

**DEEP INTEGRATION, REGIONALISM
AND NONDISCRIMINATION**

by

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Deep Integration, Regionalism and Nondiscrimination*

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1. Introduction

There is an extensive literature on the economics of preferential trade agreements (PTAs). One strand of this literature emphasizes the role of PTAs as instruments used by governments in the pursuit of “deep integration” (e.g., Lawrence, 1996), which for purposes of this paper is defined as explicit actions by governments to reduce the market segmenting effect of domestic (non-border) regulatory policies. Examples are health and safety regulations, competition policies, licensing and certification regimes, prudential requirements, environmental norms, or administrative procedures such as customs clearance practices. These types of policies target not only goods (the traditional domain of the trade policy literature), but also affect services, production processes and legal and natural persons. Such regulatory policies have effects analogous to nontariff barriers (NTBs) to trade, even though the underlying intent may not be to discriminate against foreign suppliers of goods and services. Indeed, the regulations concerned may apply equally to domestic and foreign products, in contrast to standard NTBs. Nonetheless, they can act to segment markets and reduce competition. A vital issue then is to quantify the potential benefits of deep integration efforts.

The regulatory barriers and measures that figure on the “deep integration” agenda often belong to the class of market segmenting policies that either impose real resource or frictional costs on international exchange of goods and factors, or prohibit entry by foreign suppliers altogether. As a result, deep integration can have substantial beneficial impacts. However, it may require decisions by governments: (i) to recognize a partner’s policies; or (ii) to adopt a common regulatory stance in specific areas (harmonization). This can imply far-reaching cooperation and “sharing” of sovereignty. A key question in evaluating the justification for PTAs from a

multilateral trading system perspective is the extent to which formal agreements are *technically necessary* to achieve deep integration. The more this is so, the stronger the potential case for pursuit of regional integration. Another question that is relevant in evaluating the case for regionalism is to what extent actions taken in the PTA context to reduce the prevalence of market segmentation due to regulations can be and are applied on a nondiscriminatory basis. If PTA-based policy innovations to reduce transactions or market access costs are applied to nonmembers as well as members of a PTA, this increases the attractiveness of regionalism as an instrument of trade and investment policy reform.

This paper investigates the potential importance of deep integration for Egypt in the context of trade agreements with the EU. It is sometimes argued that free trade agreements between Mediterranean countries and the EU will be detrimental to the former because they already have duty-free access to EU markets for manufactures (Schiff, 1997). But to the extent that a Euro-Mediterranean (EMA) reduces regulatory impediments in the EU, partner countries may gain in market access terms. The greater the share of frictional NTBs in a Mediterranean country's policy mix, the higher are frictional costs imposed on trade, and the greater the extent to which abolition of such costs applies on a nondiscriminatory basis, the greater the potential welfare gains resulting from a "deep" PTA.

The implications of considering these distinctions is explored by evaluating the economic impact of alternative trade liberalization and policy integration scenarios for Egypt using a computable general equilibrium (CGE) model. The case of Egypt is considered for purely illustrative purposes, largely driven by the fact that a significant amount of analytical work on Egypt already exists (Maskus and Konan, 1997). The government is far advanced in negotiations

with the European Union (EU) to establish a bilateral FTA,¹ and in 1997 agreement was reached in the Arab League to establish a free trade agreement (FTA) over a 10 year period starting in 1998.² Neither of these agreements does much to pursue a policy integration agenda, although the EMA has the potential to do so. One motivation for this paper is to quantify the magnitude of the opportunity costs of not doing so, taking into account that unilateral elimination of some regulatory barriers on a nondiscriminatory basis may not be feasible.

The plan of the paper is as follows. Section 2 reviews a number of conceptual issues that arise in the context of policy integration. Section 3 describes the status quo policies in Egypt that characterize the benchmark for simulation analysis. Section 4 describes the model, datasets, and the main scenarios that are evaluated. Section 5 reports the results of the simulation analyses. Section 6 concludes.

2. Conceptual Issues

As tariffs and related “traditional” trade barriers decline in importance, industries have started to focus on the consequences of differences in regulatory regimes across countries for their ability to compete. Regulatory regime differences may have consequences for the degree to which the contestability of markets is enhanced following a significant reduction or the complete elimination of trade control measures. Commonly mentioned examples concern the prevalence of state-owned or controlled industries/firms, the extent to which governments subsidize the activities of domestic industry, and the competition policy (antitrust) regime that applies. The

¹ Such FTAs have already been concluded between the EU and Israel, Jordan, Morocco, the Palestinian Authority, and Tunisia. Discussions are ongoing with Algeria, Egypt, Lebanon and Syria. See Galal and Hoekman (1997) for assessments of the Tunisian and Moroccan agreements and analysis of the issues for Egypt.

² The recent Arab League FTA may to some extent have been motivated by a desire to avoid the negative implications of an emerging “hub and spoke” network of bilateral Euro-Med agreements.

greater the role of the state in the economy and the more tolerant a government is of anticompetitive business practices such as cartels, bid rigging and other horizontal restraints, the less impact a formal elimination of trade barriers may have on the contestability of markets.

Although the market segmenting effects of regulatory policies may be intentional, in many cases this simply is a side effect. For example, the enforcement of health and safety standards requires testing and conformity assessment procedures for products. These presumably will apply equally to domestic and imported goods. But exporters may already be subject to equivalent controls in their home country, so that testing is duplicative, leading to higher compliance costs for foreign firms. Customs procedures may also be duplicative insofar as paperwork and data requirements have already been demanded by authorities in the home country or are not relevant to the needs of customs. Such policies may therefore be largely resource-wasting and redundant.

It has been estimated that over 60 percent of US exports are subject to mandatory health, safety, and related standards. For exports to the EU, government-issued certificates were required for 45 percent of these goods, private, third party certification was accepted in 15 percent of cases, and for the remainder manufacturers self-certification sufficed (Wilson, 1998). Within the EU, some 75 percent of the value of intra-EU trade in goods is subject to mandatory technical regulations (European Commission, 1996).³ Conformity assessment policies may therefore constitute an important technical barrier to trade. Their prevalence has risen rapidly. Unter (1998) estimates that in the case of the Hewlett-Packard company redundant testing and conformity assessment procedures increased six-fold between 1990 and 1997.

³ One-third of total intra-EU flows benefit from mutual recognition; another third are subject to "harmonization" directives (the old approach) and one fifth are covered by the EU's "new" approach (which specifies minimum

The EU now requires third-party testing, certification, or quality system registration for certain regulated sectors by organizations designated, or “notified”, to the Commission by the member states as technically competent. Only these bodies can approve goods for circulation in European markets and affix the European “CE Mark” to certified products. The requirement that final assessments be performed by European notified bodies—in limited cases the EU has authorized subcontracting by notified bodies to allow certification by foreign firms—raises the costs of testing and certification to non-EU manufacturers in many sectors and was a prime motivation for EU-US mutual recognition agreement (MRA) negotiations, which concluded in 1997. In total, these MRAs cover over \$40 billion of bilateral trade. The MRA on telecommunications and information technology products alone could result, when fully implemented, in an approximately \$1.4 billion saving to consumers and manufacturers (Wilson, 1998), implying that the frictional costs that are abolished were equivalent to a 5 percent “tax” on the value of the goods traded. While this is a significant cost reduction, the MRAs are regarded as a second best solution by US industry, which would prefer to rely much more heavily on supplier self-certification instead of third party conformity assessment.

Similar situations apply to services producers, where the need for licensing and certification of suppliers and prudential supervision may be duplicated across countries. Often such requirements are complemented by outright market access restrictions for foreign providers. The result is generally higher cost supply and the creation of rents for domestic suppliers.

The major options for dealing with the market segmenting and/or anticompetitive effects of regulatory regimes are harmonization and acceptance (or “recognition”) of foreign regulatory policy regimes. Each of these options may be pursued unilaterally or in a concerted manner.

standards -- essential requirements) (EC, 1996, pp. 22-23).

Harmonization may involve adoption by one country of another country's set of rules, or the negotiation of a common set of disciplines that imply changes for both (or all) countries. Examples abound of unilateral or independent harmonization to the standard of a trading partner. These are often driven by market size disparities. An example was a 1992 decision by Canada to adopt the US emission standards for automobiles that were specified in the US Clean Air Act of 1990 so as to ensure that auto makers located in Canada could realize economies of scale (avoid having to set up separate production lines for the Canadian and US market). Another example driven by market access considerations was a decision Switzerland to adopt the EU regime on technical regulations and industrial standards (in effect the *acquis communautaire*). This ensured that Swiss goods can enter and circulate in the EU on the same basis as EU-produced goods (Messerlin, 1998).⁴ Numerous developing countries have pursued a unilateral harmonization strategy. Often this was done by maintaining systems inherited from a colonial past or military occupation, but more deliberate efforts have also been made. South Korea, for example, adopted many German and US technical product regulations in the 1950s, as part of a strategy to upgrade the quality of industrial production and foster exports.

Harmonization may also be based on inter-governmental cooperation and agreement, or involve a decision to cede sovereignty to common or supra-national institutions. The latter is often regarded in the literature as a necessary condition for economic integration to occur—Robson (1988) defines integration as “the assignment of particular economic functions and instruments to the union or community and their exercise at that level rather than at the level of the member states.” Supranational institutions may be involved in the process of setting the rules

⁴ However, it did require a number of MRAs as well. Switzerland was put into a special situation because other EFTA members either joined the EU or the EEA. Under the EEA, EFTA members agreed to adopt the *acquis*, which automatically implied accepting to apply EU standards.

of the game (as in the case of the EU, where the Commission has been delegated the power of proposing directives and regulations), and/or the enforcement of negotiated commitments (e.g., acceptance by PTA member states of binding, independent third party adjudication or arbitration in NAFTA; or more far-reaching, the creation of a supra-national institution such as the Court of Justice in the EU).

A complement of unilateral harmonization to the standards of a trading partner or international norms is unilateral recognition of foreign regulatory regimes. Thus, a government may decide that the professional qualifications of doctors trained and certified in certain countries are sufficient for them to practice (although nationality constraints and economic needs tests may still prohibit entry by foreign service providers). Similarly, a government may accept foreign certificates of safety for certain imports as sufficient proof of quality (e.g., the Underwriters Laboratories (UL) mark is accepted in many countries). However, the ability of unilateral recognition to reduce transaction costs is inherently limited to the jurisdiction of the government concerned. In some cases a government or regulatory body may not be familiar with or trust foreign certification systems, or may consider foreign standards to be unacceptable. If so, products will be subjected to testing and certification at point of entry into its jurisdiction, imposing additional costs on imports. Negotiation of *mutual* recognition agreements (MRAs) is a mechanism through which transactions costs can then be reduced further. MRAs may be required even if a harmonization strategy is pursued by a country, as the trading partner whose standards are emulated may not accept foreign test results or conformity assessment systems as equivalent to its own, even if the formal standards are identical. Conversely, mutual recognition may require some degree of harmonization, especially in areas where mandatory standards or regulations apply, so as to ensure that the underlying norms satisfy certain basic, minimum standards.

A major advantage of mutual recognition is that allowance can be made for differences in standards across countries; subject to a “minimal equivalence” norm in those cases where public interest considerations are important, mutual recognition can ensure that existing idiosyncrasies in national requirements that do not affect health or safety objectives are accepted by trading partners. Although significant time and energy may still be required to achieve agreement on what the “minimum standards” should be in cases where this are considered necessary, this should be easier to achieve than complete harmonization.

An important empirical question is to determine the size of the potential benefits of deep integration initiatives. Relatively little work has been done on this, almost all of it focusing on the EU’s Single Market Programme. One conclusion that emerges from this work (e.g., Winters 1992; Baldwin, 1995) is that the welfare impact of deep integration will be greater the more the restrictions being addressed waste real resources rather than generate rents that are captured by interest groups. In such cases there is no rent or revenue for a country to lose by removing the restriction, unlike the losses that occur as tariffs or import quotas are abolished. Thus, it is important to determine whether regulatory barriers create rents or not. Estimates of frictional costs range between 2 and 3 percent of the value of trade (EC, 1996). In the APEC context, estimates are somewhat higher, reflecting greater “red tape” [need cite]. It is also important to determine to what extent regulatory reform can be achieved unilaterally as opposed to requiring formal, international agreements. Unilateral reforms may be sufficient to realize a significant share of the total potential gains. However, it can only affect domestic transactions, while formal agreements may have an impact in facilitating both imports and exports, as market access becomes less costly.

Finally, it is necessary to determine whether formal agreements to reduce the incidence of regulatory costs for importers and exporters can be extended to third parties. Non-members may gain if the reductions in regulatory barriers apply on a nondiscriminatory basis. If so trade diversion will be less of a concern, although supply switching from a low to a higher cost provider may still arise under deep integration initiatives. Both recognition agreements and harmonization decisions may be inherently discriminatory with respect to outsiders. For the former, discrimination may be implied if recognition is not extended to some countries. Harmonization may increase barriers to trade for third parties if their national standards or norms differ from the common norm applied in the PTA. Consequently, it cannot be assumed that reductions in real costs associated with actions to reduce the market segmenting effect of differences in regulatory regimes will benefit nonmembers.

The standard policy prescription for reducing the opportunity costs associated with trade diversion is to lower trade barriers on rest-of-the-world imports. While this is straightforward to do if the barriers are of the traditional type (tariffs, quotas), once attention shifts to domestic regulatory regimes it may not be possible to unilaterally “multilateralize” liberalization actions that have been implemented in a PTA context. Much depends in this connection on the types of barriers that are involved. Some reductions in trade costs can be extended to all sources of imports. An example are customs clearance procedures and associated documentary requirements (in the EMA context this could include adoption of the EU's Single Administrative Document). Other liberalization actions may not automatically extend to third countries. Examples include decisions to link computer systems of Customs, accept self-declaration for purposes of enforcement of mandatory product standards and related testing and certification procedures or recognize professional qualifications.

Summing up, the impact of a PTA on members and the rest of the world depends importantly on the extent to which the regulatory barriers that are eliminated are frictional in nature, whether reforms can be pursued unilaterally, and whether policy integration benefits extend on a nondiscriminatory basis. The greater the share of frictional barriers in the total set of barriers that is removed by the PTA, and the greater the extent to which barrier removal extends to nonmembers, the more beneficial it will be for the member countries. These are empirical questions or issues that should figure in any evaluation of a PTA. Unfortunately, little information tends to be available regarding the type of barriers that are subject to elimination in the PTA context or the extent to which nonmembers are able to benefit from them. What follows makes an attempt to determine the possible quantitative importance of some of these factors using a CGE model of the Egyptian economy.

3. Egypt: Trade Policy and the Pattern of Trade

Given the recent decision to establish an Arab League FTA and ongoing negotiations on a FTA with the EU, bilateral Egyptian trade flows are separated into four regions: the EU (including Turkey),⁵ the United States, the Arab League, and the rest of the world (ROW).⁶ The EU is Egypt's largest trading partner, accounting for roughly 40 percent of merchandise imports in 1995 and absorbing 45 percent of Egypt's exports. The US comes second in terms of imports, accounting for 19 percent of total imports, while the Arab League is the second most important export market for Egypt, absorbing 16 percent of all exports of goods in 1995. As shown in Table 1, in many product categories, including processed foodstuffs, wood products, paper and printing, glass and mineral

⁵ Turkey is included in the EU grouping because Turkey has recently concluded an agreement to form a customs union with the European Union, implying that any FTA with the EU will automatically be extended to Turkey.

products, transport equipment, more than 50 percent of total Egyptian exports go to Arab markets. In contrast, Egypt imports relatively little from the Arab League region. The most important in terms of import shares are petroleum products, beverages, and textiles and clothing. Despite their relatively large presence in production, vegetable foodstuffs and food processing are major import goods, as are machinery and chemicals. On the export side, Egypt's trade flows are dominated by transport services (largely because of the Suez Canal), oil, tourism and textiles and clothing.

We draw two conclusions from these statistics. First, although the EU is by far the largest trading partner of Egypt, trade flows are rather diversified. The non-Arab, non-EU, non-US "rest of the world" provides 34% of imports and takes 25% of exports. These numbers suggest that the potential for trade diversion from a "classic" preferential trade agreement with just one of Egypt's major trading partners is significant. Second, services play an important role in Egypt's current account. As there are no disaggregated data available on services trade or its breakdown by region, for purposes of the modeling exercise that follows it is assumed that the Arab League region has a 40 percent export share; the EU 25 percent; and the US 7 percent (see Table 1).⁷

Although tariffs have been declining in recent years—the maximum tariff was recently reduced to 50 percent—at around 20 to 25 percent the import weighted average tariff is still relatively high. Tariffs on inputs are often lower than those applied to final goods, leading to effective rates of protection that are often a multiple of nominal rates.⁸ With the exception of

⁶ This section draws on Maskus and Konan (1997) and Hoekman, Konan and Maskus (1998).

⁷ The Arab share is assumed to be higher than for merchandise reflecting the similarity in language, the importance of proximity for service delivery, and the prevailing policy of favoring Arab services-related investment. In earlier work, (Konan and Maskus 1997a; Maskus and Konan 1997) it is assumed that services trade is closely complementary to merchandise trade in terms of its sources so that regional shares of services trade equal each region's share in total merchandise trade. In this paper this assumption is only maintained for export shares of the Suez canal.

⁸ However, if account is taken of the fact that services are heavily protected, average effective rates of protection for manufacturing are much smaller. See Hoekman and Djankov (1997). It is also the case that total tariff revenue

those on imports of textile products, all quantitative restrictions have been abolished, and the textile bans are scheduled to be eliminated in the coming years as part of Egypt's commitments under the Uruguay Round.⁹

As tariffs and quotas have declined in importance, administrative control of the import process has become more prominent and important. Such controls and "red tape" are reflected in customs clearance procedures, in the enforcement of national health and safety standards, and in the logistics involved in moving shipments to, through, and from ports. These controls impose real trade costs on the private sector, both directly in terms of financial charges and indirectly through the opportunity costs of delays incurred in customs clearance (Kheir El Din, 1998). Customs valuation and classification practices are problematic. Assessed values are frequently reported to exceed invoice values, and applied tariffs may be a multiple of the statutory rate.¹⁰ Invoices are frequently rejected—in the case of one large foreign firm, 200 out of some 600 declarations in 1996 were rejected/contested. The Egyptian system of standards and technical regulation is a major bottleneck for importers. The General Organization for Export and Import Control (GOEIC) is one of a number of bodies that inspects consignments of goods entering Egypt that are subject to quality control standards.¹¹ As of 1994 some 1,550 tariff lines (25 percent of the tariff schedule) were subject to such controls.¹² As is the case for tariff rates, many

collections are less than what should be collected if all tariffs were fully applied, reflecting a variety of exemptions, including Arab League preferences, as well as circumvention.

⁹ Kheir el Din and El Sayed (1997).

¹⁰ The variance in valuation and applied rates can be significant. Data provided by importers in 1995 suggest that assessed values for capital equipment may exceed invoice values by 25 percent or more, while applied tariffs may exceed the applicable statutory rates by an even wider margin. See World Bank, 1995.

¹¹ Up to five different agencies may independently test and inspect a single consignment (Nathan As. 1996).

¹² Consignments that were rejected in 1993 included bolts and nuts; spare parts for cars; transformers; pressure cookers; filters; brakeshoes; ceramic tiles, light bulbs; ballpoint pens; washing machines; wheat; fresh fruit; dried fruit; sesame; frozen meat; and frozen fish. Estimates of the economic impact of the testing system do not exist.

of which escalate sharply, fees for goods that are intended for retail sale were generally at least twice as large as those that applied if further processing occurred in Egypt. Nathan Associates (1996) estimate that the direct and indirect costs of the system of standards and technical product regulations increased costs for traders and producers by between 5 and 90 percent, depending on the industry, with the highest costs for food products and imported final consumer goods.

An absence of competition in key service sectors also imposes excess costs on business. Only Egyptian nationals may import. Fees charged by the public companies providing port services for handling and storage of goods are some 30 percent higher than in neighboring countries or nations with which Egypt competes, while these companies do not provide quality service in return. Maritime shipping is a monopoly of the state-owned Egyptian Maritime Navigation Company. A 1994 survey revealed that the cost of shipment and handling in Egypt of a standard container was 27, 22, and 19 percent higher than in Jordan, Syria and Turkey, respectively (Mohieldin, 1997). Foreign firms seeking to advertise their goods pay a multiple of the rates charged for domestic producers. Low quality and high cost telecommunications impose additional costs on the private sector. The telecommunications provider is an inefficient public monopoly—waiting times for new lines, revenue per line and percentage of completed calls are among the lowest in the Middle East. National and international communications are a multiple of cost, reflecting a policy of cross-subsidizing local calls. The company manufactures telephone sets and small switches itself. Adopting a more competitive regulatory regime for telecommunications has been estimated to generate a net welfare gain that is equivalent to the

However, anecdotal evidence suggests the effect can be significant (World Bank, 1995). For example, in 1993 hundreds of tons of frozen beef were rejected on the basis that the relevant Egyptian standard (no. 1522 of 1991) was violated. It has been claimed that this standard is excessively strict. It requires that frozen beef have a fat content of 7 percent or less if for retail sale, and once defrosted, have a drip content of no more than 1 percent by weight.

total current sales of the company (some \$800 million) (Galal, 1998). Insurance is dominated by three public sector firms which have 85 percent of the general insurance market and over 90 percent of the life insurance market. Foreign ownership is only allowed in free-zones, although the Government committed to allow foreign presence in domestic market through joint ventures by 1999, subject to a maximum equity stake of 49 percent.

No comprehensive estimates exist of the total cost and incidence of the various regulatory barriers that confront Egyptian producers and traders. The standards regime alone has been estimated to have a negative direct impact equivalent to one percent of GDP (Nathan Associates, 1996). Indirect effects—e.g., through discouraging investment—will increase total costs. A number of initiatives have been taken in recent years to study and reduce red tape costs. Documentary requirements have been simplified, the incidence of stamp duties reduced, and fees for port and related services lowered. The shipping monopoly is in the process of being abolished.¹³ While these initiatives have improved the situation, much more remains to be done. In principle, implementation of an EMA could help to achieve a reduction in red tape costs through a process of simplification and abolition of administrative controls and harmonization and mutual recognition of standards. Our analysis below explores this issue further.

4. The Model and Benchmark Data

Egypt is modeled as a price taker on world markets: policy changes are assumed not to significantly alter prices in other regions of the world.¹⁴ Egypt's MFN tariffs are applied to each region in the benchmark case, weighted across sub-sectors by global import shares. To take into account existing

¹³ *Financial Times*, September 25, 1997, p. 8.

¹⁴ See Maskus and Konan (1997) for a fuller description of the model.

preferential trade within the Arab region some of the simulations reduce applied tariffs on intra Arab trade by 40 percent.¹⁵ Production exhibits constant returns to scale and firms operate in a perfectly competitive environment, so that prices equal marginal costs of output. Following standard practice in the literature, final outputs are produced according to a Leontief function using intermediate inputs and real value added (Figure 1).¹⁶ A constant elasticity of substitution (CES) production function describes the substitutability between labor and capital inputs in producing real value-added. Intermediate inputs and final goods are differentiated by country of origin according to the Armington assumption, so that export and import prices differ across regions.¹⁷ In each sector, demand for domestically produced and imported goods is represented by a CES function, and intermediate imports are also differentiated by region of supply in a CES structure. Similarly, Egyptian industries supply regionally differentiated goods to both domestic and foreign markets (exports). Production follows a nested two-stage constant elasticity of transformation (CET) function. Total output is first calculated as the sum of domestic supply and total exports, with the latter then being allocated across regions (EU, US, Arab League, and ROW) according to a sub-CET function.

Capital is assumed to be partially mobile in the sense that there are a number of resource constrained sectors, which we take to be agriculture (VG1, VG2, ANI), mining (OIL, MIN), utilities (ELE), and transport (TRN). In all other sectors capital is freely mobile. The intention

¹⁵ As discussed further below there is very little information available regarding the preference margins that actually apply.

¹⁶ A CES structure for production, assuming a substitution elasticity of 0.5, leads to very similar results.

¹⁷ This assumption may seem inconsistent with the small open economy notion that Egypt is a price taker on world markets. However, this approach is quite standard in the literature, and there is no obvious way to address this issue given the data at hand. De Melo and Robinson (1989) show that models that allow product differentiation are well

underlying this assumption is to capture the strong possibility in Egypt of resource constraints that limit intersectoral factor flows and output changes. In particular, Egyptian experts seem concerned about the ability to expand agricultural production in the face of significant water scarcities. There are also constraints on output in crude petroleum and the Suez Canal. To address the latter problem, transportation exports are held constant in the counterfactuals.

A representative consumer maximizes a nested CES utility function with a corresponding multi-staged budget constraint. In the first stage, the consumer decides how much to spend on goods from each sector, given the budget constraint. Income elasticities across sectors are set at unity as given by a Cobb-Douglas (CD) utility nest. In the second nest, the consumer determines domestic and aggregate import expenditures in each sector according to a CES function. Then given a budget for imports, the consumer selects purchases of imports from each region. These latter functions also characterize the split between government consumption and investment spending on domestic and imported goods and services. The representative consumer receives income from primary factors (production labor, non-production labor, and capital), net transfers from the government, the current-account deficit, as well as any net economic rents from the operation of nontariff barriers to trade.

As tariff reform will have a direct impact on government finances--import duties constitute over 15 percent of tax revenues and over 10 percent of total current revenues (including transfers from public firms)¹⁸ some care is taken to consider government revenue. The government is held to operate under a fixed deficit constraint in that any change in tariff collections is compensated by an

behaved under a small open economy assumption; in effect the economy is a price taker at the level of aggregate trade flows and each region's aggregation is sufficiently distinctive to support the Armington assumption.

¹⁸ International Monetary Fund (1994).

endogenous domestic tax change that makes any trade policy change revenue neutral. Public collections may rise or fall in response to the removal of a tariff, as domestic activity may increase in sectors that are more heavily taxed domestically.¹⁹ Required changes in domestic tax collections are achieved by changing the Goods and Service tax (GST), a sales tax that applies to final consumption and capital investment of domestic goods and imports, but does not apply to exports. The numerous sectoral deviations from the average GST rate and exemptions and evasion of this tax are taken into account by calibrating tax rates to measures of government revenue from indirect taxes in the benchmark year.²⁰

The formal equations and notation of the model are presented in the appendix. Intermediate inputs are disaggregated into domestic sources and imports to incorporate importing costs and tariffs in purchases for the production sector. Sector-specific proportionate import costs (u_i) and export costs (v_i) capture the impact of NTBs, or "red tape". As discussed in Section 2, import NTBs will be of four types, depending on whether formal bilateral agreements are a precondition for removal and whether they are frictional or rent-creating. Insufficient data exists to allow a breakdown of the existing set of NTBs into these categories, but all four types of costs are prevalent and significant in Egypt. Examples of costs that can be removed on an "unconditional" basis include administrative procedures and time-related costs due to inspection delays or monopoly port services. Examples of costs that could require formal bilateral agreements may include product standards and certification regimes and recognition of national licensing schemes and qualification requirements for professional service providers. In the absence of information on

¹⁹ This occurs in many counterfactuals. See Konan and Maskus (1997b).

²⁰ An additional important tax in Egypt is the corporate tax, or tax on operating surplus. This tax also varies across sectors; for example, it is not applied in agriculture. We hold the tax structure fixed in our policy analyses.

the distribution of such benefits between the EU and the rest of the world, in the simulations we assume that half of the red tape cost reduction on goods imports are “bilateral” or “conditional” on the negotiation of a MRA. In terms of goods sectors, import barriers are approximated as a 15 percent excess cost.

NTBs also vary in their implementation from being frictional to being resource-using and rent seeking and the simulation exercises consider both possibilities. In the case of frictional NTBs, we assume that a reduction in import NTBs shifts “rent revenues” to the consumer (representative agent) in the form of increased purchasing power. In contrast, resource-using NTBs impose further costs on society as they employ resources wastefully. That is, NTBs are directly-unproductive and their rents are dissipated. In either case, changes in aggregate consumption are a direct measure of “equivalent variation,” with the cost of living index associated with the utility function chosen as numeraire.

One of the impacts of deeper integration with the EU will potentially be greater competition in service markets by Egyptian firms, foreign suppliers, and foreign direct investment. To appropriately model the service sector would require information on the nature of present market imperfections and the potential form that an open market might take. We approximate the current environment with either a conservative 7.5 or 15 percent markup on service production, where the rents generated are collected by the representative agent.²¹ In addition, import barriers are assumed to add a 10 percent increment in cost to construction, 30 percent in transport (excluding Suez canal activities) and communications, and 15 percent in the

²¹ Comprehensive estimates of the cost-raising effects of regulatory regimes that restrict competition in service markets are lacking. However, many case studies of individual sectors suggest that excess costs are more than 15 percent. See Section 2 above, World Bank (1995) and the contributions in Galal and Hoekman (1997) for a discussion.

remaining service markets. Service import barrier removal is assumed to require a MRA (i.e., to be discriminatory) in construction, business, financial, insurance, personal, social and cultural services (CON, INS, FIN, HSG, SER, REC, and PER). For the remaining service sectors, liberalization is assumed to be applied strictly on a MFN basis (ELE, TRD, RES, TRN, and COM). Throughout the counterfactuals, service import barriers are rent creating.

A distinctive feature of the approach taken is that we do not impose any export NTBs on Egyptian producers. In past work, e.g., Maskus and Konan (1997) and Hoekman, Konan and Maskus (1998), this was done to account for inefficiencies and higher costs incurred by exporters. The direct imposition of “cost wedges” on service sector inputs, along with the various NTBs applied to imports of goods and services, should allow us to better account for the anti-export bias implied by status quo policies.

Two standard closure rules are imposed: the savings-investment balance (equation A12) and a fixed current account balance (equation A14). The savings-investment balance is based on the assumption that the capital stock is exogenously fixed at the benchmark level. This stock is financed through forced consumer savings that acts as a direct (lump-sum) tax. A capital good is modeled as composite goods of fixed composition. Firms buy composite capital according to their preferences. The interest rate (an index price of the composite capital stock) is endogenous and determined by factor demand conditions.²² The current-account imbalance is held constant at its benchmark level throughout the simulations. Foreign currencies are scaled so that the appropriate GDP deflator (“world” price index) is one. Given the small-economy assumption, the world price

²² No distinction is made between domestic capital and capital inflows from foreign direct investment (FDI). The impact of trade liberalization on the volume of FDI is generally ambiguous. Tariff reduction will lower the incentive of foreign firms to service Egyptian markets with “tariff jumping” FDI. In contrast, lower tariffs on intermediate imports may encourage export-oriented FDI. These issues are beyond the scope of the present analysis. See Brown, Deardorff and Stern (1997) for an exploration of the issue in the context of the EU-Tunisia agreement.

index is held constant throughout the analysis. Because the benchmark current account is in deficit, it represents an addition to the representative agent's income through exogenous capital inflows, as noted in equation (A12). To hold B fixed while international prices are constant requires a balancing item in equation (A14). This is accomplished by means of a change in the home "real exchange rate," which refers implicitly to a change in the home price index (generated by changes in price of home-produced goods) sufficient to sustain a constant current-account deficit measured at world prices.²³ Thus, B is held fixed, along with the price terms, requiring e to change as import and export volumes change.

The government budget deficit is a deduction in available income for the representative agent, constituting a transfer to government consumption. As indicated earlier, we hold D fixed during our simulations. Thus, if a policy reform causes prices to fall, thereby reducing the tax revenues required to finance government expenditures, this tax saving is transferred to the representative agent. At the same time, if trade liberalization results in lost tariff revenues, the revenues are recouped by means of allowing GST tax rates, τ_{Ci} , to vary. The GST is applied on sales of goods and services at rates ranging from zero to 25. The standard tax rate is 10 percent (see Table 2 for benchmark GST rates).²⁴ Taxes paid by firms on their intermediate input purchases are recoverable through a tax credit, with the exception of purchases of investment goods and some service inputs. Absent sufficient information on these tax credit exceptions, we choose to model

²³ A rise in the "real exchange rate" is consistent with a depreciation of home currency, in that the per-unit price of foreign exchange rises.

²⁴ Tax rates on capital are held constant. Effective corporate tax rates calculated for 1990 are reported in Table 2. Legislated corporate tax rates are considerably higher than these effective rates, which reflect tax holidays, depreciation schedules, and various exemptions. Available information indicates that there is no tax on agriculture, approximately a 23% effective tax on services, and approximately an 18% tax on manufactures, which we apply also to the mining and crude oil sectors. These rates have been incorporated into the 1990 SAM to calibrate the benchmark economy.

the tax as a levy solely on final goods purchases, assuming that taxes on all inputs are credited back to purchasing firms.

The data for the model consist of a Social Accounting Matrix (SAM) and other parameters, such as elasticities of substitution and transformation,²⁵ import and export trade flows by region, and tax and tariff rates. These data are assembled into a consistent set of relationships between intermediate demand, final demand, and value-added transactions using the 1989/1990 input-output table for Egypt, updated to incorporate trade and tax policies and trade shares as of 1994.²⁶ Trade and tariff data by 8-digit HS line were aggregated to the input-output sectoral basis using import weights consistent with the concordance between the input-output table and the tariff classification. From these data, regional trade shares for 1994 were applied to 1990 trade volumes on the input-output basis. Egypt does not realize the full revenue that would obtain if statutory tariff rates were applied to all imports because of various exemptions for duty-drawback provisions and investment incentives. Thus weighted legal tariff rates were scaled downward (by some 20 percent) to ensure consistency with total import duty collections in 1994. To take into account the existence of the quantitative restrictions on imports of textiles and clothing, the statutory MFN rates for this sector have been doubled. Finally, it is assumed that the cost impacts of "red tape" on imports from Arab countries are half those facing other trading partners reflecting past integration efforts within the region.

²⁵ As there is also little empirical evidence on Egyptian elasticities, labor-capital substitution is allowed to vary across industries, using estimates from Harrison, Jones, Kimbell and Wigle (1992). Labor-labor substitution is set at a conservative 0.50 (see Table 2). Benchmark trade elasticities are drawn from Rutherford, Rutstrom and Tarr (1993). The various trade elasticities are 2.0 for substitution between domestic and imported goods, 5.0 for substitution among regional imports and for transformation between domestic output and exports, and 8.0 for transformation among regional export destinations. These parameters are consistent with the ranges of elasticities reported in Lofgren (1994). Results of sensitivity analysis with respect to the various trade elasticities are reported in Maskus and Konan (1997).

²⁶ See Maskus and Konan (1997) for a detailed discussion of the updating procedure, which involved re-calibrating the model on the basis of the 1994 policy parameters.

5. Preferential Trade Liberalization: Simulations and Results

Various preferential trade-liberalization scenarios for Egypt are analyzed with the model, involving different combinations of FTAs with the EU and the Arab region. The first, Tables 3 and 4 Columns (1), is a shallow partnership agreement with the European Union in which Egypt preferentially removes all tariffs on EU goods but does not liberalize non-tariff barriers or service barriers.²⁷ The EU responds by providing somewhat improved access to its markets assumed to be equivalent to a one percent increase in export price for all commodities except agriculture and clothing, where a two percent terms of trade improvement occurs (VG1, VG2, ANI, TX1, TX2, CLO). These improvements are assumed to reflect the removal by the EU of frictional NTBs. Egypt already enjoys duty-free access to EU markets for manufactures, and is not likely to obtain significantly better market access terms for agricultural produce.²⁸

The draft EMA devotes some attention to the reduction of administrative NTBs to Egyptian trade. There are Articles dealing with technical assistance to ensure greater harmonization and upgrading of customs and standards-related institutions, and financial assistance is available for improvements in infrastructure. If these provisions are implemented and trade procedures and institutions are modernized, this may have a substantial impact in reducing trade costs. Several possibilities for deep integration are considered in Table 3 (service barriers fixed) and Table 4 (service barriers liberalized). We suspect that most of the NTBs on goods are frictional as they relate to "quality control" and red tape at the borders, reported in

²⁷ Throughout the counterfactual simulations the beverage tariff is not changed to reflect Egypt's social policy for maintaining rigorous barriers on imported alcoholic beverages. Similarly, tariffs on tobacco products are held fixed in order to reflect the fact that governments in the region will continue to impose high excises on these products for revenue and health purposes.

²⁸ This differs from the more optimistic assumption of an 8 percent export price gain in EU's agriculture and textile sectors used in Konan and Maskus (1997a).

Table 3 Columns (2) and (3) and Table 4 Columns (2) to (5). Yet, there is no firm evidence on this score and thus we also model the possibility that NTBs are rent creating, Table 3 Columns (4) and (5) and Table 4 Column (6) to (9). In each case, we consider two levels of service liberalization: elimination of a 7.5 percent and a 15 percent domestic price wedge, respectively.

In each case there is also a MFN and a MRA scenario. In the case of NTBs on goods, we assume that one-half of the import barriers are nondiscriminatory and are fully eliminated on a MFN basis once they are removed in the context of a FTA with the EU. The remaining NTBs are assumed to be “standards-related” in that their removal is on a discriminatory basis, benefitting only the EU. In the context of the prospective EMA, the MRA scenario combines MFN liberalization of nondiscriminatory barriers and removal of standards NTBs on imports from the EU (so that standards liberalization does not extend to the rest of the world). On the services side, we distinguish between sectors where liberalization will apply on a MFN basis and those where it cannot. In the latter case, the MRA results are additional to the MFN scenario. The MFN scenario, e.g. Table 3 Columns (2) and (4), liberalizes barriers on a nondiscriminatory basis. The reduction of “standards-related” services regulations is assumed to require a formal mutual recognition-type agreement (MRA) with the EU, so that these barriers are eliminated on a discriminatory basis, e.g. Table 3 Columns (3) and (5).

The next set of scenarios focuses on an EU agreement against the backdrop of the FTA with the Arab League nations. The Arab League agreement is a “classic” FTA under which only tariffs are removed. As mentioned previously, little is known regarding the tariffs that are effectively applied on intra-Arab trade flows. As the Arab region is both a major destination of Egyptian exports and tariff levels in the region are significantly higher than those that are applied

in the EU and US markets, in principle liberalization of Arab trade barriers can have a major impact on Egyptian welfare. In the scenarios an attempt is made to assess the sensitivity of the results to different levels of applied tariffs in the Arab region. We compute the applied tariff rates in the benchmark case as a function of actual trade weights (the Arab region's terms of trade adjust as a percentage of the weighted average tariff rates), reported in Table 2.²⁹

Table 3 reports results for Egypt-EU FTA scenarios holding services barriers fixed. If the agreement is restricted to a shallow FTA, an estimated welfare gain of 0.15 percent is generated over benchmark 1994 levels. The real exchange rate (ERATE) or shadow price of foreign currency increases by 2 percent in order to maintain the benchmark current account deficit. The goods and services tax (GST) falls by about 4 percent. As the reformed tariffs become more efficient tax collection tools, the GST can be lowered, implying a gain in welfare for the representative agent. Despite a decrease in tariff collections, government budget neutrality implies a *reduction* in the GST as resources and consumption flow into highly domestically-taxed sectors in response to the fall in tariffs.³⁰ Real returns to both factors, production and non-production labor (PLWAGE and NLWAGE) increase by around 2 percent, reflecting enhanced efficiency in the economy. EU exports to Egypt increase by 34% by value. Trade diversion exceeds trade creation, resulting in the very small positive impact of the PTA.

A deep integration scenario has a substantially larger impact in terms of welfare, ranging from 0.3 to 1.8 percent of GDP, depending on whether it is assumed that NTBs are frictional or not. If NTBs are modeled as frictional, welfare gains are not surprisingly the largest. All deep

²⁹ Data for Jordan's and Lebanon's tariffs were compiled from Hoekman and Djankov (1997); Morocco's and Tunisia's tariffs were obtained from Rutherford et al. (1993, 1995) A concordance consistent with the Egyptian IO table was developed to map tariffs into the 38 sectors of the model. Tariffs were weighted by 1996 import shares, using the UN COMTRADE data base.

integration scenarios involve elimination of nondiscriminatory NTBs. Whether an MRA is reached to eliminate EU standards-related NTBs is important and in a surprising fashion. When import barriers are treated as frictional (as we largely suspect), an EU MRA raises welfare by 44 percent over what is obtained from elimination of the nondiscriminatory merchandise NTBs. In comparison, if NTBs are treated as rent-creating, a MRA with the EU results in lower trade creation, higher trade diversion and a smaller reduction in the goods and service tax. Instead of increasing welfare, in this case an EU MRA lowers welfare by about 20 percent. In extensive sensitivity analysis (not reported), this pattern is remarkably robust—extending NTB liberalization to European standards on a discriminatory basis (MRA scenario) is welfare enhancing with frictional barriers but is worse than only eliminating non-discriminatory barriers when such barriers generate economic rents. This suggests there “nontraditional” trade diversion costs associated with MRAs in that the welfare impact of preferential liberalization depends on the type of barrier that is being removed.

If services barriers and the domestic service markups are also removed (Table 4) welfare gains expand from between eight percent in Column (3) to 87 percent in Column (9) over scenarios in Table 3. Elimination of high services barriers with frictional NTBs has a moderate effect—welfare is 25 percent higher under MFN liberalization (Column (4)) and 16 percent higher under the MRA scenario (Column (5)). In the case of rent-creating NTBs for goods, the contribution of service liberalization is substantially greater—welfare gains increase by between 41 and 87 percent. As in the no service reduction case, when deep integration is extended to EU standards-related barriers by an MRA, welfare rises if NTBs are frictional and falls in the case of rent-generating barriers.

³⁰ That government revenues may increase in response to a piecemeal tariff reform is discussed in Konan and

Sectoral impacts for the case of frictional merchandise NTBs and MRA-based elimination (which includes abolition of the 50 percent of NTBs assumed to apply on a MFN basis) reveal that “deep integration” has significant impacts on output of many sectors, including beverages, tobacco, clothing, leather, shoes, and furniture (Table 5). Exports rise substantially for food, beverages, leather, wood products and furniture. The same sectors were output tends to expand following abolition of the NTBs are also among the industries that benefit most from services liberalization. Elimination of the services wedges has virtually no additional impact on output or trade, however, relative to the deep integration case without services liberalization.

Adding a FTA between Egypt and the members of the Arab League results in substantially larger welfare gains for Egypt, even if there is no deep integration associated with the EU FTA (1.4 percent instead of 0.15 percent) (Table 6). This is not surprising given that intra-Arab trade barriers are much higher than those applying to Egypt’s exports to the EU. The Arab League FTA could give rise to large increases in intra-regional trade: exports to the Arab region rise by more than one-billion US dollars, while the value of imports from the region rise by 124 million US dollars relative to the 1994 benchmark. Implementation of the Arab FTA results in large reductions in exports to the EU and the US, as Egyptian producers reorient their goods to the region. The Arab FTA greatly increases the payoff to deep integration with the EU as well—depending on assumptions regarding MFN vs. MRA and frictional or rent-creating barriers, welfare could rise by up to 3 percent of GDP. Adding in services liberalization as well could further increase the benefits of the PTAs by another 20 to 25 percent (Table 7). These are quite high numbers for the type of static, competitive model that is used, and largely reflect the high MFN tariff levels that apply in the Arab region.

Maskus (1997b).

6. Conclusions

The positive welfare implications of a shallow EU FTA for Egypt are very small, reflecting the fact that Egypt already has duty-free access to the EU—the loss in tariff revenues that will be incurred is about equal to the efficiency gains that will result. Large welfare gains from a EU FTA are conditional upon the elimination of regulatory barriers and red tape. If deep integration can deliver such an improvement in the business environment, gains will at least double, and may rise up to ten-fold. The variance in these impact results indicates that it is important to have a good sense of whether elimination of regulatory barriers can be applied on a nondiscriminatory basis, and whether the barriers create rents or are largely frictional in nature. In the case of Egypt, a case can be made that frictional costs are likely to be large, to represent a major share of the total costs imposed by the regulatory regime, and not to require MRA-type formal agreements as a condition of their abolition. But the fact remains that we do not have reliable information on any of these key parameters.

Our results suggest that the additional impact of services liberalization is non-trivial, but is less significant than we had expected. This appears to reflect the fact that excess service costs impact relatively more on imports and domestic production than on exports. Given low trade barriers in the EU and the relatively high tariffs maintained by Egypt and other Arab countries, it is not surprising that there are potentially large gains associated with intra-Arab trade liberalization. Here again much depends on the availability of accurate information on the actual trade policies of the Arab countries vis a vis each other. These are also difficult to come by. To the best of our knowledge, no comparable cross-country empirical analyses have been undertaken to estimate what the tariff equivalents are of the various NTB-related trade costs that currently exist in Egypt and the Arab region more generally. Without such empirical work—which should

span both product and service markets—computational work of the kind attempted in this paper will necessarily be subject to large margins of error.

That being said, it is important that not too much be made of the weakness of the datasets that are available. The major points that emerge from the analysis are fully consistent with the policy prescriptions that emerge from economic theory and analytical models. FTAs that are limited to the elimination of tariffs for merchandise trade flows are of limited value at best. Such FTAs may as easily be welfare reducing as welfare enhancing. It is important that FTAs go beyond elimination of tariffs and quotas to include NTBs and red tape costs, as well as efforts to open service markets to foreign competition. Both policymakers and analysts must take into account that some types of “red tape” stemming from the enforcement of regulatory regimes cannot be eliminated on an MFN basis. To the extent that this is the case, account must be taken of the possibility of non-traditional trade diversion effects. A comparison of the scenarios that assume either MFN or MRA-based liberalization of merchandise NTBs suggests that the effects of MRA-type discriminatory liberalization may be detrimental if merchandise NTBs are of the rent-creating type. This finding may be a function of the modeling approach taken in this paper, and further research into this result is clearly required. Nonetheless, it suggests that greater attention needs to be devoted to determine what share of “deep” integration benefits can be (has been) extended on a nondiscriminatory basis.

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TABLE 1: BENCHMARK OUTPUT AND TRADE SHARES

SECTOR	Output*			Import*					Export*				
	(1)	Total (2)	EU [®] (3)	US (4)	MENA ¹ (5)	Total (6)	EU [®] (7)	US (8)	MENA ¹ (9)				
AGRICULTURE													
1. Vegetable products, foodstuffs (VG1)	12.4	13.3	11.7	47.9	2.2	2.6	27.0	1.5	63.5				
2. Vegetable products, non-foodstuffs (VG2)	1.7	0.0	36.9	16.5	1.2	0.1	49.3	13.4	14.1				
3. Animal products (ANI)	8.0	0.8	82.7	0.0	9.6	0.3	35.2	2.3	53.0				
MINING AND QUARRYING													
4. Crude petroleum and natural gas (OIL)	2.7	1.2	52.0	7.0	24.4	18.5	30.6	4.6	1.0				
5. Other extractive industries (MIN)	.09	2.0	17.7	14.8	3.5	0.2	56.8	9.2	21.4				
MANUFACTURING													
6. Food processing (FOO)	7.7	15.1	40.3	10.6	2.3	1.3	20.1	4.5	49.3				
7. Beverages (BEV)	0.6	0.0	41.7	16.3	28.5	0.0	1.2	0.0	87.6				
8. Tobacco products (TOB)	1.9	1.0	27.0	27.4	2.5	0.0	0.4	0.7	45.3				
9. Cotton ginning and pressing (TX1)	1.2	0.5	36.9	0.3	0.9	4.2	33.7	0.2	1.4				
10. Cotton spinning and weaving (TX2)	5.2	2.4	33.4	7.1	3.7	10.3	72.4	10.9	6.1				
11. Clothing: assembled and pieces (CLO)	1.4	0.0	12.4	0.9	19.1	1.2	34.7	49.1	8.6				
12. Leather products, excl. shoes (LEA)	0.2	0.0	25.7	0.9	13.8	0.1	48.8	1.5	30.9				
13. Shoes (SHO)	0.4	0.0	16.0	2.9	12.0	0.0	20.5	1.9	60.5				
14. Wood products, excl. furniture (WOO)	1.1	5.0	39.8	1.4	0.4	0.1	1.5	0.1	86.1				
15. Furniture (FUR)	1.4	0.0	57.0	34.7	1.4	0.5	14.9	10.6	58.5				
16. Paper and printing (PAP)	1.5	3.3	46.8	17.1	2.9	0.9	1.6	0.8	91.7				
17. Chemicals, excl petro. (CHE)	3.1	10.8	62.6	12.2	7.9	1.8	31.3	3.5	39.4				
18. Petroleum refining (PET)	2.7	1.2	48.4	6.2	28.9	3.3	58.5	0.6	7.2				
19. Rubber, plastics and products (RPL)	0.8	2.3	42.8	20.4	9.8	0.3	41.3	0.7	45.3				
20. Porcelain, china, pottery (POR)	0.3	0.4	47.4	7.8	11.5	0.1	42.2	1.5	32.4				
21. Glass and products (GLA)	0.3	0.5	63.3	5.3	3.6	0.1	9.3	5.5	62.1				
22. Mineral products, n.e.i. (MPD)	1.7	0.4	61.6	3.8	2.2	0.0	4.8	2.0	80.9				
23. Iron, steel, other base metals (MET)	2.8	2.6	35.5	11.8	9.0	0.8	68.3	1.9	24.3				
24. Machinery and appliances (MAC)	3.5	23.1	59.4	17.4	2.4	4.6	9.5	3.9	58.0				
25. Transportation equipment (TRA)	1.0	5.9	33.8	12.1	0.7	0.4	3.6	0.3	89.8				
26. Other manufacturing (OMF)	0.1	0.5	47.6	11.2	3.5	0.1	25.4	3.2	62.5				

TABLE 1: BENCHMARK OUTPUT AND TRADE SHARES (Continued)

SECTOR	Output*			Import*				Export*			
	(1)	Total (2)	EU [®] (3)	US (4)	MENA ¹ (5)	Total (6)	EU [®] (7)	US (8)	MENA ¹ (9)		
SERVICES AND OTHER											
27. Electricity, gas, and water (ELE)	1.7	0.2	44.6	16.8	4.3	0.7	25.0	7.0	40.0		
28. Construction (CON)	5.5	0.2	44.6	16.8	4.3	0.8	25.0	7.0	40.0		
29. Trade (TRD)	7.1	0.3	44.6	16.8	4.3	5.6	25.0	7.0	40.0		
30. Restaurants, hotels, coffeehouses (RES)	2.3	0.0	44.6	16.8	4.3	5.0	25.0	7.0	40.0		
31. Transport and storage (TRN)	6.0	1.3	44.6	16.8	4.3	31.9	44.7	6.7	20.2		
32. Communications (COM)	0.8	0.1	44.6	16.8	4.3	0.4	25.0	7.0	40.0		
33. Financial establishments (FIN)	1.5	1.1	44.6	16.8	4.3	0.0	25.0	7.0	40.0		
34. Insurance (INS)	0.3	0.0	44.6	16.8	4.3	0.5	25.0	7.0	40.0		
35. Real estate, housing services (HSG)	2.8	3.9	44.6	16.8	4.3	0.0	25.0	7.0	40.0		
36. Social and community services (SER)	6.0	0.1	44.6	16.8	4.3	0.2	25.0	7.0	40.0		
37. Recreational and cultural services (REC)	0.5	0.2	44.6	16.8	4.3	3.2	25.0	7.0	40.0		
38. Personal services (PER)	0.9	0.0	44.6	16.8	4.3	0.0	25.0	7.0	40.0		

Notes: [®] Including Turkey; ¹ Excluding Israel.

Source: Modified from Konan and Maskus 1997.

TABLE 2: Government Policy and Elasticity Parameters (%)

SECTOR	GST-94*	K Tax-94	Egypt Tariff, 1994	MENA Tariff	ESUB _{KL}
	(2)	(3)	(4)	(5)	(6)
AGRICULTURE					
1. Vegetable products, foodstuffs (VG1)	0.0	0.0	2.5	6.3	0.95
2. Vegetable products, non-foodstuffs (VG2)	10.0	0.0	6.7	28.9	0.95
3. Animal products (ANI)	0.0	0.0	4.4	6.7	0.95
MINING AND QUARRYING					
4. Crude petroleum and natural gas (OIL)	0.0	18.0	8.2	2.9	0.43
5. Other extractive industries (MIN)	10.0	18.0	7.0	15.6	0.43
MANUFACTURING					
6. Food processing (FOO)	0.0	18.0	6.8	18.3	0.95
7. Beverages (BEV)	10.0	18.0	953.2	14.8	0.95
8. Tobacco products (TOB)	10.0	18.0	65.5	83.1	0.95
9. Cotton ginning and pressing (TX1)	10.0	18.0	17.3	24.9	0.93
10. Cotton spinning and weaving (TX2)	10.0	18.0	23.3	17.4	0.93
11. Clothing: assembled and pieces (CLO)	10.0	18.0	53.7	32.5	1.19
12. Leather products, excl. shoes (LEA)	10.0	18.0	34.8	44.6	0.75
13. Shoes (SHO)	10.0	18.0	51.8	36.9	0.75
14. Wood, excl. furniture (WOO)	5.0	18.0	8.1	28.1	0.93
15. Furniture (FUR)	10.0	18.0	46.9	34.9	0.93
16. Paper and printing (PAP)	0.0	18.0	13.3	18.6	1.00
17. Chemical, excl petroleum (CHE)	5.0	18.0	8.9	17.6	1.01
18. Petroleum refining (PET)	0.0	18.0	7.1	20.0	0.43
19. Rubber, plastics and products (RPL)	10.0	18.0	15.6	24.7	0.97
20. Porcelain, china, pottery (POR)	10.0	18.0	43.5	21.3	0.93
21. Glass and products (GLA)	10.0	18.0	29.6	17.2	0.97
22. Mineral products, n.e.i. (MPD)	5.0	18.0	18.1	12.7	0.43
23. Iron, steel, other base metals (MET)	10.0	18.0	17.2	32.6	0.43
24. Machinery and appliances (MAC)	25.0	18.0	17.9	19.9	1.20
25. Transportation equipment (TRA)	25.0	18.0	41.2	56.6	1.88
26. Other manufacturing (OMF)	10.0	18.0	19.3	24.9	1.19
SERVICES AND OTHER					
27. Electricity, gas, and water (ELE)	2.5	23.0	0.0	0.0	1.88
28. Construction (CON)	10.0	23.0	0.0	0.0	1.99
29. Trade (TRD)	8.0	23.0	0.0	0.0	1.28
30. Restaurants, hotels, coffeehouses (RES)	8.0	23.0	0.0	0.0	1.99
31. Transport and storage (TRN)	0.0	23.0	0.0	0.0	1.88
32. Communications (COM)	5.0	23.0	0.0	0.0	1.99
33. Financial establishments (FIN)	8.0	23.0	0.0	0.0	1.99
34. Insurance (INS)	0.0	23.0	0.0	0.0	1.99
35. Real estate and housing services (HSG)	8.0	23.0	0.0	0.0	1.99
36. Social and community services (SER)	10.0	23.0	0.0	0.0	1.99
37. Recreational and cultural services (REC)	8.0	23.0	0.0	0.0	1.99
38. Personal services (PER)	10.0	23.0	0.0	0.0	1.99

* Adjusted to be consistent with the real value of the 1990 government deficit. MENA tariff is trade weighted.
 Source: Based on World Bank data and author's calculations.

TABLE 3: Impacts of Egyptian -EU Trade Agreement with Service NTBs fixed

	Shallow Integration (NTBs fixed) (1)	Deep Integration with Frictional Import NTBs		Deep Integration with Rent Generating NTBs	
		MFN (2)	MRA (3)	MFN (4)	MRA (5)
<i>Macroeconomic Variables (% change)</i>					
Welfare (EV)	0.153	1.239	1.785	0.363	0.292
Exchange Rate	2.342	2.858	3.050	3.258	3.701
Goods and Service Tax	-3.937	-4.422	-2.992	-3.790	-1.833
Average Tariff	4.516	4.444	4.122	4.449	4.128
Tariff Revenue	-1.705	-1.693	-1.748	-1.701	-1.760
Production Wage	1.988	2.728	3.066	2.772	3.163
Non-production Wage	2.366	3.142	3.508	3.331	3.871
Interest Rate	1.879	2.688	2.972	2.729	3.040
Trade Creation (\$mil)	125	135	153	133	150
Trade Diversion (\$mil)	141	138	154	140	158
<i>Export Value Share (%)</i>					
EU	40.5	40.6	40.5	40.5	40.4
US	5.6	5.6	5.6	5.6	5.6
MENA	22.9	22.9	23.0	23.1	23.2
<i>Import Value Share (%)</i>					
EU	56.1	56.3	58.7	56.4	58.8
US	14.3	14.3	13.6	14.2	13.5
MENA	3.1	3.0	2.8	3.0	2.8
<i>Export Value (change US\$ billion)</i>					
EU	.342	.357	.370	.402	.445
US	.027	.028	.030	.036	.043
MENA	.133	.142	.152	.179	.215
<i>Import Value (change US\$ billion)</i>					
EU	1.050	1.170	1.409	1.142	1.360
US	-200	-172	-204	-184	-224
MENA	-052	-057	-067	-059	-070
<i>Export Quantity (% change)</i>					
EU	19.5	20.3	21.0	22.9	25.3
US	10.3	10.8	11.5	13.6	16.2
MENA	12.6	13.5	14.4	17.0	20.4
<i>Import Quantity (% change)</i>					
EU	36.7	40.9	49.3	39.9	47.6
US	-16.3	-13.9	-16.6	-14.9	-18.1
MENA	-18.4	-20.3	-23.9	-20.9	-24.9

TABLE 4: Impacts of Egyptian -EU Trade Agreement with Service NTBs Liberalized

Macroeconomic Variables (% change)	Shallow Integration (NTBs fixed)		Deep Integration with Frictional Import NTBs Service Barriers 7.5%			Deep Integration with Frictional Import NTBs Service Barriers 15.0%			Deep Integration with Rent Generating NTBs Service Barriers 7.5%			Deep Integration with Rent Generating NTBs Service Barriers 15.0%														
	(1)	(2)	MFN	MRA	(3)	MFN	MRA	(4)	MFN	MRA	(5)	MFN	MRA	(6)	MFN	MRA	(7)	MFN	MRA	(8)	MFN	MRA	(9)			
Welfare (EV)	0.153	1.397	1.935	1.544	2.074	0.512	0.431	0.648	0.546	0.512	0.431	0.648	0.546	0.512	0.431	0.648	0.546	0.512	0.431	0.648	0.546	0.512	0.431	0.648	0.546	
Exchange Rate	2.342	3.122	3.411	3.097	3.389	3.506	4.000	3.483	3.982	3.506	4.000	3.483	3.982	3.506	4.000	3.483	3.982	3.506	4.000	3.483	3.982	3.506	4.000	3.483	3.982	
Goods and Service Tax	-3.937	-4.386	-3.001	-4.438	-3.040	-3.694	-1.658	-3.720	-1.640	-3.694	-1.658	-3.720	-1.640	-3.694	-1.658	-3.720	-1.640	-3.694	-1.658	-3.720	-1.640	-3.694	-1.658	-3.720	-1.640	
Average Tariff	4.516	4.443	4.121	4.443	4.120	4.448	4.127	4.447	4.126	4.448	4.127	4.447	4.126	4.448	4.127	4.447	4.126	4.448	4.127	4.447	4.126	4.448	4.127	4.447	4.126	
Tariff Revenue	-1.705	-1.694	-1.750	-1.693	-1.749	-1.702	-1.761	-1.701	-1.760	-1.702	-1.761	-1.701	-1.760	-1.702	-1.761	-1.701	-1.760	-1.702	-1.761	-1.701	-1.760	-1.702	-1.761	-1.701	-1.760	
Production Wage	1.988	2.956	3.689	3.035	3.785	3.022	3.855	3.110	3.970	3.022	3.855	3.110	3.970	3.022	3.855	3.110	3.970	3.022	3.855	3.110	3.970	3.022	3.855	3.110	3.970	
Non-production Wage	2.366	3.203	3.639	3.130	3.563	3.427	4.119	3.365	4.066	3.427	4.119	3.365	4.066	3.427	4.119	3.365	4.066	3.427	4.119	3.365	4.066	3.427	4.119	3.365	4.066	
Interest Rate	1.879	2.845	3.138	2.755	3.040	2.880	3.192	2.786	3.086	2.880	3.192	2.786	3.086	2.880	3.192	2.786	3.086	2.880	3.192	2.786	3.086	2.880	3.192	2.786	3.086	
Trade Creation (\$mil)	125	135	153	135	153	133	150	133	150	133	150	133	150	133	150	133	150	133	150	133	150	133	150	133	150	
Trade Diversion (\$mil)	141	138	155	138	155	140	158	140	158	140	158	140	158	140	158	140	158	140	158	140	158	140	158	140	158	
Export Value Share (%)																										
EU	0.405	0.406	0.405	0.405	0.404	0.405	0.403	0.405	0.403	0.405	0.403	0.405	0.403	0.405	0.403	0.405	0.403	0.405	0.403	0.405	0.403	0.405	0.403	0.405	0.403	
US	0.056	0.056	0.056	0.056	0.056	0.056	0.057	0.056	0.057	0.056	0.057	0.056	0.057	0.056	0.057	0.056	0.057	0.056	0.057	0.056	0.057	0.056	0.057	0.056	0.057	
MENA	0.229	0.230	0.232	0.231	0.232	0.232	0.235	0.232	0.235	0.232	0.235	0.232	0.235	0.232	0.235	0.232	0.235	0.232	0.235	0.232	0.235	0.232	0.235	0.232	0.235	
Import Value Share (%)																										
EU	0.561	0.562	0.595	0.562	0.595	0.563	0.596	0.563	0.596	0.563	0.596	0.563	0.596	0.563	0.596	0.563	0.596	0.563	0.596	0.563	0.596	0.563	0.596	0.563	0.596	
US	0.143	0.143	0.133	0.143	0.133	0.143	0.133	0.143	0.133	0.143	0.133	0.143	0.133	0.143	0.133	0.143	0.133	0.143	0.133	0.143	0.133	0.143	0.133	0.143	0.133	
MENA	0.031	0.030	0.027	0.030	0.027	0.030	0.027	0.030	0.027	0.030	0.027	0.030	0.027	0.030	0.027	0.030	0.027	0.030	0.027	0.030	0.027	0.030	0.027	0.030	0.027	
Export Value (Change US\$ billion)																										
EU	0.342	0.429	0.460	0.430	0.461	0.474	0.530	0.475	0.531	0.474	0.530	0.475	0.531	0.474	0.530	0.475	0.531	0.474	0.530	0.475	0.531	0.474	0.530	0.475	0.531	
US	0.027	0.040	0.045	0.040	0.046	0.047	0.057	0.047	0.057	0.047	0.057	0.047	0.057	0.047	0.057	0.047	0.057	0.047	0.057	0.047	0.057	0.047	0.057	0.047	0.057	
MENA	0.133	0.190	0.220	0.192	0.223	0.227	0.283	0.229	0.285	0.227	0.283	0.229	0.285	0.227	0.283	0.229	0.285	0.227	0.283	0.229	0.285	0.227	0.283	0.229	0.285	
Import Value (Change US\$ billion)																										
EU	1.050	1.194	1.535	1.197	1.538	1.166	1.488	1.170	1.491	1.166	1.488	1.170	1.491	1.166	1.488	1.170	1.491	1.166	1.488	1.170	1.491	1.166	1.488	1.170	1.491	
US	-0.200	-0.163	-0.210	-0.161	-0.209	-0.174	-0.229	-0.173	-0.228	-0.174	-0.229	-0.173	-0.228	-0.174	-0.229	-0.173	-0.228	-0.174	-0.229	-0.173	-0.228	-0.174	-0.229	-0.173	-0.228	
MENA	-0.052	-0.055	-0.069	-0.055	-0.069	-0.057	-0.072	-0.057	-0.072	-0.057	-0.072	-0.057	-0.072	-0.057	-0.072	-0.057	-0.072	-0.057	-0.072	-0.057	-0.072	-0.057	-0.072	-0.057	-0.072	
Export Quantity (% change)																										
EU	19.462	24.391	26.158	24.448	26.212	26.959	30.187	27.008	30.223	26.959	30.187	27.008	30.223	26.959	30.187	27.008	30.223	26.959	30.187	27.008	30.223	26.959	30.187	27.008	30.223	
US	10.259	15.102	17.160	15.212	17.249	17.918	21.759	18.005	21.803	17.918	21.759	18.005	21.803	17.918	21.759	18.005	21.803	17.918	21.759	18.005	21.803	17.918	21.759	18.005	21.803	
MENA	12.633	18.017	20.906	18.264	21.136	21.559	26.878	21.776	27.054	21.559	26.878	21.776	27.054	21.559	26.878	21.776	27.054	21.559	26.878	21.776	27.054	21.559	26.878	21.776	27.054	
Import Quantity (% change)																										
EU	36.713	41.745	53.683	41.870	53.808	40.777	52.013	40.893	52.122	40.777	52.013	40.893	52.122	40.777	52.013	40.893	52.122	40.777	52.013	40.893	52.122	40.777	52.013	40.893	52.122	
US	-16.261	-13.196	-17.061	-13.063	-16.937	-14.147	-18.563	-14.025	-18.459	-14.147	-18.563	-14.025	-18.459	-14.147	-18.563	-14.025	-18.459	-14.147	-18.563	-14.025	-18.459	-14.147	-18.563	-14.025	-18.459	
MENA	-18.419	-19.669	-24.765	-19.580	-24.681	-20.280	-25.697	-20.196	-25.624	-20.280	-25.697	-20.196	-25.624	-20.280	-25.697	-20.196	-25.624	-20.280	-25.697	-20.196	-25.624	-20.280	-25.697	-20.196	-25.624	

TABLE 5: Sectoral Impacts of Egyptian -EU Trade Agreement and Frictional Import NTBs

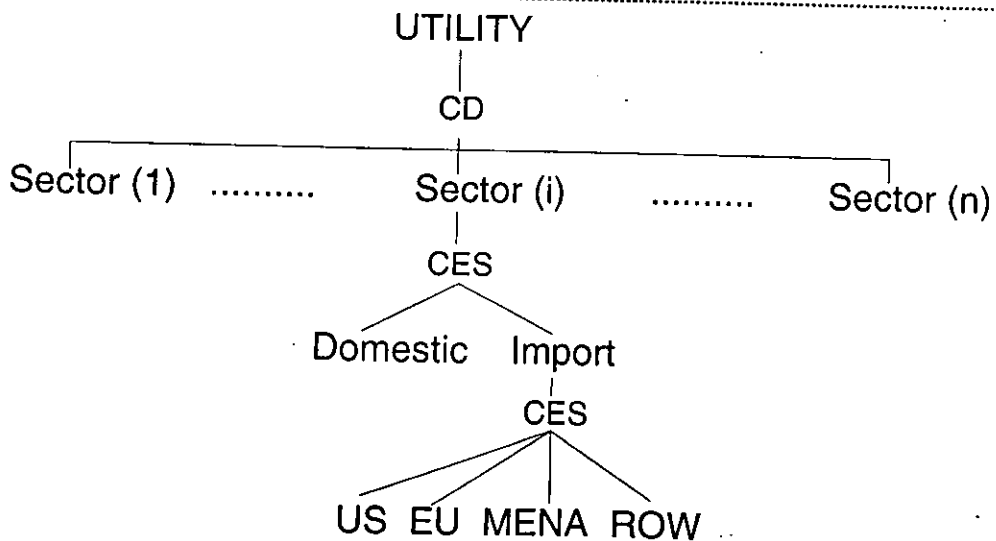
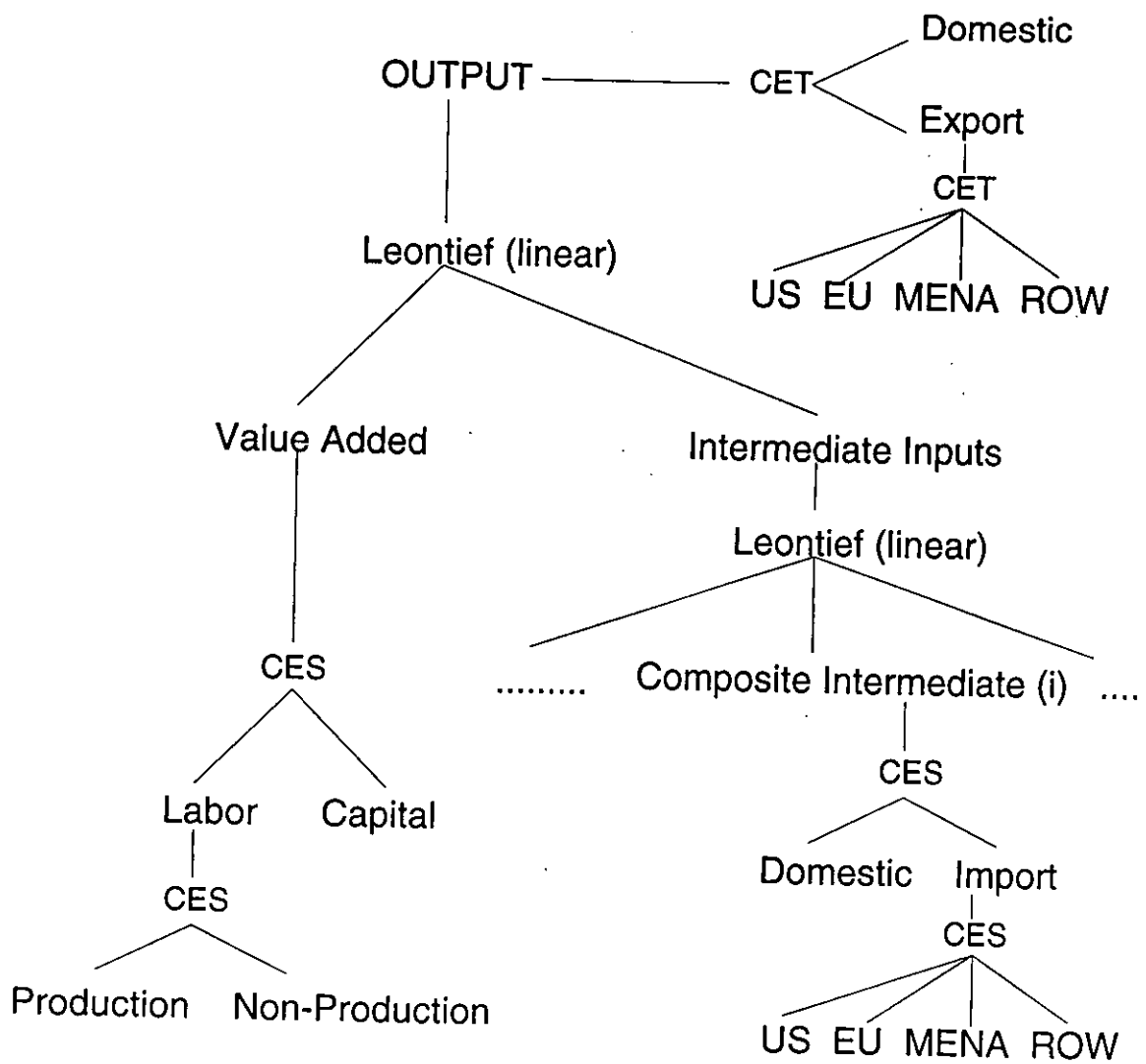
Sector	Shallow (NTBs fixed)			MRA -- Service NTBs fixed			MRA -- Services liberalized		
	Output	Exports	Imports	Output	Exports	Imports	Output	Exports	Imports
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
<i>AGRICULTURE</i>									
VG1	-0.27	9.63	-2.61	-0.38	10.36	2.30	-0.37	9.83	2.53
VG2	0.39	1.79	7.26	0.26	2.24	14.69	0.39	0.20	15.85
ANI	-0.40	12.10	3.14	-0.24	9.89	13.95	-0.23	9.57	14.09
<i>MINING AND QUARRYING</i>									
OIL	0.20	0.48	6.96	0.17	0.76	13.47	0.36	0.89	14.01
MIN	-0.06	11.85	-0.99	-0.20	25.22	-0.12	-0.17	22.38	0.88
<i>MANUFACTURING</i>									
FOO	-1.45	5.48	3.02	-1.66	7.46	9.62	-1.35	8.70	9.57
BEV	0.33	9.39	-3.19	1.81	14.60	-2.47	2.18	16.63	-2.70
TOB	-0.14	8.96	75.63	0.49	10.16	93.74	2.03	15.71	93.19
TX1	0.01	1.71	38.51	-0.18	2.00	49.55	-0.36	1.02	51.16
TX2	1.68	17.51	47.07	1.88	18.81	60.04	2.40	20.16	60.05
CLO	1.62	13.82	116.36	2.16	14.62	139.96	2.63	16.74	139.01
LEA	0.86	13.34	25.16	2.13	18.28	34.97	2.83	20.83	34.82
SHO	-0.41	8.37	35.53	0.53	11.03	47.53	0.86	13.08	47.13
WOO	-1.60	8.60	1.17	-4.19	11.75	3.59	-3.70	13.51	3.67
FUR	0.02	8.08	74.82	1.42	13.20	92.03	1.84	15.01	91.80
PAP	-2.71	7.77	5.80	-4.57	9.95	10.17	-3.67	13.26	10.08
CHE	-1.60	10.88	4.19	-2.72	15.77	8.88	-1.94	17.77	9.24
PET	3.24	11.68	3.02	4.63	15.49	9.72	5.28	17.61	8.91
RPL	-2.50	10.00	7.76	-3.29	13.79	13.27	-2.75	17.22	12.59
POR	-8.73	-1.16	46.61	-9.88	1.32	56.09	-9.57	3.20	55.57
GLA	-8.69	-0.75	30.09	-10.98	-1.80	38.15	-10.56	0.16	37.85
MPD	-1.19	4.53	21.82	-1.05	7.86	31.64	-0.96	8.81	31.35
MET	-3.81	6.99	7.42	-5.92	6.87	12.21	-5.39	9.11	12.08
MAC	-5.50	7.95	8.11	-7.96	9.24	11.87	-7.04	11.93	11.84
TRA	-8.95	27.01	15.64	-10.84	33.51	19.49	-10.75	34.53	19.22
OMF	1.90	16.12	13.44	2.65	21.54	20.27	6.43	30.66	20.87

TABLE 6: Egyptian -EU Trade Agreement with Arab League FTA and Service NTBs Fixed

	Shallow Integration (NTBs fixed) (1)	Deep Integration with Frictional Import NTBs		Deep Integration with Rent Generating NTBs	
		MFN (2)	MRA (3)	MFN (4)	MRA (5)
<i>Macroeconomic Variables (% change)</i>					
Welfare (EV)	1.372	2.525	3.094	1.820	1.684
Exchange Rate	-4.387	-4.311	-4.486	-4.106	-4.103
Goods and Service Tax	-0.973	-1.410	0.197	-1.088	0.892
Average Tariff	4.365	4.331	4.037	4.349	4.070
Tariff Revenue	-1.593	-1.562	-1.610	-1.561	-1.608
Production Wage	10.201	11.671	12.593	11.907	13.098
Non-production Wage	5.497	6.565	7.127	6.631	7.267
Interest Rate	6.772	7.863	8.377	7.999	8.660
Trade Creation (\$mil)	522	569	620	584	652
Trade Diversion (\$mil)	78	69	84	69	83
<i>Export Value Share (%)</i>					
EU	0.259	0.252	0.245	0.250	0.241
US	0.033	0.032	0.031	0.032	0.030
MENA	0.478	0.491	0.502	0.495	0.511
<i>Import Value Share (%)</i>					
EU	0.555	0.559	0.583	0.560	0.585
US	0.138	0.137	0.131	0.137	0.130
MENA	0.049	0.046	0.043	0.046	0.043
<i>Export Value (Change US\$ billion)</i>					
EU	-0.557	-0.588	-0.613	-0.581	-0.602
US	-0.110	-0.115	-0.119	-0.114	-0.118
MENA	1.161	1.229	1.290	1.283	1.400
<i>Import Value (Change US\$ billion)</i>					
EU	1.602	1.790	2.114	1.784	2.103
US	-0.082	-0.043	-0.071	-0.051	-0.087
MENA	0.124	0.118	0.101	0.117	0.098
<i>Export Quantity (% change)</i>					
EU	-31.664	-33.419	-34.848	-33.056	-34.262
US	-41.873	-43.705	-45.143	-43.429	-44.727
MENA	110.235	116.674	122.455	121.955	133.095
<i>Import Quantity (% change)</i>					
EU	56.034	62.611	73.951	62.382	73.545
US	-6.691	-3.473	-5.801	-4.142	-7.086
MENA	44.088	42.212	36.000	41.587	34.841

TABLE 7: Egyptian -EU Trade Agreement with Arab League FTA Service NTBs Liberalized

Macroeconomic Variables (% change)	Shallow Integration (NTBs fixed)			Deep Integration with Frictional Import NTBs			Deep Integration with Rent Generating NTBs		
	Service Barriers 7.5%			Service Barriers 15.0%			Service Barriers 15.0%		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Welfare (EV)	1.372	2.968	3.514	3.451	4.027	2.278	2.127	2.775	2.665
Exchange Rate	-4.387	-4.153	-4.218	-4.245	-4.313	-3.954	-3.845	-4.048	-3.945
Goods and Service Tax	-0.973	-1.809	-0.571	-2.147	-0.943	-1.497	0.103	-1.847	-0.291
Average Tariff	4.365	4.339	4.053	4.336	4.050	4.357	4.086	4.353	4.083
Tariff Revenue	-1.593	-1.556	-1.601	-1.553	-1.598	-1.555	-1.598	-1.552	-1.595
Production Wage	10.201	12.085	13.528	12.162	13.623	12.326	14.049	12.404	14.149
Non-production Wage	5.497	6.411	6.862	6.184	6.609	6.473	6.995	6.239	6.726
Interest Rate	6.772	8.075	8.694	7.917	8.525	8.208	8.973	8.045	8.795
Trade Creation (\$mil)	522	583	647	584	648	599	680	599	681
Trade Diversion (\$mil)	78	67	81	66	80	67	80	66	79
Export Value Share (%)									
EU	0.259	0.252	0.244	0.252	0.244	0.250	0.240	0.250	0.240
US	0.033	0.032	0.031	0.033	0.031	0.032	0.031	0.032	0.031
MENA	0.478	0.491	0.506	0.491	0.505	0.496	0.515	0.495	0.514
Import Value Share (%)									
EU	0.555	0.558	0.592	0.558	0.591	0.559	0.594	0.559	0.593
US	0.138	0.138	0.128	0.138	0.128	0.137	0.127	0.137	0.127
MENA	0.049	0.046	0.042	0.046	0.042	0.046	0.042	0.046	0.042
Export Value (Change US\$ billion)									
EU	-0.557	-0.553	-0.573	-0.546	-0.566	-0.546	-0.563	-0.539	-0.555
US	-0.110	-0.109	-0.112	-0.107	-0.110	-0.108	-0.111	-0.106	-0.109
MENA	1.161	1.297	1.401	1.308	1.413	1.351	1.512	1.362	1.525
Import Value (Change US\$ billion)									
EU	1.602	1.839	2.294	1.851	2.307	1.834	2.283	1.846	2.298
US	-0.082	-0.027	-0.074	-0.021	-0.068	-0.035	-0.089	-0.029	-0.083
MENA	0.124	0.121	0.099	0.123	0.100	0.120	0.096	0.121	0.097
Export Quantity (% change)									
EU	-31.664	-31.440	-32.604	-31.032	-32.186	-31.074	-32.021	-30.663	-31.597
US	-41.873	-41.436	-42.623	-40.670	-41.842	-41.157	-42.211	-40.388	-41.423
MENA	110.235	123.147	133.045	124.155	134.184	128.452	143.792	129.468	144.999
Import Quantity (% change)									
EU	56.034	64.324	80.219	64.324	80.219	64.109	79.827	64.538	80.337
US	-6.691	-2.176	-5.994	-2.176	-5.994	-2.834	-7.252	-2.353	-6.742
MENA	44.088	43.284	35.285	43.284	35.285	42.671	34.157	43.132	34.635



MODEL EQUATIONS AND NOTATION

A. Production

- | | |
|-----------------------------|---|
| 1. Labor Aggregator | $L_i = [b_{1i}L_{1i}^{(\sigma_L-1)/\sigma_L} + b_{2i}L_{2i}^{(\sigma_L-1)/\sigma_L}]^{\sigma_L/(\sigma_L-1)}$ |
| 2. Value Added Function | $V_i = [a_{Li}L_i^{(\sigma_i-1)/\sigma_i} + a_{Ki}K_i^{(\sigma_i-1)/\sigma_i}]^{\sigma_i/(\sigma_i-1)}$ |
| 3. Imported Intermediates | $M_{iN} = [\sum_r \delta_{ri} m_{riN}^{(\eta_i-1)/\eta_i}]^{\eta_i/(\eta_i-1)}$ |
| 4. Composite Intermediate | $z_{ji} = [\gamma_{di} d_{ji}^{(\eta_j-1)/\eta_j} + \gamma_{mi} m_{ji}^{(\eta_j-1)/\eta_j}]^{\eta_j/(\eta_j-1)}$ |
| 5. Final Goods Technology | $Y_i = \min[z_{1i}/a_{1i}, \dots, z_{ni}/a_{ni}, V_i/a_{VA}]$ |
| 6. Domestic & Foreign Sales | $Y_i = [\alpha_{Di} D_i^{(\epsilon_i-1)/\epsilon_i} + \alpha_{Xi} X_i^{(\epsilon_i-1)/\epsilon_i}]^{\epsilon_i/(\epsilon_i-1)}$ |
| 7. Export Allocation | $X_i = [\sum_r \beta_{ri} X_{ri}^{(\epsilon_i-1)/\epsilon_i}]^{\epsilon_i/(\epsilon_i-1)}$ |
| 8. Marginal Cost Condition | $c_i Y_i = \sum_j (1+v_j) p_j d_{ji} + \sum_r \sum_t (1+u_j+t_{jt}) p_{rt}^m m_{rtj} + \sum_i (1+\tau_{Ki}) w_K K_i + w_L L_{1i}$ |

B. Utility

- | | |
|---|--|
| 9. Utility Function | $U = \prod_i C_i^{\lambda_i}; \sum_i \lambda_i = 1$ |
| 10. Domestic & Import Consumption
(applies also to G_i and I_i^F) | $C_i = [\phi_{Di} D_{iC}^{(\psi_i-1)/\psi_i} + \phi_{MiC} M_{iC}^{(\psi_i-1)/\psi_i}]^{\psi_i/(\psi_i-1)}$ |
| 11. Import Allocation
(applies also to M_{iG} and M_{iI}^F) | $M_{iC} = [\sum_r \delta_{ri} M_{ric}^{(\eta_i-1)/\eta_i}]^{\eta_i/(\eta_i-1)}$ |

C. Constraints and Balancing Items

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|--|--|
| 12. Agent's Budget Constraint
($u_i = 0$ if NTBs are frictional) | $\sum_i \bar{p}_i^C C_i = w_K \bar{E}_K + w_L \bar{E}_L + eB - \sum_i \bar{p}_i^{IF} I_i^F - \sum_i \bar{p}_i^I I_i^I + D + \sum_i \sum_r u_i p_{ri}^m M_{ri} + \sum_i v_i Y_i$ |
| 13. Government Budget Constraint | $\sum_i \bar{p}_i^G G_i = D + \sum_i \tau_{Ki} w_{Ki} K_i + \sum_i \tau_{Ci} (\bar{p}_i^C C_i + \bar{p}_i^{IF} I_i^F) + \sum_i \sum_r (1+\tau_{Ci}) t_{ri} p_{ri}^m (M_{riC} + M_{riI}^F)$ |
| 14. Current Account Balance | $B = \sum_r \sum_i (1/e) (p_{ri}^m M_{ri} - p_{ri}^X X_{ri})$ |
| 15. Product Market Clearance | $S_i = \sum_j a_{ij} Y_j + G_i + I_i^F + I_i^I + C_i$ |
| 16. Factor Market Clearance | $\sum_i K_i = \bar{E}_K; \sum_i L_{1i} = \bar{E}_{1L}, \sum_i L_{2i} = \bar{E}_{2L}, K_j = \bar{E}_{Rj}$ |
| 17. Zero Profits | $p_i D_i + \sum_r p_{ri}^X X_{ri} = c_i Y_i$ |
| 18. Supply Value Balance | $\bar{p}_i S_i = \bar{p}_i^Z \sum_j a_{ij} (1+v_j) Y_j + (1+\tau_{Ci}) (\bar{p}_i^C D_{iC} + \bar{p}_i^{IF} D_{iI}^F) + \bar{p}_i^G D_{iG} + \bar{p}_i^{IF} I_i^I + \sum_r (1+\tau_{Ci}) (1+u_r+t_{ri}) p_{ri}^m (M_{riC} + M_{riI}^F) + \sum_r (1+u_r+t_{ri}) p_{ri}^m M_{riG}$ |

D. Price Relationships and Identities

- | | |
|----------------------------------|---|
| 19. Components of Domestic Sales | $D_i = D_{iC} + D_{iI}^F + I_i^I + D_{iG}$ |
| 20. Components of Import Sales | $M_i = M_{iN} + M_{iC} + M_{iI}^F + M_{iG}$ |

21. Domestic Price of Intermediate Imports (holds also for imports for G) $p_i^N = (1 + u_i + t_i)p_i^m$
22. Domestic Price of Imports for C (holds also for imports for I^F) $p_i^C = (1 + \tau_{Ci})(1 + u_i + t_i)p_i^m$
23. Consumer Price of Domestic Goods (holds also for purchases for I^F) $p_i^C = (1 + \tau_{Ci})(1 + v_i)p_i$
24. Capital-Market Equilibrium $\tau_{K1} + w_{K1} = \dots = \tau_{Kn} + w_{Kn}$ (mobile capital sectors)

LIST OF VARIABLES

L_{it}, L_{2i}	Production and non-production labor inputs, sector i ($i=1, \dots, 38$)
L_i	Aggregated labor input, sector i
K_i	Capital inputs, both mobile and immobile
V_i	Value added
M_i	Total imports
M_{ri}	Imports from region r ($r = \text{EU, ROW}$)
M_{iN}	Imports of commodity i for intermediate use
m_{riN}	Imports for intermediate use from region r ($r = \text{US, EU, MENA, ROW}$)
z_j	Composite intermediate input of j into i ($j=1, \dots, 38$)
d_{ji}, m_{ji}	Intermediate usages of domestic and imported goods
Y_i	Output of good i
D_i, X_i	Output for domestic sales and exports
D_{iC}, D_{iG}, D_{iI}^F	Domestic sales: private and public consumption, and capital formation
X_{ri}	Exports of good i to region r
c_i	Index of marginal cost of production
p_i	Domestic producer price index
$\bar{p}_i^Z, \bar{p}_i^C, \bar{p}_i^{IF}, \bar{p}_i^G$	Domestic price indexes (home and imported prices)
w_K, w_L	Factor price indexes (where w_K is fixed in resource-constrained sectors)
U	Utility
\bar{p}_i	Composite price index for total domestic supply
C_i, G_i	Private and public consumption
I_i^F, I_i^I	Fixed capital formation and inventory investment
M_{iC}, M_{iG}	Imports for private and public consumption
M_{iI}^F	Imports for fixed capital formation
M_{riC}, M_{riG}	Imports for private and public consumption from region r
M_{riI}^F	Imports for fixed capital formation from region r

e	Real exchange rate (price index for foreign exchange)
B	Current-account balance
D	Government budget deficit (held fixed)
S_i	Supply on domestic market ($D_i + M_i$)
p_{ri}^N	Domestic price index for intermediate imports
p_{ri}^C, p_{ri}^G	Domestic price indexes for imports for private and public consumption
p_{ri}^F	Domestic price index for imports for gross capital formation
p_{ri}^C, p_{ri}^F	Price index for private consumption/fixed capital of domestic goods
p_{ri}	Producer price index for goods exported to region r
τ_{ci}	Endogenous tax rate on consumption ("goods and services tax")

LIST OF PARAMETERS

σ_L	Substitution elasticity between labor types
σ_i	Substitution elasticity between capital and labor
η_a	Substitution elasticity between intermediates and value added
η_i	Armington elasticity between EU and ROW imports
η_j	Substitution elasticity between domestic and imported intermediates
ϵ_i	Transformation elasticity between domestic and exported output
e_i	Transformation elasticity between EU and ROW exports
ψ_i	Substitution elasticity between domestic and imported consumption
τ_{ki}	Tax rate on operating surplus ("capital tax")
t_{ri}	Tariff rate on imports from region r
u_i	NTB administrative cost rate on imports
v_i	Service sector rents on domestic output ($v_i=0$ for non-service sectors)
$\bar{E}_K, \bar{E}_{1L}, \bar{E}_{2L}, \bar{E}_{Rj}$	Endowment of capital, labor, and resource-constrained capital
p_{ri}^m	Price of imports from region r
p_{ri}^x	Price of exports in region r