Economic integration, market structure and growth dynamics: Implications for Morocco's Free Trade Agreement with the European Union

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Abstract. This paper offers a general equilibrium assessment of the impacts on Morocco from implementing a free trade agreement (FTA) with the European Union. The analysis emphasizes the market structure in oligopolistic manufacturing sectors using detailed firm and industry data. In addition, we account for dynamic effects due to capital accumulation and foreign investment. Our long analysis shows that FTA will have a positive effect on Morocco's welfare and GDP growth. Moreover, production patterns are likely to shift to labor-intensive industries such as textile and clothing, while manufacturing export shares will rise at the expense of agriculture.

Keywords: Trade liberalization, market structure, applied general equilibrium

1. Introduction

Preferential trading agreements (PTA) have multiplied in recent years and have increasingly brought together economies at different stages of development. Despite a vast literature on PTA's, relatively few empirical analyses have focused on implications for small developing economies. Notable exceptions are the impact studies for NAFTA on Mexico (Young and Romero, 1994; Burfisher, Robinson and Thierfelder, 1994).

As a PTA typically calls for multi-sector trade liberalization, the effects on resource allocation depend not only on the existing trade policies, but also on the extent and nature of oligopolistic interactions and the ease of entry and exit of firms from particular industries. Moreover, in a PTA linking North-South economies, it is generally believed that the small developing country would benefit by exploiting scale economies in a larger integrated market. Yet this is an empirical question; and it has not been thoroughly analyzed in the existing literature. One of the main problems with existing studies that incorporated market structure into trade liberalization analyses has been the relatively poor empirical foundations of the models.

This research investigates the economic impacts on Morocco from forming a PTA with the European Union. The agreement signed in February 1996 calls for a free trade in industrial goods to be phased in over 12 years. This means that Morocco, which already enjoys duty-free access in industrial goods from pervious agreements, will have to reciprocate by abolishing its own tariffs on European industrial goods. Given that much of liberalization will fall on manufacturing industries which are predominantly

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oligopolistic, a thorough treatment of market structure is critical for any meaningful assessment of how PTA with affect the Moroccan economy.

The potential implications of the agreement on the Moroccan economy are substantial, since two-thirds of its exports and half of its imports are with the EU. In addition, the EU also provides the bulk of foreign investment to Morocco. Hence, in addition to market structure, the present analysis also accounts for the dynamic effects of capital accumulation and investment flows.

The specific objectives of this analysis are as follow: (1) to examine the linkages between trade reforms and the market structure in the case of a small developing economy, (2) to quantify the sectoral and economywide responses to tariff reductions in the Moroccan oligopolistic manufacturing industries, (3) to quantify the welfare gains from capital accumulation and increased PTA-induced FDI into Morocco;1 and (4) to derive a set or recommendations for trade and industrial policies for Morocco.

We employ a multi-region multi-sector applied general equilibrium model, GTAP, modified to account for imperfect competition, and scale economies (Francois and Roland-Holst, 1997; Francois, 1998). Unlike previous analyses (e.i. Devarajan and Rodrik, 1989; Brown, Deardorff, and Stern, 1996) our treatment of market structure for manufacturing industries is based on detailed firm-level census data. Our model also takes into account dynamic growth effects from capital accumulation (Francois et al., 1998). These affects come into play as trade reforms affect the relative factor prices and with it the differential allocation of investment among productive sectors of the economy. These effects have recently been incorporated into applied general equilibrium analyses of PTA's involving developing countries (Mercenier and Yeldan, 1995; Rutherford and Tarr, 1996). By combining an empirically based treatment of market structure with long run dynamic effects of capital accumulation, our study provides a solid framework to analyze the long run effects on the Moroccan economy from entering a PTA with European Union. In this analysis, we take the long-run perspective and assume full employment; that we assume that the aggregate economy-wide level of unemployment implicit in the benchmark data base is unaffected in the long run by PTA[2]. The analysis emphasizes welfare and growth effects on Morocco due to PTA as well as the likely changes in production, consumption and trade patterns.

2. The Morocco-EU Preferential Trading Agreement

Prior to the new Association Agreement, Morocco's economic relations with the EU were governed by the Trade and Cooperation Agreement that date back to 1976. Morocco was granted non-reciprocal duty free access for industrial products while it committed to MFN status for its imports from EU. For agricultural products, preferences granted by the EU comprise tariff reductions, and non-tariff preferences such as seasonal tariff quotas on a certain number of items.

[2] In a separate analysis we tackle the short term effects of Morocco-EU PTA by incorporating unemployment, fiscal and revenue constraints and imposing restrictions on sectoral capital mobility and entry and exit of firms.

The most significant element of the Morocco-EU PTA is the reciprocal access for European exports into Morocco through the dismantling of import tariffs over 12 years and the immediate abolition of any quantitative restrictions. In exchange, Morocco would receive financial assistance to help upgrade its domestic industries and infrastructure. The Agreement also included provisions for competition policies and practices and harmonization of technical rules, standards, and certification procedures to EU's practices, in addition to a (partial) liberalization of the rights of establishment (national treatment). For agriculture, any potentially substantial liberalization was deferred to the year 2000 for a second round of negotiations.

The PTA is likely to have a substantial impact on the Moroccan economy through a number of channels. The trade liberalization could result in static gains over the long run, both from the reallocation of factors of production towards sectors where Morocco has a comparative advantage and from economies of scale to the integration of larger markets. Dynamic gains may be obtained through higher levels of investment and accelerated growth. However, the PTA itself doesn't necessarily guarantee an increase in investment flows. On one hand, FDI might increase from the perception of reduced uncertainty and the "locking in" of reforms through the agreement. In addition, the harmonization of laws and regulations combined with a good track of macroeconomic management may induce larger portfolio investments by European investors. On the other hand, increased investment may not materialize if the so-called "Hub-and-spoke" effect dominant. In this case, investment may move away from Morocco and into EU as producers in Europe gain additional export access to the Moroccan market and other duty-free markets in the southern Mediterranean countries. To counteract this effect, Morocco has actively pursued bilateral free trade agreements with other Mediterranean countries such as Tunisia, Egypt, and Turkey.

Overall, Morocco's interest in a PTA with EU can be placed in a context of a dual strategy to: a) deepen economic reforms with greater role for the private sector and market mechanisms, and b) seek a closer economic ties with Western Europe in the form of free trade agreement to fully take advantage of the reforms undertaken and ensure better markets for its products as its economy becomes more open.

3. Economics of PTA: A small country perspective

In this section we review the basic economic mechanisms determining trade flows, production and welfare when two countries form a Preferential Trading Area. We highlight the case of a PTA involving a small developing economy with a large industrialized one and focus on the implications for the small partner. We first consider perfectly competitive case, then move to imperfectly competitive environment, and finally bring in dynamic effects from capital accumulation.

3.1 Static welfare effects

Starting with a partial equilibrium, three-country model (say, Morocco taken to be the home country, the European Union or EU and ROW), we assume Armington-type product differentiation to allow for two-way trade and that we start from a pre-PTA

equilibrium where *ad valorem* tariff applies to imports from both sources (EU and ROW). A preferential reduction in the tariff on imports from the EU will result in an increase in the quantity demanded by Morocco. Since imports from ROW are gross substitutes with EU imports, there is a downward shift in demand for imports from the ROW. The welfare impacts translate into a gain in consumer surplus coming from EU imports yielding a "trade creation" effect and a loss of surplus equal to tariff revenue loss due to lower imports from ROW. But the net effect to the home country (Morocco) is ambiguous and depends on the relative size of trade creation/trade diversion areas. The actual outcome depends on elasticities, tariffs and trade shares that are country specific. For example, a higher degree of substitution (larger trade elasticities) between imports from different sources (EU versus ROW) will affect the extent of trade diversion with imports that are very good (but not perfect) substitutes leading to relatively larger trade diversion rectangles.

In an imperfectly competitive environment, particularly for manufacturing, scale economies in production are thought to be a major source of welfare gains from preferential trading. These positive effects arise from expansion in the output of a given good with declining average costs, hence expanding the welfare impacts. For a formal exposition of these effects we follow Rodrik (1988) analytical framework[3] which consider a small perturbation in an economy characterized by a number of important distortions: imperfect competition, increasing returns to scale and trade protection. The real income effect can be decomposed into several components as follow:

$$dy = \sum (P_i - P_i^*) dM_i + \sum (P_i - AC_i) dX_i + \sum n_i AC_i [1 - (1/s_i)] dx_i \qquad (1)$$

where i indexes sectors; p and p^* are the domestic and world prices; M_i and X_i are net imports and output of i, respectively; AC is the average cost of production, n is the number of firms; s the ratio of average to marginal cost; and x is the output of a representative firm in a given sector.

The first term reflects the traditional volume of trade effects as trade reform would be welfare increasing by spurring imports in sectors where domestic prices are kept above world prices. The second term reflects the effect of imperfect competition and the presence of excess profits in sectors where price is above average cost. The third term captures unrealized economies of scale when average cost is higher than marginal cost. The latter two terms suggest that the contraction of imperfectly competitive sectors may not be desirable as these manufacturing sectors are already operating at too small a scale from the perspective of these two features; hence it is desirable for the manufacturing sectors to expand on account of these imperfections. The net welfare effect from trade liberalization may be indeterminant in the presence of imperfect competition with a possibility of welfare loss by squeezing those manufacturing firms that are already operating at sub-optimal levels.

[3] A more complete analytical analysis of welfare effects of preferential trading arrangements is found in Baldwin and Venables (1995). However, Rodrik emphasis on a developing country case makes it more suitable for our purposes.

However, with free entry and exit of firms within an industry, trade liberalization may rationalize the industry by reducing the number of firms in the protected manufacturing sectors, allowing the remaining firms to achieve greater scale economies. This rationalization of industry will allow for both higher imports (as desired from the first term) and expanded domestic production (as desired by the third term). The productivity improvements that result from movement down the firms' average cost curves, may be large enough to stimulate the growth of the manufacturing sector as a whole, hence amplifying the efficiency benefits of liberalization. Harris (1984) found substantial welfare gains from Canada's trade liberalization related to a high increase in aggregate factor productivity resulting from induced rationalization effects and increased firm size. In general, one would expect a greater scope for rationalization in the case of small countries, particularly those with high initial tariffs like Morocco.

3.2 Accumulation effects

A PTA may lead to not only to a one-time increase in income due to static efficiency gains, but also a sustained increase in the rate of growth of income and capital accumulation via changes in return to investment (Baldwin, 1992). Under diminishing returns to scale framework, capital accumulation (or increase of capital stock through investment) may be temporary as the increased capital stock reduces the rate of return to capital. Regional integration will usually affect factor prices, including the rate of return to capital for both member and non-member countries. With trade reforms, the new set of relative prices is reflected in differential rental rates on capital among sectors, resulting in sectorally differentially investment allocation.

Under the assumption of fixed savings rates[4](Cobb-Douglas specification of national production function), the dynamic growth effects are a constant proportion of static efficiency gains (Baldwin, 1992). That is if we assume that initial equilibrium is at steady state, trade liberalization would induce static gains that result from a more efficient allocation of fixed regional endowment of capital and other primary factors. This translates into a departure from steady state, thus initiating dynamic adjustments to return to the steady state. This in turn generates additional "dynamic" gains from endogenous capital accumulation with exogenous saving rate. In other words, beginning-of-period capital stock is endogenized and allowed to grow until the higher 'static gain' growth rates of capital fall back to their steady state rate of growth.

So far we abstracted from interregional capital mobility. However, the change in relative prices arising from tariff elimination could make investment in the liberalizing country attractive leading to foreign investment inflow (FDI). This is critical for developing countries as they are typically unable to fully finance their growth in investment with domestic savings. In addition to expanding of capital endowment, FDI can also induce efficiency gains in factor productivity (new technology, marketing know-how) and resource allocation (Kehoe et al., 1995). However the extent of productivity gains from FDI may depend more on the degree of spillover effects than on the additional

[4] An alternative is to consider endogenous saving determination (Ramsey model) in which case trade liberalization is likely to result in higher expected global rate of return which may induce households to increase the portion of income into saving.

capital endowment per se (Kogima, 1978). This is likely to vary by country and depends on such factors as the educational level, technological gap and degree of competition, among others (Kokko, 1994). In the case of Morocco, where industrial inter-firm and intra-sectoral linkages are scarce, Haddad and Harrison (1993) found no evidence for technological spillover within the same industry even though foreign-owned firms had higher levels of total factor productivity.

4. The Analytical Model

A modified version of the multi-region multi-sector GTAP model (Hertel, 1997) was developed for the Moroccan economy (MOR) as part of a world that includes two other regions: the European Union (E_U) and the rest of the world (ROW). The multi-regional framework allows us to explicitly model policy changes for both partners in the PTA: Morocco and the EU. Moreover, this permits us to treat endogenously any changes of terms-of-trade for Morocco that might result from a PTA.

In our model, each region has 28 sectors producing tradeable goods in addition of non-tradeable sector producing capital goods. Of the tradeable sectors, seven are in agriculture, six in food processing industries and eight in other manufacturing. Manufacturing (food and non-food) sectors were treated as oligopolistic markets with scale economies while the remaining sectors are perfectly competitive. There are five factors of production (land, unskilled and skilled labor, capital and natural resources) in fixed supply with labor and capital mobile across sectors while land and natural resources are sector-specific. All input markets operate under constant return to scale and perfect competition. In this section we describe only the model features that relate to market structure and capital accumulation drawn from the works of Francois et al. (1996), Francois and Roland-Holst (1997) and Francois (1998). The remaining features of the static GTAP model is documented elsewhere (Hertel, 1997) and will not be repeated here.

4.1 Scale economies

In this analysis, we model economies of scale for manufacturing sectors. Economies of scale are usually specified by adding a fixed cost component to the unit variable cost function. In this case, the average cost takes the following form:

$$AC = \frac{F}{X} + MC \qquad (2)$$

where AC, MC, F and X are average cost, marginal cost, fixed cost, and output, respectively. It is common in the literature to calibrate fixed costs via the cost disadvantage ratio (CDR), a measure of unrealized scale economies, defined as follow:

$$CDR = \frac{AC - MC}{AC} \qquad (3)$$

The industry-wide external scale economies are modeled following Francois (1998) by linking percentage changes in output with percentages in inputs assuming homothetic technologies. That is we implement the following relationship:

$$\hat{X} = \left[\frac{1}{1-CDR}\right]\hat{Z} = \left[1+\frac{CDR}{1-CDR}\right]\hat{Z} \qquad (4)$$

where 1/(1-CDR) is output elasticity, which also equals average to marginal cost ratio (AC/MC). Since the basic GTAP is written as CRTS model, scale economies are accounted for by allowing output adjustments to respond to both changes in the activity on the input side and a (positive) Hicks-neutral technical change.

4.2 Imperfect competition

In our model we incorporate imperfect competition for the manufacturing sectors. Given the predominance of oligopolistic and highly concentrated industries in Morocco, we assume that these sectors behave in a Nash-Cournot fashion - that is firms play a quantity game and adjust output to maximize profits, with price as the equilibrating variable. The choice of Cournot (over Bertrand) can be justified by the relatively higher importance of industry concentration and lower importance of firm level-product differentiation. Further, we assume that firms act as oligopolists only on their domestic market but behave competitively in the export market. In addition to Cournot, we assume that products are differentiated by home or import variety, that is products of all firms within a sector are otherwise perfect substitutes. This assumption is reasonable for developing countries since typically domestic manufacturing industries tend to produce relatively undifferentiated products[5].

Unlike previous analyses, we do not rely on the conjectural variation approach, which despite being a convenient way of parameterizing oligopolistic behavior, is criticized for lack of theoretical foundation (Shapiro, 1989). Instead, we derive a Cournot price markup condition as follows:

$$\frac{p-\bar{c}}{p} = \frac{H}{\varepsilon} \qquad (5)$$

where $H = \sum_{i=1}^{n} s_i^2$ is the Herfindhal index of concentration and s_i is firm market share. In this equation, the price-markup over marginal costs varies endogenously, increasing with the Herfindhal index and decreasing with a higher market elasticity of demand.

The benchmark market elasticity of demand is calibrated with econometric estimates of markups and Herfindhal indices from manufacturing census data. The demand

[5] An alternative specification is firm-level differentiation, for example following Dixit-Stiglitz specification. This approach may generate larger welfare gains from trade liberalization because of the added effect of greater variety of products available to consumers through increased trade (Harris, 1984). On the other hand, in the presence of scale economies, the efficiency welfare gains from industry rationalization following trade liberalization may be dampened as welfare is reduced with fewer varieties.

elasticity is derived from the demand structure and cost shares. Following Francois (1998), the demand elasticity of good *j* in market *i* is given by:

$$\varepsilon_{j,i} = \sigma + (1-\sigma)\zeta_{j,i} \qquad (6)$$

$$\zeta_{j,i} = \sum_{r=1}^{R} \frac{X_{j,i,r}}{X_{j,i}} \left(\sum_{k=1}^{R} \left(\frac{\alpha_{j,k,r}}{\alpha_{j,i,r}} \right)^{\sigma_j} \left(\frac{P_{j,k,r}}{P_{j,i,r}} \right)^{1-\sigma_j} \right)^{-1} \qquad (7)$$

where σ is Armington trade elasticity of substitution between imports of different sources, $X_{j,i,r}$ is the quantity of X_j from region *i* consumed in region r; $\alpha_{j,i,r}$ is the CES weight; and $P_{j,i,r}$ is the price of good j from region *i* consumed in region r.

4.3 Savings, Investment and Capital accumulation

Economic integration induces accumulation effects that go beyond the static consequences of trade liberalization. Moreover, for a policy-analytic simulation we need to also consider the effects of sustained increase in the rate of growth of income and capital accumulation. For a small country entering a Preferential Trading Agreement, like Morocco, foreign direct investment (FDI) is critical for long term growth.

In this analysis we account for growth dynamics by applying a steady state model of capital accumulation implemented in GTAP and developed by Francois et al. (1996). Steady state is defined here as a situation where investment equals the rate of depreciation on capital and therefore the growth rate of capital equals zero. We implement a Solow-type capital stock adjustment under a fixed trade balance closure. The latter assumption implies that investment must be financed solely from domestic saving. We also make a simple assumption that all regions are initially at steady state. In this case, a fixed proportion of the static gain will be saved and invested, leading to additional income part of it is saved and so forth until a new equilibrium is reached. The post-reform steady state capital is given by:

$$K_1 = K_0(Y_1/Y_0)(P_0/P_1) \qquad (8)$$

where subscripts 0 and 1 denote pre- and post-reform values. Here, the change in steady state capital stock, following a shock to the regional GDP functions, is proportionate to the change in the steady state GDP functions, controlling for changes in the relative prices of the composite investment goods. In this closure, percentage changes in capital stocks are equated to percentage changes in investment. As a result investment and capital stocks change by the same amount making the percentage change of the growth rate of capital zero. The net result is a change in the steady state level of capital and income

Using the same steady state model of capital accumulation, we also attempt to account for foreign investment and hence allow for international capital mobility. In this case, increases in capital stocks located within a region may not be owned by national residents of that region and therefore GDP is no longer the same as GNP. In the model this is handled via a new equation, which computes the foreign investment income, and which can be interpreted as the difference between GDP and GNP. Implementation of this equation also requires that expected rate of return and current rate of return to capital, be equalized.

4.4 GTAP database, trade and tax structure

The underlying data structure for the model is the GTAP global data base version 4, which covers 45 countries/regions and 50 sectors (McDougall et al., 1998). Each economy is represented by an input-output (I/O) table. The first task in this research was to incorporate the Moroccan I/O table into the GTAP database. We used the 1990 I/O table for Morocco developed by OECD (Bussolo and Roland-Holst, 1993). This I/O table initially covered 133 sectors and was aggregated up to the GTAP 50 sectoral classification. The latter was further aggregated up to 28 sectors used in this analysis (see table 1). In this aggregation all the major productive sectors are separated out. In primary agriculture we separated out the sectors based on their net trade basis (mostly importable or exportable) and also based on whether the sectors are subject to non-tariff barriers to trade, particularly for exports to EU. In manufacturing, the model aggregation separates out the majority of the sectors listed in the official statistics of the Moroccan Ministry of Commerce.

All Input-Output tables are updated to a common base year, 1995, except for the protection data (which vary by country). In the model aggregation, the tariff structure was updated using effective tariff rates from various sources including the latest 1996 legislation on tariff rates for agricultural goods. The data base was also adjusted to account for the previous preferential agreements between Morocco and EU. The benchmark tariff structure used in the analysis is reported in table 2. Morocco's import tariffs are relatively high compared to other regions. With few exceptions, all import duties on manufacturing products are higher than ROW and they are much higher than for the EU. The exceptions are in food processing industries such as beverage products. For agricultural products only sugar and livestock have lower rates than the aggregate ROW.

Bilateral trade flows in the GTAP data base originate from the UN COMTRADE database and subjected to a reconciliation methodology developed by Gehlhar (1998). In the case of Morocco, a majority of exports go to EU as shown in table 2. This includes most of the agricultural and fish products, wearing apparel and light manufacturing. However, more food processed and chemical products are exported to third countries. On the import side, most manufacturing products originate from EU with import shares ranging from 57% (metal products) to 96% (wearing apparel). The sourcing of agricultural and food imports depend on the products. While livestock, meat products and vegetable oil are imported predominantly from EU, other agricultural and food products are imported mostly from third countries.

4.5 Manufacturing data and market structure calibration

Table 2 provides detailed information on the manufacturing and food processing sectors in this model. Food processing activities account for 30% of manufacturing gross output and 20% of employment. Textile and clothing account for 42% of manufacturing employment and 16% of gross output. Other leading sectors include chemicals and metal products generating 14% and 17% of gross output respectively (8% and 13 % in employment).

The relative capital intensity of these sectors is typical of semi-industrialized country with textile and clothing being the most labor intensive while beverages and tobacco, paper and publishing, chemical and metal products show relatively high capital to labor ratios. Food processing sectors are mid- to low capital intensive. The sector with the highest export share is the clothing industry with over 80 % of gross output exported. Textile and chemicals follow with 40 and 31%, respectively. Food processing, wood products and light manufacturing also have significant export shares (15 to 20%).

In terms of market structure, most sectors are extremely concentrated with 8 out of 15 sectors having a 4-plant concentration (C4) ratio over 70% and 12 in 15 over 50%. Only food processing, textile and clothing sectors exhibit relatively low levels of concentration. To calibrate the Cournot oligopoly model for imperfectly competitive sectors, we use Herfindhal indices and derive the model conformable benchmark number of firms, based on demand elasticity for the model using equation (5), and calibrate the benchmark price-cost margins, or markups in these sectors.

The model implementation of scale economies requires the calibration of a cost disadvantage ratio. The latter has been problematic in the empirical literature. The most common approach has been to apply CDR estimates computed from minimum efficiency scale estimates from engineering cost studies, dating mostly from the 60's and 70's and compiled by Pratten (1988) and others (Gasiorek, Smith and Venables (1992); Harrison, Rutherford and Tarr (1994); Roland-Holst, Reniert and Shiells (1994); Willenbockel (1994)). In our study we base our estimates of CDR on gross estimates of scale economies using the firm-level manufacturing census data. For each imperfectly competitive sector, we computed a ratio commonly used as gross measure of scale economies in the industrial organization literature. The ratio is gross output per worker in the smaller establishments with half the industry sales divided by the corresponding values in the larger establishments accounting for the balance of industry sales. To derive a CDR ratio consistent with the theoretical literature, the computed ratio was scaled using an outside estimate of CDR for manufacturing as a whole from an economy similar to Morocco. The scaled ratio is the sectoral CDR reported in table 2.

5. Simulations and Results

We are interested in estimating the effects of trade liberalization resulting from preferential trade agreements with the EU on the Moroccan economy. Starting from a benchmark database for 1995, implementation of the PTA was modeled as a unilateral

removal by Morocco (MOR) of all duties on industrial imports[6] from the European Union (E_U) while maintaining tariffs duties from third countries (ROW). A static constant returns to scale model version for comparing results (model scenario A) was contrasted with a static model with imperfect competition and scale economies (Scenario B). The latter is our base model for this analysis. To take into account long-run dynamic effects of capital accumulation, we use a steady state closure for capital accumulation without international capital mobility (model Scenario C). The latter assumption is relaxed in Scenario D, which takes foreign investment into account with income adjusted by the portion generated by foreign investment. In all four model scenarios analyzed, we assume fixed trade balance, and in scenarios with imperfect competition, we assume free entry and exit of firms consistent with our long run perspective. To build intuition into the discussion of results we begin with the static perfect competition case (Scenario A) then move to the imperfect competition case (Scenario B), and finally the steady state model cases (Scenarios C and D).

5.1 Static effects under Perfect competition and constant returns to scale

In Scenario A, welfare, measured in terms of equivalent variation declined by $ 151 million as a result of unilateral removal of manufacturing tariffs by Morocco (table 3). This decline reflect a dominant terms of trade effect. Aggregate imports and exports increased by 31 and 48 percent, respectively. The larger increase in volume of exports compared to imported can be explained by a price effect whereby a larger volume of exports is needed to pay for imports due to differential import and export price changes and the fixed trade balance assumption. At the sectoral level, imports from ROW decline in all manufacturing sectors while EU imports expand (table 4). In agriculture, imports from all sources increased for grains, vegetables and oilseed crops but declined for sugar. On the export side, exports declined for both primary agriculture and food processing sectors. On the other hand, exports for all non-food manufacturing sectors expanded, especially in textile and clothing. These results indicate that PTA with EU will likely have substantial effects on trade patterns with shares likely to increase for textiles and clothing and decrease for agricultural based products.

The welfare effect of trade liberalization can be decomposed into several components. In this comparative static scenario, there are two dominant welfare components at play: terms of trade (TOT) and allocative efficiency (AE). In Scenario A, the AE gain of $314 million was smaller than the TOT loss of $ 464 million. Much of AE gains came from elimination of import tax and imports expansion. The TOT deterioration came predominantly from the export side and result from a decrease in Morocco's export prices relative to the worldwide average. This result is to be expected from a discriminatory and largely unilateral tariff reduction, especially for a country with relatively high tariffs like Morocco.

In this scenario, real factor returns (amount of goods that the wage and rent will buy) increased. By substantially reducing tariffs, Morocco lowers the nominal domestic prices of both imports and import-competing goods, and this feeds through the economy to reduce other goods prices and factor prices as well. However, the falling prices of

[6] In food processing, only the non-agricultural component of the duty was set to zero.

imports and other goods also mean that these lower nominal factor prices can be used to buy an increased amount of goods, and real factor prices therefore can rise. In Scenario A, given the full employment assumption, real returns to unskilled labor increased by 6.4 percent compared to 4.07 percent for skilled labor and 3.55 percent for rental rate of capital. The higher return to labor compared to capital is an indication that pre-liberalization capital was relatively more protected than labor given the Moroccan tariff structure, and manufacturing liberalization would result in a relative shift in favor of (unskilled) labor-intensive sectors.

5.2 Static effects under imperfect competition and scale economies

We next turn to the model scenarios where manufacturing sectors are modeled with imperfect competition and increasing returns.

In Scenario B under free entry and exit of firms, the PTA implementation led to a net welfare gain of $ 196 million and GDP increase of 2%. This is due to a much larger gain from AE ($469.5 Million) in addition to gains from scale economies ($156.7 million). Moreover, TOT losses are somewhat smaller in this case ($-430.2 million) compared to the perfect competition case (Scenario A). In Scenario B, the AE component is largely determined by the gains from lower import duties and higher imports ($373.4 million). In addition, under imperfect competition, the presence of markups accounted for a smaller but significant share of AE gain ($80.6 million).

Output adjustments in Scenario B differed from those in perfect competition case (Scenario A) in two ways. First, there are now three manufacturing sectors that expanded output following trade liberalization: beverages & tobacco, textiles, and clothing (in Scenario A only the latter two expanded). Second, with few exceptions the degree of output contraction observed in manufacturing sectors were smaller than under the perfect competition case. This is consistent with the theory of imperfect competition as domestic firms reduce price-cost markups before contracting output when faced with stiffer competition from abroad. At the same time, sectors such as textiles and clothing that expanded output, did so at lower rate compared to the perfect competition case which suggest some exercise of market power by these sectors.

Real returns to factors were higher in Scenario B compared to the perfect competition case (Scenario A) but the ranking was the same and was highest for unskilled labor (7.66%), followed by skilled labor (6.01%) and capital (5.4%). The relatively higher returns to mobile factors in Scenario B is reflected in the output adjustment profile given that three manufacturing sectors expanded output (beverages & tobacco, textile, clothing) compared to only two in the perfect competition case (textile, clothing).

Changes in output and markups for manufacturing sectors show a more complex picture than the textbook story of pro-competitive effects of trade liberalization. All sectors that contracted output also reduced markups. Of the three manufacturing sectors that expanded output, markups for the sector beverages & tobacco- a highly concentrated sector, were reduced while for textiles and clothing-low concentration sectors, markups increased suggesting some increase in market power.

For trade flows, imports of agricultural commodities from both EU and ROW increased by a greater percentage compared to perfect competition scenario. For manufacturing goods, relative magnitude of import expansion from EU (contraction from ROW) compared to the prefect competition case varied with the sector. On the export side, there were some notable changes in relative magnitude as a result of implementing imperfect competition and scale economies. For example, vegetable, oil and fats switched sign from lower exports (in Scenario A) to expanded exports (Scenario B). For this sector the expansion of exports under Scenario B (+3.76%) may be explained by the combination of lower markups (-5.69%) and smaller output contraction (-22.27% in Scenario B compared to -24.85% in Scenario A). Another notable difference between the two scenarios is the much larger (though starting from a smaller base) increase in exports of beverages & tobacco in Scenario B (where output expanded) compared to Scenario A (where output contracted).

5.3 *Steady State effects: Capital Accumulation and Foreign Direct Investment*

Taking the long run approach and accounting for capital accumulation, results from Scenario C show that tariff liberalization resulted in an increase in GDP by a close to 3.98 percent while capital stock increased by 4.28 percent (table 3). As an approximate measure of welfare under a steady state scenario, private consumption increased by 1.82 percent. Allowing for foreign investment (Scenario D), increased in capital stock bt 27% and GDP by +14.2%. However, the latter figure must be discounted by the income portion earned by foreign investment and repatriated. In this scenario, private consumption increased by close to 7 percent in Scenario D.

The structural implications for allowing for steady state capital accumulation are significant under Scenario D with foreign investment. Output expansion was observed in many manufacturing-that otherwise contracted under the static model- notably wood products and chemical products (table 4). A total of nine manufacturing sectors out of 15 expanded output under a long run scenario compared to 3 out of 15 in a static model. These results indicate that implementation of PTA will likely result in substantial structural change in production patterns likely to be reshaped more along the lines of Morocco's comparative advantage. Both trade and investment enhancing policies are critical in affecting this transformation.

5. Conclusions

This study provides a general equilibrium assessment of the economic impacts on Morocco following implementation of a free trade agreement with the European Union. The analysis emphasized medium and long term implications of imperfect competition, scale economies in manufacturing industries and of dynamic effects of capital accumulation. The implementation of market structure into an AGE framework was based on detailed industrial data for Moroccan manufacturing sectors.

Results from a static model show that taking market structure into account, the implementation of PTA will result in GDP increase by 2% and a net welfare gain of $200 million (compared to 1% GDP and $-195 million loss in welfare in the perfect competition case). The contrast in outcome highlight the importance of properly

implementing market structure of domestic industries when assessing the growth and welfare implications of trade liberalization.

The analysis also shows that PTA result in some important structural changes. Returns to labor are greater than rental rate of capital causing a likely shift towards more labor-intensive industries. While many manufacturing sectors contract output from increased competition from EU imports, sectors like textile and clothing expand significantly under PTA. Moreover, the shift to labor-intensive manufacturing sectors will be at the expense of agricultural output which slightly contracted.

In a dynamic model with capital accumulation, allowing for foreign investment resulted in greater growth rates as expected, but more importantly, revealed that many sectors both in agriculture and manufacturing expanded output, an outcome not revealed in a static case. This result highlights the positive interactions between the possibilities of scale economy gains and investment.

In the short run however, domestic constraints, such as fiscal imbalances from revenue losses, labor market rigidities, and imperfect capital mobility may also impact the economic outcome of PTA. Given the policy relevance of these constraints in the Moroccan case, we are extending the long-run analysis of PTA impacts by taking these constraints into account.

References:

Baldwin, R.E. (1992), "Measurable dynamic gains from trade," Journal of Political Economy 100(1):162-174.

Baldwin, R.E. and A.J. Venables (1995), "Regional Economic Integration." In G.M. Grossman and K. Rogoff, eds., Handbook of International Economics, volume III, North-Holland/Elsevier.

Brown, D.K., A.V. Deardorff, and R.M. Stern (1996), "Some Economic Effects of the Free Trade Agreement Between Tunisia and European Union," Prepared for the Egyptian Center for Economic Studies Conference "How Can Egypt Benefit from a Trade Agreement with the EU?" Cairo, Egypt, June 26-27, 1996.

Burfisher, M.E., S. Robinson and K.E. Thierfelder (1994), "Wage Changes in a US Mexico Free Trade Area: Migration vs Stopler -Samuelson Effects", in J.F. Francois and C.R. Shiells (eds.) *Modeling Trade Policy: Applied General Equilibrium Assessments of North-American Free Trade*, New York: Cambridge Uni. Press.

Bussolo Maurizio and D. Roland-Holst. "A Detailed Input-Output Table for Morocco, 1990". OECD Technical Paper. No. 90. OECD. Paris 1993.

Devarajan, S. and D. Rodrik, (1989), Trade Liberalization in developing countries: Do imperfect competition and scale economies matter?, American Economic Review 79, 283-287.

Francois, J.F., B.J. McDonald and H. Nordstrom (1996), "Liberalization and Capital Accumulation". GTAP Technical Paper No. 7. July 1996.

Francois, J.F., and D.W. Roland-Holst (1997), "Scale Economies and Imperfect Competition". Chapter 11 in J. Francois and K. Reinert (eds.) *Applied Methods for Trade Policy Analysis: A Handbook*, New York: Cambridge University Press.

Francois, J. F. (1998), Scale Economies and Imperfect Competition in the GTAP Model. GTAP Technical Paper No. 14

Gasiorek, M., A. Smith and A.J. Venables (1992), 1992: Trade and welfare; a general equilibrium model. CEPR Discussion Paper No. 672. London: CEPR.

Gehlhar, M. (1998), "Reconciling merchandise trade." Chapter 11A and 11C in McDougall, R.A., A. Elbehri and T. Truong (eds.), Global Trade, Assistance, and Protection: The GTAP 4 Data Base. Center for Global Trade Analysis, Purdue University.

Haddad, Mona and Anne Harrison, 1993. Are Positive Spillovers from Direct Foreign Investment? Evidence from Panel Data for Morocco," Journal of Development Economics 42:51-74.

Harris, R.G, (1984), Applied general equilibrium analysis of small open economies with scale economies and imperfect competition", American Economic Review 74, 1016-1032.

Harrison, G.H., T.F. Rutherford, and D.G. Tarr (1994), "Product Standards, Imperfect Competition and the Completion of the market in the European Community", Policy Research Working Paper 1293, World Bank, Washington, D.C.

Hertel, Thomas (1997) (ed.) Global Trade Analysis Modeling and Applications. Cambridge University Press.

Kehoe, T.J, C. Polo and F. Sancho (1994), An evaluation of the performance of an applied general equilibrium model of the Spanish economy", Econ. Theory 6,115-141 .

Kojima, K. (1978), "Foreign Direct Investment: A Japanese Model of Multinational Business Operations, New York, NY: Praeger.

Kokko, A. (1994), "Technology, market characteristics and spillover", Journal of Development Economics, 43:279-293.

McDougall, R.A., A. Elbehri and T. Truong (eds.) (1998), "Global Trade, Assistance, and Protection: The GTAP 4 Data Base. Center for Global Trade Analysis, Purdue University.

Mercenier, J. and E. Yeldan (1996), "On Turkey's Trade Policy: Is a Customs Union with Europe Enough? European Economic Review 41 (1997): 871-80.

Nasr, H., L. Jaidi, and M. Zouaioui (1992), Prix et Concurrence au Maroc: Douze etudes sectorielles. Ministere Charge des Affaires Economiques. Ed. Najah El Jadida, Casablanca.

Pratten. (1988), AA survey on the economies of scale." In: Studies on the Economics of Integration. Luxemburg: Commission of the European Communities.

Rodrik, D., (1988), Imperfect competition, scale economies, and trade policy in developing countries, In: R.E. Baldwin, ed., Trade policy issues and empirical analysis (University of Chicago Press, Chicago, IL).

Roland-Holst, D.W., K.A. Reinert and C.R. Shiells (1994), "A general equilibrium analysis of North American Economic integration", In: Francois, J.F. and C.R. Shiells (eds.) Modeling trade policy: AGE assessments of North American free trade. Cambridge: Cambridge University Press.

Rutherford, T.F. and D.G. Tarr (1996), Regional Trading Arrangements for Chile: Do the Results Differ with a Dynamic Model? World Bank (unprocessed).

Shapiro, C. (1989), Theories of oligopoly behavior", In: R. Schmalense and R.D. Wilig (eds.) Handbook of Industrial Organization, Elsevier Science Publishers B.V.

Young, L. and J. Romero (1994), " A Dynamic Dual Model of the North American Free Trade Agreement" in: J.F. Francois and C.R. Shiells (eds.) *Modeling Trade Policy: Applied General Equilibrium Assessments of North-American Free Trade*, New York: Cambridge Uni. Press.

Willenbockell, D. (1994), " Applied General Equilibrium modeling: Imperfect competition and European Integration. London: John Wiley and Sons. LTD.

Table 1 Commodity aggregation and mapping with the GTAP version 4 sectoral classification

Model sectors:			*GTAP sectoral classification:*
Agriculture & Other Primary sectors:			
1	grn	Grains crops	Paddy rice (pdr); Wheat (wht); Cereal grains nec (gro)
2	vfn	Vegetables-fruits	Vegetables, fruit, nuts (v_f)
3	osd	Oil seeds	Oil seeds (osd)
4	sgr	Sugar crops	Sugar cane, sugar beet (c_b)
5	pfb	Plant-based fibers	Plant-based fibers (pfb)
6	oag	Other agriculture	Crops nec (ocr); Wool silk-worm cocoons (wol)
7	lvk	Livestock	Bovine cattle, sheep and gots, horses (ctl); Animal products nec (oap); Raw milk (rmk)
8	fsh	Fishing	Fishing (fsh)
9	for	Forestry	Forestry (for)
10	cog	Energy products	Coal (col); Oil (oil); Gas (gas); petroleum coal products (p_c)
11	mnr	Minerals	Minerals nec (omn)
Manufacturing:			
12	mtp	Meat products	Bovine cattle, sheep and goat, horse meat products (cmt); Meat products nec (omt)
13	vof	Vegetable oils & fat	Vegetable oils and fats (vol)
14	drp	Dair products	Dairy products (mil)
15	sgp	Sugar	Sugar (sgr)
16	ofp	Other food products	Processed rice pcr); Food products nec (ofd)
17	btp	Beverages & Tobacco	Beverages and tobacco products (b_t)
18	txt	Textiles	Textiles (tex)
19	wal	Wearing apparel	Wearing apparel (wap); Leather products (lea)
20	wdp	Wood products	Wood products (lum)
21	pap	Paper & Publishing	Paper products, publishing (ppp)
22	chm	Chemical products	Chemical, rubber, plastic products (crp)
23	mmp	Metal products	Mineral products nec (nmm); Ferrous metals (i_s); Metals nec (nfm); Metal products (fmp)
24	mvt	Motor vehicles	Motor vehicles and parts (mvh); Transport equipment nec (otn)
25	lmn	Light manufacturing	Electronic equipment (ele); Machinery and equipment nec (ome)
26	omn	Other maunfacturing	Manufactures nec (omf)
Services:			
27	utl	Utilities	Electricity (ely); Gas manufacture distribution (gdt); water (wtr)
28	srv	Other services	Construction (cns); Trade, transport (t_t); Financial, business, recreational services (osp); Public admin and defence, education, health (osg); Dwellings (dwe)

Table 2: Tariff structure, and trade shares and manufacturing market structure (Morocco; 1995)

(percent)		**Tariff rates** (a)				**Export shares** (b)		**Import shares** (b)		Market structure data (c)			
			E_U										
		MOR (b)	From MOR (c)	From ROW	ROW	E_U	ROW	E_U	ROW	*4-plant Conc. Ratio*	*Herfindhal Index (b)*	*Price-cost Markup (c)*	*Economies of scale (CDR) (d)*
Agriculture & Other Primary													
	Grains crops	124.00*	8.59	8.59	96.95	0.00	1.00	0.49	0.51				
	Vegetables-fruits	18.26	0.00(3.00)	1.95	12.48	0.83	0.17	0.56	0.44				
	Oil seeds	90.97*	0.00	0.00	6.61	N.T.	N.T.	0.40	0.60				
	Sugar crops	0.00	73.70	73.70	37.20	N.T.	N.T.	N.T.	N.T.				
	Plant-based fibers	2.50	40.00	40.00	14.30	1.00	0.00	0.09	0.91				
	Other agriculture	20.00	1.20	1.20	9.70	0.46	0.54	0.15	0.85				
	Livestock	4.00	5.91	5.91	11.24	1.00	0.00	0.93	0.07				
	Fishing	22.88	2.55	2.55	6.07	0.92	0.08	N.T.	N.T.				
	Forestry	11.60	0.00	0.00	1.40	0.46	0.54	0.10	0.90				
	Energy products	5.45	0.12	0.12	3.54	0.85	0.15	0.13	0.87				
	Minerals	3.41	0.00	0.00	2.44	0.61	0.39	0.13	0.87				
Manufacturing													
	Meat products	24.00*	0.00	13.12	31.22	0.86	0.14	0.73	0.27	66.43	0.2173	1.11	0.24
	Vegetable oils & fat	13.80	50.60	64.20	21.75	0.75	0.25	0.85	0.15	87.27	0.4250	1.33	0.16
	Dair products	23.03	0.00	5.58	62.07	0.00	1.00	0.52	0.48	87.65	0.4254	1.49	0.13
	Sugar	148.00*	27.30	27.30	35.40	1.00	0.00	0.01	0.99	90.27	0.4893	2.39	0.11
	Other food products	25.30	0.00(1.50)	3.29	10.32	0.44	0.56	0.46	0.54	32.52	0.0790	1.06	0.10
	Beverages & Tobacco	18.91	0.00(2.30)	1.84	31.23	0.90	0.10	0.27	0.73	95.84	0.7907	2.45	0.10
	Textiles	27.79	0.00	1.73	20.92	0.62	0.38	0.92	0.08	36.91	0.1214	1.07	0.19
	Wearing apparel	34.04	0.00	4.90	12.16	0.93	0.07	0.96	0.04	25.67	0.0434	1.02	0.19
	Wood products	12.91	0.00	0.73	4.97	0.63	0.37	0.61	0.39	81.48	0.3236	1.26	0.11
	Paper & Publishing	20.59	0.00	0.52	5.55	0.45	0.55	0.80	0.20	51.72	0.2218	1.21	0.20
	Chemical products	17.41	0.00	0.83	8.49	0.32	0.68	0.70	0.30	68.39	0.3892	1.35	0.16
	Metal products	12.64	0.00	0.78	7.80	0.63	0.37	0.57	0.43	56.55	0.2315	1.19	0.09
	Motor vehicles	21.75	0.00	1.10	9.29	0.57	0.43	0.65	0.35	86.56	0.2867	1.10	0.25
	Light manufacturing	18.82	0.00	1.37	6.28	0.79	0.21	0.84	0.16	88.52	0.4138	1.21	0.15
	Other maunfacturing	34.03	0.00	2.47	8.12	0.82	0.18	0.73	0.27	93.25	0.5141	1.49	0.14
Services													
	Utilities	0.00	0.00	0.00	0.20	--	--	--	--				
	Other services	0.00	0.01	0.01	0.75	--	--	--	--				

Notes:

(a) Tariff data are MNF-based and are computed from GTAP data base version 4. Import tariffs for Morocco marked with * were compiled from various sources and reflect effective actual rates. Tariff rates from Morocco into EU reflect trade agreements in force between the two partners prior to PTA. For three sectors: Vegetables-fruits, Other food products and "Beverages & Tobacco", numbers reflect the two-tier tariff structure from the tariff-rate quota regime applied by EU.

(b) GTAP are from the GTAP data base version 4

(c) All manufacturing and market structure data are authors' calculations from annual manufacturing survey (Moroccan Ministry of Commerce and Industry)

Table 3: Aggregate Results

	Static		Steady State
	PC-CRTS (Scenario A)	*IC-IRTS (Scenario B*	*Solow-type K accumulation*
GDP (%)	0.97	1.93	3.98
Aggregate imports (%)	30.94	29.86	31.27
Aggregate exports (%)	47.65	45.92	48.22
Terms of trade (%)	-2.63	-2.56	-2.74
Factor returns (% change):			
Land	-3.19	-4.41	-0.78
Unskilled labor	6.38	7.66	9.05
Skilled labor	4.07	6.01	7.24
Capital	3.55	5.40	2.81
Welfare decomposition ($ million):			
Allocative	314.00	469.50	--
Endowment	0.00	0.00	--
Tech change	0.00	156.70	--
Terms-of-trade	-464.50	-430.20	--
Total E.V.	-151.20	196.00	--
Consumption (%)	-0.94	0.23	1.82

Note: PC-CRTS: Perfect competion-Constant returns to scale; IC-IRTS: Imperfect competion-Increasing returns to scale

Table 4: Sectoral Effects

	Static Model (PC - CRTS)					Static Model (IC-IRTS)					Steady State (with regional capital mobility)				
		Imports					*Imports*					*Imports*			
	Ouput	*EU*	*ROW*	*Exports*	*Markups*	*Ouput*	*EU*	*ROW*	*Exports*	*Markups*	*Ouput*	*EU*	*ROW*	*Exports*	*Markups*
Grains crops	-3.79	2.06	2.31	-13.37		-4.54	8.03	8.28	-23.51		-2.34	11.02	11.29	-23.14	
Vegetables-fruits	-4.55	4.54	4.8	-10.37		-6.43	11.05	11.33	-19		-3.2	15.75	16.05	-18.92	
Oil seeds	-6.04	0.54	0.78	-12.68		-7.38	5.14	5.37	-22.33		-3.2	10.1	10.35	-22.59	
Sugar crops	-7.2	-4.56	-4.29	-12.03		-7.19	-0.12	0.11*	-22.57		-2.42	8.95*	9.16	-21.85	
Plant-based fiber	-4.05	0.33	0.58	-7.39		-1.27	5.86	6.09	-11.2		5.47*	14.28	14.55	-12.56	
Other agriculture	32.17	-14.11	-13.91	98		30.26	-14.23	-14.05	102.56		35.95	-9.18	-8.99	97.1	
Livestock	-3.01	10.06	10.42	-21.31		-2.45	20.78	21.14	-33.92		2.35*	29.91	30.3	-36.64	
Fishing	-0.72	-2.67	-2.56	0.45		-1.32	1.59*	1.73*	-5.02*		0.93*	9.91	10.08	-9.45	
Forestry	-2.05	5.19	5.44	-10.98		-3.76	9.6	9.83	-18.99		8.92*	39.75	40.03	-33.16	
Energy products	-7.56	-4.68	-4.55	-11.78		-8.17	-2.17	-2.06	-22.46		19.34*	4.34*	4.45*	64.53*	
Minerals	-5.94	-13.44	-13.42	4.89		-6.7	-3.55	-3.49	-7.67*		3.43*	5.76*	5.81*	0.11*	
Meat products	-12.01	21.36	-47.72	0.52	0.00	-14.79	23.1	-47.29	-3.8*	-4.03	-9.38	28.56	-44.86	1.35*	-2.46
Vegetable oils & fat	-24.85	37.97	-56.22	-2.33	0.00	-22.27	37.65	-56.71	3.76*	-5.8	-18	42.79	-55.02	7.63	-4.8
Dair products	-18.16	176.49	-55.26	-4.78	0.00	-13.1	154.15	-58.5	22.2*	-5.69	-8.36	158.86	-57.67	30.49	-4.74
Sugar	-2.95	190.21	0.6	-6.53	0.00	-2.29	190.16	3.14	-8.95	-0.92	3.08*	196.59	5.52	-4.71	-0.05
Other food products	-7.05	355.75	-59.43	-5.9	0.00	-7.72	356.91	-57.47	-11.92	-1.01	-2.45	362.49	-56.9	-5.56	-0.44
Beverages & Tobacco	-10.1	777.14	-83.3	72.43	0.00	68.72*	64.09	-97.91	1856.69	-20.75	17.42	314.6	-92.89	-11.18*	-10.6
Textiles	16.09	56.98	-82.39	146.18	0.00	20.45	52.08	-83.78	161.22	3.09	27.79	59.58	-82.91	172.6	4.1
Wearing apparel	42.08	485.3	-96.6	140.46	0.00	36.96	444.14	-97.32	128.73	5.15	49.8	462.53	-97.21	150.62	6.54
Wood products	-8.48	61.94	-50.82	36.83	0.00	-5.25	59.64	-51.72	48.07	-2	8.83*	72.18	-47.72	66.27	-0.19
Paper & Publishing	-14.82	55.9	-55.38	15.71	0.00	-10	57.5	-55.12	24.38	-3.55	1.92*	64.82	-52.92	43.59	-0.89
Chemical products	-9.89	58.73	-54.73	12.33	0.00	-4.25	60.21	-54.49	20.46	-2.32	7.94*	71.47	-51.11	33.28	-0.25
Metal products	-18.35	96.18	-60.83	9.54	0.00	-13.42	97.39	-60.75	22.59	-2.92	3.15*	104.78	-59.17	62.51	-1.1
Motor vehicles	-46.67	121.71	-96.66	234.72	0.00	-34.75	125.24	-97.29	326.82	-13.29	-15.7	156.57	-96.83	452.44	-6.09
Light manufacturing	-19.43	42.53	-79.05	29.35	0.00	-14.54	42.41	-79.93	38.78	-3.55	3.87*	64.85	-76.48	67.01	-0.53
Other maunfacturing	-42.37	212.13	-88.97	16.06	0.00	-22.44	160.37	-91.54	150.08	-11.11	-10.66	178	-90.87	188.62	-8.84
Utilities	-4.49	9.04	9.18	-19.57		-2.96	25.46	25.63	-27.07		8.07*	-12.23*	-12.1*	38.49*	
Other services	-2.89	-2.07	-1.87	-3.24		-2.25	3.08*	3.26*	-9.74		11.04*	4.94	5.13	7.22*	

*Note: Values followed by * in the IC-IRTS scenario indicate a sign change compared to the PC-CRTS; for the steady state scenario, * indicate a sign change compared to IC-IRTS.*