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The Cost of EU Trade Protection in Textiles and Clothing

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APPENDICES

(Note: Chapters III and VI have no appendices)

Since the EURO was introduced only as of 1/1/99, the corresponding values in this study, which uses data prior to this date, refer to ECUs.

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The Cost of EU Trade Protection in Textiles and Clothing

Abstract:
This paper estimates the costs of EU restraints on trade in textiles and clothing. After explaining the methods used, we examine the impact of an opening up of EU trade in textiles and clothing, inter alia to those economies where the textile and clothing (T&C) industries command sizeable shares of exports and output. The estimates are based, firstly, on a partial equilibrium analysis allowing us to directly cover the effects of liberalization on the importation, production and consumption of T&C products; secondly, a general equilibrium analysis incorporates the wide-sweeping indirect costs of ATC within the EU. It turns out that in 1997 EU consumers paid roughly ECU 25 billion more for T&C products, due to quotas, tariffs and indirect effects.

Keywords: Agreement on Textiles and Clothing – ATC, Multi-fiber Arrangement, Costs of Protection, EU trade policy

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This paper is part of ongoing research dealing with protection and trade regimes in the Post-Uruguay Round years. The authors are indebted to the accuracy, patience and perseverance with which Michaela Rank prepared the data plus diagrams and Christiane Yildiz produced text plus tables. Remaining errors are spurious even if the authors accept responsibility for them.

I. Executive Summary

The importance of the textile and clothing industries in many EU countries – aside from some Southern Rim members – is now relatively minor in terms of both production and exports (see Diagram 1). Overall they amount to slightly more than five percent of exports and less than five percent of manufacturing value-added. For this reason, one might expect protection of textile and clothing markets in the European Union to be a minor issue. However, this is not the case. The EU has in fact been backloading much of its implementation of obligations stemming from the Uruguay Round Agreement on Textiles and Clothing (ATC), and it must be feared that they will be delayed until January 1, 2005.[1]

This paper estimates the costs[2] of EU restraints on trade in textiles and clothing. After explaining the methods used, we examine the impact of an accelerated implementation of EU obligations under the ATC. This means opening up of EU trade in textiles and clothing, inter alia to those economies

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1 When the term ATC or MFA (Multifiber Arrangement) is used in connection with designating those countries from which the EU or other industrial countries import textile and clothing products, it covers all such countries even if they were not ATC or MFA signatories (e.g. China, Vietnam).

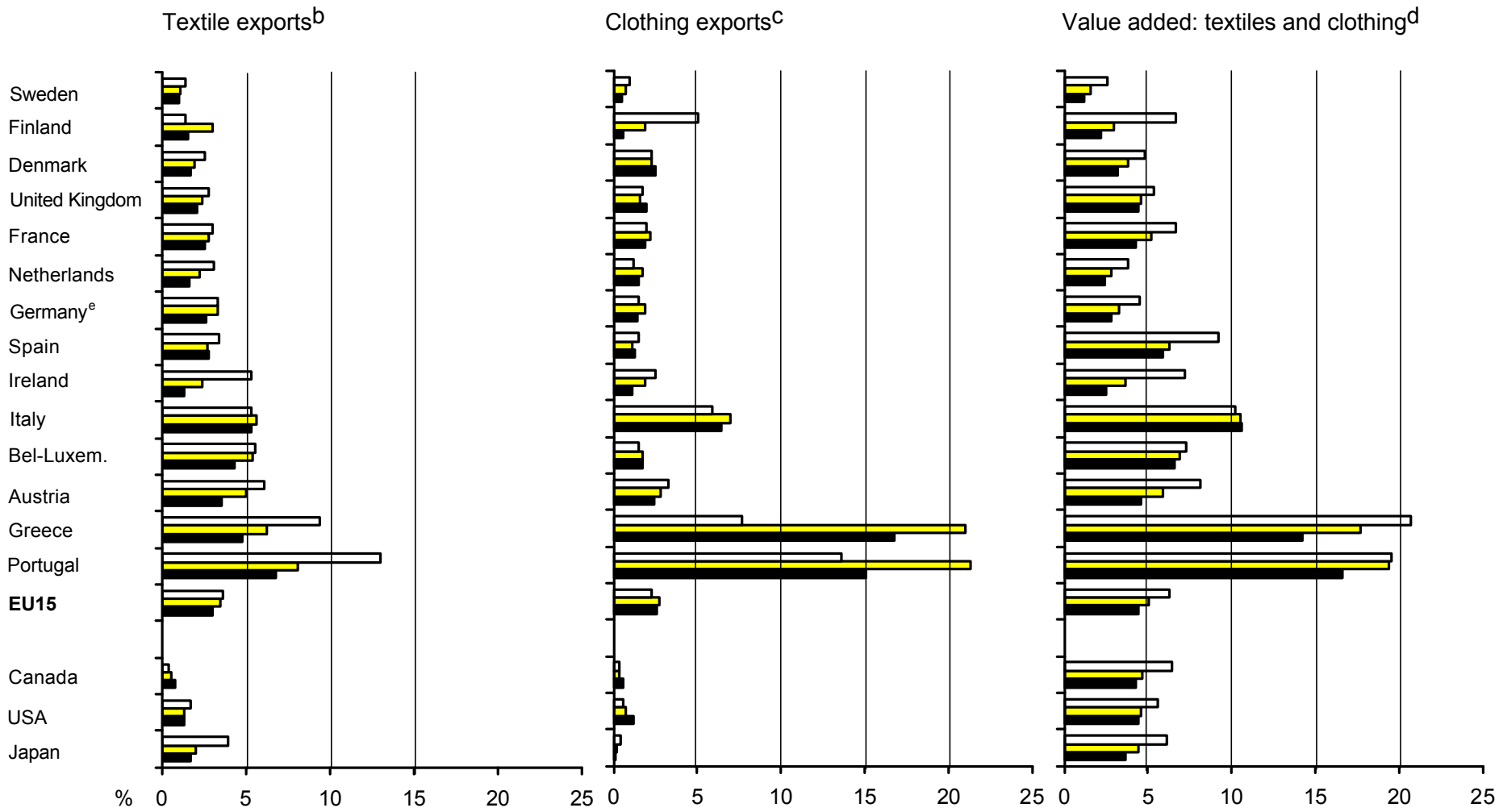
2 In this paper mention is made of "costs" of EU restraints on trade. Income losses or welfare losses are synonyms describing the same aspect. Accordingly benefits, income gains or welfare gains describe the positive side of removing such restraints.

where the textile and clothing (T&C) industries command sizeable shares of exports and output (see Diagram 2). The estimates are based on two types of quantitative economic models. The first method (a partial equilibrium analysis) allows us to directly cover very specific details in connection with the importation, production and consumption of T&C products. The second method (a general equilibrium analysis) incorporates – among other things – the wide-sweeping indirect effects within the EU. The mix of techniques used also allows us to focus on overall trade and EU-wide income effects. A summary of the basic findings is provided below:

1. The initial results, just looking at the relatively direct effects (stemming from the partial equilibrium analysis) reveal that in 1997 EU consumers will have paid roughly ECU 12 billion more for T&C products, due to quotas and tariffs.

   Based on the more all-encompassing approach (that is, applying general equilibrium analysis) the costs to the EU consumers due to higher textile and clothing prices (both for imported and domestic goods) amount to ECU 12.7 billion.

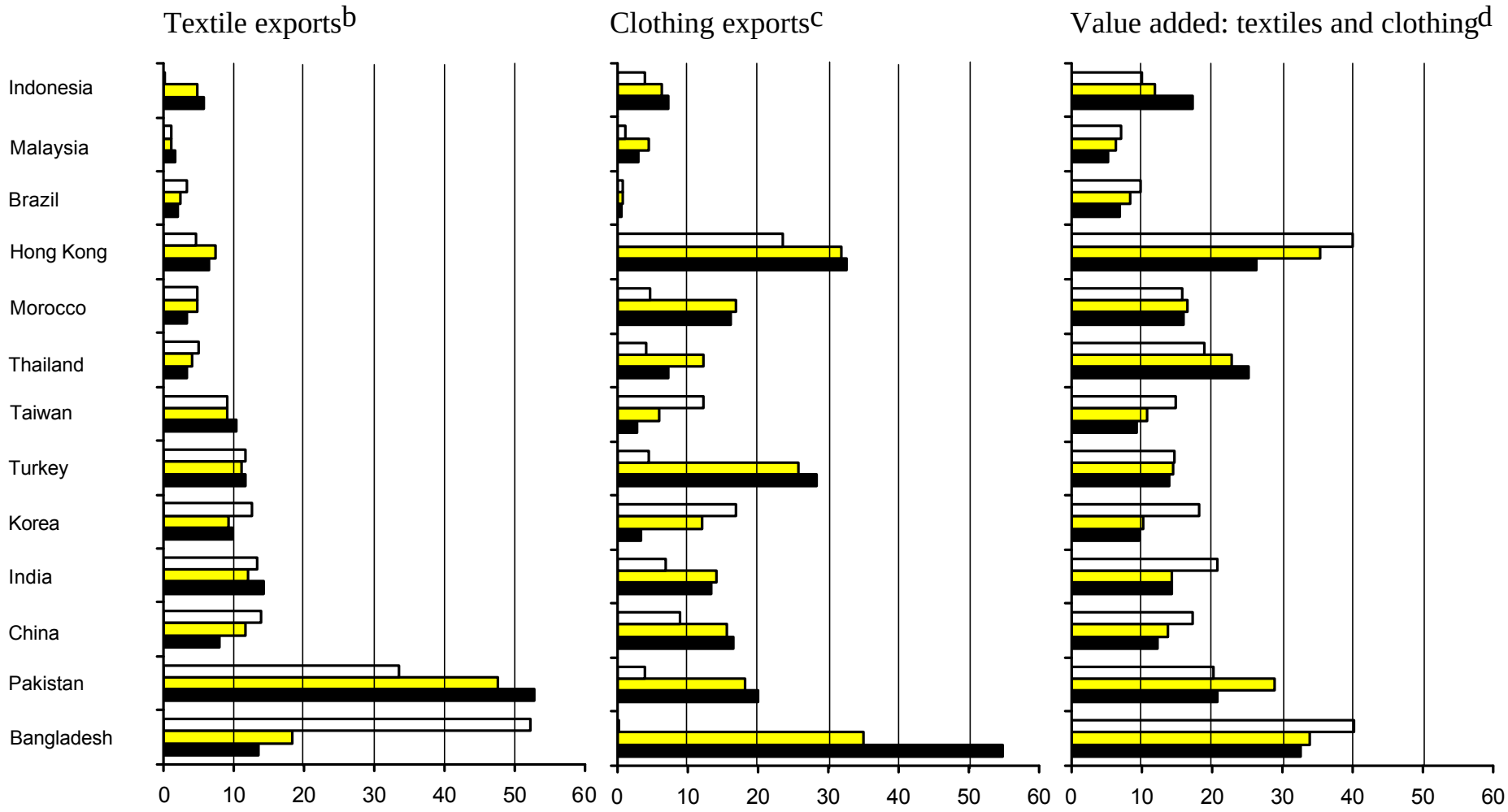
Diagram 1 — Textile and Clothing Exports and Value-Added Shares for EU and some other OECD Countries: 1980, 1990, 1996[a]



[a]1980: ☐ ; 1990: ▭ ; 1996: ▬ . (Actual data given in Table AI.1.) Ranked according to share of textile exports in 1980 within EU and within other listed countries. – [b] Share of textile exports in total merchandise exports - in %. – [c] Share of clothing exports in total merchandise exports - in %. – [d] Share of clothing and textile value added in total value added of manufacturing industry; data labeled 1996 actually stems from 1995. – [e] West Germany for 1980 and 1990.

Source: Own calculations based on GATT (1993: Tab. III.35 and III.42); WTO (1997: Tab. IV.56 and IV.63); UNIDO (1997: selected country tables).

Diagram 2 — Textile and Clothing Exports and Value-Added Shares for Selected Developing Economies: 1980, 1990, 1996[a]



[a]1980: ▭ ; 1990: ▭ ; 1996: ▬ . (Actual data given in Table AI.1.) Ranked according to share of textile exports in 1980. – [b] Share of textile exports in total merchandise exports - in %. – [c] Share of clothing exports in total merchandise exports - in %. – [d] Share of clothing and textile value added in total value added of manufacturing industry; data labeled 1996 actually stem from 1995.

Source: See Diagram 1.

2. If the implementation of the ATC had been accelerated, so that a complete integration would have taken place by 31 December 1997, EU consumers – including indirect effects – would have gained over ECU 25 billion per year (measured in 1997 ECU – see Table 16). Of these, almost ECU 6.5 billion of the annual gains simply follow from a recapture of ATC quota rents. Other gains stem from increased investments and a reallocation of resources into areas with higher returns. The sum of the yearly discounted net income gains from a full 1997 implementation amount to over ECU 160 billion.

3. In recalculating the above results of ECU 12.7 billion for consumers plus ECU 12.3 billion from the loss in efficiency and other factors, together totaling ECU 25 billion, then taking an EU family of four, we find an average gain resulting from accelerated implementation (i.e. doing away with quotas and tariffs) amounting to ECU 270 per year.[3]

4. These national income gains also imply that each job saved in the textile and clothing industries by delayed implementation costs between ECU 28 thousand in the textile industry and ECU 41 thousand in the clothing industry per year (Table 19). Since the industry as a whole is contracting,

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[3] If a partial equilibrium analysis is used, i.e. direct costs only, the costs in 1997 for a family of four amounted to roughly ECU 130 per year.

the cost of EU protection for the textile and clothing industry could well approach the full value added of this industry by the time quotas are removed by the year 2005.

5. As far as the distribution of the costs of protection across various population groups is concerned, the quota prices for children's clothes are noticeably higher. This is despite the fact that adult clothes typically carry higher prices. With recent quota prices for children's clothes (i.e. 1997) some 200% higher than for comparable adult clothing, the magnified impact on families with children is obvious.

6. Compared with two other studies carried out 16 and 4 years ago respectively, the average costs of the ATC in an EU family of four calculated in this study for 1997 (i.e. ECU 270) are virtually identical. For instance, in the 1983 study costs were calculated for the UK amounting to what would be ECU 260 today. We have arrived at practically the same amount. In the 1995 study costs were calculated just 9 ECU more than our results.

7. The conclusions reached here are very much the same as those in the 1998 OECD study on the benefits of open markets. It is not only the high costs to the consumers but also the fact that protection causes high wages

to be paid for jobs which are not internationally viable, hence using resources which could be invested, for instance, in improving human capital levels.

8. These considerations give credence to the proposal that liberalization under the ATC should be effected as fast and as complete as possible. Holding out until the year 2005 implies accruing significant direct costs for consumers and substantial income losses to the economy as a whole, which could otherwise have been invested in production potential – be it in human or physical capital – where the EU has definite comparative advantages. Beyond this, and not specifically dealt with here, are the economic losses accruing to the developing countries.

II. An Overview of Protection of Textiles and Clothing Markets

The Ministerial Declaration at Punta Del Este that launched the Uruguay Round stated that the "Negotiations in the area of textiles and clothing shall aim to formulate modalities that would permit the eventual integration of this sector into GATT on the basis of strengthened GATT rules and disciplines." The negotiations launched at Punta Del Este led to the Agreement on Textiles and Clothing (ATC), an attempt to end almost 40 years of discriminatory protection in violation of the basic precepts of the GATT system.

The textiles and clothing (T&C) sector had previously been treated as a special case, with their own regulatory framework. This was first institutionalized in the beginning of the 1960s with the Short Term Arrangements (STA) regarding international trade in cotton textiles. The STA aimed at an orderly opening of restricted markets to avoid (for importing countries) detrimental market disruptions. The definition of "market disruption" adopted by the Contracting Parties in 1960 entailed the possibility of singling out imports of particular products from particular countries as the disrupting source. This opened the door for the series of

bilaterally negotiated quota restrictions that became the rule in the following Long Term Arrangement (LTA) in 1962 (see Table 1). By the turn of the decade it had become apparent that the multiplicity of make shift arrangements protecting the T&C industry would have to be replaced. This realization, however, needed until the end of 1973 before the Multifibre Arrangement (MFA) was agreed upon and put into effect as of 1/1/1974. Its product coverage was extended to non-cotton textiles and clothing. The final MFA (i.e. # IV) was extended several times until the Agreement on Textiles and Clothing as an integrated part of the Uruguay Round agreement came into force.

Like the preceding arrangements, the MFA provided rules for the imposition of quotas, either through bilateral agreements or unilateral actions, when surges of imports cause market disruption, or the real (Annex A) threat thereof, in importing countries. In the years leading up to the Uruguay Round Agreements, six developed participants actively applied quotas under the MFA – the EU, the U.S., Canada, Norway, Finland and Austria. These were applied almost exclusively on imports from developing countries. Sweden liberalized its textile and clothing

Table 1 — From the STA to the ATC: A Long Chronology on Deliberalizing Trade and a Short One on Liberalizing

Date	Action taken
1955: December	**Japan** (MITI) unilaterally restrains exports of cotton fabrics and clothing to **USA** "to promote mutually beneficial relations".
1957: January	Five year agreement reached with **Japan** on limiting overall textile exports to **USA**.
1958: November	**United Kingdom** signs "voluntary" limitation on cotton T&C products with **Hong Kong**, by threatening otherwise imposition at lower than prevailing volume levels.
1959: September	**United Kingdom** signs similar restraint agreements with **India** and **Pakistan**.
1960: November	GATT Contracting Parties recognize the problem of "market disruption", even if it is just threatened; serves as "excuse" for establishing future NTBs.
1961: July	The Short Term Arrangement (STA) is agreed.
1962: February	The Long Term Arrangement (LTA) is agreed to commence on October 1, 1962, and last for five years.
1963–64	The **United States** tries and fails to secure an international agreement on wool products.
1965: June	The **United States** tries and fails to negotiate restraints on **Japanese** wool products.
1966: June	The **United Kingdom** implements a global quota scheme in violation of the LTA – the LTA providing only for product-specific restraints.
1967: April	Agreement is reached to extend the LTA for three years.
1969–71	**United States** negotiates VERs with **Asian suppliers** on wool and man-made fibers.
1970: October	Agreement is reached to extend the LTA for three years. It was later extended three months more, to fill the gap until the MFA came into effect.
1973: December	The MFA is agreed to commence on January 1, 1974, and to last for four years.
1977: July–December	The **European Economic Community** and the **United States** negotiate bilateral agreements with developing countries prior to agreeing to extension of the MFA.
1977: December	The MFA is extended for four years.
1981: December	The MFA is renewed for five years. The **USA**, under pressure from increased imports resulting from dollar appreciation, negotiates tough quotas.
1986: July	The MFA is extended for 5 years, to conclude with Uruguay Round.
1991: July	The MFA is extended pending outcome of the Uruguay Round negotiations.
1993: December	The Uruguay Round (UR) draft final act provides for a 10-year phase-out of all MFA and other quotas on textiles in ATC. MFA extend until UR comes into force.
1995: January 1	1st ATC tranche liberalized by importing countries – 16% of 1990 import volume.
1998: January 1	2nd ATC tranche liberalized by importing countries – 17% of 1990 import volume.
2002: January 1	3rd ATC tranche liberalized by importing countries – 18% of 1990 import volume.
2005: January 1	4th ATC tranche liberalized by importing countries – 49% of 1990 import volume.

Source: Based on Spinanger (1999: Table 1).

regime in 1991 and withdrew from the MFA agreement. However, it effectively rejoined this regime when it joined the European Union. Two other developed country participants, Japan and Switzerland, did not impose MFA quotas, but instead restricted themselves to "signalling" a readiness to apply quotas by the act of being signatories to the MFA agreement, combined with (active) import surveillance. As shown by Winters (1994), import surveillance can, at least in concentrated industries, induce a fall in import levels as producers are trying to forestall explicit quotas. The restrictiveness of the applied MFA quotas, since replaced by the ATC regime, varies from product to product, and from supplier to supplier, and aggregate measures are highly uncertain. Estimates of the aggregate, bilateral restrictiveness of quotas are reported in Table 2.

The quota rents reported in Table 2 are based on estimates reported by Yang (1992, 1994), Yang et al. (1997), and the GTAP version 3 dataset (McDougall 1997). These rates, as a result extension of extension of free access to the Central European producers and expanded ATC quotas, are lower than comparable estimates reported for 1992.

Table 2 — EU Protection for Textiles and Clothing – The Estimated 1997 Tariff Equivalents of ATC Quotas as % of Imports at C.I.F. Valuation Plus MFN Tariffs

	Textiles	Clothing
Non-tariff barriers (Quotas)		
Australia & New Zealand	0.0	0.0
Japan	0.0	0.0
Indonesia	14.0	30.6
Malaysia	21.6	34.8
Philippines	8.2	20.0
Thailand	10.3	23.6
China	20.5	24.0
Korea	8.2	14.4
Hong Kong & Singapore	7.9	14.2
Taiwan	9.4	16.7
India	20.2	24.6
Rest of South Asia and Indian Ocean	15.7	19.6
North America	0.0	0.0
Former Soviet Union	8.1	9.0
EFTA	0.0	0.0
Central & East European Countries	1.3	3.0
Rest of World	6.5	5.8
Weighted average NTBs	**5.6**	**10.2**

EU industrial tariffs	Textiles	Clothing	All goods
Weighted average tariffs – pre-Uruguay	9.0	12.6	5.7
Weighted average tariffs – post-Uruguay	6.8	10.9	3.6

Source: Own estimates.

The Uruguay Round Agreement on Textiles and Clothing (ATC) requires a gradual phase out of the quota restrictions carried over from the MFA regime. This process is detailed in Table 3. The integration of the products covered by the agreement is to be achieved in three stages under a ten-year transition period. The first stage calls for the integration of products comprising not less than 16 % of the total volume of each member's 1990 imports of the products listed in the annex to the Agreement. The second

stage, beginning in year 4, requires the integration of a further 17 %. The third stage, beginning in year 8, requires that another 18 % of imports be brought under normal GATT rules. Each importing country is free to choose the products it will integrate at each stage, the only constraint being that they shall encompass products from each of the four groupings: tops and yarn, fabrics, made-up textile products, and clothing. Products that remain restricted during the transition period benefit from a progressively increasing quota. The previously applied MFA quota annual growth rates are to be scaled up by a factor of 16 % in the first stage – for instance, from 3% to (3×1.16 =) 3.48% – an additional 25 % in the second stage, and yet another 27 % in the third stage. This will turn a 3% initial annual growth rate to 5.52% in the third stage. It is important to note, however, that the effective expansion of quotas through 2005 will be negligible. At the end of the ten year transition period, all remaining quantitative restrictions on textiles and clothing (carried over from the MFA regime) are to be terminated. In effect, much of the liberalization of ATC products will be back-loaded until the very end of the 10 year phase-in period. In addition, because of the graduation of products not actually restricted in the first phases of the ATC, almost all of the MFA liberalization may end up being back-loaded.

Table 3 — Integration Scheme for Textiles and Clothing – an Example

	Integration (Base: 1990 import volume of the products listed in ATC annex)	Growth rate of residual quotas (Base: Previously agreed MFA growth rates of quotas)
Stage I. (January 1, 1995)	16%	16% higher growth rate than initially (e.g.: 3% to 3.48%)
Stage II. (January 1, 1998)	Further 17% (total 33%)	Increase by 25% (e.g.: 3.48% to 4.35%)
Stage III. (January 1, 2002	Further 18% (total 51%)	Increase by 27% (e.g.: 4.35% to 5.52%)
End of the 10 year transition period (January 1, 2005)	Remaining 49% (total 100%)	

Note: The example in this table is based on an assumed underlying quota growth rate of 3 %. In actuality, these rates largely vary between a range of 2 and 6 %. Many sensitive products will have little or no effective growth in quotas through 2005.

Source: Own calculations and GATT (1994: 87-89).

III. Economics of Textile and Clothing Protection – Theory and Methods

III.A Introduction

Governments around the world have long attempted to restrict the sovereignty of their own subjects and distort the efficient international allocation of resources by instituting protectionist measures. While they may be entitled to impinge upon their own subjects' welfare, they are surely not empowered by subjects of other countries to impinge on their welfare. Fortunately, it is true that the economic modeling of trade policies has made immense strides in assessing major ramifications of such protectionist measures (see Francois, Reinert, 1997: 3–24). Hence, the impact of imposing international trade protection measures, with their multifaceted and wide-sweeping changes, can now be more accurately portrayed, tracked and estimated. One of the difficulties in this process is trying to gauge the size and impact of all those measures of non-tariff nature, such as the

quotas central to the MFA regime. Such measures, after all, hinder prices from correctly ensuring that world income is maximized.[4]

Indeed, by focusing on potential world income the transnational impact of protectionism is put into its proper perspective. While this particular aspect will be discussed in concluding this paper, the main thrust of this analysis is to deal with one key NTB aspect, namely the quantification of non-tariff barriers. It begins by briefly reviewing some relevant aspects of textile and clothing trade protection. It then provides some general background on methods and institutional factors, before presenting some new comparative evidence on how different methods of calculations yield widely differing results. Although focusing primarily on the impact of NTBs in the area covered by the MFA or rather the Agreement on Textiles and Clothing (ATC),[5] this paper also taps a rich and virtually unexploited set of data on actual prices of identical, internationally traded goods, in order to show how to more directly compute tariff equivalents.

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4 As Laird points out (1997: 34), and these authors completely concurr, perhaps the theoretically best definition of "non-tariff distortions" was put forth by Baldwin (1970). It designates them as "being any measure public or private that causes internationally traded goods and services, or resources devoted to production of these goods and services, to be allocated in such a way as to reduce potential real world income."

5 The ATC replaced the MFA (Multi-fiber Arrangement) in line with the Uruguay agreement as of 1/1/1995. For an overview of this agreement and the liberalization steps taken so far see Baughman, et al. 1997.

III.B The Theory

III.B.1. Welfare, Employment and Transfers

Aside from the relatively recent integration of monopolistic competition into international trade theory, and the ensuing implications for national levels of protection (Krugman, 1979), some of the seminal studies dealing with the impact of trade protection on welfare, employment, and other variables, still present a relevant basic theoretical framework. One of them is Gottfried Haberler's book on "International Trade" (1933), the other is Harry G. Johnson's study on "The Cost of Protection and the Scientific Tariff" (1960). Especially the latter enabled fruitful empirical research to be carried out, such as Stephen P. Magee's (1972) analysis of the welfare effects of US trade restrictions.

Furthermore, the work of B.N. Jeon and G.M. v. Furstenberg (1986), drawing on Harry G. Johnson's above theoretical outline, demonstrate nicely the interrelationship between a very simple macroeconomic two-goods model and the microeconomic or sectoral implications that follow from this model (see Appendix AII.1 for methodological details).

The traditional partial equilibrium analysis applies a formula to try to capture the *deadweight losses* (DWL) of a tariff (t): The deadweight losses

represent the net impact of protection due to higher domestic prices and lower domestic demand.

Of course, it has to be borne in mind that the deadweight losses express only the welfare effects in the country applying protection; foreign countries, or rather world welfare affected by the said protection are not dealt with.[6] Based on the same partial equilibrium analysis approach the employment effects of a tariff can be calculated. Likewise transfers from domestic consumers to suppliers can be calculated based on tariff rates and imports affected (see Appendix AII.1).

In the case of a tariff the respective receipts go to the domestic government. In the case of non-tariff trade barriers, i.e. quotas, the situation becomes far more difficult to interpret: it is not only a matter of whether quotas are traded, but also a question of whether rents are shared with the importers. If quotas are traded, which is basically the case with ATC products (see below), the transfers will accrue to the quota holder (quota seller). In most cases it is assumed that quotas are owned by subjects in the exporting countries, usually individuals/legal entities but sometimes governments. In

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6 It can be argued that in the case of an infinitely elastic world-market supply – which means that prices are calculated according to the same marginal costs everywhere – there are no comparable deadweight losses on the world market, and that only the level of employment is changed in the rest of the world (cf. below).

such cases the benefits would accrue to them and accordingly decrease welfare in the importing country. If rents accrue purely on the import side, then national subjects reap the transfers and the national deadweight loss decreases by the respective amount. However, as shown by Krishna and Tan (1997: 58–77), there may be every reason to assume that large importers (like department stores or catalogue houses) can exert enough economic pressure to extract a sizeable share of the rent. Furthermore, and this is a key point in analysis of the distribution of the rents, the quota rents can accrue to third parties who have merely established production facilities in the exporting country.

III.B.2. The Welfare Calculus Applied

III.B.a. The Marginal Utility of Money: An Often Neglected Aspect

The core idea behind foreign-trade protection basically rests on a redistribution of income. Thus, when neglecting deadweight losses, it can be conveniently argued in the framework of a two-sector model that the protection-induced income increase of one sector reduces the income in the other sector by the same amount.[7] Only in the case where the marginal

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[7] It may be possible to analogously argue in the framework of the Stolper-Samuelson theory regarding the factors of production; or, in the same vein, the argument may be centered on the redistribution between consumers and suppliers.

utility of money is the same for the losers and winners of protection (with respect to the same amount of money), and only then, is the above-described analysis of welfare effects correct. If, however, the marginal utility of money is different for winners than for losers, the traditional welfare analysis of protection is incorrect. And this seems to be the case: Examining that part of economic policy which is concerned with social policy instruments, it can be said that social policy only makes sense if the marginal utility of money differs between rich and poor citizens. Assuming for the moment, just like social policy does, that the idea of the marginal utility of money decreasing with rising income holds, then foreign-trade protection has, aside from deadweight losses, welfare losses that are solely due to income redistribution because the sector which profits from protection, profits less than the losing sector loses.[8]

III.B.b. The Welfare Formula

In the following we shall distinguish between the national deadweight loss of a trade barrier and the international deadweight loss. The national deadweight loss consists of three parts, namely the "pure" deadweight loss

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8 Needless to say that the argument holds in the case of an initial equilibrium only; this makes it different from social-policy analysis because the very idea of social policy is a social disequilibrium in the first place.

referring to formula [1], the distributional loss referring to formula [4], and the transfers. The transfers at the same time make up for the difference between the national and the international deadweight loss: In case the quota rents accrue to foreigners –non-Europeans in the case of the EU – they are considered to be losses to the national economy (see Appendix II.3).

Actually, the expression "international deadweight loss" is a euphemism because the deadweight losses suffered by discriminated foreign suppliers are not considered. But it may also be argued, and this is not meant to be an excuse, that the national deadweight loss does not capture all the welfare effects of protection; for example, there are induced costs in the exporting sector of the protecting country through induced changes of the exchange rate, or through more expensive means of production or other inputs, not to mention possible trade policy reactions of foreign countries.

III.C The Fact-Finding Process

III.C.1. Preliminary Remarks

In analyzing the impact of foreign-trade policy the respective theoretical tools and the corresponding methods must be adapted to the particular type of protection. Measuring the cost of protection is quite straightforward in

the case of simple ad valorem tariffs. As regards the measurement of non-tariff trade barriers, the model becomes more complicated; therefore, of all those possible non-tariff barriers (see footnote 1) only border measures in the form of quota protection will be considered here. With respect to the latter, it is necessary to differentiate between ATC quota protection – as applied to exports of textile and clothing producing countries – and other kinds of quota protection, for instance as applied in the EU in the case of imports of shoes, tableware, etc., which tends to impact primarily on the importing side.

The background behind the spawning of the MFA (see above) must be briefly recalled in order to better appreciate the intricacies in dealing with its impact. In essence the MFA, as was conceived in the negotiations prior to inception in 1974, and continued through the various extensions up to the ATC in the UR in 1994 (see Baughman et al.), was initially nothing more than the transfer of country-specific monopoly rights to exporters of textile and clothing products in developing countries. As succinctly stated by Yang et al. (1997: 255) the developed countries "felt it necessary to 'purchase' compliance by giving the exporters the right to control exports. Because export rights [were] scarce, they became valuable assets in those supplying countries [i.e. developing countries] that are internationally competitive

suppliers." How the rights to these assets were distributed in the various countries was not regulated, but in those countries which were particularly successful they tended to be more performance oriented.

As noted earlier, the quota rents initially accrued almost entirely to individuals (or legal entities) in the producing countries, who were no doubt also subjects of these countries. Over the years, however, importers (buyers) discovered that new textile and clothing producing countries could also offer similar products at competitive prices and therefore they acquired quotas. Hence, the quasi-monopolistic position of certain major suppliers (e.g. Hong Kong) tended to be diluted, at least to the extent the major suppliers themselves did not establish production facilities in these new MFA locations. Given the new sourcing options and the increase in concentration on the importers' side, it was conceivable that quota rents were shared with (to a smaller or even larger degree) importers.

But there were indeed entrepreneurs in countries like Hong Kong, Taiwan and Korea, who relocated production facilities to newly competitive countries, building up capacities there and – where possible – capturing

rents in these countries (see Spinanger 1995: 237–250).[9] The issue in the context of this paper is simply that the rents flow to the supplying countries.

III.C.2. Measuring Tariff Equivalents of Non-Tariff Trade Barriers

The above applied formulas for calculating the effects of trade protection in the country applying the protection (see Appendix AII) imply that information is required on imports, employment and domestic production for those sectors to be analyzed. However, expressing the effects of trade protection as % of imports in the case of deadweight losses and transfer effects, and as % of employment in the case of employment effects, and as % of domestic production in the case of production effects, makes it possible to leave out imports, employment and production and to concentrate on other variables, namely the tariff equivalent of NTBs, the price elasticity of import demand and the price elasticity of suppply (i.e. σ, β_m and $\varepsilon_{i.}$). This will be done in the following; special emphasis will be placed on estimating σ, i.e. on estimating the wedge that import protection

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9 The degree to which such shifts were likewise accompanied by transferring quasi-monopoly power is not know. While the dominance of Hong Kong producers throughout the region may be an indication that this does occur, the actual shares of these producers in the individual countries would tend to run counter to this argument.
More likely is that offshore producers were able to capture only the prevailing rents in the individual countries, plus perhaps an increment for reducing information costs for buyers accessing third country markets via Hong Kong.

drives between the prices charged for imports on the domestic market and the prices paid to foreign exporters of the product.

An initial and naive approach to measuring the tariff equivalent (i.e. the price effect) of a non-tariff trade barrier would be to divide the domestic price of an imported good by the price of the imported good (minus 1). This is a naive approach for several reasons:

– The price of the imported good is considered to be equivalent to the cost of production. To this must be added the costs of distribution, taxes and subsidies, if any, and – most important – the price effect of the domestic market structures on the imported good. The latter refers to the competitive environment in which importers operate (e.g. the domestic price may be increased due to a monopolistic element, or even decreased due to the impact of possibly "cut-throat" competition among importers).

– There is no way to statistically identify a formerly imported good once it enters the economy; if there are domestically produced substitutes, the qualitative "proximity" of the domestically produced good to the imported good is expressed as a price differential which would reflect the quality differential; thus, the supposed tariff equivalent of the NTB can include and express a heterogeneity of products.

In order to circumvent, or eliminate, these problems there are several methods that were applied in the past and one or the other that could be applied in the future:

III.C.a. Two Four-Product-Baskets Approaches

(1) The Case of the Non-Substitutable Substitutes

This method was applied to developments in the early 1970s when it was attempted to capture the price effect of quantitative quotas on imports from some less-developed economies (such as Hong Kong). The quotas referred to imports of women's underwear (made from cotton), in the framework of the "Long-Term Arrangement Regarding International Trade in Cotton Textiles". For that purpose four product baskets were statistically created: one containing regulated imports of women's underwear, one containing domestically produced women's underwear (domestic apparent consumption instead of domestic production was used), liberalized imports which were produced in the foreign country with the same production function as the regulated imports, and domestic production produced with the same production function than the regulated ones (see Appendix AII.4).

The conditions which have to hold to make the method applicable are:

(a) quality differences between regulated imports and domestic products of the same variety are the same as between liberalized imports (produced with the same production function) and their domestic counterparts;

(b) nominal tariffs of regulated and liberalized products differ but insignificantly;

(c) the elasticity of substitution between the two groups is very low.

This method is quite intriguing because it seems to rely on two conditions which contradict: A zero elasticity of substitution of demand (i.e. a zero cross-price-elasticity of demand) between the liberalized and regulated products which are imported or produced domestically, and, at the same time, a uniform production function for regulated and liberalized imports. The solution in this case was that the import quotas, among others, referred to women's underwear, and that the liberal import regime contained, among others, men's underwear. It could be argued that at the time the analysis was made (some 25 years ago) the zero substitution elasticity was quite plausible.

The computations led to the following results: Whereas the prices of imports (i.e. unit values) of liberalized products were on average of 72.4 % higher than the respective prices of domestic goods, the prices calculated for

restricted goods were 150 % higher than the prices of relevant domestic goods. In other words, the computations showed that the price gap in relation to domestic products was 77.6 percentage points higher for restricted commodities than for liberalized ones. This price gap corresponded – in terms of import prices of the unrestricted products – to an implicit tariff of 51.7 %.

(2) The Case of the Competing Multinational Firms

This method is applicable in those few cases where a multinational corporation sells its goods not only in the domestic market (here: Germany), but also in other countries, particularly those with a more liberal international trade regime. If it is applicable, it is argued, the prices charged by the said company in the two different countries would reflect – ceteris paribus – the effects of the trade barriers. Taking absolutely identical commodities of the same firm which are traded freely in foreign markets as a reference, allows the calculation of the price effects of trade barriers without having to worry about factors such as differing retail margins (see Appendix AII.4).

It should be added that the method allows to neglect the exchange rate between the countries considered since only intra-firm exchange rates (and

intra-firm retail margins) are involved. The conditions necessary to apply this method are that

a) sufficient information on the prices demanded by the multinational firm at the consumer price level is available, and

b) the multinational firm does not apply any loss-leader practices with respect to the relevant products during the time period analyzed.

In order to initially find out whether this method would yield the expected results, data from IKEA catalogues for the years 1988-1998 were collated with respect to products subjected in the EU to quota restrains (as of the early 90's) and those not subjected to quotas at all. For each year identical products were selected from the German and the Hong Kong catalogues, whereby every attempt was made to maintain the same articles in the sample. As can be seen from Table 4 the protection indicator does seem to reveal that the imposition of quotas in the EU did indeed cause prices for these products to shift upward relative to those not affected by quotas. This led us to believe that it was worthwhile to calculate the tariff equivalents as can be found in Table 5.

Table 4 — Test for Price Differences between Protected and Non-Protected Sectors: The Case of the Competing Multinational Firm

Years	Conversion factors in		Protection indicator (%)[c]
	Protected sector (%)[a]	Non-protected sector (%)[b]	
1988	21.2	21.4	–0.8
1990	17.0	18.1	–6.4
1992	22.7	17.6	28.6
1993	**19.1**	**15.7**	**21.7**
1994	24.4	17.8	37.2
1995	20.2	18.1	10.6
1996	18.8	16.8	12.0
1997	15.1	13.4	12.8
1998	20.1	17.9	12.3

[a]Ratio of prices of selected articles in Germany to prices in Hong Kong for protected sector. — [b]Ratio of prices of selected articles in Germany to prices in Hong Kong for non-protected sector. — [c]Percentage difference between conversion factor in protected sector and in non-protected sector.

Source: Own calculations based on IKEA catalogues from Hong Kong and Germany.

Table 5 — Calculation of a Tariff Equivalent According to the "Competing-Multinational-Firm" Method: Tableware, 1993

– An Example –

HS category	Product description	Quantity	Prices		Conversion factors	Gross tariff equivalent[a] (%)	Tariff rate[b] (%)	Tariff equivalent[c] (%)
			Price in Hong Kong (HK$)	Price in Germany (DM)	Price in DM/ price in HK$ (%)			
	Protected sector							
6911.10-00	Plate Ø 24,5 cm	4 pcs.	198.–	36.–	18.18	15.7	13.5	14.7
	Soup plate Ø 19.5 cm	4 pcs.	174.–	36.–	20.69	31.7	13.5	25.3
	Serving plate 28 x 19.5 cm	1 pc.	128.–	26.–	20.31	29.3	13.5	23.0
	Tableware	5 pcs.	228.–	39.–	17.11	8.9	13.5	2.5
	Average[d]	·			19.07	21.4	13.5	16.4
	Non-protected sector							
8211/8215	Cutlery	16 pcs.	366.–	55.–	15.03		12.5	
9405.20-11	Table lamp 40 cm	1 pc.	988.–	169.–	17.11		7.1	
to	Floor lamp 121 cm	1 pc.	1 288.–	199.–	15.45	–	7.1	–
9405.20-99	Table lamp 22 cm	1 pc.	118.–	18.–	15.25		7.1	
	Conversion rate and tariff [d]				15.71		8.5	

[a]Calculated as individual rate of protection, divided by average conversion rate minus one, multiplied by 100. — [b]If more than one HS category, then unweighted average calculated. — [c]Calculated as: (Conversion factor in protected sector /conversion factor in non-protected sector – 1) · (100 + gross tariff equivalent in non-protected sector – actual tariff rate). — [d]Arithmetic average.

Source: IKEA Catalogue, 1993. – Own calculations.

This approach does, however, have certain weaknesses: to the extent that catalogue prices across countries are shaped by different factors, then price comparisons could yield distorted results. In the case of Hong Kong and Germany there are at least three factors which could tend to distort prices: (i) the respective organizational setup; (ii) the impact of services on prices; (iii) a different market niche. After examining these three factors, it was concluded that – regardless of their impact – there is no reason to assume that they would have a differentiated effect on products in the protected versus the non-protected sector.

III.C.b. Two International-Trade-Theory Approaches

(3) The Case of the Trade Diversion

The trade diversion method presupposes that an import barrier imposed on the exports of one country leads to a diversion of trade to the "second-best" supplier of the goods under quota regulation.[10] Buying from the "second-best" supplier is necessarily more expensive for the domestic consumer than to buy from the original (the "first-best") supplier. Product heterogeneities at the 8-digit level of import statistics should not play any major role regarding this method due to the fact that the trade and production contracts

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10 Table 6 merely demonstrates this method using data from 1993.

normally contain highly specified product descriptions and tight quality controls. This method can be applied to all quotas considered, i.e. also to quotas on textiles and clothing; although one might argue that the ATC at the same time applies to the trade-diversion countries which are taken for a reference, the general argument is that there is competition also among countries whose exports are under quota regulation (see Appendix AII.5).

This method seems to be more straightforward and easier to apply than the first one because it does not depend on the specific and rarely realistic conditions of the former method. However, it has to be borne in mind that there are some conditions which have to be fulfilled to make this calculation represent the true price effect of the non-tariff trade barrier:

a) there must not be significant differences in quality between countries i and t on the 8-digit level of trade flows;

b) producers in country i must not react by changing the prices of their exports;

c) it must be possible to identify country t, i.e. the country which will receive the additional orders.

Table 6 — Calculation of a Tariff Equivalent According to the "Trade-Diversion Method": Footwear, 1993

– An Example –

HS Category	Product[a]	Imports from						Tariff equivalent[d] (%) (7)
		PR China			Taiwan			
		Value (1 000 ECU) (1)	Quantity (t) (2)	Unit value[b] (1 000 ECU/t) (3)	Value (1 000 ECU) (4)	Quantity (t) (5)	Unit value[c] (1 000 ECU/t) (6)	
6403	Footwear with outer soles of rubber, plastics, leather or composition leather and uppers of leather:							
6403.51-19	– Footwear with outer soles of leather, with uppers of leather, covering ankle (but not calf), with in-soles >= 24 cm, for women (excl. 6403.11-00 to 6403.40-00)	692	43	16.09	194	8	24.25	50.7
6403.59-95	– Footwear with outer soles of leather, with uppers of leather (not covering the ankle), with in-soles >= 24 cm, for men (excl. 6403.11-00 to 6403.40-00, 6403.59-35 and 6403.59-50)	988	105	9.41	318	14	22.71	141.3
6403.59-99	– Footwear with outer soles of leather, with uppers of leather (not covering the ankle), with in-sole >= 24 cm, for women (excl. 6403.11-00 to 6403.40-00, 6403.59-39 and 6403.59-50)	598	46	13.00	65	5	13.00	0
Total		2 278	194	11.74	577	27	21.37	82.0
Average		—	—	12.83[e]	—	—	19.99[e]	55.8/64[f]

[a]Excerpted from HS Nomenclature of Goods. – [b]Col.(1)/Col.(2). — [c]Col.(4)/Col.(5). – [d][(Col.(6)/Col.(3))-1] 100. – [e]Unweighted average of unit values. – [f]Unweighted average of tariff equivalents.

Source: SAEG, Monthly EEC External Trade and External Trade Supplement. – Own estimates and calculations.

(4) The Case of the Law of One Price

This method refers to the "law of one price" for a specific good, i.e. to a uniform price assumed to prevail in all countries in the case of a world-wide free trading system.[11] It is argued that (i) at the 8-digit level of import and export statistics traded goods are highly identical, no matter where they come from or where they go to – this, of course, can be considered as being a rather heroic assumption; (ii) the import restrictions of Germany are also imposed relatively equally (against the same foreign suppliers) across the other EU countries; (iii) the price-raising effects of trade barriers in the importing country apply to all EU countries; (iv) trade among EU countries is free of barriers. If all this is the case, the effects of import quotas on domestic prices can be estimated from German prices of exports into other EU countries (cf. Table 7; see Appendix AII.5).

Our tests show that the law-of-one-price method is not too reliable. The reasons might be manifold, for example:

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11 Table 7 merely demonstrates this method using data from 1993.

Table 7 — Calculation of a Tariff Equivalent According to the Law-of-One-Price Method: Textiles Category 4, 1993

– An Example –

Product Category[a]	Imports from PR China			Exports to the United Kingdom			Tariff equivalent (%)[d] (7)
	Value (1000 ECU) (1)	Quantity (t) (2)	Unit value[b] (1 000 ECU/t) (3)	Value (1 000 ECU) (4)	Quantity (t) (5)	Unit value[c] (1 000 ECU/t) (6)	
Men's or boys' shirts, knitted or crocheted (6105):							
– of cotton (6105.10-00)	5 015	352	14.25	1 192	52	22.92	60.8
– of synthetic fibbers (6105.20-10)	450	42	10.71	626	50	12.52	16.9
T-shirts, singlets and other vests, knitted or crocheted (6109):							
– of cotton (6109.10-00)	22 591	2 141	10.55	6 320	319	19.81	87.8
– of man-made fibers (6109.90-30)	1 189	59	20.15	950	37	25.68	27.4
Total	20 245	2 594	11.27	9 088	458	19.84	76.0
Average	—	—	13.92[e]	—	—	20.23[c]	45.3/48.2[f]

[a]Excerpted from HS Nomenclature of Goods. – [b]Col.(1)/Col.(2). — [c]Col.(4)/Col.(5). – [d][(Col.(6)/Col.(3))-1] 100. – [e]Unweighted average of unit values. – [f]Unweighted average of tariff equivalents.

Source: See Table 6.

a) even at the 8-digit level of foreign-trade statistics, homogeneity of German exports and imports is not guaranteed;

b) discrimination might exist among EU countries regarding imports under EU quota regulations; in fact, the "Official Journal" of the EU seems to contain a fair amount of discrimination among EU countries regarding their trade policy options.

III.C.c. The Auction Approach

Not surprisingly, three of the four methods of measuring tariff equivalents give little reason to be particularly confident about measuring the impact of protection on import prices. After all, they are based on unit values, and thus on wide-reaching assumptions. Unit values, no matter how disaggregated they are, differ for many reasons over time or across countries, only one of the many reasons being protectionist measures (Chan-Lee 1971). As opposed to actual market prices, unit values are second-best proxies for the price and quality component in international trade.

In order to deal with "real" prices instead of unit values, an economist would prefer applying data from auction sales of protected goods. And indeed there is one country, often labelled as a free-trade country, where

quotas are openly sold. In Hong Kong there are data available on quota prices on a monthly or even daily basis, referring to the specific product categories (be they for the EU or the USA) covered by the ATC.

III.C.3. What about Elasticities?

A large number of econometric "guesstimates" of elasticities in foreign trade (starting with Houthakker 1969) do exist. It can be said that the results cover a wide spectrum. Some authors tried to estimate foreign-trade elasticities by starting from a balance of payments equilibrium, and deducting the domestic price elasticities of demand. Others, such as Sawyer and Sprinkle (1996, 1997) start by estimating an import demand function. The latter show in a survey (1996) that price elasticities referring to changes in foreign prices range between |–0.39| and |–4.8| regarding *total imports* of the United States (the underlying studies rely on the time-series analyses of different time spans); the ratio of changes in foreign prices and in domestic prices led to results, again with respect to the total imports of the United States, between |–0.13| and |–3.0|. With respect to *manufactured imports* the relative price elasticities range between |–0.5| and |–4.7|.

Senhadji (1997) estimates import demand equations for a large sample of countries, showing that the elasticity for Germany's total imports is |–0.2|,

for France |–0.3|, Italy |–0.4|, and the United States |–0.5|, all these elasticities exhibiting different levels of significance. Other studies, such as one of Sazanami/Matsumura (1985) and Leppänen/Pyy (1995) are quite in the same range. All in all, approaches and results are wrought with difficulties, implying a definite caveat. [8]

What can be said in addition is that price elasticities in foreign trade are generally – in absolute terms –significantly higher than "domestic" price elasticities. Secondly, price elasticities should be considered as rising with disaggregation, reflecting – on the demand side – an increase in the availability of products for the consumer.[9] Given the above welfare and employment-effects formulas, it can be concluded that aggregated statistics may lead to a significant underestimation of the true welfare/employment effect. This underestimation may be further aggravated if the variance of tariff rates rises with disaggregation.

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8 Taking the above cited results of Sawyer/Sprinkle for a reference, welfare and employment effects would be between 9 times (4.7/0.5) and 23 times (3.0/0.13) higher when calculated by applying the upper price elasticity as compared to the lower one (cf. page 20).See also the estimates and sources referred to in Dimaranan et al. (1997) in connection with the GTAP Data Base.

9 Interesting to note that with disaggregation the variance of tariff rates (and possibly of tariff equivalents of NTBs) also rises.

III.C.4. The Bottom Line

Import protection raises the prices of importables and opens a margin for price increases by domestic producers. The purpose of the above was to measure the price margins created by non-tariff trade barriers. Since in three cases we had no actual statistics on prices of imports in the domestic market, three of the working hypotheses put forward permitted only a rough kind of measurement. A fourth method incorporated actual prices. Each of the methods discussed compare data from different sets of statistics: Method 1 compares import statistics with statistics of domestic consumption (which includes products from domestic production minus exports); the second method compares "domestic prices" in different countries; the third method compares imports from one country with imports from another country; the fourth method compares imports from one country with exports of the country of destination. In addition, methods 1, 3 and 4 use unit values as a proxy for prices. Thus, the main problem of all methods seems to be: Do we compare homogenous products? If not, how do we allow for quality and structural differences in an adequate manner? In the overview presented in Table 8 it is argued that the method of the multinational corporation should be the most reliable, and that the law-of-

one-price method is the least reliable of the four methods. The criteria (columns 3–6) are:

– Homogeneity. This refers directly to quality differences of the products compared. The "product mix" (column 3) deals with changes in the product mix at the 6-digit or 8-digit level of the respective statistics. Even at the 8-digit level each commodity group consists of many sub-products, each possibly having a different price, different specific weight, different characteristics, etc. (see e.g. Aw, Roberts [1988], De Melo, Winters [1993] and sources therein). The structure within each commodity group must be the same in the countries and statistics taken for a reference. If they are different we have a problem of quality difference. The multinational corporation approach is the best in this respect because it compares truly identical products. Column 4, the "real" quality differences, refers to quality differences that are not a statistic artifact such as the structural component in column 3.

Table 8 — Overview of Some Methods and Some Problems of Measuring Non-Tariff Barriers to Trade

Working hypothesis	Empirical basis	Homogeneity		Retail margins	World market price	Expected reliability[1]
		Product mix	"Real" quality differences			
(1)	(2)	(3)	(4)	(5)	(6)	(7)
1) Non-substitutable substitutes	Unit values of imports and of domestic production (6-digit level)	2	2	2	1	3
2) Multinational corporation	Market prices contained in catalogues of firms	1	1	2	1	1
3) Trade Diversion	Unit values of imports (8-digit level)	2	2	1	1	2
4) Law-of-one price	Unit values of imports and of exports (8-digit level)	4	4	4	1	4

[1] Scale between 1 (the most reliable of the four approaches) and 4 (the least reliable of the four approaches).

– Retail margins (column 5). This criterion refers to the Balassa-argument that prices of non-tradables rise with the degree of development of a country. In other words: even identical products have different prices in different countries under free trade conditions if the available statistics present unit values, or prices, which include some form of service. Retail margins are a "pars pro toto" for this argument. In this case we feel that the trade-diversion method should operate with identical retail margins as long as imports from a country at the same level of economic development are considered.

– World-market-price effect. If the country applying import protection thereby regulates a large part of foreign supply one might expect the world-market price to react (i.e. to be lower than without protection). Under that circumstance the price effect of the non-tariff barrier calculated by each of the methods would be too high. We don't see that any of the methods has a comparative advantage in this respect.

Unanswered remain questions about two issues. First of all, the degree to which quota rents are actually of relevance today, particularly in the Asian countries, must be examined further. With regional integration occurring between the EU and its contiguous as well as indirectly contiguous neighbours plus the US and its Southern neighbours, trade is being diverted

from traditional suppliers in Asia to these countries. This may well have led to lower quota utilization rates and hence in some cases to quota redundancy. Secondly, the fact that quota rents have been reduced or even disappeared on the export side does not necessarily mean that this is the case on the import side. Unfortunately, little information exists on this issue, but with strong competition between major retailers/producers, the question is how much room exists for such rents. Leaving aside the implications of shifting quota rents from the supply side to the demand side, at least in light of the above mentioned spillover investments from the original major suppliers, there would seem to be reason to believe that the impact of the ATC liberalization implies that the regional distribution could be quite different than what has been calculated in many of the computational models.

IV. Empirical Results

IV.A Introduction

As outlined above, the following results evolve from an applied partial equilibrium model. The model is based on the concept of consumers' surplus. As with any other model with stated constraints, this implies that the results are not refutable – with the exception of calculation errors, of course. Consequently, the empirical work is not performed in order to refute or test a hypothesis, but rather to gather valuable information about the dimensions of the welfare/employment effects of trade policies. The problems we encounter are not those of correctly forecasting, but of correctly measuring.

In the field of trade barriers, especially non-tariff trade barriers, we have to acknowledge that we know all too little about them. As a matter of fact, the normal procedure is that the governments, which have long applied these trade barriers, are in the habit of demanding research work on the question of what trade barriers they apply and how these barriers work. Indeed, with respect to the German trade policy (which formally has been in the domain of the European Union since the end of the 1960s), we have to rely on information published, for example, in the official journals. As far as non-

tariff trade barriers are concerned, these journals give only scattered information and, tantamount to that, the information is hardly understandable (cf. Glismann 1996: 94 sqq.).[12]

Aside from the shaky information about non-tariff trade barriers and how they are applied, we tried to demonstrate some of the problems that arise when trying to calculate the price effects of such barriers; the same holds of course for elasticities. Both pieces of information are essential when trying to calculate welfare, employment and related effects: The welfare effects, for example, depend in a linear fashion on elasticities; whether the relevant elasticity β is $|0.1|$ or $|10|$ induces welfare effects to vary by the factor 100. With respect to the price impact, these are squared, hence errors of measurement are squared, and not just linearly influenced. "So, in the strictest sense, we operate with a measuring rod (or triangle) of distressingly elastic rubber" (Scherer 1970: 404).

In the following, first the effects of quotas will be calculated, and then the effects of what we shall call trade policies (i.e. quotas and tariffs). It should

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12 Aside from the import quotas for MFA/ATC published in the Official Journal of the European Communities information on quotas aimed at other products on a bilateral abasis (e.g. EU restraints on Japanese cars) are hard to come by.

be realized that the tariff effects alone are not the difference between the trade-policy effects and the quota effects, because the effects of quotas and tariffs are multiplicative.

With respect to calculating the impact of the ATC we have "hard" information on the German trade with Hong Kong (including quota prices) regarding MFA categories in textiles and clothing, basically "hard" information regarding the EU trade with Hong Kong, and less than "hard" information regarding trade with developing countries (as well as Eastern European countries).

The term "developing country" or "restrained exporter" is understood as referring to all Non-OECD countries before 1995 (including Turkey). Most of them are subjected to EU restraints via quotas.

In carrying out the calculations the following assumptions were made:

- The basis upon which ATC price effects were calculated is the trade between Germany and Hong Kong.

- Hong Kong was considered to be a typical representative for a restrained exporter. Knowing that Hong Kong exports are being produced on

demand as in other major exporting countries, this assumption seems valid.[13]

– In expanding results to the European Union, the impact of its trade restrictions were captured by a restrictiveness index; we arrived at this index by calculating the ratio between quota imports per capita for Germany and for the EU as a whole. The quota premia, which were available for Hong Kong's exports into Germany, were multiplied for the total EU by this ratio of restrictiveness.

– The categories for which we had information were considered to be correctly reflecting the situation of all clothing (textile) products with respect to the ATC.

– Since we have no information, neither in Germany nor in the European Union, on national employment in the import-substituting sectors of the individual categories, we crudely assumed that the labour productivity of the total industry (clothing, textiles) was identical to the labour productivity in the individual categories. Then we assumed that the number of employed who could potentially be displaced by liberalization

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13 Of course, Hong Kong produces higher-priced products, but this is irrelevant in this connection.

would be (at a maximum) equivalent to the affected imports divided by the labor productivity variable.[14]

To summarize the above: It was important for the study to isolate the country-specific impact of the MFA/ATC within the EU. We achieved this by starting with detailed trade, production, employment and pay data for Germany. The respective quota prices for trade with Germany were drawn from Hong Kong. The quota prices for important catagories were used as benchmarks for calculating the price effects. To apply these to all relevant imports from major restrained exporters it was assumed that under similar demand conditions quota prices would be relatively similar (i.e. vis-à-vis export prices). While quota allocation systems differ noticeably across restrained exporters, the Hong Kong quota allocation system is deemed very efficient. Hence its quota prices must be considered to be lower. This being the case using Hong Kong quota prices does not tend to inflate the estimates of the costs of protection.

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14 This, of course, implies that the labor productivity variable for imports is of the same size as for domestic production. As far as the EU is concerned this is probably a reasonable assumption. However, should the employment affects in the developing countries be of interest, lower values would have to be assumed.

IV.B The Results

The empirical results are shown in Tables 9–13. The basic information that lead to the welfare calculations are in the Annex, Tables AIV.1–AIV.14. The first Annex Tables (AIV.1–AIV.3) are concerned with tariff equivalents and quota prices which were the result of auctions among traders in Hong Kong. Tables AIV.4–AIV.12 were calculated in order to arrive at an index of restrictiveness as described above. This index was meant to project results calculated for Germany to the whole European Union; this way of extrapolation does have the disadvantage that in the case of too few observations the final results achieved for Germany may not be compatible with those achieved for the EU (as in the case of textiles, where we had to rely on one commodity group only, cf. footnote below). Tables AIV.13 and AIV.14 provide import, employment, production and price data on the ATC categories which are used in the following to estimate the ATC and trade-policy effects. Table AIV.15 contains, for three ATC categories, the effects of quotas and trade policy at large (which covers quotas and tariffs) with respect to German imports from the People's Republic of China.

Tables 9–13 show that transfers to foreigners ("quota rents") are the largest part of the national deadweight losses.[15] Second are the losses due to the redistribution of incomes because of the hypothesized decline in the marginal value of money for those that benefit from the redistribution.

When calculating the welfare effects in terms of "jobs-saved" by protectionist trade policies (cols. 9–11 in Tables 9–12), the national deadweight losses are on average (last row) between 81 600 ECU per employed person (trade-policy effects of EU imports from Hong Kong, Table 12) and 207 000 ECU (German ATC effects of imports from Hong Kong, Table 9) with respect to the clothing sector. The international losses for the same sector are between 14 100 per capita (Table 10) and 37 100 in the German case (Table 9, same category). The relations show that

- transfers matter (as can be seen from difference between the "national" and the "international" per-capita effects), and that

- the costs of protection per job saved are significantly larger in the case of Germany than in the case of the total European Union. This is mainly due

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15 In case a comparison between the results achieved here and those of other studies is aimed at, one should bear in mind that the traditional deadweight losses are those welfare effects that are called "pure" in Tables 9–12 (i.e. col. 2).

to the fact that the number of jobs endangered is quite small in the case of Germany relative to the European Union.

The trade-policy effects which are defined to include quotas and tariffs are at first sight surprisingly low when compared with the ATC per-capita effects: The national (German) total costs per capita of the trade policy as a whole are smaller than the national total costs of the ATC alone. Again, this may be explained by simple algebra: The change in the total national deadweight loss when moving from ATC to ATC cum tariffs is smaller than the corresponding increase in the employment effects; it should be remembered that the transfers of trade policy as a whole are similar to those of the ATC alone because tariffs are redistributed to the EU.

In Table 13 the main results of the welfare calculations are briefly portrayed. The employment effects in the EU of ATC and of ATC plus tariffs seem to be rather low relative to total employment.[16] In the clothing industry total developing country protection just saves 4.5 % of the jobs on

16 The decline in the relative employment effect as well as in the welfare effects regarding textiles when moving from Germany to the EU is due to the restrictiveness index and to the only one observation in textiles available. Knowing that in other areas quotas are quite tight, the restrictiveness index for textiles could be too low (which is to say that the EU is less liberal than the index shows). The calculations thus wrongly indicate an absolute decline in the employment and welfare costs data.

average and leads to welfare reductions that are by and large in the same range.

Based on the estimates of the national total costs of trade policy in Table 13 (cols. 6 and 8 for developing countries) figures for 1997 are calculated by applying the growth rates of T&C imports from this developing countries over the time period 1990-1997.[17] The resulting figure for 1997 amounts to roughly ECU 12 bill. For a family of four this would mean additional expenditure of almost ECU 130 per year or even more if babies or young children were present (see footnote on page 48).

[17] The growth rates amounted to 66% in the case of textiles and 90% in the case of clothing. To adjust for the fact that textiles in our sample were underrepresented, we accordingly adjusted the textile imports to coincide to the levels relative to EU clothing imports from all developing countries in the base year 1990. The reason for the underrepresentation of textiles is that Hong kong does not export many textile products in the restricted categories. By expanding our sample to coincide with the actual figures we are not distorting the results, but rather ensuring that the sample correctly reflects trade with the restricted countries.

Table 9 — ATC Effects on Welfare, Distribution and Employment: German Imports from Hong Kong 1990

Category	Welfare					Sectoral Employment		Welfare Costs per Job Saved		
	National deadweight loss				International deadweight loss [a,b]					
	"Pure" [a]	Quota rents [a]	Distribution [a]	Total [a]				"Pure"	Total	International
	(1000 ECU)					%	Number	(1000 ECU)		
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Textiles										
2	0.4	55.5	10.9	66.8	11.3	0,7	0.3	1.4	231.8	39.2
Clothing										
4	78.8	2645.2	487.5	3211.5	566.3	3,2	16.0	4.9	201.0	35.4
5	1059.8	20341.2	3481.5	24882.5	4541.3	5,9	115.6	9.2	215.2	39.3
6	329.6	10650.0	1955.8	12935.4	2285.4	3,3	64.1	5.1	201.8	35.7
7	134.7	6407.8	1211.7	7754.2	1346.4	2,2	39.5	3.4	196.4	34.1
8	491.5	11796.8	2093.8	14382.0	2585.2	4,6	69.1	7.1	208.2	37.4
21	110.1	3950.1	732.2	4792.4	842.3	3,0	23.9	4.6	200.2	35.2
Sum 4-21	*2204.5*	*55791.1*	*9962.5*	*67958.2*	*12167.1*	·	*328.2*	*6.7*	*207.0*	*37.1*

[a] For definitions see pp AI 1-2. – [b] National deadweight loss minus quota rents.

Source: Tables AIV.5-AIV.14. – Additional calculations.

Table 10 — ATC Effects on Welfare, Distribution and Employment: EU Imports from Hong Kong 1990

	Welfare					Sectoral Employment		Welfare Costs per Job Saved		
	National deadweight loss				International deadweight loss [a,b]					
	"Pure" [a]	Quota rents [a]	Distribution [a]	Total [a]				"Pure"	Total	International
Category	(1000 ECU)					%	Number	(1000 ECU)		
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Textiles										
2	0.3	199.0	19.8	219.1	20.1	0.2	2.7	0.1	80.5	7.4
Clothing										
4	585.4	13210.8	1061.4	14857.6	1646.8	4.9	141.4	4.1	105.1	11.6
5	9833.6	111805.0	6086.7	127725.3	15920.3	11.4	1024.4	9.6	124.7	15.5
6	3471.0	59467.2	4341.7	67279.9	7812.7	6.8	610.4	5.7	110.2	12.8
7	3674.6	50922.4	3310.8	57907.8	6985.4	8.8	498.6	7.4	116.1	14.0
8	4782.2	64335.6	4096.0	73213.8	8878.2	9.1	624.8	7.7	117.2	14.2
21	1533.1	24094.4	1688.2	27315.8	3221.4	7.5	243.1	6.3	112.4	13.3
Sum 4-21	*23880.0*	*323835.4*	*20584.8*	*368300.3*	*44464.9*	·	*3142.7*	*7.6*	*117.2*	*14.1*

[a] For definitions see pp. AI 1-2. – [b] National deadweight loss minus quota rents.

Source: Tables AIV.5-AIV.14. – Additional calculations.

Table 11 — Trade-Policy Effects[a] on Welfare, Distribution and Employment: German Imports from Hong Kong 1990

	Welfare					Sectoral Employment		Welfare Costs per Job Saved		
	National deadweight loss				International deadweight loss [a,c]					
	"Pure" [b]	Quota rents [b]	Distribution [b]	Total [b]				"Pure"	Total	International
Category	(1000 ECU)					%	Number	(1000 ECU)		
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Textiles										
2	20.3	55.5	34.2	110.0	54.5	5.2	2.0	9.9	55.0	26.7
Clothing										
4	572.1	2645.2	529.0	3746.3	1101.1	8.6	43.0	13.3	87.1	25.6
5	3897.4	20341.2	2432.0	26670.6	6329.4	11.3	221.7	17.6	120.3	28.5
6	2457.1	10650.0	2115.0	15222.1	4572.1	9.1	175.0	14.0	87.0	26.1
7	1807.1	6407.8	1813.0	10027.9	3620.1	8.1	144.6	12.5	69.3	25.0
8	2411.0	11796.8	1768.1	15975.9	4179.1	10.2	153.0	15.8	114.4	27.3
21	959.2	3950.1	864.2	5773.5	1823.4	8.8	70.7	13.6	81.7	25.8
Sum 4-21	*12103.9*	*55791.1*	*9521.3*	77416.3	21625.2	·	*808.1*	*15.0*	*95.8*	*26.8*

[a] ATC plus tariffs. – [b] For definitions see pp. AI 1-2. – [b] National deadweight loss minus quota rents.

Source: Tables AIV.5-AIV.14. – Additional calculations.

Table 12 — Trade-Policy Effects[a] on Welfare, Distribution and Employment: EU Imports from Hong Kong 1990

	Welfare					Sectoral Employment		Welfare Costs per Job Saved		
	National deadweight loss				International deadweight loss [a,c]					
	"Pure" [b]	Quota rents [b]	Distribution [b]	Total [b]				"Pure"	Total	International
Category	(1000 ECU)					%	Number	(1000 ECU)		
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Textiles										
2	267.6	199.0	509.0	975.6	776.6	4.7	78.0	3.4	12.5	10.0
Clothing										
4	2470.7	13210.8	1828.1	17509.6	4298.8	10.1	290.5	8.5	60.3	14.8
5	19708.4	111805.0	6404.6	137918.0	26113.0	16.1	1450.3	13.6	95.1	18.0
6	11095.5	59467.2	6272.6	76835.3	17368.1	12.1	1091.3	10.2	70.4	15.9
7	9141.3	50922.4	4102.0	64165.7	13243.3	13.8	786.4	11.6	81.6	16.8
8	11533.2	64335.6	4962.8	80831.6	16496.0	14.1	970.2	11.9	83.3	17.0
21	4426.1	24094.4	2294.1	30814.6	6720.2	12.7	413.1	10.7	74.6	16.3
Sum 4-21	*58375.1*	*323835.4*	*25864.2*	408074.7	84239.3	·	*5001.7*	*11.7*	*81.6*	*16.8*

[a] ATC plus tariffs. – [b] For definitions see pp. AI 1-2. – [c] National deadweight loss minus quota rents.

Source: Tables AIV.5-AIV.14. – Additional calculations.

Table 13 — Concluding Table: Costs of ATC and of Trade Policy in Germany and in the EU, 1990

	ATC				Trade Policy			
	Textiles		Clothing		Textiles		Clothing	
	Germany	EU	Germany	EU	Germany	EU	Germany	EU
1. Employment Effects of Barriers against								
a. Hong Kong	0.3	2.7	328	314	2	78	808	5002
b. All developing countries[a]	182	336	4782	42808	1216	9766	11774	68134
c. %[b]	0.1	0	2.6	3.4	0.6	0.6	6.4	5.5
2. Costs of Barriers against								
a. Hong Kong[c]								
(1) "Pure"	0	0	2205	23880	20	268	12104	58375
(2) National Total	67	219	67958	368300	110	976	77416	408075
(3) International[c]	11	20	12167	44465	55	777	21625	84239
b. All developing countries								
(1) "Pure"[c]	243	41	32123	325279	12345	33505	176375	795149
%[d]	0	0	0.8	1.4	0.2	0.1	4.3	3.5
(2) National Total[c]	40622	27433	990263	5016762	67121	122166	1128079	5558549
%[d]	0.7	0.1	24.2	22.3	1.2	0.3	28.9	27.4
(3) International[c]	6872	2517	177295	605674	33142	97249	315112	1147452
%[d]	0.1	0	4.3	2.7	0.6	0.3	7.7	5.1

[a] Number of import-competing jobs saved. – [b] All developing countries as % of the industry's domestic employment. – [c] 1000 ECU. – [d] % of the industry's domestic value added.

Source: Tables AIV.15-AIV.18. – IMF (International Financial Statistics). – OECD (Foreign Trade by Commodities). – Gesamttextil, *Jahrbuch der Textilindustrie* (various issues).

V. A Computable General Equilibrium Assessment of Textile and Clothing Protection

V.A The Model

V.A.1 CGE Model Data

Our model data come from a number of sources. Data on production and trade are based on national social accounting matrices, linked through trade flows (see Reinert and Roland-Holst 1997). Social accounting data are drawn directly from the Global Trade Analysis Project (GTAP) dataset. (McDougall 1997). The most recent GTAP datasets (versions 3 and 4) are benchmarked to 1992 and 1995. However, we have moved the base year forward somewhat, adjusting our data based on actual growth rates as reported by the IMF, so that we work with reference to 1997 when we discuss income and welfare effects. We work with the 1997 base year for assessment of textiles and clothing restrictions. 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. The protection data for textiles and clothing are summarized in Table 2. These are taken from the GTAP database, adjusted for the effects

of growth through 1997. The GTAP parameter and policy estimates are themselves based on values found in the literature (McDougall 1997).

Our data on tariffs 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 based on estimates found in the literature, and reflect traditional non-tariff border measures.[18] Where applicable, quota rents are calculated from these tariff equivalents. They also reflect data on NTBs from the UNCTAD-TRAINS database.

The sectors and regions in our aggregation of the data are detailed in Table 14. A mapping to ISIC (International Standard Industrial Classification) sectors is provided in a separate technical annex.

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18 Tariff equivalents of industrial NTBs are taken from Haaland and Tollefson (1994), Yang (1992, 1994), USITC (1993), Flam and Nordstrom (1994), published antidumping rates (all as described in Francois et al 1995), assessments of the automobile and chemical industry prepared for the EU-US joint study, and the UNCTAD TRAINS database. 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. We also supplement our protection data with estimates of government procurement preference margins (see Francois, Nelson, and Palmeter 1997). Agricultural protection data are based on OECD and USDA data on agricultural protection (see Ingco 1996).

Table 14 – Model Aggregation Scheme

Regions	*Sectors*
Australia and New Zealand Japan Indonesia Malaysia Philippines Thailand China Korea Hong Kong and Singapore Taiwan India South Asia North America Former Soviet Union European Union Central and Eastern Europe European Free Trade Area Rest of World	Agriculture, Forestry, and Fisheries Extraction Industries Textiles Clothing Light Manufacturing Heavy Manufacturing Services

V.A.2 Theoretical structure

We turn next to the basic theoretical features of the model. More details on the theoretical structure of the model are provided in the separate technical annex. The numerical analysis presented here is based on a 7 sector, 18 region computable general equilibrium (CGE) model of the world economy (Table 14). 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.

In terms of theoretical structure, perfect competition is assumed in constant return to scale (CRS) sectors.[19] 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

19 That is, costs are not affected by scale of production.

with the so-called "Armington" assumption.[20] 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 accruing from import/export quota licenses (when applicable). Part of the income is distributed as subsidy payments to some sectors, primarily in agriculture. Prices on goods and factors adjust until all markets are simultaneously in (general) equilibrium. In the base model, we do not model changes in international capital flows, but rather our capital market closure involves fixed net capital inflows and outflows. (Rational expectations with international capital flows are an optional long-run closure of the model.) To summarize, factor markets are competitive, labour and capital are mobile between sectors but not between countries.

In the heavy manufacturing sector, we assume imperfect competition and scale economies that are *internal* to each firm, depending on its own production level. In particular, based on estimates of positive scale elasticities (see the technical appendix), we model the sector as being characterized by Chamberlinian large-group monopolistic competition (for

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20 This is like saying that the demand for French red wine is different from the demand for Chilean red wine.

more on this approach, see Ethier 1982 and Krugman, 1980).[21] 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 (for more on this, see Francois and Roland-Holst 1997). Similar gains follow from consumer good specialization.

In other applications of the model (Baldwin, Francois, and Portes 1997; Francois, McDonald and Nordstrom 1996), a dynamic link has also been included, whereby the static or direct income effects of trade liberalization induce shifts in the regional pattern of savings and investment. These effects have been explored extensively in the trade literature.[22] This includes Baldwin (1992), Smith (1976, 1977), Srinivasan and Bhagwati (1980), and

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21 This represents the case where there are sectors in which individual firms have market power, but due to threat of entry by other firms, profits are driven down.

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

Francois et al (1996a). Several studies of the Uruguay Round have also incorporated variations on this mechanism.[23] 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 behavior. They are not included in the present application. This is because we are focusing on the relatively immediate effects of an accelerated ATC implementation, which view as a short-run question.

V.B The Experiments

We turn now to the results of an accelerated ATC implementation. At present, there has been only very limited liberalization under the ATC. This is because of a combination of factors, including back-loading built into the ATC itself. It is also because of the decision of importing WTO Members (including the EU) to graduate products not actually covered under the old MFA quotas that were folded into the ATC.

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23 These studies are surveyed in Francois et al (1996b).

Three policy experiments are summarized in Tables 15. The first experiment involves immediate lifting of all EU import quotas on textiles and clothing. The second experiment involves immediate implementation of EU scheduled tariff reductions for textiles and clothing. The third involves the immediate implementation of both scheduled tariff reductions and quota liberalization.

Table 15 — CGE Experiments

1.	Immediate lifting of all EU quota restrictions on textiles and clothing.
2.	Immediate implementation of all EU commitments for Uruguay Round tariff reductions for textiles and clothing.
3.	Combined implementation of experiments (1) and (2).

Table 16 presents estimates of the annual income gains from each experiment. The total for the entire European Union is based on „equivalent variation," which is basically a real income effect. This estimate is based on two effects. The first is the direct change in nominal national income as a result of the experiments detailed in Table 15. The second effect is the change in the cost of consumer goods (the price of consumption). The combination of these two effects yields the change in real welfare. This is reported in monetary terms in Table 17. The values in the table represent the

„equivalent“ income transfer needed to realize the welfare gains in each experiment. These values are reported in 1997 ECUs.

The net gain for the European Union as a whole breaks down as follows. The elimination of quotas on textiles and clothing would yield an annual welfare gain of roughly ECU 25 billion. Over the 1999-2005 period that remains for Uruguay Round implementation, this translates to a discounted total gain (assuming a 3 % discount gain) of ECU 156 billion. The gains from tariff reductions are much smaller, amounting to ECU 0.7 billion annually, and to a discounted total gain of ECU 4.5 billion (less than 0.1 % of GDP). The combined effect of both accelerated quota and tariff liberalization amounts to ECU 25.2 billion annually, and a discounted total of ECU 162 billion (again roughly 0.3 % of GDP).

Table 16 — Annual Income Effects 1997 (millions of ECU)

	Quota liberalization	UR tariff cuts	Quotas & UR tariff cuts
Austria	639	18	661
Belgium-Luxembourg	789	22	815
Denmark	494	14	511
Finland	350	10	362
France	4,428	124	4,581
Germany	6,752	196	6,999
Greece	211	5	217
Ireland	175	5	181
Italy	3,356	83	3,453
Netherlands	1,101	32	1,140
Portugal	230	5	235
Spain	1,580	43	1,633
Sweden	517	15	536
United Kingdom	3,824	106	3,956
Total	24,446	677	25,282

Source: CGE-model based estimates.

Table 16 also reports estimated income effects for individual Member States. These are calculated on the following basis. First, the change in the nominal value of GDP is calculated for each Member, based on the sectoral composition of national GDP and estimated changes in sectoral output. Second, the gain to consumers is allocated across Member States based on national shares of total EU consumption. The combination of these two effects yields the estimated national income gains. They vary across Members in part because textiles and clothing represent different shares of GDP in different States. The bulk of national income gains accrue to France, Germany, Italy, the Netherlands, and the United Kingdom. The

gains for Italy are relatively large because while Italy carries a relatively large share of the negative sectoral impact, the estimated gains to Italian consumers far outweigh this.

Table 17 reports the sectoral effects of the three experiments. The negative shocks to sectoral output are concentrated almost completely in textiles and clothing, and especially in clothing. There is a consequent expansion of EU production in the heavy manufacturing sectors, which includes transport, metals production, and other machinery and equipment.

Table 17 — Production Effects

	Quota liberalization	UR tariff cuts	Quotas & UR tariff cuts
Agriculture, Forestry, and Fisheries	0.2	0.0	0.2
Extraction Industries	0.3	0.0	0.4
Textiles	-7.1	-1.0	-8.1
Clothing	-39.7	-3.2	-43.2
Light Manufacturing	0.3	0.0	0.3
Heavy Manufaccturing	1.1	0.1	1.3
Services	0.1	0.0	0.1

Source: CGE-model based estimates.

To summarize, the results reported in Tables 16 and 17 point to significant income gains, amounting to a potential total gain from accelerated ATC implementation of over ECU 160 billion (in 1997 ECUs). These gains are

spread across Member States, with the greatest absolute gains accruing to France, Germany, Italy, the Netherlands, and the United Kingdom.

A different perspective on these results is offered in Tables 18 and 19. According to Eurostat, the median European houshold (47% of all houeholds) consists of 3-4 persons. Over 22 % of households consist of over 4 members. In Table 18, we offer national estimates of the net annual cost from the current regime of textile and clothing protection, extrapolated to a hypothetical household of four. These values range from a low of 83 ECU per year in Greece to over 386 ECU per year in Denmark. On an EU-wide basis, these net costs amount to roughly 270 ECU annually for a family of four.

Table 19 compares estimated jobs saved in textile and clothing to income costs. This results in an estimated "cost per job saved" figure, as reported in the table. These costs (which are in addition to actual employment costs) amount to ECU 28 thousand annually in the textile industry, and ECU 41 thousand annually in the clothing industry. These are based on gross jobs saved within the relevant sector. If there is also some job destruction in other sectors due to protection of textiles and clothing, the net cost will be higher than the values reported in the table.

Table 18 – Annual Costs in ECU (1997) for a Family of Four

	Quota liberalization	UR tariff cuts	Quotas & UR tariff cuts
Greece	80	2	83
Portugal	93	2	94
Spain	161	4	166
Ireland	189	5	196
Italy	233	6	240
Sweden	234	7	242
United Kingdom	259	7	268
Finland	272	8	281
Netherlands	281	8	291
Belgium-Luxembourgh	297	8	307
France	302	8	312
Austria	316	9	327
Germany	329	10	341
Denmark	373	11	386
EU average	261	7	270

Source: Income estimates are from CGE-model based estimates, while population figures are from Eurostat.

Table 19 – Annual Costs per Job Saved in ECU (1998)

	Welfare cost	Jobs "saved"	Cost per job
Textiles	3,735,351,697	131,272	28,455
Clothing	21,606,957,936	525,123	41,146
Total	25,342,309,633	656,395	38,608

Note: These are sectoral employment effects. Because there will be replacement employment generated in other sectors, these estimates understate the cost per net job saved.

Source: CGE-model based estimates.

VI. Conclusions

This study has estimated the costs of EU trade restraints on trade in textiles and clothing. It did this by applying two methods to capture the welfare impact of the EU's trade barriers on textile and clothing imports from developing countries.[24] The estimates were based on two types of quantitative economic models. The first method (a partial equilibrium analysis) allowed us to directly cover very specific details in connection with the importation, production and consumption of T&C products. The second method (a general equilibrium analysis) incorporated – among other things – the wide-sweeping indirect effects within the EU. The mix of techniques used also allowed us to focus on overall trade and EU-wide income effects.

The initial results, just looking at the relatively direct effects (stemming from the partial equilibrium analysis shown in Table 13 and extrapolated based on methods described on page 33) reveal that in 1997 EU consumers

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24 The initial estimates were based on the year 1990. This year was chosen since the agreed upon liberalization pattern in the Uruguay Round is based on the EU's imports in this particular year. Likewise, by drawing on a year prior to the instituting of the common internal market on January 1st, 1993, it was possible to construct an index of restrictiveness for the individual EU countries. Before the common internal market was created country specific quota allocations prevailed. By assuming that differing per capita textile and clothing imports from non-EU countries reflect the degree to which more or less protectionism is maintained, then a relative restrictiveness index can be estimated. It used Germany as a base and was applied to the available data on quota prices.

will have been paying roughly ECU 12 billion. Based on the more all-encompassing approach (that is, applying general equilibrium analysis) the costs to the EU consumers due to higher textile and clothing prices (both for imported and domestic goods) amount to EU 12.7 billion.

If the implementation of the AC had been accelerated, so that a complete integration would haven taken place by 31 December 1997, EU consumers – including indirect effects – would have gained over ECU 25 billion per year (measured in 1997 ECU – see Table 16). Of these, almost ECU 6.5 billion of the annual gains simply follow from a recapture of ATC quota rents. Other gains stem from increased investments and a reallocation of resources into areas with higher opportunity costs. The discounted net income gains from a full 1997 implementation amount to over EU 160 billion.

These national income gains also imply that each job saved in the textile and clothing industries by delayed implementation costs between ECU 28 thousand in the textile industry and ECU 41 thousand in the clothing industry per year (Table 19). Since the industry as a whole is contracting, the cost of EU protection for the textile and clothing industry could well approach the full value added of this industry by the time quotas are removed by the year 2005.

In recalculating the above results of ECU 12.7 billion for consumers plus ECU 12.3 billion from the loss in efficiency and other factors, together totaling ECU 25 billion, then for an EU family of four, we find an average gain resulting from accelerated implementation amounting to ECU 270 per year.[25]

As far as the distribution of the costs of protection across various population groups is concerned, the quota prices for children's clothes are noticeably higher.[26] This is despite the fact that adult clothes typically carry higher prices. With recent quota prices for children's clothes (i.e. 1997) some 200% higher than for comparable adult clothing, the magnified impact on families with children is obvious.

The obvious question must be asked about how plausible these estimates are. Of course, they rest on assumptions which are based on rigorous empirical evidence and backed up by theoretical underpinnings which shape

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25 For the partial equilibrium analysis costs of roughly ECU 130 per year for a amily of four in 1997 were calculated.

26 In EU MFA categories 4, 6, 6A, 21 and 73 for Hong Kong children's wear can be shipped using quotas at a ratio of 5:3, i.e. 5 children's garments for 3 normal garments. However, this **special provision** can be used to cover quantities amounting to only 1-3% of the total quota for the individual MFA categories! In the case of subcategory 6A (men's and boys' trousers) the amount of children's clothing being exported **outside the special provision** was 10 times higher than the amount being exported **under the special provision** in 1997. This means, if 3% of the total 6A quota was utilized **under the special** provision for children's clothing, then 30% **outside the special provision** was used for the rest of children's clothing exports.

the various parameters used in the modeling. To an informed layperson this may sound like a method of producing results in line with the authors own prejudices, based on the philosophy: "You tell me what results you want, and I will produce them for you." Nothing could be further from the truth!

However, since merely contending that this is the case can hardly be considered evidence, let us refer to results of other economists,[27] produced earlier and independent of one another, aside from using different approaches, but generally based on the same, widely accepted economic foundations. The first study refers to the year 1980 and was carried out for the United Kingdom (Cable 1983: 123). It came up with a figure of roughly 60 ECU for a family of four. Recalculating this figure for 1997, taking into account the rapid rise in imports from non-OECD countries since then, the costs of protection for a family of four in the UK amounts to roughly 260 ECU. A glance at Table 18 shows that this is almost exactly the result we achieved.

In a study produced some 12 years later (Kallin 1995: 8) a figure of about 200 ECU for a family of four in the EU12 was estimated to be the cost of protection resulting from the MFA in the year 1993. Again recalculating this

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[27] Cable (1983); Kallin (1995).

figure for 1997 produces an amount equalling roughly 270 ECU, which can be considered to be a conservative estimate. Table 18 reveals that our estimate is quite similar.

Of course the above quoted studies represent only a few of the numerous studies carried out on the impact of textile and clothing protection in the EU. While other estimates can be found which are not quite as identical as the above two, we would like to point out that in none of the studies known to us have estimates shown that the MFA has lead to an improvement in the EU's welfare. As a matter of fact if one reviews the results of the Uruguay Round (Spinanger 1997: Table A3) there are no other foreign trade measures the removal of which produces such large positive welfare gains (between 30% – 40% of total estimated gains from the Round). And if this is the case, why should we wait until the year 2005 in order to fully collect such gains?

The conclusions reached here are not any different than those in the 1998 OECD study on the benefits of open markets. It is not only the high costs to the consumers but also the fact that protection causes high wages to be paid for jobs which are not internationally viable, hence using resources which could be invested, for instance, in improving human capital levels.

All these considerations would give credence to the proposal that the liberalization of the ATC should be effected as fast and as complete as possible. Holding out until the year 2005 implies accruing income losses which could otherwise have been invested in production potential – be it in human or physical capital – where the EU has definite comparative advantages. Beyond this, and thus not directly dealt with here, are the economic losses accruing to the developing countries.

Bibliography

Armington, P.A. (1969). A Theory of Demand for Products Distinguished by Place of Production. IMF Staff Papers 16: 159-178.

Aw, B.Y. and M.J. Roberts (1988). Price and Quality Level Comparisons for US Footwear Imports: An Application of Multilateral Index Numbers (257-275). In: Feenstra, R.C. (ed.), *Empirical Methods for International Trade.* The MIT Press, Cambridge.

Baldwin, R. (1970). *Non-tariff Distortions in International Trade.* Washington, D.C., Brookings Institution.

Baldwin, R.E. (1992). Measureable Dynamic Gains From Trade. *Journal of Political Economy* 100 (February): 162-174.

Baldwin, R.E. and J.F. Francois (1996). *Transatlantic Free Trade: A Quantitative Assessment*. Centre for Economic Policy Research mimeo.

Baldwin, R.E. and J.F. Francois (1997). Preferential trade liberalization in the North Atlantic. CEPR discussion paper.

Baldwin, R.E. and J.F. Francois (1998). *Computable General Equilibrium Assessments of Transatlantic Trade and Investment Initiatives*. Report prepared for the European Commission, March.

Baldwin, RE.R. Forslid and J. Haaland, (1996). Investment Creation and Investment Diversion: A Simulation Study of the Single Market Programme. NBER working paper.

Baldwin, R.E., Francois, J.F. and R. Portes (1997). Costs and Benefits of Eastern Enlargement of the EU. *Economic Policy*, April.

Baughman, L., R. Mirus, M. Morkre and D. Spinanger (1997). Of Tyre Cords, Ties and Tents. *The World Economy* 4: 407-434.

Blackhurst, R., Enders, A. and J.F. Francois (1996). The Uruguay Round and Market Access: Opportunities and Challenges for Developing Countries. In: Martin, W. and L.A. Winters (eds.), *The Uruguay Round and the Developing Countries*, Cambridge University Press, New York.

Brown, D., A.V. Deardorff, A.K. Fox and R.M. Stern (1996). The Liberalisation of Services Trade: Potential Impacts in the Aftermath of the Uruguay Round. In: Martin, W. and A. Winters (eds.), *The Uruguay Round and the Developing Countries*, Cambridge University Press.

Cable, V. (1983). *Protectionism and Industrial Decline.* London.

Chan-Lee, J.H. (1971). Intercountry Cost and Price Comparisons. IMF Staff Papers 18 (2): 332–388.

Commission of the European Communities (1988). *The Cost of Non-Europe.* Brussels.

Commission of the European Communities (1998). *The New Transatlantic Marketplace*. Communication from the Commission to the Council, the European Parliament, and the Economic and Social Committee, March.

De Melo, J. and A.L. Winters (1993). Price and Quality Effects of VERs Revisited: A Case Study of Korean Footwear Exports. *Journal of Economic Integration* 8: 33-57.

Dimaranan, B., R. McDougall and Th. Hertel (1997). Behavioral Parameters (18.1–18.22). In: McDougall, R.A., *Global Trade, Assistance, and Protection – The GTAP 3 Data Base*. Purdue.

Economic Planning Agency (1997). Economic Effects of Selected Trade Facilitation Measures in APEC Manila Action Plan. Mimeo prepared for APEC secretariat, Japan.

Edgeworth, F.Y. (1925). *Papers Relating to Political Economy* (2): 18. London.

Ethier, W. (1982). National and International Returns to Scale in the Modern Theory of International Trade. *American Economic Review* 72 (June): 950-959.

Flam, H. and H. Nordström (1994). The Single Market(s) for Cars in Europe. Stockholm Institute for International Economics, Centre for Economic Policy Research discussion paper.

Francois, J. F. and K. A. Reinert (1997). Applied Methods for Trade Policy Analysis: An Overview (3-24). In: Francois, J. F. and K. A. Reinert

(1997). *Applied Methods for Trade Policy Analysis: A Handbook.* Cambridge.

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

Francois, J.F., (1994). Global Production and Trade: Factor Migration and Commercial Policy with International Scale Economies. *International Economic Review* 35 (3): 565-581.

Francois, J.F., B. McDonald and H. Nordström (1996). A User's Guide to Uruguay Round Assessments. CEPR discussion paper.

Francois, J.F., B. McDonald and H. Nordström (1997). Trade Liberalization and the Capital Stock. In Francois, J.F. and K.A. Reinert (eds.), *Applied Methods for Trade Policy Analysis: A Handbook.* Cambridge: New York.

Francois, J.F., B. McDonald and H. Nortström (1995). Assessing the Uruguay Round. In: Martin, W. and L.A. Winters (eds.), *The Uruguay Round and the Developing Economies.* World Bank discussion paper 307.

Francois, J.F., D. Nelson and N.D. Palmeter (1997). Government Procurement: A Post Uruguay Round Perspective. In: Hoekman. B. and P. Mavroidis (eds.), *Law and Policy in Public Purchasing*. University of Michigan Press..

Frankena, K. (1995). Trans-Atlantic Ties to be Strengthened. *USITC International Economic Review,* August.

Frost, E. (1997). *Transatlantic Trade: A Strategic Agenda*. Institute for International Economics. Washington.

General Agreement on Tariffs and Trade – GATT (1993). *Trade Policy Review: European Communities, Volume I.* Geneva.

General Agreement on Tariffs and Trade – GATT (1994). *The Results of the Uruguay Round of Multilateral Trade Negotiations – The Legal Texts.* Geneva.

Glismann, H.H. (1996). *Wirtschaftliche Auswirkungen mengenmäßiger Importbeschränkungen.* Kieler Studien 279. Tübingen.

Glismann, H.H. and A. Neu (1971). Towards New Agreements on International Trade Liberalization. Methods and Examples of Measuring Nontariff Trade Barriers. *Weltwirtschaftliches Archiv* 107 (2): 235–271.

Haaland, Jan and T.C. Tollefsen (1994). The Uruguay Round and Trade in Manufactures and Services. General Equilibrium Simulations of Production, Trade and welfare Effects of Liberalization. CEPR discussion paper 1008.

Haberler, G. (1933). *Der internationale Handel*. Berlin.

Harrison, W.J. and K.R. Pearson (1994). An Introduction to GEMPACK, Second edition.

Herin, J. (1986). Rules of Origin and Differences Between Tariff Levels in EFTA and in the EC. Occasional Paper 13, EFTA. Geneva.

Hertel, T.W. (ed.)(1996). *Global Trade Analysis: Modeling and Applications*. Cambridge University Press. New York.

Hertel, T.W., E.B. Peterson, P.V. Preckel, Y. Surry and M.E. Tsigas (1991). Implicit Additivity as a Strategy for Restricting the Parameter Space in CGE Models. *Economic and Financial Computing* 1(1): 265-289.

Hoekman, B. (1995). Assessing the General Agreement on Trade in Services. In: *The Uruguay Round and the Developing Countries*. World Bank discussion paper 307.

Hoekman, B. (1996). Assessing the General Agreement on Trade in Services. In: Martin, W. and A. Winters (eds.), *The Uruguay Round and the Developing Countries*. Cambridge University Press.

Houthakker, H.S. and S. Magee (1969). Income and Price Elasticities in World Trade. *The Review of Economics and Statistics* 51 (2): 111-125.

Industry Commission (1995). *The Impact of APEC's Free Trade Commitment. IC95*. Australia, Canberra.

Ingco, Merlinda (1996). The Uruguay Agreement on Agriculture. In Martin, W. and A. Winters (eds.), *The Uruguay Round and the Developing Countries*. Cambridge University Press.

Jeon, B.N. and G.M. v. Furstenberg (1986). Techniques for Measuring the Welfare Effects of Protection: Appraising the Choices. *Journal of Policy Modelling* 8 (2): 273–303.

Johnson, H.G. (1960). The Cost of Protection and the Scientific Tariff. *Journal of Political Economy* 68 (4): 327–345.

Jomini, P., J.F. Zeitsch, R. McDougall, A. Welsh, S. Brown, J. Hambley and J. Kelley (1991). *SALTER: A General Equilibrium Model of the World Economy, volume 1: Model Structure, Database, and Parameters*. Canberra, Australian Industry Commission.

Kalinn, M. (1995). *EU's Textile and Clothing Import Restrictions*. Stockholm (mimeo).

Krishna, K. and L.H. Tan (1997). The Multifibre Arrangement in Practice: Challenging the Competitive Framework (59-77). In: Robertson, D. (ed.), *East Asian Trade After the Uruguay Round*. Cambridge.

Krugman, P. (1979). Increasing Returns, Monopolistic Competition, and International Trade. *Journal of International Economics* 9: 469-480.

Krugman, P.R. (1980). Scale Economies, Product Differentiation, and the Pattern of Trade. *American Economic Review 70* (December): 950-959.

Laird, S. (1997). Measuring Trade Barriers (Chapter 2). In: Francois, J.F. and K.R. Reinert (eds.), *Applied Methods for Trade Policy Analysis: A Handbook.* Cambridge University Press: New York.

Laird, S. (1997) Quantifying Commercial Policies (27-75). In: Francois, J. F. and K. A. Reinert *Applied Methods for Trade Policy Analysis: A Handbook.* Cambridge

Leppänen, S. and M. Pyy (1995). Income and Price Elasticities of Foreign Trade in Finland and Austria. WIFO Working Paper 84. Wien.

Magee, St.P. (1972). The Welfare Effects of Restrictions on U.S. Trade. *Brookings Papers on Economic Activity* (3): 645–701.

Martin, W. and L.A. Winters (eds.)(1995). *The Uruguay Round and the Developing Economies*. World Bank discussion paper 307.

McDougall, R., ed. (1997). *The GTAP database – version 3.* Global Trade Analysis Center, Purdue University.

Pratten, C. (1988). *A Survey of the Economies of Scale.* Research on the Cost of Non-Europe, volume 2, Commission of the European Communities. Brussels.

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.), *Modelling Trade Policy: AGE Models of North American Free Trade.* Cambridge University Press, 1994.

Sawyer, W.C. and R.L. Sprinkle (1996).The Demand for Imports and Exports in the US: A Survey. *Journal of Economics and Finance* 20 (1): 147–178.

Sawyer, W.C. and R.L. Sprinkle (1996).The Demand for Imports and Exports in Japan: A Survey. *Journal of the Japanese and International Economies* 11 (2): 247–259.

Sazanami, Y. and A. Matsumura (1985). Income and Price Elasticities in US-Japan Bilateral Trade. *Keio Economic Studies* 22 (1): 47–56.

Scherer, F.N. (1970). *Industrial Market Structure and Economic Performance*. Chicago.

Senhadji, A. (1997). Time-Series Estimation of Structural Import Demand Equations: A Cross-Country Analysis. IMF Working Paper 97/132. Washington, .DC.

Smith, M.A.M (1977). Capital Accumulation in the Open Two-Sector Economy. *The Economic Journal* 87 (June): 273-282.

Smith, M.A.M. (1976). Trade, Growth, and Consumption in Alternative Models of Capital Accumulation. *Journal of International Economics* 6 (November): 385-388.

Spinanger, D. (1995). The Spillover of Export Capabilities in the Textile and Clothing Industry: The Case of Hong Kong (237-249). In: Navaretti, G.B., R. Faini and A. Silberston, *Beyond the Multifibre Arrangement:*

Third World Competition and Restructuring Eruope's Textile Industry. OECD Development Centre Documents. Paris.

Spinanger, D. (1997). The WTO after the Singapore Ministerial: Much to Do about What? Institute of World Economics, Kiel Discussion Papers 304. Kiel.

Spinanger, D. (1999). Textiles Beyond the MFA Phase-Out. *The World Economy* 22 (4): 455-476.

Srinivasan, T.N. and J.N. Bhagwait (1980). Trade and Welfare in a Steady-State (Chapter 12). In: Chipman, J.S. and C.P Kindelberger (eds.), *Flexible Exchange Rates and the Balance of Payments.* North-Holland Publishing.

U.S. Department of Commerce (var. issues). *Survey of Current Business*.

U.S. International Trade Commission (1993). *The Economic Effects of Significant U.S. Import Restraints: An Update.* USITC, November.

United Nations Committee on Trade and Development (1994). *Columbus Ministerial Declaration on Trade Efficiency*.

Winters, A. (1994). Import Surveillance as a Strategic Trade Policy. In: Krugman, P. and A. Smith (eds.), *Empirical Studies of Strategic Trade Policy*. The University of Chicago Press, Chicago.

World Trade Organization (1995). *Trends and Statistics*. WTO Secretariat.

Yang, Y. (1992). The Impact of the MFA on World Clothing and Textile Markets with Special Reference to China. Ph.D. dissertation, Australian National University, Canberra.

Yang, Y. (1994). The Impact of the MFA Phase-Out on World Clothing and Textile Markets. *Journal of Development Studies* 30 (July).

Yang, Y., W. Martin and K. Yanagishima (1997). Evaluating the Benefits of Abolishing the MFA in the Uruguay Round Package (253-279). In: Hertel, Th.W. (ed.), *Global Trade Analysis. Modeling and Applications*. Cambridge.

A P P E N D I X

Appendix I

Table AI.1 — Textile and Clothing Exports and Value-Added Shares for Selected OECD and Developing Countries: 1980, 1990, 1996[a]

	Exports						Value-added		
	Textiles[b]			Clothing[c]			Textiles & Clothing[d]		
	1980	1990	1996	1980	1990	1996	1980	1990	1995
	Selected OECD countries								
EU 15	**3.9**	**3.4**	**2.8**	**2.3**	**2.7**	**2.4**	**6.3**	**5.0**	**4.2**
Sweden	1.4	1.1	1.0	1.0	0.7	0.5	2.6	1.6	1.2
Finland	1.4	3.0	1.5	5.1	1.9	0.6	6.7	3.0	2.2
Denmark	2.5	1.9	1.7	2.3	2.3	2.5	4.8	3.8	3.2
United Kingdom	2.8	2.4	2.1	1.7	1.6	2.0	5.4	4.6	4.4
France	3.0	2.8	2.5	2.0	2.2	1.9	6.7	5.2	4.3
Netherlands	3.1	2.2	1.6	1.2	1.7	1.5	3.8	2.8	2.4
Germany	3.3	3.3	2.6	1.5	1.9	1.4	4.5	3.3	2.8
Spain	3.4	2.7	2.8	1.5	1.1	1.3	9.2	6.3	5.9
Ireland	5.3	2.4	1.3	2.5	1.9	1.1	7.2	3.7	2.5
Italy	5.3	5.6	5.3	5.9	7.0	6.4	10.2	10.5	10.6
BelgiumLuxem.	5.5	5.4	4.3	1.5	1.7	1.7	7.3	6.9	6.6
Austria	6.1	5.0	3.5	3.3	2.8	2.4	8.1	5.9	4.6
Greece	9.4	6.2	4.8	7.7	21.0	16.8	20.7	17.7	14.2
Portugal	13.0	8.1	6.8	13.6	21.3	15.1	19.5	19.4	16.6
Canada	0.4	0.5	0.8	0.3	0.3	0.6	6.4	4.7	4.3
USA	1.7	1.3	1.3	0.6	0.7	1.2	5.6	4.6	4.4
Japan	3.9	2.0	1.7	0.4	0.2	0.1	6.1	4.4	3.7
	Selected developing countries								
Indonesia	0.2	4.8	5.7	4.0	6.4	7.2	10.0	11.9	17.3
Malaysia	1.2	1.2	1.7	1.2	4.5	3.0	7.0	6.4	5.3
Brazil	3.3	2.4	2.1	0.7	0.8	0.5	9.9	8.3	6.8
Hong Kong	4.6	7.5	6.5	23.6	31.9	32.7	40.1	35.4	26.4
Morocco	4.9	4.8	3.3	4.7	16.9	16.1	15.8	16.5	15.9
Thailand	5.1	4.0	3.4	4.1	12.2	7.2	18.9	22.8	25.2
Taiwan	9.0	9.1	10.4	12.3	5.9	2.8	14.8	10.8	9.3
Turkey	11.8	11.1	11.7	4.5	25.7	28.3	14.7	14.4	14.0
Korea	12.6	9.3	9.8	16.8	12.1	3.3	18.2	10.2	9.6
India	13.3	12.1	14.2	6.9	14.1	13.4	20.7	14.3	14.3
China	14.0	11.6	8.0	8.9	15.6	16.6	17.2	13.7	12.3
Pakistan	33.5	47.6	52.8	3.9	18.1	20.1	20.2	28.9	20.8
Bangladesh	52.2	18.3	13.6	0.2	35.0	54.8	40.3	33.9	32.6

[a]Ranked according to share of textile exports in 1980 within EU and within other listed countries. - [b] Share of textile exports in total merchandise exports - in %. - [c] Share of clothing exports in total merchandise exports - in %. - [d] Share of clothing and textile value added in total value added of manufacturing industry; data stem from 1995.

Source: See Diagram 1.

1. Welfare, Employment and Transfers

The traditional partial equilibrium analysis applies the following formula to try to capture the *deadweight losses* (DWL) of a tariff (t):

[1] $DWL = \frac{1}{2}\sigma^2 \cdot \beta_m \cdot M$

where σ refers to the relative price effect of a trade barrier[28], β_m to the respective price elasticity of import demand and M to the imports at the existing level of protection. This formula has the simple advantage of making all variables refer to the protectionist situation instead of a hypothetical free-trade situation.

Based on the same partial equilibrium analysis approach the *employment effects* of a tariff t are calculated by

[2] $dBi = \sigma_i \cdot \varepsilon_i \cdot B_i$

where B_i refers to employment in the sector i, and ε to the respective price elasticity of supply. Or, measured in relative terms,

$dB_i / B_i = \sigma_i \cdot \varepsilon_i$.

These formulas presuppose that the marginal productivity of labour is the equal to the average productivity of labour, which an economist, who is used to thinking in terms

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28 σ is based on the (higher) domestic price of the imported good ($\sigma = t/(1+t)$), or of the import substitute produced at home, whereas t normally is calculated on the basis of the import price (= world market price).

of decreasing returns to a partial factor variation, might find it hard to believe. In the case where the marginal productivity of labour is below average, the employment effect of protection would be greater in a linear fashion.

The size of the *transfers* from domestic consumers to the government has been graphically represented by the standard rectangle above the world-market supply curve and below the price-plus-tariffs line, i.e. the tariff receipts of government. In other words:

[3] $T = t \cdot M$.

In the case of import quotas there are no tariff receipts of government. Instead, there are quota rents of about the same size as the tariff receipts in the case of tariffs; these rents are, for the sake of convenience, supposed here to go to foreigners:

[3'] $QR = r \cdot M$

with r being the quota rent relative to the import price.

Thus, the national deadweight loss increases by the quota rents received by foreigners.

2. The Marginal Utility of Money: An Often Neglected Aspect

Since we have no way of measuring the marginal utility of anything, we have to take a proxy for the amount of redistribution; we suggest taking the above described transfers including the protection-induced increase in profits with:

[4] $DWLR = \nu \cdot [\sigma \cdot (X) - \frac{1}{2}DWL]$.

Thus, the deadweight loss due to the redistribution (DWLR) is the relative price effect of a trade barrier, multiplied by domestic production of close substitutes (X), minus half of the above measured deadweight loss (assuming that the "production costs of protection" are half the deadweight loss).[29] ν is a parameter of distribution, defined between 0 and 1, and is related to the curve of marginal utility of money; let's assume in the following that it is 0.2.

3. The Welfare Formulas

The national deadweight losses are defined as

[5] $National\ DWL = \frac{1}{2}\sigma^2 \cdot \beta_m \cdot M + r \cdot M + 0{,}2\ [\sigma X - \frac{1}{2}DWL]$

Consequently the international deadweight loss would be the national deadweight loss minus the transfers that go to foreigners; foreigners play the de facto role of the (national) fiscal agent in the case of tariffs (where tariff receipts are not included in the national deadweight loss because they go to the national fiscal agency).

[6] $International\ DWL = National\ DWL - r \cdot M$

4. Two Four-Product-Baskets Approaches

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29 Referring to the redistribution of income between capital and labour would pose additional empirical problems because the argument would be about (relatively) scarce and (relatively) abundant factors.

a. The Case of the Non-Substitutable Substitutes

The formula applied to calculated tariff equivalents (TEs) was the following:

$$[7] \quad TE = \left[\left[\sum_{i=1}^{n} \sum_{l=1}^{p} \frac{\frac{G^{V_{Mil}}}{G^{V_{Cl}}}}{\frac{G^{Q_{Mil}}}{G^{Q_{Cl}}}} - \sum_{i=1}^{n} \sum_{j=1}^{m} \frac{\frac{G^{V_{Mij}}}{G^{V_{Cj}}}}{\frac{G^{Q_{Mij}}}{G^{Q_{Cj}}}} \right] / \sum_{i=1}^{n} \sum_{l=1}^{p} \frac{\frac{G^{V_{Mil}}}{G^{V_{Cj}}}}{\frac{G^{Q_{Mil}}}{G^{Q_{Cj}}}} \right] \cdot 100$$

with:

i = 1, ..., n : countries, whose exports are subject to nontariff trade barriers;

j = 1, ..., m : products, whose importation from the region i is subject to non-tariff trade barriers;

l = 1, ..., p : products, whose importation from the region i is liberalized;

VMij : value of imports of the products j from the region i;

VCj : value of domestic apparent consumption of product j;

QMij : quantity of imports (pieces or weight) of product j from the region i;

QCj : quantity of domestic apparent consumption of product j;

G : Germany (as an example).

The variables with "l" instead of "j" refer to the analogous units for products, whose importation from the region i is liberalized, i.e.:

$$TE = 100 \cdot \frac{P_r^d \cdot P_l^m - P_r^m \cdot P_l^d}{P_r^d \cdot P_l^m} = 100 \cdot \left(1 - \frac{P_r^m \cdot P_l^d}{P_r^d \cdot P_l^m} \right)$$

with:

m : imported products

d : domestic "

r : regulated "

l : liberalized "

Relation $P_l^m / P_l^d \Rightarrow$ quality differences, also for regulated imports and their domestic counterparts.

b. The Case of the Competing Multinational Firms

The formula is as follows:

[8] $$TE = \frac{{}^{DM}_{G}p_{j(i)}}{{}^{HK\$}_{HK}p_{j(i)}} \cdot \sum_l \frac{{}^{HK\$}_{HK}p_l}{{}^{DM}_{G}p_l}$$

with

p : price

l : products which are imported freely

HK : Free-trade country

HK$: Currency of the free-trade country

DM : Currency of the protectionist country.

5. Two International-Trade-Theory Approaches

a. The Case of the Trade Diversion

The formula which will be applied (cf. Table 6) in this case is the following:

$$[9] \quad TE = \left[\frac{{}_{G}V^{k}_{Mj(i)t}}{{}_{G}Q^{k}_{Mj(i)t}} \cdot \frac{{}_{G}Q^{k}_{Mij}}{{}_{G}V^{k}_{Mij}} - 1 \right] \cdot 100$$

with

t	:	the new exporting country
i	:	country, whose exports are subject to NTBs
j	:	products, whose importation from the region i is subject to non-tariff trade barriers
V	:	value
Q	:	quantity
k	:	8-digit commodity underlying import restrictions in Germany
G	:	Germany

b. The Case of the Law of One Price

The following formula is applied:

$$[10] \quad TE = \left(\frac{{}^{Z}_{G}X_{j(i)}}{{}^{k}_{G}O_{j(i)}} \cdot \frac{{}_{G}Q^{k}_{Mi}}{{}_{G}V^{k}_{Mi}} - 1 \right) \cdot 100$$

with:

${}^{Z}_{G}X$	:	value of German exports into EU country Z
${}^{Z}_{G}O$	:	quantity of German exports into EU country Z

Table AIV.1 — Tariff Equivalents[b,c] of Import Quotas vis-à-vis the People's Republic of China in %: **– Textiles –**

Product group:	Category 1	Category 2
HS/KN:	ex 5204 ex 5205 ex 5206	ex 5208 ex 5211 ex 5209 ex 5212 ex 5210
Generic specification[a]:	Cotton yarns	Cotton fabrics, raw or bleached
(1)	(2)	(3)
Year 1988	14.8 / 47.4	28.7 / 58.9
1989	0 / 22.3	25.4 / 69.1
1990	4.8 / 25.3	15.3 / 70.3
1991	6.3 / 24.3	7.7 / 26.1
1992	7.3 / 45.3	3.8 / 44.2
1993	1.3 / 15.0	42.2 / 98.3
1994	.	20.0 / 63.7

[a] Authors' own definition. – [b] Method 2; lowest and highest estimate according to the type of averaging (cf. text). – [c] Net of tariffs.

Source: Eurostat, *Monthly EEC External Trade* (various issues), *EEC: External Trade Supplement* (various issues). – Own calculations.

Table AIV.2 — Tariff Equivalents[b,c] and Hong Kong Quota Prices[d] for MFA Categories 4 and 21 Imported by Germany 1988–1997: **– Clothing –**

Product group:	Category 4			Category 21		
Indicator:	Tariff equivalents	Quota premia		Tariff equivalents	Quota premia	
HS/KN:	ex 6105, ex 6109, ex 6110			ex 6201, ex 6202, ex 6211		
Generic specification[a]:	Knitted shirts, T-shirts, etc.			Woven parkas, anoraks, etc.		
Unit:	% of Unit value	HK$/Doz.	% of Unit value	% of Unit value	HK$/Doz.	% of Unit value
(1)	(2)	(3)	(4)	(5)	(6)	(7)
Year: 1988	33.5 / 62.5	34.9	2.3 / 7.6 / 12.9	0 / 36.0	·	·
1989	67.8 / 113.5	12.5	0 / 2.7 / 7.9	0 / 19.5	17.3	1.1
1990	33.8 / 93.5	34.9	2.1 / 6.8 / 11.5	0 / 14.8	99.6	6.3
1991	63.2 / 94.5	86.8	12.5 / 17.2 / 21.9	0 / 22.5	245.3	14.4
1992	0 / 16.3	27.2	0.6 / 5.3 / 10.0	11.3	62.4	3.5
1993	12.8 / 66.8	13.9	0 / 2.7 / 7.4	0.3	35.8	1.8
1994	8.2 / 30.5	7.9	0 / 1.5 / 6.2	·	35.9	1.9
1995	·	3.2	0 / 0.6 / 5.3	·	40.6	2.1
1996	·	2.5	0 / 0.5 / 5.2	·	57.8	3.1
1997	·	2.4	0 / 0.5 / 5.2	·	48.0	2.5

[a] Authors' own definition. – [b] Method 2; lowest and highest estimate according to the type of averaging (cf. text). – [c] Net of tariffs. – [d] Average of 12 observations per year ± standard deviation.

Source: Eurostat, *Monthly EEC External Trade* (various issues), *EEC: External Trade Supplement* (various issues). – Federation of Hong Kong Garment Manufacturers: Unpublished Material. – Own calculations.

Table AIV.3 — Hong Kong Quota Prices[b] for MFA Categories 5–8 Imported by Germany 1988–1997: **– Clothing continued –**

Product group:	Category 5		Category 6		Category 7		Category 8	
HS/KN:	ex 6101, ex 6102, ex 6110		ex 6203, ex 6204, ex 6211		ex 6106, ex 6206		ex 6205	
Generic specification[a]:	Knitted pullovers, cardigans, etc.		Woven shorts		Blouses		Woven shirts	
Unit:	HK$/ Doz.	% of Unit value	HK$/ Doz.	% of Unit value	HK$/ Doz.	% of Unit value	HK$/ Doz.	% of Unit value
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Year: 1988	297	11.8 / 19.0 / 26.2	45	0.9 / 4.4 / 7.9	49	3.6 / 6.8 / 10.0	70	5.3 / 11.9 / 18.5
1989	160	7.5 / 11.7 / 19.9	37	0.1 / 3.8 / 7.5	25	0.2 / 3.3 / 6.4	31	0 / 5.1 / 11.4
1990	217	6.5 / 13.4 / 20.3	61	2.9 / 7.1 / 11.3	43	2.1 / 4.6 / 7.1	74	4.9 / 10.1 / 15.3
1991	459	21.5 / 28.4 / 35.3	121	0.9 / 5.1 / 9.3	79	6.0/ 8.5/ 11.0	91	7.1 / 12.3 / 17.4
1992	263	9.4 / 16.3 / 23.2	32	0 / 3.8 / 8.0	22	0 / 2.4 / 4.9	21	0 / 2.9 / 8.1
1993	120	0.5 / 7.4 / 14.3	42	0.7 / 4.9 / 9.1	16	0 / 1.7 / 4.2	16	0 / 2.2 / 7.4
1994	76	0 / 4.7 / 11.6	39	0.4 / 4.6 / 8.8	18	0 / 1.9 / 4.4	12	0 / 1.6 / 6.6
1995	122	0.7 / 7.6 / 14.5	17	0 / 2.0 / 6.2	17	0 / 1.8 / 4.3	4	0 / 0.5 / 5.7
1996	249	8.5 / 15.4 / 22.3	15	0 / 1.8 / 6.0	13	0 / 1.4 / 3.9	3	0 / 0.4 / 5.6
1997	242	8.1 / 15.0 / 21.9	12	0 / 1.4 / 5.6	18	0 / 1.9 / 4.4	3	0 / 0.4 / 5.6

[a] Authors' own definition. – [b] Average of 12 observations per year ± standard deviation.

Source: Eurostat, *Monthly EEC External Trade* (various issues), *EEC: External Trade Supplement* (various issues). – Federation of Hong Kong Garment Manufacturers: Unpublished Material. – Own calculations.

Table AIV.4 — MFA Quota Restrictions on Imports from Hong Kong by EU Countries 1990: Category 2[a]

EU countries	Restraint limit	Quantity licensed		Maximum import level	Relative restrictiveness index		
	Quantity (kg)	Quantity (kg)	Utilisation (%)	Quantity (kg)	**I**[b]	**II**[c]	**III**[d]
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Germany	827000	730358	88.31	962405	1	1	1
Italy	742000	841343	113.39	864430	0.79	0.62	0.79
France	617000	666039	107.95	718805	0.96	0.78	0.96
Benelux	417000	422044	101.21	485805	0.63	0.55	0.63
United Kingdom	10175000	10756087	105.71	11853875	0.06	0.05	0.06
Ireland	450000	216658	48.15	524250	0.08	0.15	0.08
Greece	45000	45328	100.73	52425	2.36	2.06	2.35
Denmark	82000	33549	40.91	95530	0.65	1.40	0.65
Portugal	7000	389	5.56	8155	14.58	231.70	14.56
Spain	35000	843	2.41	40775	11.50	421.60	11.49
EU total	**12570000**	**12982280**	**103.28**	**14644050**	**0.22**	**0.19**	**0.22**

[a] Woven cotton fabrics. – [b] German restraint limit (Col. 1) per capita relative to the respective EU member's limit per capita. – [c] Same as "I" but calculated with respect to the licensed quantity (Col. 2) per capita. – [d] Same as "I" but calculated with respect to the maximum import level per capita.

Source: Own calculations based on Hong Kong Trade Department from unpublished material.

Table AIV.5 — MFA Quota Restrictions on Imports from Hong Kong by EU Countries 1990: Category 2A[a]

EU countries	Restraint limit	Quantity licensed		Maximum import level	Relative restrictiveness index		
	Quantity (kg)	Quantity (kg)	Utilisation (%)	Quantity (kg)	**I**[b]	**II**[c]	**III**[d]
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Germany	685000	442583	64.61	797640	1.00	1.00	1.00
Italy	636000	558286	87.78	740940	0.76	0.56	0.76
France	525000	162878	31.02	611625	0.93	1.94	0.93
Benelux	360000	232254	64.52	419400	0.61	0.61	0.60
United Kingdom	8804000	6077167	69.03	10256660	0.06	0.05	0.06
Ireland	391000	216658	55.41	455515	0.08	0.09	0.08
Greece	40000	45328	113.32	46600	2.19	1.25	2.19
Denmark	71000	5509	7.76	82715	0.62	5.17	0.62
Portugal	5000	389	7.78	5825	16.91	140.40	16.90
Spain	31000	0	0.00	36115	10.75	—	10.75
EU total	**10863000**	**7298469**	**67.19**	**12655395**	**0.21**	**0.20**	**0.21**

[a] Woven cotton fabrics, finished. – [b] German restraint limit (Col. 1) per capita relative to the respective EU member's limit per capita. – [c] Same as "I" but calculated with respect to the licensed quantity (Col. 2) per capita. – [d] Same as "I" but calculated with respect to the maximum import level per capita.

Source: Own calculations based on Hong Kong Trade Department from unpublished material.

Table AIV.6 — MFA Quota Restrictions on Imports from Hong Kong by EU Countries 1990: Category 3[a]

EU countries	Restraint limit	Quantity licensed		Maximum import level	Relative restrictiveness index		
	Quantity (kg)	Quantity (kg)	Utilisation (%)	Quantity (kg)	**I**[b]	**II**[c]	**III**[d]
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Germany	1754000	29154	1.66	2039025	1.00	1.00	1.00
Italy	421000	67705	16.08	489413	2.96	0.31	2.96
France	1370000	20131	1.47	1592625	0.91	1.03	0.91
Benelux	649000	0	0.00	754463	0.86	—	0.86
United Kingdom	6598000	2884139	43.71	7670175	0.19	0.01	0.19
Ireland	135000	16172	11.98	156938	0.57	0.08	0.57
Greece	17000	0	0.00	19763	13.22	—	13.22
Denmark	171000	9526	5.57	198788	0.66	0.20	0.66
Portugal	4000	0	0.00	4650	54.11	—	54.11
Spain	11000	0	0.00	12788	77.59	—	77.59
EU total	**9376000**	**2997673**	**31.97**	**10899603**	**0.62**	**0.03**	**0.62**

[a] Woven synthetic fabrics. – [b] German restraint limit (Col. 1) per capita relative to the respective EU member's limit per capita. – [c] Same as "I" but calculated with respect to the licensed quantity (Col. 2) per capita. – [d] Same as "I" but calculated with respect to the maximum import level per capita.

Source: Own calculations based on Hong Kong Trade Department from unpublished material.

Table AIV.7 — MFA Quota Restrictions on Imports from Hong Kong by EU Countries 1990: Category 4[a]

EU countries	Restraint limit	Quantity licensed		Maximum import level	Relative restrictiveness index		
	Quantity (pcs)	Quantity (pcs)	Utilisation (%)	Quantity (pcs)	**I**[b]	**II**[c]	**III**[d]
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Germany	11736000	12879884	109.75	13262000	1.00	1.00	1.00
Italy	1567000	597509	38.13	1796346	5.32	15.30	5.24
France	1727000	1848940	107.06	1942875	4.85	4.97	4.87
Benelux	3365000	3377772	100.38	3886575	1.11	1.21	1.09
United Kingdom	16842000	18086985	107.39	18947250	0.50	0.51	0.51
Ireland	204000	216806	106.28	240256	2.53	2.61	2.43
Greece	166000	92016	55.43	186750	9.06	17.94	9.10
Denmark	845000	644908	76.32	975975	0.89	1.29	0.87
Portugal	34000	0	0.00	38250	42.60	—	42.79
Spain	118000	124475	105.49	131952	48.40	50.35	48.91
EU total	**24868000**	**24989411**	**100.49**	**28146229**	**1.56**	**1.71**	**1.56**

[a] Knitted shirts, t-shirts, lightwight fine knit roll, polo or turtle necked jumpers and pullovers, vests and the like. – [b] German restraint limit (Col. 1) per capita relative to the respective EU member's limit per capita. – [c] Same as "I" but calculated with respect to the licensed quantity (Col. 2) per capita. – [d] Same as "I" but calculated with respect to the maximum import level per capita.

Source: Own calculations based on Hong Kong Trade Department from unpublished material.

Table AIV.8 — MFA Quota Restrictions on Imports from Hong Kong by EU Countries 1990: Category 5[a]

EU countries	Restraint limit	Quantity licensed		Maximum import level	Relative restrictiveness index		
	Quantity (pcs)	Quantity (pcs)	Utilisation (%)	Quantity (pcs)	**I**[b]	**II**[c]	**III**[d]
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Germany	11207000	12551246	111.99	12691928	1.00	1.00	1.00
Italy	815000	586273	71.94	943363	9.76	15.19	9.55
France	985000	898159	91.18	1115513	8.12	9.97	8.12
Benelux	2274000	2524188	111.00	2632155	1.57	1.58	1.53
United Kingdom	11681000	12239509	104.78	13426632	0.69	0.74	0.68
Ireland	68000	55749	81.98	78710	7.25	9.91	7.10
Greece	111000	118685	106.92	131622	12.94	13.55	12.36
Denmark	767000	647977	84.48	887803	0.94	1.25	0.92
Portugal	15000	6345	42.30	16988	92.20	244.11	92.20
Spain	49000	36316	74.11	55493	111.30	168.18	111.30
EU total	**16765000**	**17113201**	**102.08**	**19288279**	**2.21**	**2.43**	**2.18**

[a] Knitted pullovers, cardigans, slipovers, anoraks, waister jackets and the like. – [b] German restraint limit (Col. 1) per capita relative to the respective EU member's limit per capita. – [c] Same as "I" but calculated with respect to the licensed quantity (Col. 2) per capita. – [d] Same as "I" but calculated with respect to the maximum import level per capita.

Source: Own calculations based on Hong Kong Trade Department from unpublished material.

Table AIV.9 — MFA Quota Restrictions on Imports from Hong Kong by EU Countries 1990: Category 6[a]

EU countries	Restraint limit	Quantity licensed		Maximum import level	Relative restrictiveness index		
	Quantity (pcs)	Quantity (pcs)	Utilisation (%)	Quantity (pcs)	**I**[b]	**II**[c]	**III**[d]
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Germany	20952000	20926413	99.88	23830395	1.00	1.00	1.00
Italy	1302000	833851	64.04	1484280	11.42	17.81	11.39
France	1465000	1358608	92.74	1670100	10.20	10.99	10.18
Benelux	3277000	3248382	99.13	3700962	2.03	2.05	2.05
United Kingdom	23301000	22824870	97.96	26233074	0.65	0.66	0.66
Ireland	110000	92903	84.46	123996	8.38	9.91	8.46
Greece	206000	95219	46.22	234840	13.03	28.17	13.00
Denmark	2511000	2560492	101.97	2862540	0.54	0.53	0.54
Portugal	37000	2737	7.40	42180	69.88	943.53	69.72
Spain	99000	74575	75.33	112860	102.99	136.55	102.75
EU total	**32308000**	**31091637**	**96.24**	**36464832**	**2.15**	**2.23**	**2.16**

[a] Woven trousers and m. or b. shorts. – [b] German restraint limit (Col. 1) per capita relative to the respective EU member's limit per capita. – [c] Same as "I" but calculated with respect to the licensed quantity (Col. 2) per capita. – [d] Same as "I" but calculated with respect to the maximum import level per capita.

Source: Own calculations based on Hong Kong Trade Department from unpublished material.

Table AIV.10 — MFA Quota Restrictions on Imports from Hong Kong by EU Countries 1990: Category 7[a]

EU countries	Restraint limit	Quantity licensed		Maximum import level	Relative restrictiveness index		
	Quantity (pcs)	Quantity (pcs)	Utilisation (%)	Quantity (pcs)	**I**[b]	**II**[c]	**III**[d]
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Germany	17919000	19530230	108.99	20203673	1.00	1.00	1.00
Italy	907000	195402	21.54	1022643	14.02	70.93	14.02
France	977000	979894	100.30	1101568	13.08	14.22	13.08
Benelux	2622000	2494535	95.14	2976741	2.17	2.49	2.16
United Kingdom	7648000	7317602	95.68	8623120	1.69	1.93	1.69
Ireland	43000	42647	99.18	51483	18.34	20.15	17.27
Greece	41000	40530	98.85	47048	56.01	61.76	55.03
Denmark	649000	660793	101.82	731748	1.78	1.90	1.78
Portugal	15000	0	0.00	16913	147.42	—	147.42
Spain	79000	84309	106.72	89073	110.38	112.73	110.38
EU total	**12981000**	**11815712**	**91.02**	**14660337**	**4.57**	**5.47**	**4.56**

[a] Blouses and shirt-blouses, w. or g. – [b] German restraint limit (Col. 1) per capita relative to the respective EU member's limit per capita. – [c] Same as "I" but calculated with respect to the licensed quantity (Col. 2) per capita. – [d] Same as "I" but calculated with respect to the maximum import level per capita.

Source: Own calculations based on Hong Kong Trade Department from unpublished material.

Table AIV.11 — MFA Quota Restrictions on Imports from Hong Kong by EU Countries 1990: Category 8[a]

EU countries	Restraint limit	Quantity licensed		Maximum import level	Relative restrictiveness index		
	Quantity (pcs)	Quantity (pcs)	Utilisation (%)	Quantity (pcs)	**I**[b]	**II**[c]	**III**[d]
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Germany	19293000	21699157	112.47	22111025	1.00	1.00	1.00
Italy	1731000	1612137	93.13	1974548	7.91	9.55	7.95
France	972000	1062897	109.35	1093500	14.16	14.56	14.42
Benelux	3209000	3516506	109.58	3610125	1.91	1.96	1.95
United Kingdom	20562000	18076785	87.91	23132250	0.68	0.87	0.69
Ireland	74000	73882	99.84	84730	11.47	12.93	11.49
Greece	57000	26226	46.01	65265	43.38	106.04	43.42
Denmark	1810000	1940886	107.23	2036250	0.69	0.72	0.70
Portugal	25000	0	0.00	28125	95.23	—	97.02
Spain	125000	137828	110.26	140625	75.11	76.61	76.51
EU total	**28565000**	**26447147**	**92.59**	**32165418**	**2.24**	**2.72**	**2.28**

[a] Woven shirts, m. or b.. – [b] German restraint limit (Col. 1) per capita relative to the respective EU member's limit per capita. – [c] Same as "I" but calculated with respect to the licensed quantity (Col. 2) per capita. – [d] Same as "I" but calculated with respect to the maximum import level per capita.

Source: Own calculations based on Hong Kong Trade Department from unpublished material.

Table AIV.12 — MFA Quota Restrictions on Imports from Hong Kong by EU Member 1990: Category 21[a]

EU countries	Restraint limit	Quantity licensed		Maximum import level	Relative restrictiveness index		
	Quantity (pcs)	Quantity (pcs)	Utilisation (%)	Quantity (pcs)	**I**[b]	**II**[c]	**III**[d]
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Germany	7474000	8092320	108.27	8501675	1.00	1.00	1.00
Italy	575000	501804	87.27	668438	9.22	11.44	9.03
France	721000	782839	108.58	830138	7.39	7.37	7.31
Benelux	1417000	1363531	96.23	1647263	1.68	1.89	1.64
United Kingdom	5068000	5411505	106.78	5764850	1.07	1.08	1.07
Ireland	40000	36698	91.75	46058	8.22	9.70	8.12
Greece	53000	15866	29.94	61613	18.07	65.37	17.68
Denmark	833000	582038	69.87	968363	0.58	0.90	0.57
Portugal	22000	2737	12.44	25575	41.92	364.87	41.02
Spain	116000	113400	97.76	134850	31.35	34.73	30.68
EU total	**8845000**	**8810418**	**99.61**	**10147148**	**2.80**	**3.04**	**2.77**

[a] Woven parkas, anoraks, windcheaters, waister jackets and the like. – [b] German restraint limit (Col. 1) per capita relative to the respective EU member's limit per capita. – [c] Same as "I" but calculated with respect to the licensed quantity (Col. 2) per capita. – [d] Same as "I" but calculated with respect to the maximum import level per capita.

Source: Own calculations based on Hong Kong Trade Department from unpublished material.

Table AIV.13 — German and European Imports of Textiles and Clothing Products under Quota Regulation: 1990

Group	Germany					EU				Imports from developing countries[d]	
	Hong Kong				World	Hong Kong			World	Germany	EU
	Unit Value[a]	Restricted Quantity	Imports		Imports total	Restricted Quantity	Imports		Imports total		
			actual	theoretical[b]			actual	theoretical[b]			
	(1000 ECU/t)	(t)	(Mill. ECU)	(Mill. ECU)	(Mill. ECU)	(t)	(Mill. ECU)	(Mill. ECU)	(Mill. ECU)	(Mio. ECU)	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
1	2.3 / (2.4)[c] / 3.5	·	0	·	474	·	1	·	1867	·	·
2	3.3 / 4.5 / 4.3	827	2.6	3.7	726	13397	48.0	60.3	4028	·	·
2a	4.9 / 4.5 / 11.7	685	1.6	3.1	445	11548	25.1	52.0	2458	·	·
3	·	1754	·	·		11130	·	·	·	·	·
Textiles	·	·	36.2	·	13778		128.4			2250	7550
4	8.9 / 21.5 / 17.6	1807	56.5	38.9	944	5636	160.3	121.2	2606	·	·
5	/ 61.3 /	2477	170.0	151.8	·	6182	·	379.0	·	·	·
6	/ 12.6 /	11901	150.8	150.0	·	30252	·	381.2	·	·	·
7	/ 43.2 /	3225	151.8	139.3	·	5561	·	240.2	·	·	·
8	/ 27.9 /	4187	130.9	116.8	·	10386	·	289.8	·	·	·
21	16.6 / 19.3 / 21.8	3250	108.3	62.7	676	7095	212.9	136.9	1603	·	·
Clothing	·	·	1547	·	10667	·	2374	·	·	9610	21090
Textiles and Clothing	·	·	1583	·	24445	·	2502	·	·	11860	28640

[a] Unit value of imports from PRC (left hand side), from Hong Kong (middle), and from all countries (right hand side). – [b] Restricted quantity (cols. (3) and (7) respectively) multiplied by the unit value of German imports (col. (2)). – [c] Unit value of the EU's imports. – [d] Includes imports from (formerly) state trading countries.

Source: Statistical Office of the FRG: Fachserie 7, Reihen 2.1 und 7 (1990). – EU: Official Journal of the EU, current issues. – Tables 1–8. – Own compilations and estimates.

Table AIV.14 — Basic Data on the Costs of Protection: Germany and the European Union 1990

Commodity Group	Price Effect	σ^2_G	Imports from Hong Kong		Restrictiveness Index	EU's Price Effect	σ^2_{EU}	Employment[a]		Production[b]	
			Germany	EU 12 total				Germany	EU 12 total	Germany	EU total
	(%)		(Mill. ECU)		(RI)	[(2)·(5)]				(Mio. ECU)	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Textiles											
1	4.8	0.002	.	.	.	.	.			.	.
2	1.5	0.0002	3.7	60.3	0.22	0.33	0.000	(39)	1655	.	.
3	.		.	.	0.62	.	.			.	.
Total (actual)	**.**		**(36.2)**	**(128.4)**	**.**	**.**	**.**	**209000**	**1533000**	**20100**	**101400**
Clothing								183000	1250000	14200	64600
4	6.8	0.004	38.9	121.2	1.6	10.9	0.010	(502)	(2877)	.	.
5	13.4	0.014	151.8	379.0	2.2	29.5	0.052	(1957)	(8984)	.	.
6	7.1	0.004	150.0	381.2	2.2	15.6	0.018	(1934)	(9046)	.	.
7	4.6	0.002	139.3	240.2	4.6	21.2	0.031	(1796)	(5701)	.	.
8	10.1	0.008	116.8	289.8	2.2	22.2	0.033	(1506)	(6778)	.	.
21	6.3	0.004	62.7	136.9	2.8	17.6	0.022	808	(3249)	.	.
Total (actual)			**(1548)**	**(2374)**				**183000**	**1250000**	**14200**	**64600**

[a] In parentheses: Estimates of the number of potentially endangered jobs (employment in the import-substituting sector) regarding the individual categories. – [b] Total sales.

Source: Tables AIV.1, 13.

Table AIV.15 — A Glimpse at Additional Effects of Regional Trade Policies: Impact of Quotas on German Imports from the People's Republic of China 1990

Category	Welfare					Sectoral Employment	
	National deadweight loss				International deadweight loss		
	"Pure"	Transfers	Distribution	Total			
	(Mio. ECU)					%	Number
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Quota Effects						
2	0.154	2.68	0.39	3.22	0.54	6.6	28
4	0.367	3.89	0.40	4.66	0.77	12.6	40
21	0.026	1.81	0.34	2.17	0.36	1.5	15
	Trade Policy at Large[a]						
2	0.391	4.69	0.54	5.62	0.93	10.6	44
4	0.659	5.89	0.45	7.00	1.11	16.9	53
21	0.661	10.57	1.78	13.02	2.45	7.4	72

[a] Quotas and Tariffs.

Source: Glismann 1996. – Own calculations.

Appendix V: Technical Description of the Model

This appendix provides an overview of the basic structure of the global CGE model employed for assessment of accelerated implementation of the EU commitments under the ATC. The model is a a standard multi-region computable general equilibrium (CGE) model, with important features related to the structure of competition (as described by Francois and Roland-Holst 1997. The reader is referred to Hertel (1996) for a detailed discussion of the basic algebraic model structure represented by the GEMPACK code (available upon request). The capital accumulation mechanisms (not used for this set of short-run experiments) are described in Francois et al. (1996). While this appendix provides a broad overview of the model, discussion of mathematical structure is limited to scale economies and market structure. 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 data are based on Version 3 of the GTAP dataset (McDougall 1997), with an update to 1997 as discussed in the body of the report.

AV-1 General Structure

The overall structure of a regional economy is represented in Figure AV.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 AV.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 Table AV.1.

AV-2 Taxes and Policy Variables

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

AV-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 of 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.

AV-4 Production Structure

The basic structure of production is depicted in Figure AV.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 Table AV.1.

AV-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 produced by a Leontief technology, with household/government transfers being

endogenous. The lower-tier nest for current consumption is specified as a Cobb-Douglas. The regional capital markets adjust so that changes in savings match changes in regional investment expenditures.

AV-6 Market Structure

AV-6.1 Demand for imports: Armington sectors

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

$$q^{M}_{j,r} = \left[\sum_{i=1}^{R} a_{j,i,r} \; M^{r_j}_{j,i,r} \right]^{1/r_j} \tag{1}$$

In equation (1), $M_{j,i,r}$ 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.

$$q_{j,r} = \left[\Omega_{j,M,r} \left(q^{M}_{j,r} \right)^{b_j} + \Omega_{j,D,r} \left(q^{D}_{j,r} \right)^{b_j} \right]^{1/b_j} \tag{2}$$

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 import $M_{j,i,r}$ can then be shown to equal

$$M_{j,i,r} = [a_{j,i,r} / P_{j,i,r}]^{s^M_j} [\sum_{i=1}^{R} a_{j,i,r}^{s^M_j} P_{j,i,r}^{1-s^M_j}]^{-1} E^M_{j,r}$$

(3)

$$= [a_{j,i,r} / P_{j,i,r}]^{s^M_j} P^M_{j,r}{}^{s^M_j-1} E^M_{j,r}$$

where $E^M_{j,r}$ represents expenditures on imports in region r on the sector j Armington composite.

AV-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

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

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 (4) 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 1997).

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:

(5) $$z_{j,f_i} = \sum_{r=1}^{R} \frac{X_{j,f_i,r}}{X_{j,f_i}} \left(\sum_{k=1}^{n} \left(\frac{a_{j,k,r}}{a_{j,f_i,r}} \right)^{s_j} \left(\frac{P_{j,k,r}}{P_{j,f,r}} \right)^{1-s_j} \right)^{-1}$$

(6) $$P_{f,i} = AC_{f,i}$$

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

(7) $$e_{j,f,i} = s_j + (1 - s_j) z_{j,f,i}$$

(8) $$\frac{P_{f,i} MC_{f,i}}{P_{f,i}} = \frac{1}{e_{f,i}}$$

In a fully symmetric equilibrium, we would have $\zeta = n^{-1}$. However, the calibrated model includes CES weights g, 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.

(9) $$Z_{ij} = \sum_{f=1}^{n_j} TC_{j,i,f}$$

Cost functions for individual firms are defined as follows:

(10) $$C(x_{j,i}) = (a_{j,i} + b_{j,i}\ x_{j,i})\, P_{Z_{j,i}}$$

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:

(11) $$\bar{x}_{j,i} = \left(\frac{Z_{j,i\ 1}}{Z_{j,i\ 0}} \right)^{(1-r_j)/r_j} X_{j,i}$$

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

(12) $$\bar{g}_{j,i,r} = a_{j,i,r}\, n_{j,i\ 0}^{\ 1-\Gamma_j}$$

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

In equation (12), n_0 denotes the number of firms in the benchmark. Through calibration, the initial CES weights in equation (12) 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.

AV-7 Labour Markets

Our default closure involves modelling 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. Alternative closures involve rigid real wages, and alternatively ad hoc specification of labour supply (which implicitly covers the flexible and rigid wage cases as special cases).

Table AV.1 — Elasticities

	substitution in value added	CDR	trade substitution elasticities
agriculture	0.76	0.00	4.75
extraction	1.14	0.00	5.30
textiles	1.26	0.00	4.40
clothing	1.26	0.00	8.80
light manufacturing	1.26	0.00	5.64
heavy manufacturing	1.26	0.135	7.40
services	1.40	0.00	3.80

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.

Figure AV.1 — Armington Aggregation Nest

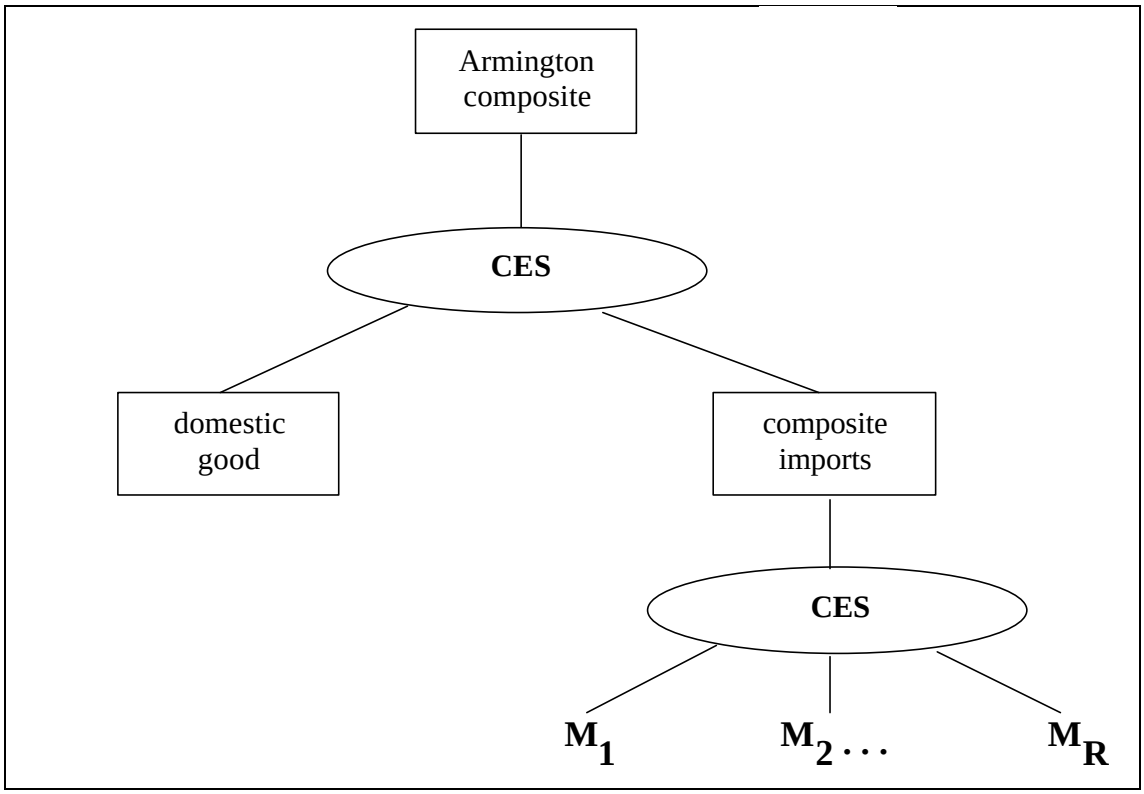

Figure AV.2 — Basic Features of the Simulation Model

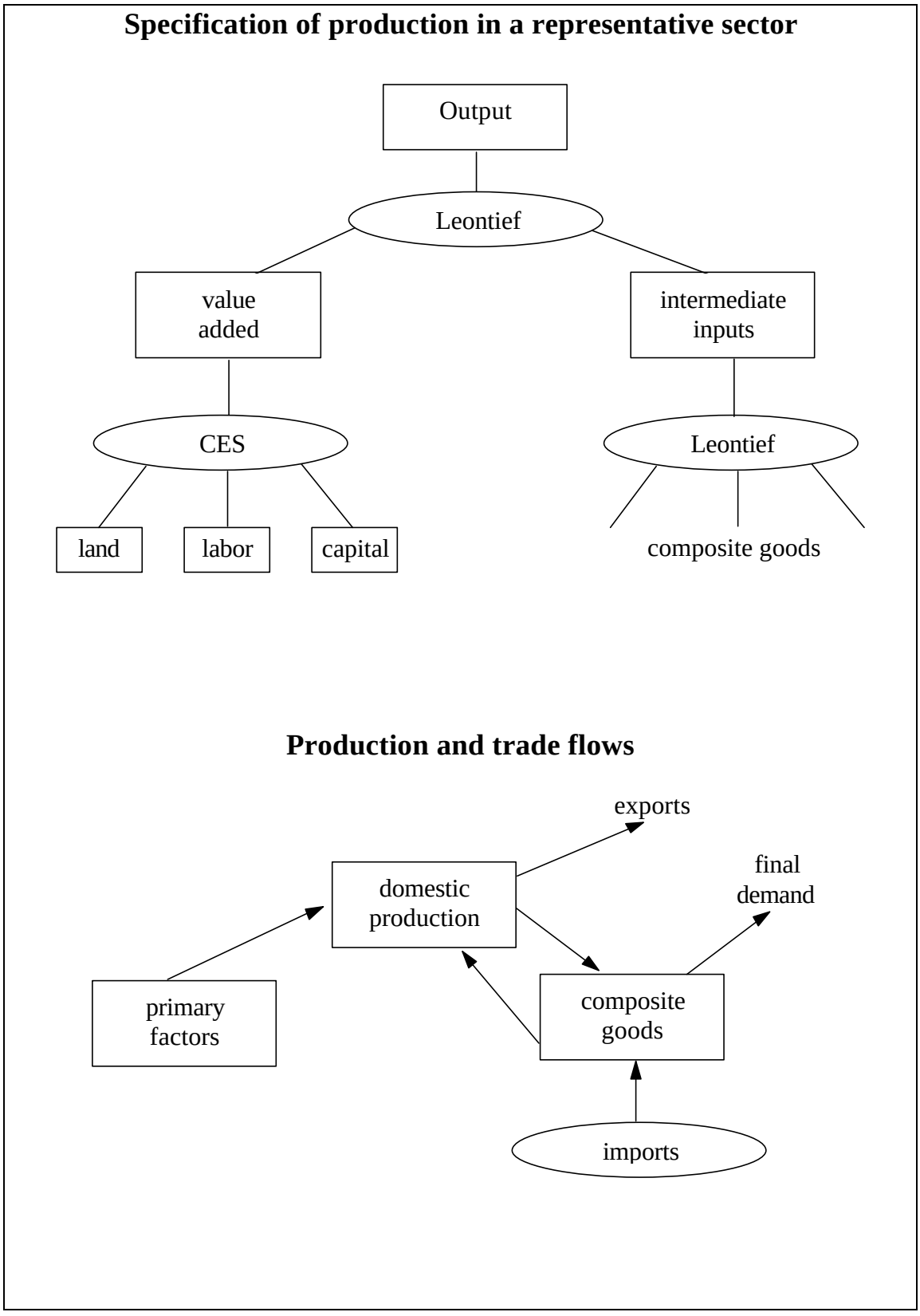

Table AV.2 - Concordance of Model Sectors to ISIC Sectors*

Agriculture

(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)
(p) 1110 Agricultural & livestock production (non-grain crops only)
(p) 1120 Agricultural services (servicing non-grain crops production only)
(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
1210 Forestry
1220 Logging
1301 Ocean and coastal fishing
1302 Fishing n.e.c.

Extraction

2100 Coal mining
(p) 3540 Manufacture of miscellaneous prod. 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 prod. of petroleum and coal (except briquettes)**

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

Light Manufacturing

(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
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
3511 Manufacture of basic industrial chemicals except fertilisers
3512 Manufacture of fertilisers and pesticides
3513 Manufacture of synthetic resins, plastic materials & man-made fibres exc. 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.
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, exc. 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.

Heavy Manufacturing

3710 Iron and steel basic industries
3720 Non-ferrous metal basic industries
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.
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.
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.
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

Services

4101 Electric light and power
4102 Gas manufacture and distribution
4103 Steam and hot water supply
4200 Water works and supply
5000 Construction
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
7132 Supporting services to air transport
7191 Services incidental to transport

7192 Storage and warehousing
7200 Communication
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.
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

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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.