No. 1611

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INTERNATIONAL TRADE

Centre for Economic Policy Research

ISSN 0265-8003

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Discussion Paper No. 1611
March 1997

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CEPR Discussion Paper No. 1611

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ABSTRACT

Preferential Trade Liberalization in the North Atlantic*

This study provides a quantitative assessment of the implications of preferential trade liberalization by the North Atlantic economies. Emphasis is placed on the pattern of production and trade in North America and Western Europe, the pattern of import protection, and the likely trade and income effects of trade liberalization. The potential benefits of preferential trade liberalization are also compared with the potential benefits of post-Uruguay Round most-favoured nation-based reductions in trade barriers. The numerical assessment highlights the impact both on the North Atlantic economies themselves, and on their important regional trading partners.

JEL Classification: F13, F47
Keywords: free trade agreements, preferential trade, regionalism, TAFTA, transatlantic trade

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*This paper is produced as part of a CEPR research programme on *Globalization and Regionalism: Policy-making in a Less National World*, supported by a grant from the Ford Foundation (no. 920–1265–1). The views expressed in this paper are strictly those of the authors, and are not meant to represent those of any institution with which they may have ever been affiliated. The authors acknowledge support from the UK Foreign and Commonwealth Office and from the European Commission for the research programme on which this paper is based.

Submitted 7 March 1997

NON-TECHNICAL SUMMARY

In December 1995, at the EU–US summit in Madrid, the European Union and the United States adopted a 'New Transatlantic Agenda'. This agenda covers a broad set of issues, ranging from collaboration in Bosnia to environmental protection, cooperation against international crime and terrorism, and transatlantic academic collaboration. It also calls for significant steps towards trade liberalization. This includes bilateral reduction or elimination of tariffs in industrial products, accelerated implementation of Uruguay Round tariff reductions, and negotiated reduction in regulatory and other non-tariff barriers to trade.

This study provides a quantitative assessment of the implications of preferential trade liberalization by the North Atlantic economies. Emphasis is placed on the pattern of production and trade in North America and Western Europe, the pattern of import protection, and the likely trade and income effects of trade liberalization. The potential benefits of preferential trade liberalization are also compared with the potential benefits of post-Uruguay Round most-favoured nation (MFN)-based reductions in trade barriers. The numerical assessment highlights the impact both on the North Atlantic economies themselves, and on their important regional trading partners.

As a combined trade bloc, North America and Western Europe would be a leviathan, accounting for almost two-thirds of world trade and about one-half of world income. Trade between these two regions consists largely of two-way trade in similar industrial products. In 1994, almost 40% of this trade was in machinery, cars, car parts, and other transport equipment. Out of $276 billion in total transatlantic merchandise trade, very little, in relative terms, was in politically sensitive industries, such as textiles, clothing, steel and agricultural goods, where trade frictions are concentrated.

Because of the combination of Uruguay Round commitments to reduce tariffs and the Information Technology Agreement reached at the WTO Singapore Ministerial, most transatlantic trade will face either relatively low tariffs (generally less than 2.5%) or even zero tariffs, even without a preferential trade agreement. This in turn means that reduction in industrial tariffs alone, without a deeper liberalization initiative, is likely to have little, if any, impact on trade and incomes. Outside of agriculture, peak protection (tariff equivalents of over 30%) does affect NAFTA and EU exports of fishery and mining products, textiles, clothing, fabricated metal products, transport equipment, machinery

and other manufactures. These rates are generally found in Asia, Latin America and Africa, however, not Western Europe or North America.

We employ an applied general equilibrium model to assess the quantitative implications of transatlantic trade liberalization. This involves numerical simulation of a range of liberalization scenarios. All liberalization scenarios are based on post-Uruguay Round protection data. The preferential liberalization scenarios are also compared with scenarios involving further multilateral liberalization. The results suggest that a narrow preferential agreement, leading only to the elimination of tariffs on industrial goods, is likely to have very little discernable impact. In terms of national income gains, we estimate a very slight increase for North America and EFTA, with basically no effect on the EU. In contrast, a deeper agreement, including elimination on a bilateral basis of industrial tariffs, agricultural protection, and contingent protection (i.e. anti-dumping remedies) does imply modest income and wage gains for the North Atlantic economies. This involves a broadening of the coverage of the plurilateral government procurement agreement, and a reduction in trading costs through mutual recognition/harmonization of standards.

The implications for third countries vary, depending on the degree of liberalization. One qualitatively consistent result that emerges from the various sets of estimates is that a preferential agreement implies welfare losses for North Africa and the Middle East. These losses are generally of a magnitude that is roughly comparable (as a percentage of GDP) to the gains for the EU. This follows from eroded conditions of market access into the West European market.

The results also suggest that the potential economic benefits to Western Europe and North America of preferential liberalization are easily swamped by the potential gains from comparable liberalization pursued in a multilateral setting. For other regions (particularly developing countries), the implications of such multilateral liberalization depend critically on their own participation. Developed country preferential liberalization, either involving the North Atlantic economies or the entire OECD, can imply adverse effects for various developing country regions under different sets of estimates (especially in Africa, but also in Latin America). These adverse effects can be turned into gains through comparable multilateral liberalization in the affected regions, however. For example, in the simulations, further trade liberalization involving developing country tariff reductions implies significant gains for developed and developing country regions alike. These gains for non-OECD regions follow, largely, from import liberalization by the developing regions themselves. In other words, it is not that OECD-based liberalization 'fails' to benefit non-

OECD economies. Rather, for all regions, the direction and magnitude of the estimated welfare and income effects of liberalization are highly correlated with the degree of own-liberalization.

1. Introduction

In December 1995, at the EU-US summit in Madrid, the European Union and the United States adopted a "New Transatlantic Agenda." This agenda covers a broad set of issues, ranging from collaboration in Bosnia to environmental protection, cooperation against international crime and terrorism, and transatlantic academic collaboration. It also calls for significant steps toward trade liberalization.[1] This includes bilateral reduction or elimination of tariffs on industrial products, accelerated implementation of Uruguay Round tariff reductions, and negotiated reduction in regulatory and other non-tariff barriers to trade.

This study provides a quantitative assessment of the implications of preferential trade liberalization by the North Atlantic economies. Emphasis is placed on the pattern of production and trade in North America and Western Europe, the pattern of import protection, and the likely trade and income effects of trade liberalization. The potential benefits of preferential trade liberalization are also compared with the potential benefits of post-Uruguay Round most favoured nation (mfn)-based reductions in trade barriers. The numerical assessment highlights the impact both on the North Atlantic economies themselves, and on their important regional trading partners.

The paper is organized as follows. In Section 2, we provide an overview of the structure of production and trade in the transatlantic economies. This is followed, in section 3, by an overview of the pattern of protection. We turn to a set of model based quantitative assessments of transatlantic trade liberalization in Section 4. Concluding comments are provided in Section 5.

2. The Transatlantic Economies: An Overview

2.1 The composition of production and trade

As a combined trade bloc, North America and Western Europe would be a leviathan, accounting for almost two-thirds of world trade and about half of world income. Plainly, it is this fact that makes any transatlantic initiative a matter of concern for the world at large. As Table 2.1 shows, Western Europe (the EU15 plus EFTA4) is about 25% larger than North America (USA and Canada) in terms of population. Due to Europe's lower per capita income, however, the two regions have roughly the same national income (about $7 trillion each). For comparison, Japan's

[1] For an overview of the political pros and cons of a preferential trade initiative, see Frankena (1995) and Frost (1997).

population (125 million) is about a third and its GNP is about a half of Western Europe's.

At the same time, despite the comparable economic sizes of the European Union and United States, the EU far outstrips North America in terms of trade volume. Indeed, Western Europe alone undertakes half of the world's merchandise and services trade. In comparison, North America's exports are about one sixth of world merchandise and services trade. Given this, Europe is also about 2.5 times more open (as measured by merchandise exports to GNP) than is North America.

Such an assessment is somewhat misleading, however. Much of Europe's trade is with itself (and subject to preferential trading rules). When considering extra-regional trade only, the U.S., Western Europe and Japan are all equally open, with extra-regional exports-to-GNP ratios of about 6% each. In this sense the three blocs are all more or less dependent to the same degree on trade subject to WTO-related disciplines.

The overall structure of production for the EU15 and the U.S. is presented in Table 2.2. The two regional economies are broadly similar. The secondary sectors produce most of the trade, but account for only about a quarter of output. Services accounts for between two-thirds and three-fourths of all output. Given the importance of services in these economies, it would appear that including services in international trade liberalization initiatives is important. The primary sectors, which generate so many of the transatlantic trade disputes, actually account for only a minor share of both economies.

We turn next to the regional composition of trade. Figure 2.1 shows the pattern from a regional perspective, while Figure 2.2 highlights West Europe's trade pattern from the global perspective. As figure 2.1 shows, transatlantic trade is primarily two-way trade in similar products, (i.e. intraindustry trade). That is to say, cross-Atlantic shipments in both directions consist of approximately the same goods. The vast majority (more than 85%) of this trade is in industrial goods, while almost 40% is in machines, cars, car parts and other transport equipment. Very little transatlantic trade is in the traditionally politically-sensitively industries such as textiles, clothing, iron, steel and agricultural goods.

Turning to the global pattern of EU trade (Figure 2.2), it is worth noting that:

- According to WTO definitions Asia is West Europe's biggest external trade partner, with Europe shipping $170 billion to Asia and importing $208 from Asia in 1994.

- North America is West Europe's number two trade partner, with transatlantic trade about three-fourths the size of Europe-Asia trade.

- West Europe's trade with the other regions is much smaller, although trade with Central and Eastern Europe and the Former Soviet Republics amount to about half of transatlantic trade. This East-West trade within Europe has grown rapidly since 1989, and is likely to continue to do so given the rapid income growth in some of these countries, and most of this trade is already subject to preferential trade agreements that are being phased in.

Figure 2.3 presents similar information for North America. Notice that West Europe and Asia are the largest trading partners of North America, with transatlantic trade reaching 60% of transpacific trade. North America's third largest trading partner, Latin America, is still quite important, with this trade amounting to about two-thirds of transatlantic trade. Additionally, North America's trade with the remaining regions is relatively unimportant. Thus in an important sense, North America's trade pattern is much less diversified than is Europe's.

In terms of the commodity composition of trade, the commodity mix of North America's exports is slightly more diverse across regions than is Europe's. The share of agriculture products in its export mix, for instance, ranges from 10% within North America to 27% with Eastern Europe (including the former soviet republics). North America's import mix from various regions is also quite varied. Mining dominates the imports from Africa and the Middle East, but manufactures accounts for over half of imports from all other regions. Agricultural exports to North America are important only for Latin America, for whom the share is about one-fifth.

Finally, Tables 2.3 through 2.5 present information on the importance of bilateral EU15-U.S. trade for both economies. Table 2.3 lists the importance of exports to each economy as a share of total exports from the source region (excluding intra-EU trade). Hence, the U.S. market accounts for over 10 percent of European exports (and often between 15 and 20 percent) for all manufactured goods except textiles. The U.S. market for machinery and transport equipment is particularly important for Europe. For the U.S., Europe is an important export market for primary processing industries (like processed foods, lumber, pulp, and paper), but also for the machinery, transport equipment, and other machinery industries. By this set of measures, Europe is a relatively more important destination market for U.S. industry than the U.S. is for European industry.

Table 2.4 presents similar information to that in Table 2.3, only in terms of export sourcing. By this measure, Europe is again a more important supplier for the U.S. than vice-versa. However, in part this is because trade is relatively less important, overall, in the U.S. than in Europe. As table 2.5 and Table 2.1 show, exports are a higher share of GDP in Western Europe than in the U.S. Overall, though, the importance of exports, measured as a share of sectoral demand, is comparable across sectors.

2.2 Foreign investment

Figure 2.4 shows the development of outward direct investment for the EU12 (including intra-EU flows) and the US. These data have been harmonized and converted into ECU by Eurostat, though the underlying data come from the IMF balance of payments statistics. It is important to recall that these figures are notoriously unreliable. In particular, they tend to underestimate the extent to which firms control production, marketing and research assets abroad. Despite these shortcomings, they are still that best systematic source of information on foreign direct investment flows for a wide range of countries. Several points from the data are worth highlighting:

- On both sides of the Atlantic, the 'globalization' phenomenon took off in the mid-1980s and continues to expand rapidly.

- In terms of levels, the EU12 and US flows are approximately the same magnitude.

- Although one must be careful in comparing trade and capital flows, it is interesting to note that for the US, outward direct investment flows are more than twice the size of their exports of goods. For the EU, goods exports are about 30% larger than direct investment flows.

Figure 2:5 presents 1989 data for the breakdown of EU12 foreign investment, drawn from a recent Eurostat study (Eurostat, 1993).[2] The salient points are:

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[2]It should be pointed out, however, that 1989 was near the peak of 'Euro-euphoria'. The macroeconomic situation was highly buoyant and foreign investors were encourage by the success of the Single Market programme and the Iberian accession. In particular, most EFTAns became major investors in the EU during this period due to fears of exclusion from the Single Market. The successful completion of European Economic Area and the recent enlargement have reduced EFTA-EU investment flows in all EFTAns except Switzerland (see

- o Intra-EU12 flows are half the EU12's of inward and outward flows. Note that this regional bias is substantially less than it is for trade in goods.
- o The EU12 inward direct investment pattern is much more diversified geographically than its outward investment pattern.
- o Of the extra-EU12 flows the US accounts for two-third of the outflows, but only a third of the inflows.
- o Japan and EFTA are major sources of EU12 inward flows.

Finally, Table 2.6 presents data on the cumulative pattern of U.S.-European investment. Overall, less than half of investment has been in manufacturing. Rather, the bulk is concentrated in services. In the case of U.S. investment in Europe, investment in banking and finance exceeds investments in manufacturing. In the case of European investment, manufacturing investment is followed, in terms of importance, by "other" services and wholesale trade services. Overall, these data point to the importance of FDI-related disciplines in services for any transatlantic initiative.

3. Impediments to Transatlantic Commerce

Current data on protection are surprising difficult to come by. Data on tariffs can be purchased from the UN. However, these data do not include important items such as dumping duties and quotas. UNCTAD maintains a database on incidents of nontariff barriers. However, the database does not indicate the amount of trade affected by particular measures. Extensive descriptive reports on specific national regimes are provided by GATT/WTO Trade Policy Reviews, though the treatment of non-tariff barriers is largely descriptive, and the underlying data from the reviews are not made available electronically. The situation has recently improved thanks to the massive efforts of a consortium of researchers working on the Global Trade Analysis Project (McDougall 1997), with important support from the World Bank, World Trade Organization, and U.S. Department of Agriculture.

The GTAP database, as described in McDougall, includes trade-weighted tariff

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Baldwin, Forslid and Haaland, 1995). Moreover, with Austria, Finland and Sweden inside the EU, EFTA's share in the figure is far from representative of what more recent figures would show.

equivalents by sector for a wide range of countries and regions. These tariff equivalents include actual dumping duties, price undertakings, and industrial quotas. Note that since rates are trade weighted, very low rates may reflect an extremely low level of trade rather than a very low level of protection. While this feature can be annoying, it cannot be avoided when dealing with fairly aggregate sectors.

In this section we present an overview of protection for North America, Europe and the rest of the world broken into 8 regions, namely Central Europe (nations with Europe Agreements), Sub-Saharan Africa (excluding South Africa), North Africa and the Mideast (including Israel), Japan, Asia and the Pacific (less Japan), South America, and the Rest of the world (including Russia and other former Soviet republics, China and South Africa).

3.1 The global pattern of protection

We start with an overview, plotting all 170 tariff equivalents (17 sectors and 10 regions) in the same figure. Figures 3.1 and 3.2 show the GTAP-based sectoral tariff equivalent protection rates for all the regions of the world as they will be after nations phase in the liberalization they committed themselves to in the Uruguay Round. Like a pointillist painting, the merits of the figures are best appreciated when viewed from afar. From this point of view the main points are that after the Uruguay Round cuts are implemented:

- o At this level of aggregation, the only really high trade barriers will be the developed countries' barriers against food imports.
  - Of the 170 rates, only 10 will exceed 35%. Of these ten, 7 are in agriculture and are imposed by rich countries
  - Japan's tariff on grains easily takes the "gold medal" for the world's biggest barrier, at 184%. This is more than twice as high as the silver and bronze medalists (Japan's protection of processed food and the EU's protection of grain).

- o Other highly protected sectors (as defined as sectors where multiple regions have rates over 25%) will be
  - Textiles,
  - Fabricated metal products
  - Other manufactures.

- While rich countries will have the highest barriers for agricultural, developing countries will have the highest protection rates in industrial goods. In addition, many of these rates are bound at ceiling bindings well above applied rates.

While protection rates are highest in agriculture, the vast majority of global trade is in industrial products. This is true *a fortiori* for the North American and European exports. Protection rates for these commodities are, therefore, of special interest.

Figure 3.2 shows the 10 regions' trade-weighted tariff equivalents for industrial products (processed food is not included as an industrial product in this chart). Note that:

- Developing countries systematically have much higher rates of protection than do developed countries.
  - Rates over 10% are quite rare in developed countries (at least when averaged up into moderately broad aggregates as is done here), but are the norm in developing countries. Indeed rates of 15%-20% are quite common.
- Among the developing countries, industries in the North Africa and Mideast region (denoted as Meds & ME) are the most heavily protected. Central Europe and Sub-Saharan Africa (SSA) have the least protected industrial sectors.
- The level of protection in the developed regions varies substantially by region.
  - EFTA3 (Iceland, Norway and Switzerland) is the most open region
  - NAFTA is the most protected (much of this reflecting dumping duties and tariff equivalents of quotas).

3.2 Barriers facing transatlantic trade

The final table in this subsection focuses more precisely on transatlantic barriers. In particular, Table 3.1 presents bilateral rates of protection, based on post-Uruguay Round mfn tariffs. Notice that:

- Apart from food, the big sectoral cuts (i.e. over 10%) would be in chemicals, clothing and textiles.

o For most trade (which involves heavy industry), a free trade pact would have very little impact (a cut of less 2.5%) on
  - Forestry products (for both)
  - Mining (for both),
  - Fishery products (for the U.S.)
  - Lumber, paper and pulp (for both)
  - Chemicals (for the U.S.)
  - Steel (for the EU)
  - Nonferrous metals (for both)
  - Transport equipment (for both).
  - Other machinery (for both)
  - Other manufactures (for both).

When viewed in tandem with Figure 2.1, Table 3.1 tells us that the vast bulk of transatlantic trade is already duty free. This, in turn, implies that an agreement limited to preferential liberalization of industrial tariffs will have very little impact overall.

3.3 Some implications for policy

The data presented in this section suggest that a transatlantic liberalization of the remaining border measures is likely to be quite painful from a political point of view. The reason is simple. Practical men know that trade liberalization in the real-world is almost always about an exchange of market access. That is, seen through the prism of politics boosting exports is good since this benefits exporters that are well-organized and can provide political support to governments. Seen through the same prism, increasing import levels is bad since consumers that thus benefit are not organized to pay political homage to governments that arrange liberalization. Nonetheless the firms and workers in import-competing sectors who are temporarily harmed are organized to punish the liberalizers. Reciprocal trade liberalization can proceed since the political approbation of exporters can be used to negate the opposition from firms and workers in import-competing industries. In the case of a transatlantic free trade agreement, the gains by transatlantic exporters will be mild (since these sectors have already been substantially liberalized) but the short-term loss of - and therefore political opposition from - agriculture, textiles and clothing sectors (and U.S. steel) will be great.

What this suggests is that the deeper-than-tariff-cutting aspects of the proposed "New Transatlantic Market Place", are likely to be the only ones that fly politically. In particular, the sharp contrast between the enormous role that services plays in the transatlantic economy and the minor role it has played historically in trade liberalizations suggests that opening up services trade

would be a reasonable goal for any new transatlantic trade initiative. Similarly, trade facilitation measures are also likely to fly precisely because they are relatively detached from sensitive sector complications.

4. Quantitative Estimates of Trade and Income Effects

4.1 The model

In this section we outline the basic features of the numerical model. More details on the theoretical structure of the model are provided in the technical appendix. (Further details still are available from the authors upon request). The numerical analysis is based on a 22 sector, 12 region applied general equilibrium (AGE) model of the world economy. A central feature of this class of numerical models is the input-output structure, which explicitly links industries in a value-added chain from primary goods, over continuously higher stages of intermediate processing, to the final assembling of goods and services for consumption. The link between sectors may be direct, like the input of steel in the production of transport equipment, or indirect, via intermediate use in other sectors. Sectors are also linked through various economywide constraints, like the availability of production factors at a given time. We assume full employment in factor markets, which means that all sectors cannot expand simultaneously unless there is technological progress or factor accumulation.

Our model data come from a number of sources. Data on production and trade are organized as a set of social accounting matrices, linked through trade flows. Social accounting data are drawn directly from the Global Trade Analysis Project (GTAP) version 3 dataset, which is benchmarked to 1992. (McDougall, 1997). The basic social accounting and trade data are supplemented with trade policy data, including data on tariffs, NTBs, dumping duties, and government procurement preference margins. Tariff data are from the World Bank's recent assessment of detailed pre- and post-Uruguay Round tariff schedules, concorded to GTAP model sectors. The values of tariff equivalents for NTBs are taken from estimates in the literature.[3] Where applicable, quota rents are calculated from these tariff equivalents. The sectors and

[3] Tariff equivalents of industrial NTBs are taken from Haaland and Tollefson (1994), Yang (1992, 1994), USITC (1993), Flam and Nordstrom (1994), and published antidumping rates, all as described in Francois et al (1995). Agricultural protection data is based on OECD and USDA estimates of producer and subsidy equivalents, combined with World Bank assessments of the Uruguay Round tariff schedules.

regions in our aggregation of the GTAP data are detailed in Table 4.1. A mapping to ISIC sectors is provided in the technical appendix.

For the EC and U.S., the overall structure of production in value added terms is summarized in Table 2.2. In both regions, value added is concentrated in services. Manufacturing generally accounts for less than 25 percent of value added.

In terms of theoretical structure, perfect competition is assumed in constant return to scale (CRS) sectors. In all sectors, firms employ domestic production factors (capital, labour and land) and intermediate inputs from domestic and foreign sources to produce outputs in the most cost-efficient way that technology allows. There is a single representative, composite household in each region, with expenditures allocated over personal consumption and savings (future consumption). In CRS sectors, products from different regions are assumed to be imperfect substitutes in accordance with the so-called "Armington" assumption. The composite household owns endowments of the factors of production and receives income by selling them to firms. It also receives income from the receipt of tariff revenue and rents from the sale of import/export quota licenses (when applicable). Part of the income is distributed as subsidy payments to some sectors, primarily agriculture. Prices on goods and factors adjust until all markets are simultaneously in (general) equilibrium. We do not model changes in international capital flows, but rather our capital market closure involves fixed net capital inflows and outflows. Factor markets are competitive, with labour and capital being mobile between sectors but <u>not</u> between countries. A third factor, land, is used only in agricultural production.

In sectors modelled with increasing returns to scale (IRS), we assume imperfect competition and scale economies that are *internal* to each firm, depending on its own production level. In particular, for sectors where we have estimates of positive scale elasticities (see the appendix), we model the sectors as being characterized by Chamberlinian large-group monopolistic competition. (See Ethier, 1982; Krugman, 1980). An important property of the monopolistic competition model is that increased specialization at intermediate stages of production yields returns due to specialization, where the sector as a whole becomes more productive the broader the range of specialized inputs. These gains spill over through two-way trade in specialized intermediate goods. With these spillovers, trade liberalization can lead to global scale effects related to specialization. With international scale economies, regional welfare effects depend on a mix of efficiency effects, global scale effects, and terms-of-trade effects. (See

Francois and Roland-Holst, 1997). Similar gains follow from consumer good specialization.

The model also includes a simple dynamic link, whereby the static or direct income effects of trade liberalization induce shifts in the pattern of savings and investment. These effects have been explored extensively in the theoretical trade literature.[4] This includes Baldwin (1992), Smith (1976, 1977), and Srinivasan and Bhagwati (1980). Several studies of the Uruguay Round have also incorporated variations on this mechanism.[5] Such effects compound initial output and welfare effects over the medium-run, and can magnify income gains or losses. How much these "accumulation effects" will supplement static effects depends on a number of factors, including the marginal product of capital and underlying savings behaviour.

The capital market closure explicitly allows for the effects of induced capital formation. In particular, we assume that the regional rate of savings is endogenous, and adjusts to keep the regional real price of capital fixed at the steady state level. (Underlying this specification we implicitly assume that the regional stock of capital is at its steady state level in the benchmark, and that this stock adjusts in the counterfactual to return the regional rate of return to its steady state value). Trade policy may therefore lead to an income effect on investment at given savings rates, and to intertemporal substitution effects reflected in changes in savings rates. (Francois, McDonald and Nordstrom 1996).

4.2 Numerical results

We turn next to the results of simulation analysis. The reference social accounting data for all scenarios are based on post-Uruguay Round protection. Starting with our actual 1992 dataset, this involves generating a notional dataset by imposing the combined policy shocks of the Uruguay Round, expansion of the EU to include Austria, Finland, and Norway, the formation of the North American Free Trade Agreement, and the implementation of the CEA Agreements. The different scenarios are listed in Table 4.2. Results are presented in Tables 4.3 through 4.7, and in Figure 4.1.

Experiment 1 involves a narrow agreement, leading to the elimination of tariffs on industrial goods. Because many of these tariffs were already eliminated as a result of the Uruguay

[4] These effects relate to classical models of capital accumulation and growth, rather than to endogenous growth mechanisms.

[5] These studies are surveyed in Francois et al (1996).

Round, this narrow approach to preferential liberalization has relatively little impact. There is some gain for the European Union, with basically no change for the United States. The greatest impact outside the new preferential zone is a 0.2 percent drop in GDP in North Africa and the Middle East, and in Canada. There is also a slight increase in U.S. and EU wages, and a comparable fall elsewhere. Transatlantic trade increases by roughly 3 percent, though this is accompanied by a fall in exports outside the region.

Experiment 2 involves a somewhat deeper agreement. In addition to industrial tariff elimination, we also assume that agricultural import protection is eliminated, as is contingent protection through antidumping duties. In addition, there is also a reduction in trading costs due to trade facilitation measures. Clearly these are problematic, requiring progress in the difficult areas of agriculture and competition policy. However, the potential gains are also greater: roughly 2 times larger than under the first scenario in the case of the European Union. United States welfare increases by 0.3 percent, and consumption by 0.3 percent. In the EU, welfare also increases by 0.8 percent. North American and European exports increase by 11.8 and 7.6 percent, while real wages rise by between 0.2 and 0.8 percent. However, adverse GDP and consumption effects are again realized in much of the rest of the world. Note also that preferential liberalization leads to a clear pattern of investment diversion, with capital stock expanding in the U.S. and EU but generally falling elsewhere.

Experiment 3 involves an different scenario -- open regionalism along the lines of APEC proposals. Such an approach involves negotiated tariff reductions between the United States and European Union, with the results applied on an mfn basis. Because the mfn application effectively exempts an transatlantic agreement from WTO strictures that regional agreements cover "substantially all trade," (i.e. agriculture, textiles, and clothing), such an approach may be more politically viable than a full blown preferential agreement. Open regionalism allows selective negotiation. As modelled, the open regionalism scenario is like the second preferential scenario, with the added proviso of mfn treatment. It is evident, from Table 4.3, that the adverse country effects are largely mitigated under such and approach.

Experiments 4 and 5 involve multilateral liberalization, and are provided for comparison. They represent estimates of the benefits of pursuing further liberalization (i.e. post Uruguay-Round) on a multilateral basis instead of a bilateral basis. Experiment 4 involves a 50 percent reduction in import protection on an mfn basis that is only undertaken by the OECD countries,

while Experiment 5 reflects a true multilateral post-Uruguay round of liberalization, including real tariff cuts by developing countries.

Experiments 3, 4, and 5 suggest that the gains from mfn-based liberalization, under a regional or multilateral initiative, would be much greater globally and for the transatlantic economies than would comparable degrees of preferential liberalization. In addition, a full multilateral round carries almost none of the trade diversion and adverse third country effect of the preferential scenarios. Export and wage effects are also more generally positive than under the preferential scenarios.

Also interesting is the pattern of output effects, as illustrated in Figure 4.1. Under deep preferential liberalization, expansion of output in North America is concentrated in processed primary products and chemicals, while in the EU expansion in production is concentrated in machinery and equipment and primary steel. The hardest hit sectors in the EU are chemicals and agriculture.

5. Conclusions

In this study, we have provided a quantitative assessment of the implications of preferential trade liberalization by the United States and European Union. We have emphasized the pattern of production and trade in North America and Western Europe, the pattern of import protection, and the likely trade and income effects of trade liberalization. The potential benefits of preferential trade liberalization are also compared with the potential benefits of post-Uruguay Round most favoured nation (mfn)-based reductions in trade barriers. The numerical assessments highlight the potential impact both on the North Atlantic economies themselves, and on their important regional trading partners.

Based on our assessment, we believe that a narrow preferential agreement, leading only to the elimination of tariffs on industrial goods, would yield very little return for the effort. Both the EU and U.S. face high tariffs on industrial exports. However, these tariffs are in Asia, Africa, and Latin America. The greatest benefits for the EU, under preferential liberalization, are actually under our deepest liberalization scenario. This includes agricultural liberalization, a broadening of the coverage of the plurilateral government procurement agreement, elimination of contingent protection through dumping remedies, and a reduction in trading costs through mutual recognition/harmonization of standards. Under this scenario, real income increases by 0.3 percent

in North America ($16.4 billion in 1992 dollars), 0.8 percent in the EU ($57.3 billion in 1992 dollars. This is comparable to lower-bound estimates of the impact of the Uruguay Round. At the same time, it is clear that the economic benefits of preferential liberalization are swamped by the potential gains from comparable liberalization on an mfn basis. For example, broadening the initiative to include comparable liberalization by all OECD members would yield much greater gains -- an estimated 2.4 percent increase in North American GDP ($132.4 billion in 1992 dollars), and a 3.3 percent increase in EU GDP ($222.7 billion in 1992 dollars).

The implications for third countries vary, depending on the degree of liberalization. A deep preferential agreement is good for the partners involved, and bad for the rest of the world. One qualitatively consistent result that emerges from the various sets of estimates is that the negative impact for North Africa and the Middle East, under a preferential agreement, is of a magnitude that is roughly comparable in percentage terms to the gains for the EU and U.S.

Given the pattern of protection, it may prove difficult to achieve liberalization in "sensitive" sectors through bilateral negotiations. In successful trade negotiations, the political costs of import liberalization (which are often the primary source of estimated economic gains) are balanced against the political gains of liberalization in export markets. In economic terms, both types of liberalization usually yield positive income and welfare effects. In the political calculus, however, they must be balanced. Given the combination of overlap in the regional definition of sensitive sectors with the pattern of low protection outside these sectors, this will be difficult. It appears much more likely, again given the pattern of protection, that such liberalization could be achieved in a multilateral setting. This is because the potential political benefits of export market liberalization are available in developing country markets to balance the political "costs" of further import liberalization within the EU and NAFTA. As an alternative, selective negotiated reductions in industrial tariffs on an mfn basis would also provide scope for GATT-legal liberalization, while excluding the politically difficult sectors. We are not condoning continued peak protection in sensitive sectors, but believe that, in the end, any successful initiatives will have to be politically viable, which requires balancing (or avoiding) the political costs of sensitive sector liberalization. As an alternative to selective mfn liberalization, service sector interests might also be harnessed to provide support for a more general liberalization initiative.

Technical Appendix

This appendix provides an overview of the basic structure of the global AGE model employed for assessment of a trans-Atlantic free trade agreement. The model is similar to the basic GTAP model described in Hertel et al (1996), with important modifications related to: (i) the structure of competition as described by Francois and Roland-Holst (1996) and (ii) medium-term investment-income linkages (Francois et al, 1996). The reader is referred to Hertel (1996) for a detailed discussion of the basic algebraic model structure. While this appendix provides a broad overview of the model, discussion of mathematical structure is limited to scale economies, market structure, and investment effects. The model is implemented in GEMPACK and solved as an explicit non-linear system of equations, using multi-step Euler and Gragg methods. (Harrison and Pearson, 1994). Social accounting and protection data are based on Version 3 of the GTAP dataset. (McDougall 1997).

A.1 General Structure

The overall structure of a regional economy is represented in Figure A.1. Firms produce output, employing land, labour, and capital, and combining these with intermediate inputs. Firm output is purchased by consumers, government, the investment sector, and by other firms. Firm output can also be sold for export. Land is only employed in the agricultural sectors, while capital and labour are fully mobile between all production sectors. Capital is fully mobile within regions. However, capital movements between regions are not modelled, but rather are held fixed in all simulations.

All demand sources combine imports with domestic goods to produce a composite good, as indicated in Figure A-1. In constant returns sectors, these are Armington composites. In increasing returns sectors, these are composites of firm-differentiated goods. Trade elasticities are presented in Appendix Table A-1.

A.2 Taxes and Policy Variables

Taxes are included in the theory of the model at several levels. Production taxes can be placed on

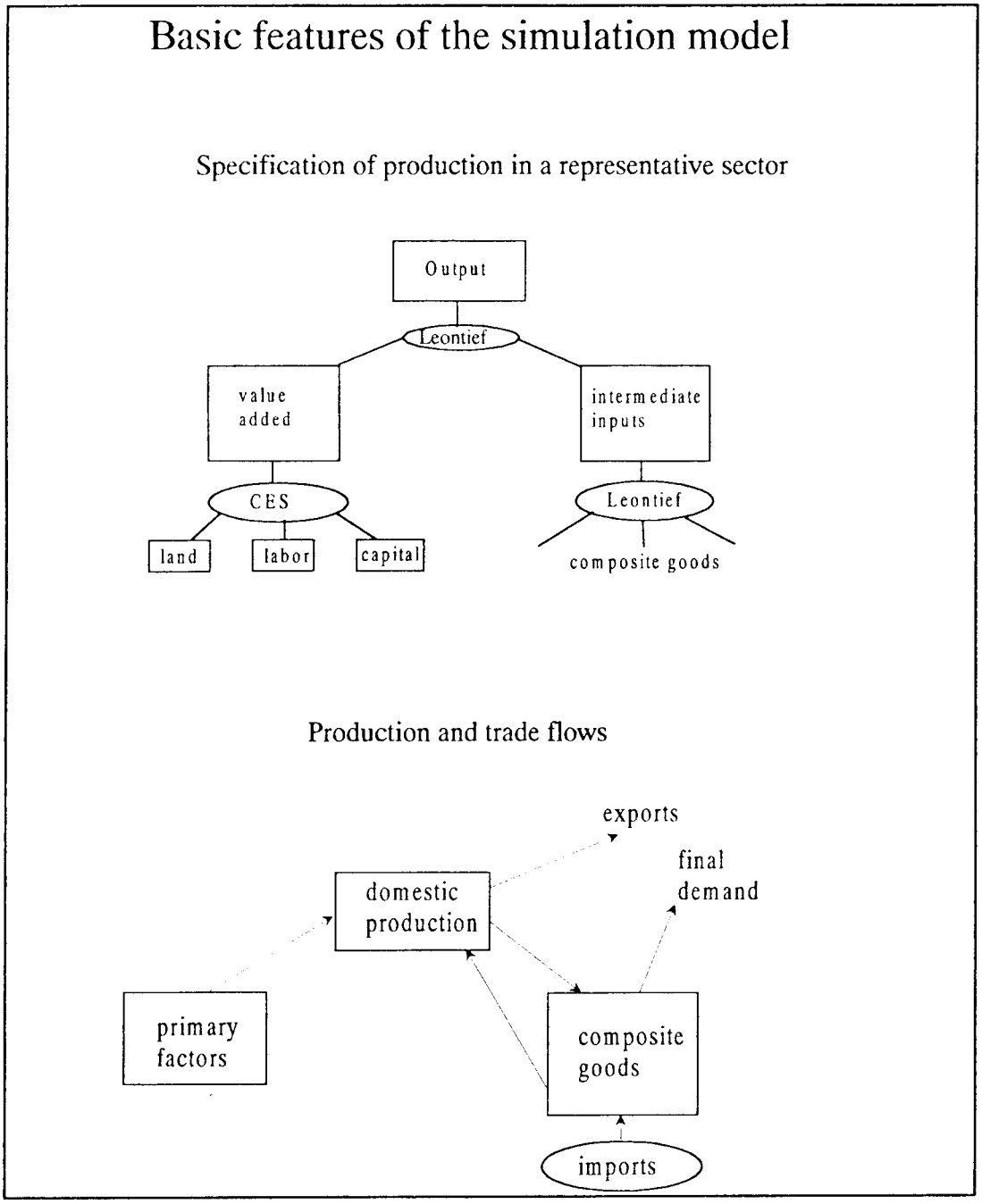

Figure A.1

intermediate or primary inputs, or on output. Some trade taxes are modelled at the border. Additional internal taxes can be placed on domestic or imported intermediate inputs, and may be applied at differential rates that discriminate against imports. This is how government procurement preferences are modelled. Taxes can also be placed on exports, and on primary factor income. Finally, taxes can be placed on final

consumption, and can be applied differentially to consumption of domestic and imported goods.

Trade policy instruments are represented as import or export taxes/subsidies. This includes applied most-favoured nation (mfn) tariffs, antidumping duties, countervailing duties, price undertakings, export quotas, and other trade restrictions.

A.3 Trade and Transportation Costs

International trade is modelled as a process that explicitly involves trading costs, which include both trade and transportation services. These trading costs reflect the transaction costs involved in international trade, as well as the physical activity transportation itself. These trading costs are met by composite services purchased from a global trade services sector, where the composite "international trade services" activity is produced as a Cobb-Douglas composite of regional exports of trade and transport service exports. Trade cost margins are based on reconciled f.o.b and c.i.f. trade data, as reported in version 3 of the GTAP dataset.

A.4 Production Structure

The basic structure of production is depicted in Figure A-1. Under constant returns, intermediate inputs are combined in fixed proportions, and this composite intermediate is in turn combined in fixed proportions with value added. This yields sectoral output Z. In increasing returns sectors, the composite Z serves as an index of economic activity, as described below in the section on monopolistic competition. The value-added substitution elasticities are presented
in Appendix Table A-1.

A.5 The Composite Household and Final Demand Structure

Final demand is determined by an upper-tier Cobb-Douglas preference function, which allocates income in fixed shares to current consumption, investment, and government services. Government services are defined by a Leontief technology, with household/government transfers being endogenous. The lower-tier nest for current consumption is specified as a Constant Difference Elasticity function (Hertel et al, 1991). The regional capital markets adjust so that changes in savings match changes in investment expenditures.

A.6 Market Structure

A.6.1 Demand for imports: Armington sectors

The basic structure of demand in constant returns sectors is Armington preferences, as illustrated in Figure A-2. In Armington sectors, goods are differentiated by country of origin, and the similarity of goods from

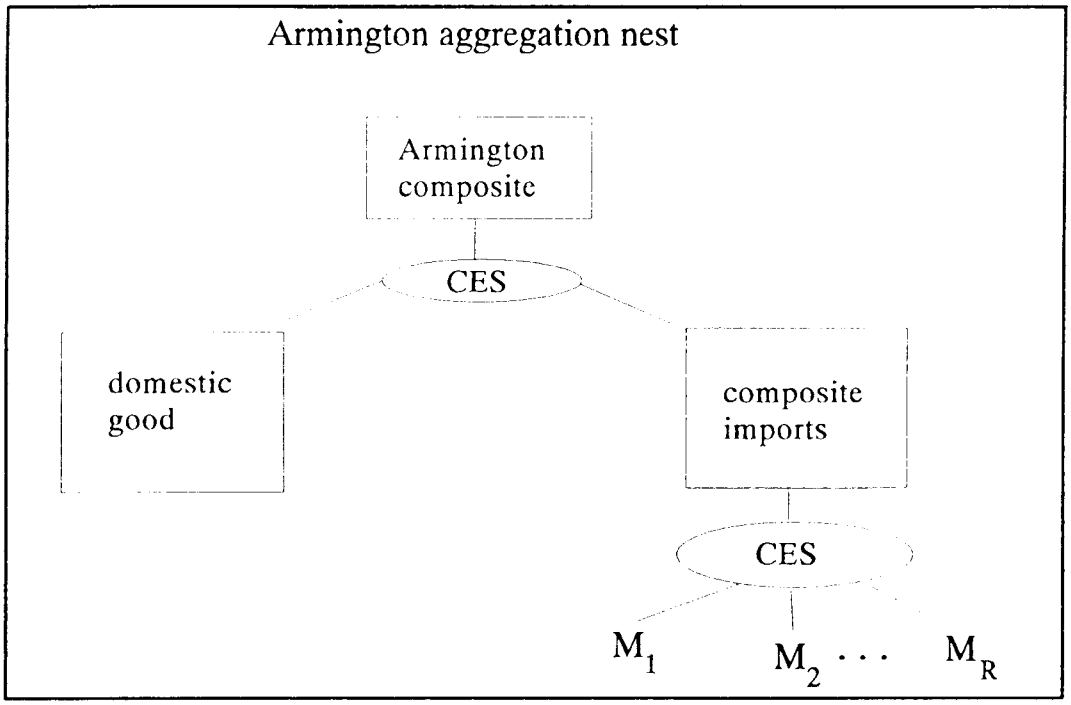

Figure A-2

different regions is measured by the elasticity of substitution. Formally, within a particular region, we assume that demand goods from different regions are aggregated into a composite import according to the following CES function:

$$q^{M}_{j,r} = \left[\sum_{i=1}^{R} \alpha_{j,i,r} M^{\rho_j}_{j,i,r}\right]^{1/\rho_j} \qquad (2)$$

In equation (1), $M_{jMi,R}$ is the quantity of M_j from region i consumed in region r. The elasticity of substitution between varieties from different regions is then equal to σ^{M}_{j}, where $\sigma^{M}_{j}=1/(1-\rho_j)$. Composite imports are combined with the domestic good q^D in a second CES nest, yielding the Armington composite q.

$$q_{j,r} = \left[\Omega_{j,M,r}\left(q^{M}_{j,r}\right)^{\beta_j} + \Omega_{j,D,r}\left(q^{D}_{j,r}\right)^{\beta_j}\right]^{1/\beta_j} \qquad (3)$$

The elasticity of substitution between the domestic good and composite imports is then equal to σ^{D}_{j}, where

$\sigma^D_j = 1/(1-\beta_j)$. At the same time, from the first order conditions, the demand for imports $M_{j,i,r}$ can then be shown to equal

$$M_{j,i,r} = [\alpha_{j,i,r}/P_{j,i,r}]^{\sigma^M_j} \left[\sum_{i=1}^{R} \alpha_{j,i,r}^{\sigma^M_j} P_{j,i,r}^{1-\sigma^M_j}\right]^{-1} E$$
$$= [\alpha_{j,i,r}/P_{j,i,r}]^{\sigma^M_j} P^M_{j,r}{}^{\sigma^M_j - 1} E^M_{j,r} \quad (4)$$

where E^M_j represents expenditures on imports in region r on the sector j Armington composite.

A.6.2 Monopolistic competition

Increasing returns sectors are modeled as monopolistically competitive. Formally, within a region r, we assume that demand for differentiated intermediate products belonging to sector j can be derived from the following CES function, which is now indexed over firms or varieties instead of over regions. We have

$$q_{j,r} = \left[\sum_{i=1}^{n} \gamma_{j,i,r} X_{j,i,r}^{\Gamma_j}\right]^{1/\Gamma_j} \quad (5)$$

where $\gamma_{j,i,r}$ is the demand share preference parameter, $X_{j,i,r}$ is demand for variety i of product j in region r, and $\sigma_j = 1/(1-\Gamma_j)$ is the elasticity of substitution between any two varieties of the good. Note that we can interpret q as the output of a constant returns assembly process, where the resulting composite product enters consumption and/or production. Equation (5) could therefore be interpreted as representing an assembly function embedded in the production technology of firms that use intermediates in production of final goods, and alternatively as representing a CES aggregator implicit in consumer utility functions. In the literature, and in our model, both cases are specified with the same functional form. While we have technically dropped the Armington assumption by allowing firms to differentiate products, the vector of γ parameters still provides a partial geographic anchor for production. (Francois and Roland-Holst 1996).

Globally, firms in different regions compete directly. These firms are assumed to exhibit monopolistically competitive behaviour. This means that individual firms produce unique varieties of good j, and hence are monopolists within their chosen market niche. Given the demand for variety, reflected in equation (5), the demand for each variety is less than perfectly elastic. However, while firms are thus able

to price as monopolists, free entry (at least in the long-run) drives their economic profits to zero, so that pricing is at average cost. The joint assumptions of average cost pricing and monopoly pricing, under Bertrand behaviour, imply the following conditions for each firm f_i in region i:

$$j, f_i \quad \sum_{r=1}^{R} \frac{X_{j,f_i,r}}{X_{j,f_i}} \left(\sum_{k=1}^{n} \left(\frac{\alpha_{j,k,r}}{\alpha_{j,f_i,r}} \right)^{\sigma_j} \left(\frac{P_{j,k,r}}{P_{j,f,r}} \right)^{1-\sigma_j} \right) \tag{6}$$

$$P_{f,i} = AC_{f,i} \tag{7}$$

The elasticity of demand <u>for each firm f_i</u> will be defined by the following conditions.

$$\epsilon_{j,f,i} = \sigma_j + (1-\sigma_j)\ \zeta_{j,f,i} \tag{8}$$

$$\frac{P_{f,i} - MC_{f,i}}{P_{f,i}} = \frac{1}{\epsilon_{f,i}} \tag{9}$$

In a fully symmetric equilibrium, we would have $\zeta=n^{-1}$. However, the calibrated model includes CES weights γ, in each regional CES aggregation function, that will vary for firms from different regions. Under these conditions, ζ is a quantity weighted measure of market share. To close the system for regional production, we index total resource costs for sector j in region i by the resource index Z. Full employment of resources hired by firms in the sector j in region i then implies the following condition.

$$Z_{j,i} = \sum_{f=1}^{n_i} TC_{j,i,f} \tag{10}$$

Cost functions for individual firms are defined as follows:

$$C(x_{j,i}) = (a_{j,i} + b_{j,i}\, x_{j,i})\; P_{z_{j,i}} \qquad (11)$$

This specification of monopolistic competition is implemented under the large group assumption, which means that firms treat the variable n as "large", so that the perceived elasticity of demand equals the elasticity of substitution. The relevant set of equations then collapses to the following:

$$\tilde{x}_{j,i} = \left(\frac{Z_{j,i\ 1}}{Z_{j,i\ 0}} \right)^{(1-\rho_j)/\rho_j} X_{j,i} \qquad (12)$$

$$q_{j,r} = \left[\sum_{i=1}^{R} \tilde{\gamma}_{j,i,r}\, \tilde{x}_{j,i,r}^{\ \Gamma_j} \right]^{\frac{1}{\Gamma_j}}$$

$$\tilde{\gamma}_{j,i,r} = \alpha_{j,i,r}\, n_{j,i\ 0}^{\ 1-\Gamma_j} \qquad (13)$$

$$\tilde{x}_{j,i,r} = \left(\frac{n_{j,i}}{n_{j,i\ 0}} \right)^{(1-\Gamma_j)/\Gamma_j} X_{j,i,r}$$

In equation (13), n_0 denotes the number of firms in the benchmark. Through calibration, the initial CES weights in equation (13) include the valuation of variety. As a result, the reduced form exhibits external scale effects, determined by changes in variety based on firm entry and exit, and determined by the substitution and scale elasticities.

A.7 Investment and the Capital Stock

A standard approach in static CGE models involves a fixed aggregate capital stock. Under this approach, we would have the supply of capital defined for each period as follows:

$$K_1 = K_0 = \overline{K} \qquad (14)$$

Trade liberalization will induce changes in the sectoral allocation of capital, but <u>not</u> in the total capital stock, under this assumption.

This type of approach misses import effects related to induced capital formation. (Baldwin 1992). When shifts in trading conditions shift the real price of capital and labour, incentives may be realized for further investment (through price and/or income effects). We allow for such effects in the present model through steady-state comparisons with endogenous capital stocks and a fixed savings rate. Under this closure, investment and the capital stock adjust to reflect changes in the supply of savings. Because a composite investment goods is specified explicitly, so that the price of the capital good varies relative to the price of the composite consumption good, our closure rule must also allow for relative price changes. We have the following condition:

$$(Y_1/Y_0) \qquad (I_1/I_0) \times (P_0/P_1) \tag{15}$$

In implementing this closure rule, we endogenize the capital stock and fix the return to capital, dropping the condition representing by equation (14) and replacing it with equation (15). The change in steady-state Investment is determined by equation (16).

$$I_1 = I_0 \ (\ K_1 \ / \ K_0 \ ) \tag{16}$$

Under this closure, a *capital-friendly* liberalization will tend to lead to accumulation effects, while alternatively one that forces down the stock of capital leads to decumulation effects. (Francois et al 1996).

A.8 Labour Markets

We model labour markets as clearing with flexible wages. We view this as a reasonable long-run assumption. To the extent that labour market rigidities are important, aggregate employment effects may be inferred from wage effects.

Appendix Table A.1
elasticities

	substitution in value added	CDR	trade substitution elasticities upper-tier	lower-tier
grains	0.56	0.00	2.2	4.4
other crops	0.56	0.00	2.2	4.4
livestock	0.56	0.00	2.8	5.3
forestry	0.56	0.00	2.8	5.6
fisheries	0.56	0.00	2.8	5.6
primary mining	1.12	0.00	2.8	5.6
processed foods	1.12	0.00	2.4	5.3
textiles	1.26	0.14	7.1	7.1
apparel	1.26	0.00	4.4	8.8
lumber, pulp, and paper	1.26	0.14	7.1	7.1
petroleum	1.26	0.10	10.0	10.0
chemicals, rubber, and plastic	1.26	0.15	6.7	6.7
primary steel	1.26	0.13	7.7	7.7
primary nonferrous metals	1.26	0.14	7.1	7.1
fabricated metals	1.26	0.12	8.3	8.3
transport equipment	1.26	0.15	6.7	6.7
other machinery and equipment	1.26	0.15	6.7	6.7
other manufactures	1.26	0.10	10.0	10.0
construction	1.40	0.00	1.9	3.8
commercial services	1.26	0.00	1.9	3.8
trade, transport, and communications	1.68	0.00	1.9	3.8
utilities	1.26	0.00	2.8	5.6
public services	1.26	0.00	1.9	3.8

Trade and value added substitution elasticities are taken from Jomini (1991).

CDR is defined as (1-(MC/AC)). CDR estimates are based on estimates reported by Pratten (1988) and Roland-Holst, Reinert, and Shiells (1992).

Import substitution elasticities for increasing returns sectors are calibrated from CDRs.

Appendix Table A-2
Concordance of Model Sectors to ISIC Sectors*

Grains
(p) 1110 Agricultural & livestock production (paddy rice only)
(p) 1120 Agricultural services (servicing paddy rice production only)
(p) 1110 Agricultural & livestock production (wheat only)
(p) 1120 Agricultural services (servicing wheat production only)
(p) 1110 Agricultural & livestock production (grains except wheat & rice only)
(p) 1120 Agricultural services (servicing production of grains,except wheat & rice only)

Nongrain Crops
(p) 1110 Agricultural & livestock production (non-grain crops only)
(p) 1120 Agricultural services (servicing non-grain crops production only)

Livestock
(p) 1110 Agricultural & livestock production (wool only)
(p) 1120 Agricultural services (servicing wool production only)
(p) 1110 Agricultural & livestock production (other livestock production only)
(p) 1120 Agricultural services (servicing other livestock production only)
1130 Hunting, trapping & game propagation

Forestry
1210 Forestry
1220 Logging

Fisheries
1301 Ocean and coastal fishing
1302 Fishing n.e.c.

Mining
2100 Coal mining
(p) 3540 Manufacture of miscellaneous products of petroleum and coal (briquettes only) **
(p) 2200 Crude petroleum & natural gas production (oil only)
(p) 2200 Crude petroleum & natural gas production (gas only)
(p) 3530 Petroleum refineries (LPG only) **
2301 Iron ore mining
2302 Non-ferrous ore mining
2901 Stone quarrying, clay and pits
2902 Chemical and fertiliser mineral mining
2903 Salt mining
2909 Mining and quarrying n.e.c.
(p) 3530 Petroleum refineries (except LPG) **
(p) 3540 Manufacture of miscellaneous products of petroleum and coal (except briquettes) **

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* This concordance is based on the SALTER/GTAP to ISIC concordance provided by the Australian Industry Commission.

(p) denotes partial allocation of 4-digit ISIC categories to a particular sector.

Appendix Table A-2
Concordance of Model Sectors to ISIC Sectors*

Processed Food

(p) 3116 Grain mill products (processed rice only)
3111 Slaughtering, preparing and preserving meat
3112 Manufacture of dairy products
3113 Canning and preserving of fruits and vegetables
3114 Canning, preserving & processing of fish, crustaceans and similar foods
3115 Manufacture of vegetable and animal oils & fats
(p) 3116 Grain mill products (except processed rice)
3117 Manufacture of bakery products
3118 Sugar factories and refineries
3119 Manufacture of cocoa, chocolate & sugar confectionery
3121 Manufacture of food products n.e.c.
3122 Manufacture of prepared animal feeds
3131 Distilling, rectifying & blending spirits
3132 Wine industries
3133 Malt liquors and malt
3134 Soft drinks & carbonated waters industries
3140 Tobacco manufactures

Textiles

3211 Spinning, weaving & finishing textiles
3212 Manufacture of made-up textile goods excluding wearing apparel
3213 Knitting mills
3214 Manufacture of carpets & rugs
3215 Cordage, rope & twine industries
3219 Manufacture of textiles n.e.c.

Apparel

3220 Manufacture of wearing apparel, except footwear

Lumber, Pulp, and Paper

3311 Sawmills, planing & other wood mills
3312 Manufacture of wooden & cane containers & small caneware
3319 Manufacture of wood & cork products n.e.c.
3320 Manufacture of furniture & fixtures, except primarily of metal
3411 Manufacture of pulp, paper & paperboard
3412 Manufacture of containers & boxes of paper and paperboard
3419 Manufacture of pulp, paper & paperboard articles n.e.c.
3420 Printing, publishing & allied industries

* This concordance is based on the SALTER/GTAP to ISIC concordance provided by the Australian Industry Commission.

(p) denotes partial allocation of 4-digit ISIC categories to a particular sector.

Appendix Table A-2
Concordance of Model Sectors to ISIC Sectors*

Chemicals, Rubber, and Plastics

3511 Manufacture of basic industrial chemicals except fertilisers
3512 Manufacture of fertilisers and pesticides
3513 Manufacture of synthetic resins, plastic materials and man-made fibres except glass
3521 Manufacture of paints, varnishes and lacquers
3522 Manufacture of drugs and medicines
3523 Manufacture of soap and cleaning preparations, perfumes and cosmetics
3529 Manufacture of chemical products n.e.c.
3551 Tyre and tube industries
3559 Manufacture of rubber products n.e.c.
3560 Manufacture of plastic products n.e.c.

Primary Steel

3710 Iron and steel basic industries

Primary Non-ferrous Metals

3720 Non-ferrous metal basic industries

Fabricated Metal Products

3811 Manufacture of cutlery, hand tools and general hardware
3812 Manufacture of furniture and fixtures primarily of metal
3813 Manufacture of structural metal products
3819 Manufacture of fabricated metal products except machinery & equipment n.e.c.

Transport Equipment

3841 Ship building and repairing
3842 Manufacture of railroad equipment
3843 Manufacture of motor vehicles
3844 Manufacture of motorcycles and bicycles
3845 Manufacture of aircraft
3849 Manufacture of transport equipment n.e.c.

Other Machinery and Equipment

3821 Manufacture of engines and turbines
3822 Manufacture of agricultural machinery and equipment
3823 Manufacture of metal and wood working machinery
3824 Manufacture of special industrial machinery and equipment except metal and wood working machinery
3825 Manufacture of office, computing and accounting machinery
3829 Machinery and equipment except electrical n.e.c.
3831 Manufacture of electrical industrial machinery and apparatus
3832 Manufacture of radio, television and communication equipment and apparatus
3833 Manufacture of electrical appliances and housewares
3839 Manufacture of electrical apparatus and supplies n.e.c.

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* This concordance is based on the SALTER/GTAP to ISIC concordance provided by the Australian Industry Commission.

(p) denotes partial allocation of 4-digit ISIC categories to a particular sector.

Appendix Table A-2
Concordance of Model Sectors to ISIC Sectors*

3851 Manufacture of professional and scientific, and measuring and controlling equipment, n.e.c.
3852 Manufacture of photographic and optical goods
3853 Manufacture of watches and clocks

Other manufactures

3231 Tanneries & leather finishing
3232 Fur dressing & dyeing industries
3233 Manufacture of products of leather & leather substitutes, except footwear and wearing appare
3240 Manufacture of footwear, except vulcanised or moulded rubber or plastic footwear
3610 Manufacture of pottery, china and earthenware
3620 Manufacture of glass and glass products
3691 Manufacture of structural clay compounds
3692 Manufacture of cement, lime and plaster
3699 Manufacture of non-metallic mineral products n.e.c.
3901 Manufacture of jewellry and related articles
3902 Manufacture of musical instruments
3903 Manufacture of sporting and athletic goods
3909 Manufacturing industries n.e.c.

Utilities

4101 Electric light and power
4102 Gas manufacture and distribution
4103 Steam and hot water supply
4200 Water works and supply

Construction

5000 Construction

Trade, Transport, and Communications

6100 Wholesale trade
6200 Retail trade
6310 Restaurants, cafes, and other eating and drinking places
6320 Hotels, rooming houses, camps and other lodging places
7111 Railway transport
7112 Urban, suburban and inter-urban highway passenger transport
7113 Other passenger land transport
7114 Freight transport by road
7115 Pipeline transport
7116 Supporting services to land transport
7121 Ocean and coastal transport
7122 Inland water transport
7123 Supporting services to water transport
7131 Air transport carriers

* This concordance is based on the SALTER/GTAP to ISIC concordance provided by the Australian Industry Commission.

(p) denotes partial allocation of 4-digit ISIC categories to a particular sector.

Appendix Table A-2
Concordance of Model Sectors to ISIC Sectors*

7132 Supporting services to air transport
7191 Services incidental to transport
7192 Storage and warehousing
7200 Communication

Commercial Services

0 Activities not adequately defined
8101 Monetary institutions
8102 Other financial institutions
8103 Financial services
8200 Insurance
8310 Real estate
8321 Legal services
8322 Accounting, auditing and bookkeeping services
8323 Data processing and tabulating services
8324 Engineering, architectural and technical services
8325 Advertising services
8329 Business services, except machinery and equipment rental and leasing, n.e.c.
8330 Machinery and equipment rental and leasing
9411 Motion picture production
9412 Motion picture distribution and projection
9413 Radio and television broadcasting
9414 Theatrical producers and entertainment services
9415 Authors, music composers and other independent artists n.e.c.
9420 Libraries, museums, botanical and zoological gardens, and other cultural services, n.e.c.
9490 Amusement and recreational services n.e.c.
9511 Repair of footwear and other leather goods
9512 Electrical repair shops
9513 Repair of motor vehicles and motorcycles
9514 Watch, clock and jewellry repair
9519 Other repair shops n.e.c.
9520 Laundries, laundry services, and cleaning and dyeing plants
9530 Domestic services
9591 Barber and beauty shops
9592 Photographic studios, including commercial photography
9599 Personal services n.e.c.

* This concordance is based on the SALTER/GTAP to ISIC concordance provided by the Australian Industry Commission.

(p) denotes partial allocation of 4-digit ISIC categories to a particular sector.

Appendix Table A-2
Concordance of Model Sectors to ISIC Sectors*

Public and Other Services

9100 Public administration and defence
9200 Sanitary and similar services
9310 Education services
9320 Research and scientific institutes
9331 Medical, dental and other health services
9332 Veterinary services
9340 Welfare institutions
9350 Business, professional and labour associations
9391 Religious organisations
9399 Social and related community services n.e.c.
9600 International and other extra-territorial bodies

* This concordance is based on the SALTER/GTAP to ISIC concordance provided by the Australian Industry Commission.

(p) denotes partial allocation of 4-digit ISIC categories to a particular sector.

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TABLE 2.1

Basic Economic Statistics:

North America, Western Europe and Japan, 1992

	Western Europe	North America	'TAFTA'	Japan
Population (millions)	350	283	633	125
GNP (1992 $billions)	7,105	6,503	13,608	3,510
Total Exports (1992 $billions)	1,686	583	2,269	340
Share of World:				
GNP (1992 %)	28%	26%	54%	14%
Population (1992 %)	6%	5%	11%	2%
Exports (1992 %)	46%	16%	62%	9%
GNP per capita (1992)	20,291	22,995	21,499	28,190
Export/GNP (1992 %)	24%	9%		10%
Extra-Regional Exports to GNP (%)	7%	6%		6%

Source: WTO (1995) and World Bank (1994)

Note: Western Europe is EU+EFTA, North America is US+Canada.

TABLE 2.2
VALUE ADDED SHARES, by sector

	EU15	USA
sector		
1 grains	0.0045	0.0049
2 other crops	0.0177	0.0063
3 livestock	0.0117	0.0033
4 forestry	0.0014	0.0019
5 fisheries	0.0011	0.0008
6 mining and petroleum	0.0337	0.0173
7 processed foods	0.0297	0.0263
8 textiles	0.0071	0.0063
9 apparel	0.0091	0.0062
10 lumber, pulp, and paper	0.0285	0.0287
11 chemicals, rubber, plastics	0.0302	0.0332
12 primary steel	0.0057	0.0056
13 primary nonferrous metals	0.0031	0.0031
14 fabricated metal products	0.0196	0.0145
15 transport equipment	0.0216	0.0252
16 other machinery	0.0497	0.0591
17 other manufactures	0.0102	0.0101
18 electricity, water, and gas	0.0220	0.0312
19 construction	0.0650	0.0636
20 trade, transport, and communications	0.2341	0.2001
21 commercial services	0.1547	0.2199
22 other services	0.2396	0.2324

source: GTAP database, version 3, 1996.

TABLE 2.3
EXPORT SHARES, destination as a share of total exports by sector

	EU15 toUSA	USA to EU15
sector		
1 grains	0.0183	0.0422
2 other crops	0.0963	0.2729
3 livestock	0.0691	0.1523
4 foretsry	0.0094	0.0382
5 fisheries	0.0963	0.1146
6 mining and petroleum	0.1594	0.3155
7 processed foods	0.1385	0.2054
8 textiles	0.0907	0.1991
9 apparel	0.1495	0.1827
10 lumber, pulp, and paper	0.0707	0.2262
11 chemicals	0.1496	0.2661
12 primary steel	0.1163	0.0854
13 primary nonferrous metals	0.1350	0.1868
14 fabricated metal products	0.1041	0.1493
15 transport equipment	0.1918	0.2017
16 other machinery	0.1656	0.2945
17 other manufactures	0.2177	0.2781

source: GTAP database, version 3, 1996.
Note, trade excludes intra-EU trade.

TABLE 2.4
IMPORT SHARES, source as a share of total imports by sector

	EU15 imports from USA	USA imports from EU15
sector		
1 grains	0.4632	0.1398
2 other crops	0.1479	0.0721
3 livestock	0.0844	0.0768
4 forestry	0.0423	0.0548
5 fisheries	0.0537	0.0271
6 mining and petroleum	0.0457	0.0719
7 processed foods	0.1591	0.3137
8 textiles	0.0778	0.2506
9 apparel	0.0231	0.0878
10 lumber, pulp, and paper	0.1055	0.1344
11 chemicals	0.2146	0.3547
12 primary steel	0.0308	0.2903
13 primary nonferrous metals	0.0566	0.1547
14 fabricated metal products	0.0842	0.1899
15 transport equipment	0.2441	0.1883
16 other machinery	0.2504	0.2168
17 other manufactures	0.1277	0.2037

source: GTAP version 3 database, 1996.
Note, trade excludes intra-EU trade.

TABLE 2.5
Destination exports as a share of sectoral output

	EU15 exports to USA	USA exports to EU15
sector		
1 grains	0.0098	0.0014
2 other crops	0.0609	0.0066
3 livestock	0.0040	0.0007
4 forestry	0.0029	0.0004
5 fisheries	0.0524	0.0043
6 mining and petroleum	0.0174	0.0053
7 processed foods	0.0111	0.0066
8 textiles	0.0145	0.0137
9 apparel	0.0136	0.0199
10 lumber, pulp, and paper	0.0136	0.0062
11 chemicals	0.0359	0.0213
12 primary steel	0.0051	0.0131
13 primary nonferrous metals	0.0146	0.0159
14 fabricated metal products	0.0073	0.0059
15 transport equipment	0.0360	0.0349
16 other machinery	0.0724	0.0401
17 other manufactures	0.0348	0.0386

source: GTAP version 3 database, 1996.

TABLE 2.6
TRANSATLANTIC FOREIGN DIRECT INVESTMENT on a historical cost basis, Year end 1995, millions of dollars

	U.S. investment in Western Europe	West European investment in U.S.
sector		
All industries	363,527	360,762
petroleum	26,375	26,831
manufacturing	131,100	157,667
wholesale trade	36,549	35,755
banking	14,391	21,073
finance (except banking)	124,467	29,644
other	30,644	89,793

source: U.S. Department of Commerce, Bureau of Economic Analysis

TABLE 3.1
POST-URUGUAY ROUND MFN TARIFFS, weighted by partner trade

	EU15 imports from USA	USA imports from EU15
sector		
1 grains	86.5	0.1
2 other crops	57.8	48.1
3 livestock	3.8	2.0
4 forestry	0.0	1.3
5 fisheries	4.7	0.1
6 mining and petroleum	0.4	0.6
7 processed foods	12.1	8.5
8 textiles	6.2	6.8
9 apparel	6.0	11.0
10 lumber, pulp, and paper	2.2	2.3
11 chemicals	4.3	2.8
12 primary steel	0.6	5.5
13 primary nonferrous metals	2.3	1.7
14 fabricated metals	2.8	2.3
15 transport equipment	1.5	2.0
16 other machinery	2.2	1.5
17 other manufactures	1.5	3.6

source: WTO integrated database (IDB) of Member tariffs, as reported by Finger et al (1995), and concorded to the GTAP version 3 database (GTAP consortium 1997). Agricultural protection data are based on OECD and USDA data on agricultural protection (see Ingco 1996).

TABLE 4.1
Model sectoring scheme

Regions:

United States of America
Canada
Mexico
European Union (EU15)
European Free Trade Area (EFTA3)
Latin America
Asia & Pacific
Japan
North Africa and the Middle East
Sub-Saharan Africa (excluding South Africa)
Central and East Europe Associates (excludes FSU)
Rest of World

Sectors:

Grains
Other crops
Livestock
Forestry products
Fishery products
Mining, extraction, and petroleum
Processed foods
*Textiles
Apparel
*Lumber, pulp, and paper
*Chemicals, rubber, and plastic
*Primary steel
*Primary non-ferrous metals
*Fabricated metal products
*Transport equipment
*Other machinery and equipment
*Other manufactures
Construction
Commercial services
Trade, transport, and communication
Electricity, water, and gas
Other services

* denotes increasing returns sector

TABLE 4.2
Policy experiments

experiment 1	**NARROW PREFERENTIAL AGREEMENT**
	o preferential elimination of bilateral industrial tariffs for EU15 and United States.
experiment 2	**BROAD PREFERENTIAL AGREEMENT**
	o preferential elimination of industrial tariffs o preferential elimination of agricultural import protection o preferential elimination of remaining NTBs (dumping) o reduction in trading costs due to trade facilitation measures on a preferential basis o deepening of Procurement Agreement, to cover 50% of procurement by EU and US on an mfn basis.
experiment 3	**OPEN REGIONALISM-TYPE AGREEMENT**
	o elimination of EU and US industrial tariffs on an mfn basis o elimination of EU and US agricultural protection on an mfn basis o elimination of remaining NTBs on an mfn basis o reduction in trading costs due to trade facilitation measures by EU and US on an mfn basis basis o deepening of Procurement Agreement, to cover 50% of procurement by EU and US on an mnf basis.
experiment 4	**OECD-BASED MULTILATERAL INITIATIVE**
	o 50 % reduction in industrial protection on an mfn basis by OECD. o 50 % reduction in agricultural protection on an mfn basis by OECD o trade facilitation leading to a reduction in level of trading costs for exports to OECD (assumed to be 2% of value of trade) o deepening of Procurement Agreement, to cover 50% of procurement on an mnf basis.
experiment 5	**WTO-BASED MULTILATERAL INITIATIVE**
	o same as experiment 4, but with all WTO Members undertaking mfn liberalization of 50% (not just OECD)

TABLE 4.3
real income effects, percent change
(based on steady-state equivalent variation)

	exp1	exp2	exp3	exp4	exp5
EU15	0.3	0.8	1.6	3.3	1.5
EFTA 3	-0.1	-0.6	3.4	2.6	9.5
United States	-0.0	0.3	1.0	2.4	1.2
Mexico	0.0	-0.4	4.7	7.6	2.7
Canada	-0.2	-0.3	0.5	1.1	1.7
Latin America	-0.0	-0.1	1.9	0.4	5.6
Asia & Pacific	-0.0	-0.1	-2.3	-8.9	9:1
Japan	-0.0	-0.1	3.0	2.9	2.8
North Africa & Middle East	-0.2	-0.3	3.9	5.7	4.9
Sub-Saharan Africa	-0.1	0.1	1.7	3.2	2.9
Central Europe	-0.0	-0.1	2.2	3.3	2.1
Rest of World	-0.0	-0.1	1.3	1.2	5.5

TABLE 4.4
real income effects,
billions of 1992 dollars

	exp1	exp2	exp3	exp4	exp5
EU15	24.1	57.3	107.9	222.7	77.4
EFTA 3	-0.2	-1.9	10.9	8.3	29.5
United States	-0.9	16.4	56.7	132.4	65.3
Mexico	0.0	-1.2	14.5	23.1	8.3
Canada	-0.9	-0.2	2.7	5.8	9.1
Latin America	-0.1	-0.4	14.8	3.2	43.7
Asia & Pacific	-8.6	-6.8	-41.9	-163.4	174.5
Japan	-0.5	-2.3	97.8	95.6	90.4
North Africa & Middle East	-1.1	-1.3	18.7	27.2	23.6
Sub-SaharanAfrica	-0.2	0.1	4.8	8.8	8.3
Central Europe	-0.0	-0.2	4.5	6.4	4.2
Rest of World	-0.1	-0.5	9.8	8.8	33.7

TABLE 4.5
Real wages, percent change

	exp1	exp2	exp3	exp4	exp5
EU15	0.3	0.8	2.2	3.6	1.3
EFTA 3	-0.1	-0.6	2.6	1.7	9.0
United States	0.1	0.2	1.6	2.7	0.9
Mexico	-0.0	-0.4	4.3	7.0	2.7
Canada	-0.1	-0.3	0.5	1.2	2.3
Latin America	-0.0	0.0	1.3	-0.1	4.7
Asia & Pacific	-0.4	-0.3	-2.1	-6.1	19.6
Japan	-0.0	-0.1	2.7	3.1	3.1
North Africa & Middle East	-0.2	-0.3	3.5	5.8	7.5
Sub-Saharan Africa	-0.1	-0.2	0.6	2.1	2.9
Central Europe	-0.0	0.1	0.7	3.7	2.1
Rest of World	-0.0	-0.0	0.8	0.5	3.5

TABLE 4.6
Volume of merchandise exports, percent change

	exp1	exp2	exp3	exp4	exp5
EU15	2.7	7.6	26.4	20.9	21.0
EFTA 3	-0.2	-1.0	8.4	6.4	24.8
United States	3.9	11.8	36.2	25.2	29.4
Mexico	-1.4	-1.5	4.1	25.9	20.4
Canada	0.6	-0.8	-0.2	5.1	14.9
Latin America	0.0	-0.7	8.9	7.6	41.1
Asia & Pacific	-0.6	-0.6	5.7	8.0	42.3
Japan	-0.2	-0.4	19.1	23.9	25.2
North Africa & Middle East	-0.9	-0.9	6.4	9.9	-36.7
Sub-Saharan Africa	-0.2	-1.3	7.2	10.5	20.6
Central Europe	0.1	-0.4	10.4	13.5	19.8
Rest of World	-0.0	-0.5	9.2	11.1	63.5

TABLE 4.7
Capital stock, percent change

	exp1	exp2	exp3	exp4	exp5
EU15	0.6	1.0	-1.7	7.2	1.1
EFTA 3	-0.1	-1.3	-5.5	2.8	16.9
United States	0.1	0.4	1.9	6.6	1.7
Mexico	0.2	-0.3	5.1	8.7	1.9
Canada	-0.2	-0.4	0.3	0.7	1.7
Latin America	0.0	-0.0	2.1	-1.0	6.5
Asia & Pacific	-0.7	-0.5	-5.9	-14.4	16.2
Japan	-0.0	-0.1	4.9	2.6	2.7
North Africa & Middle East	-0.3	-0.2	-4.5	7.8	4.0
Sub-Saharan Africa	-0.1	0.1	1.8	4.1	4.1
Central Europe	-0.2	-0.3	1.5	7.9	1.9
Rest of World	-0.1	-0.1	1.3	0.1	5.0

FIGURE 2.1

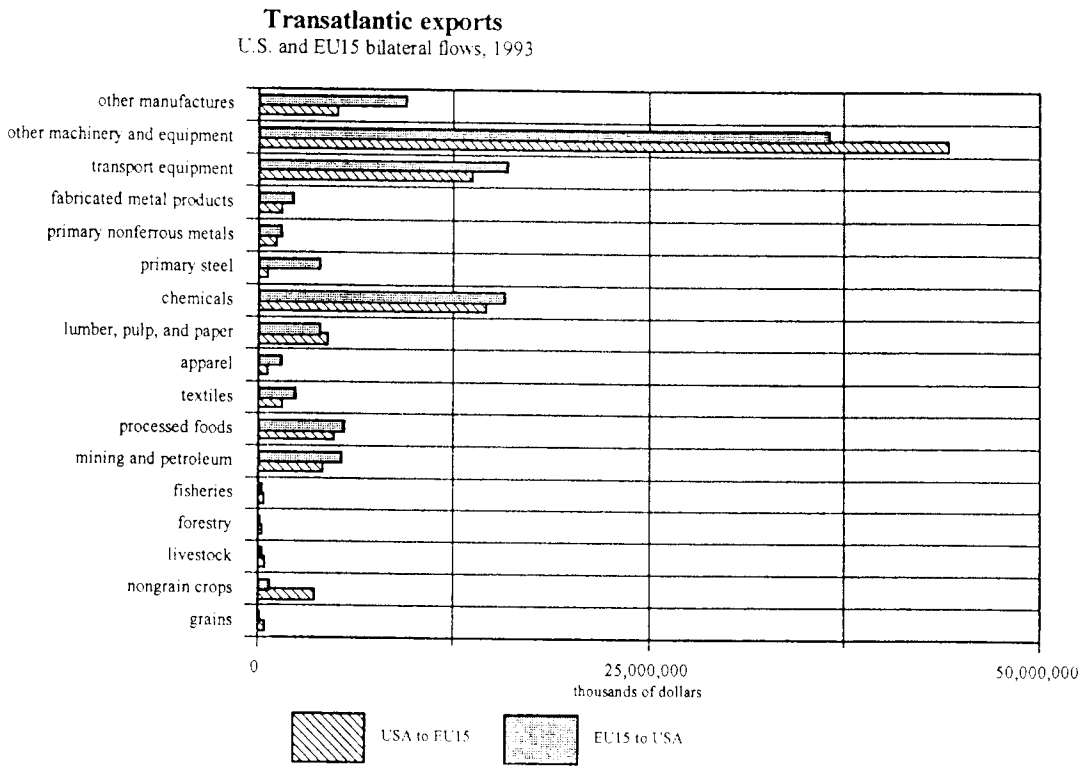

Transatlantic exports
U.S. and EU15 bilateral flows, 1993
other manufactures
other machinery and equipment
transport equipment
fabricated metal products
primary nonferrous metals
primary steel
chemicals
lumber, pulp, and paper
apparel
textiles
processed foods
mining and petroleum
fisheries
forestry
livestock
nongrain crops
grains
0
25,000,000
50,000,000
thousands of dollars
USA to EU15
EU15 to USA

FIGURE 2.2 — EU trade flows

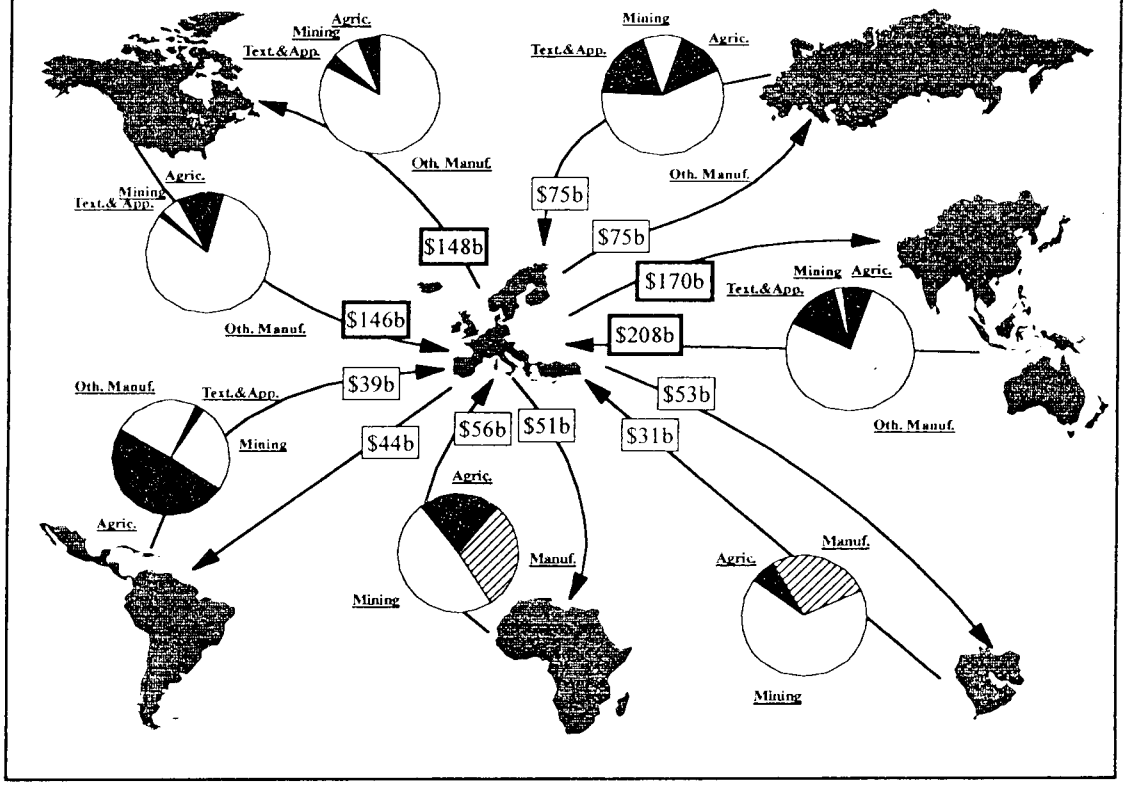


Figure 2.3 — North American Trade Flows

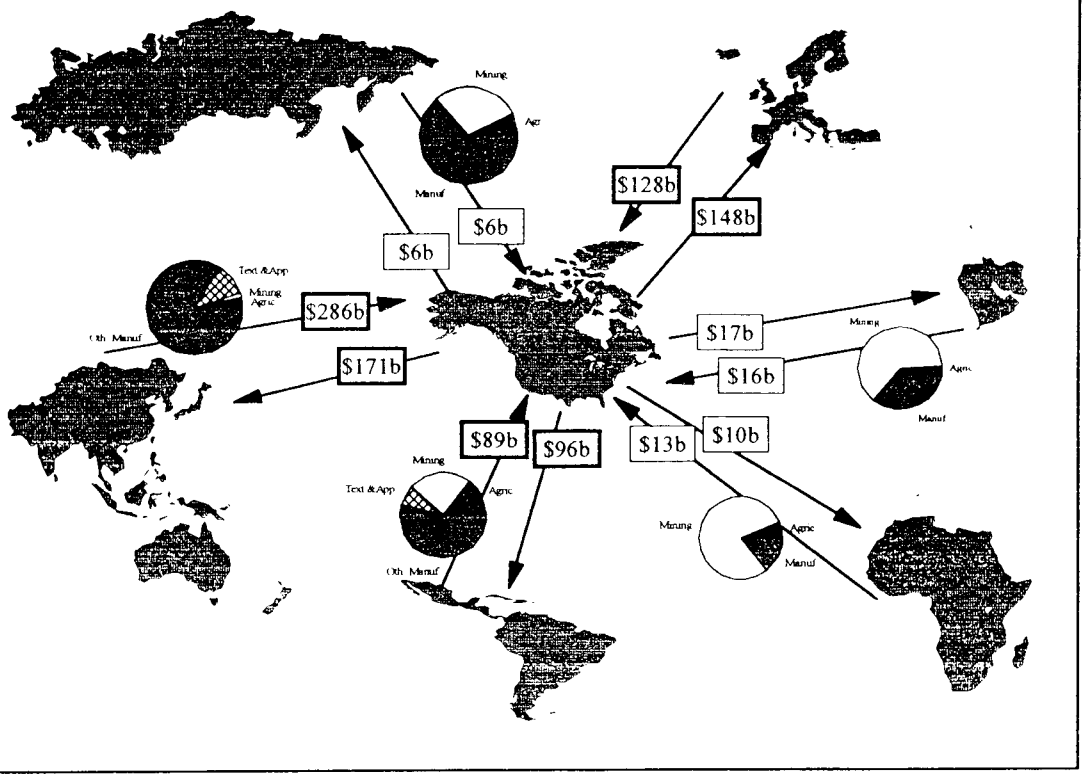


FIGURE 2.4

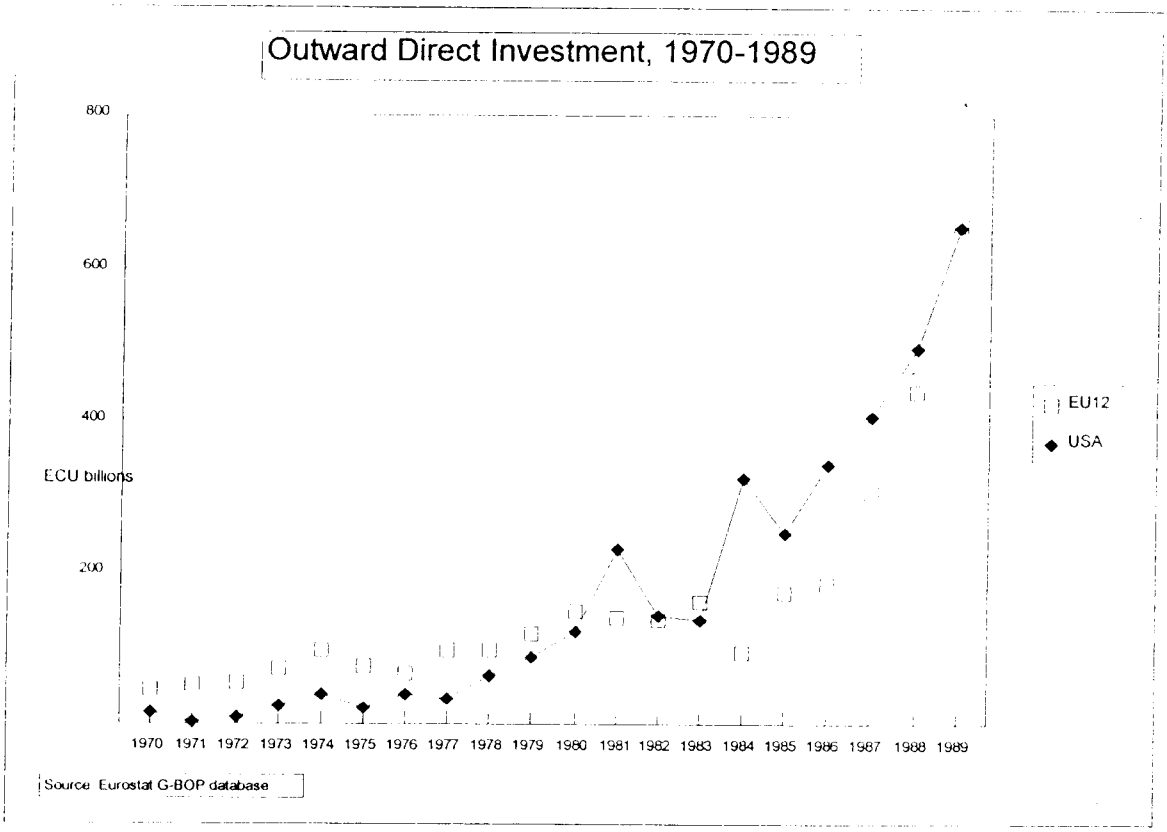
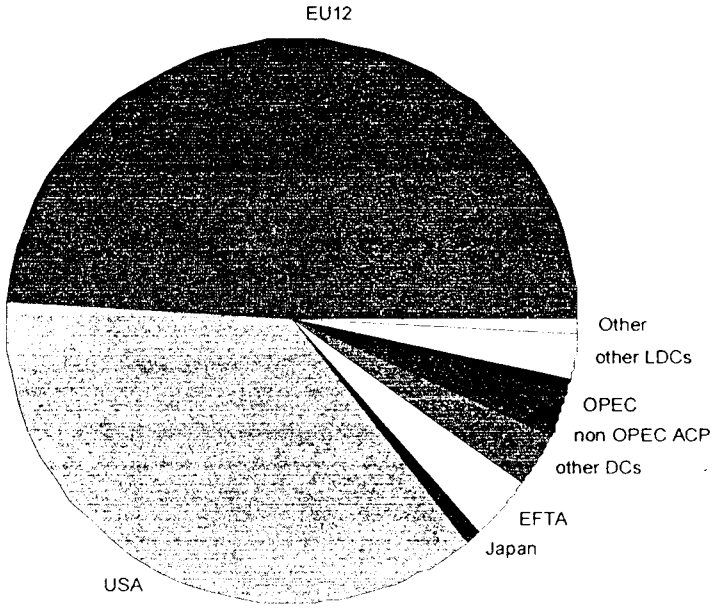
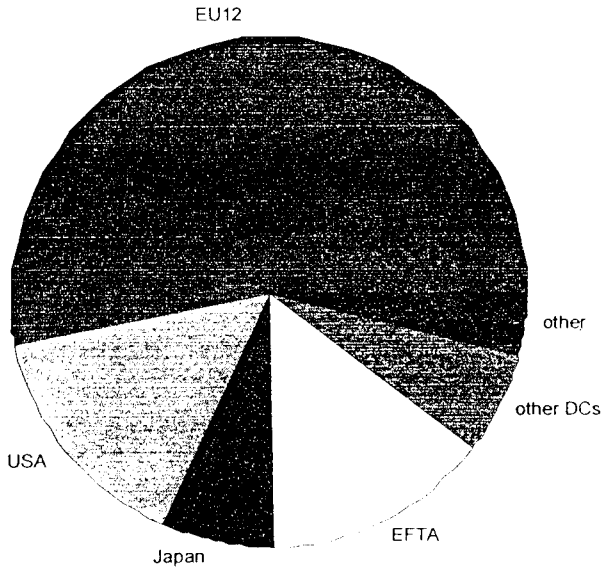

Outward Direct Investment, 1970-1989
800
600
400
200
ECU billions
1970 1971 1972 1973 1974 1975 1976 1977 1978 1979 1980 1981 1982 1983 1984 1985 1986 1987 1988 1989
EU12
USA
Source Eurostat G-BOP database

FIGURE 2.5

Destination of EU12's Outward FDI Flow, 1989



Source of EU12's inward FDI Flow, 1989



Source: "Les investissements directs de la communaute Europeenne, 1984-1989", Eur table4-eur-1, p86, and table 4-eur-7 p92

FIGURE 3.1

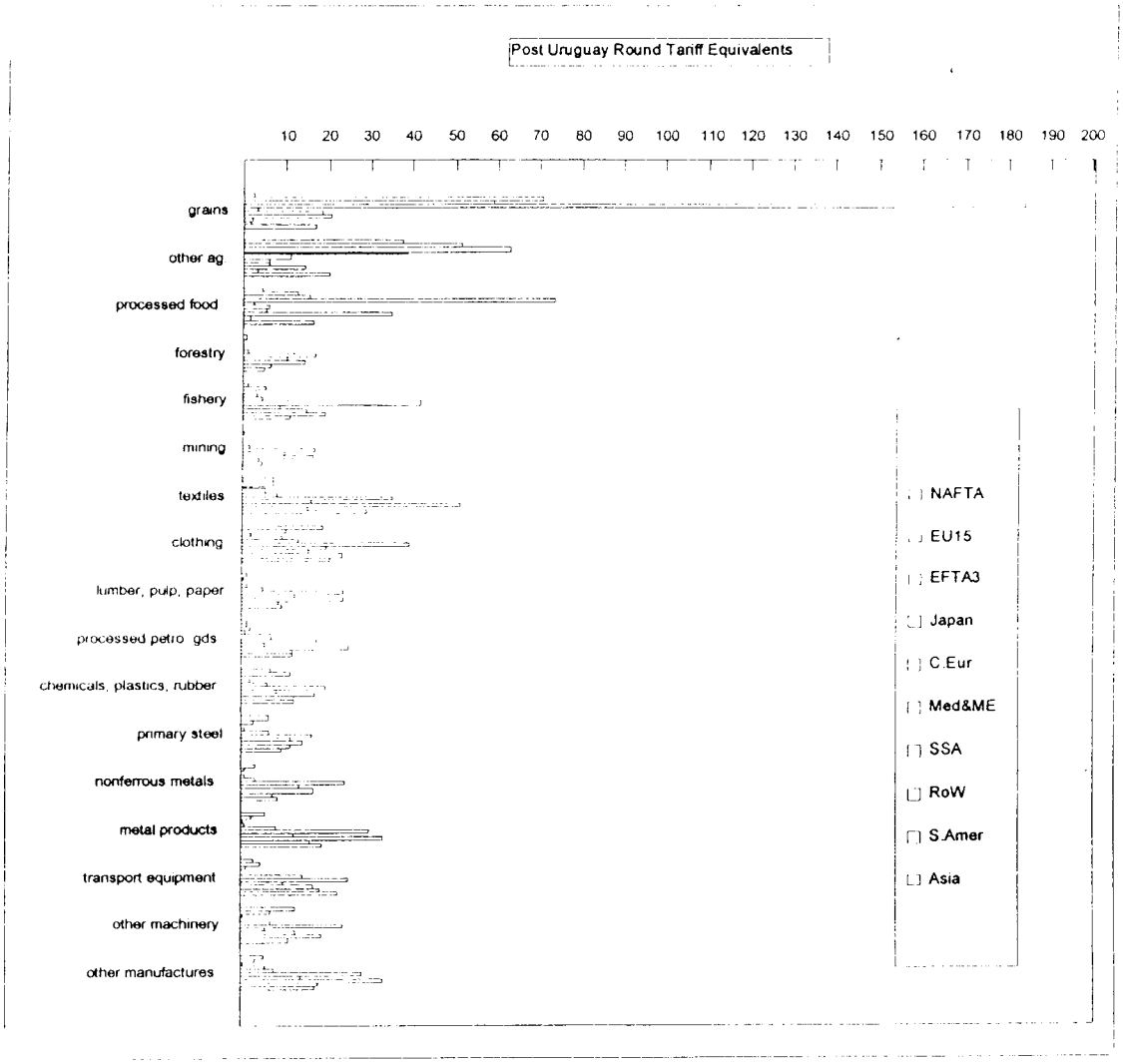

Post Uruguay Round Tariff Equivalents
10 20 30 40 50 60 70 80 90 100 110 120 130 140 150 160 170 180 190 200
grains
other ag
processed food
forestry
fishery
mining
textiles
clothing
lumber, pulp, paper
processed petro gds
chemicals, plastics, rubber
primary steel
nonferrous metals
metal products
transport equipment
other machinery
other manufactures
NAFTA
EU15
EFTA3
Japan
C.Eur
Med&ME
SSA
RoW
S.Amer
Asia

FIGURE 3.2

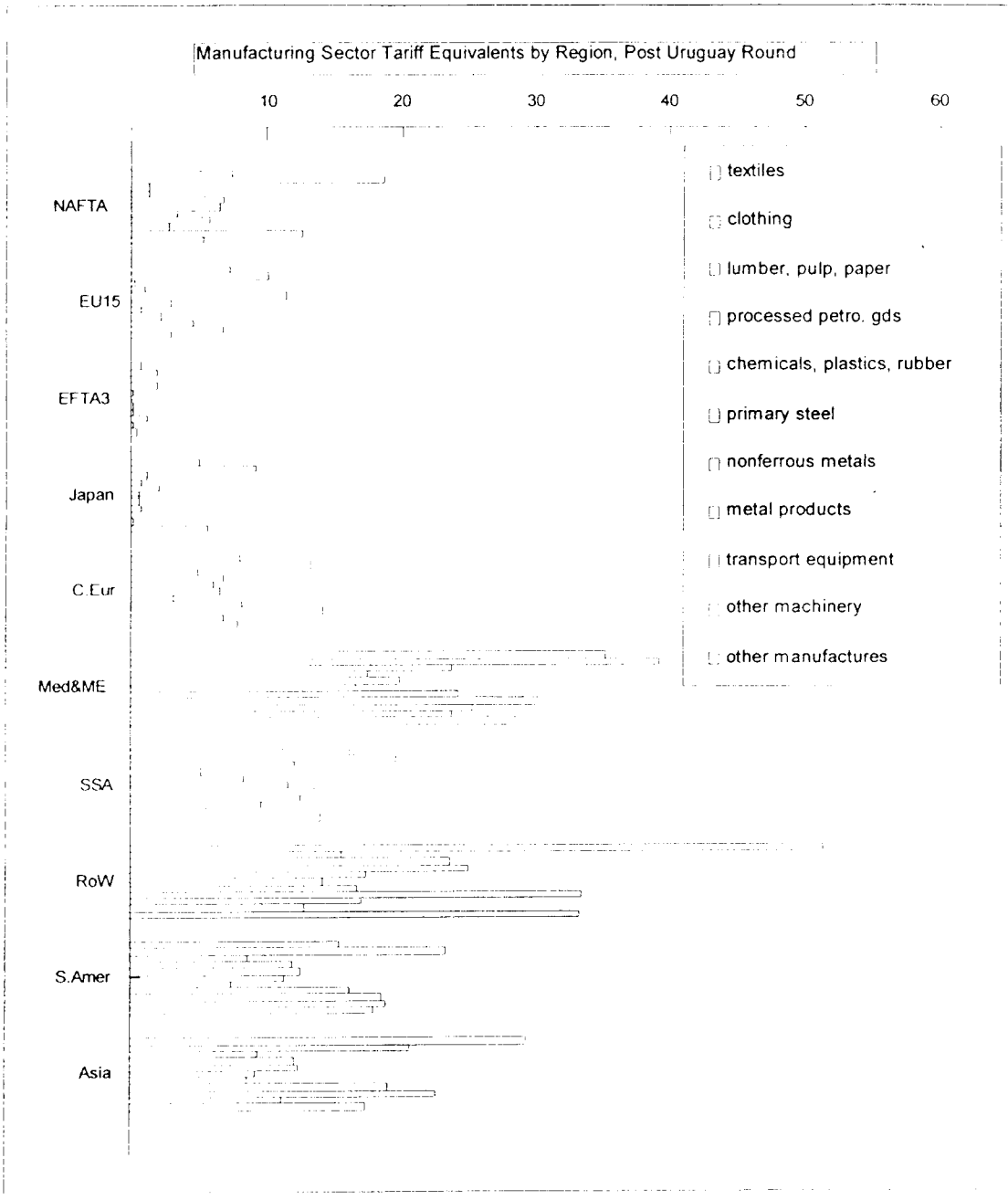

Manufacturing Sector Tariff Equivalents by Region, Post Uruguay Round
10
20
30
40
50
60
NAFTA
EU15
EFTA3
Japan
C.Eur
Med&ME
SSA
RoW
S.Amer
Asia
textiles
clothing
lumber, pulp, paper
processed petro. gds
chemicals, plastics, rubber
primary steel
nonferrous metals
metal products
transport equipment
other machinery
other manufactures

FIGURE 4.1 — output effects with preferential liberalization