Academy of Sciences (Poland)
- **LEI**, Landbouweconomisch Instituut (The Netherlands)
- **MTT**, Agrifood Research (Finland)
- **TEAGASC**, Rural Economy Research Centre (Ireland)
- **UPATRAS**, Department of Economics, University of Patras (Greece)
- **UPM-ETSIA**, Universidad Politécnica de Madrid – Escuela Técnica Superior de Ingenieros Agrónomos (Spain)
- **VÚZE**, Research Institute of Agricultural Economics (Czech Republic)

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