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LIBERALISING TRADE IN TEXTILES AND CLOTHING: A SURVEY OF QUANTITATIVE STUDIES

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This document can also be found on the following Website: **http://www.oecd.org/trade**.

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EXECUTIVE SUMMARY

At its meeting in September/October 2002, the OECD's Trade Committee Working Party initiated work to review the process of structural adjustment in the textile and clothing sectors in OECD and selected non-OECD countries [TD/TC/WP(2002)43]. The focus of the work would be on structural adjustment issues, covering recent developments in textile and clothing trade, trade-related labour adjustments, trade-related technology changes, and business facilitation. In addition, quantitative analysis based on empirical economic modelling would be considered as -a means to address possible analytical gaps in existing research. In order to identify such gaps, a literature review of quantitative studies on textile and clothing market liberalisation would be undertaken. This paper provides such a review.

There is a considerable body of analysis available that aims to quantify the economic and trade effects of textile and clothing market liberalisation. A number of analysts at national and international institutions have provided their assessments. Different tools and approaches have thereby been used to evaluate the impacts of textile trade reform at the regional or global level. Given the economic importance of the textile and clothing sector in some OECD and non-OECD countries and the resulting economy-wide repercussions that changes in the scale and pattern of textile production will tend to trigger, analysis using general equilibrium models has been dominant.

The modelling results consistently indicate considerable shifts in textiles and clothing production and trade as the Agreement on Textiles and Clothing (ATC) is implemented. There is pressure for a large-scale reallocation of resources, with production of textiles and clothing expanding in Asian and other developing countries. In parallel, textiles and clothing production in industrialised countries is expected to contract significantly, while imports of textiles and clothing from developing countries increase. Concerning further regional integration, which has played a major role in textiles and clothing trade during the 1990s, the modelling results predict welfare benefits for the participating countries, while trade diversion is expected to adversely affect outsiders.

All the reviewed studies foresee increases in global welfare as a result of ATC reform. But the estimates of welfare gains show considerable variation, with expected annual global benefits ranging from $6.5 billion to $324 billion. Some studies predict ATC reform to account for up to two-thirds of all gains from the Uruguay Round, while others put the contribution of textile and clothing liberalisation at merely 5 per cent. There is similar discrepancy with respect to the distribution of welfare gains. A number of analysts see developing countries as the main beneficiaries of ATC reform, while others expect them in the aggregate to lose from the policy changes. There is also variation in the direction and magnitude of expected welfare impacts at the level of many individual developing countries.

In this context of uncertainty regarding the reform outcome, it is striking that developing countries have consistently been supporting the removal of the Multifibre Arrangement (MFA). But, as some of the quantitative studies show, this stance is understandable in a dynamic world where capital accumulation effects are taken into account and the fact that inefficient quota-allocation schemes can lead to a dissipation of quota rents over time. Under these circumstances, elimination of the MFA might make it possible for developing countries to seize upon their comparative advantage in textiles and clothing and increase their export revenues and incomes.

Another significant result from the empirical studies is that Canada, the EU and the USA are again and again expected to experience substantial increases in welfare from ATC reform, while these countries had been among the initiators of the MFA in the first place. The optimistic modelling results seem partly due to the implicit assumption that resources that are released from some activity can switch to another one without major disruption. In other words, any potential short or medium-term adjustment problem is assumed away. This assumption makes it difficult to properly understand the purpose of quotas. While substantial welfare gains for most OECD countries from lower consumer prices and more efficient resource allocation seem likely in the longer run, potential adjustment problems following MFA phase-out are an important policy consideration and might warrant further analysis.

1. Background

1. On 1 January 1995, the WTO Agreement on Textiles and Clothing (ATC) came into force, which sets out a process to integrate trade in textiles and clothing into the general GATT framework. It is a transitional arrangement that is scheduled to lead to the application of normal GATT rules to the sector after 1 January 2005. From 1974 to 1994**,** trade in textiles and clothing was governed by the Multifibre Arrangement (MFA), which provided for the application of selective bilateral quotas when surges in imports of particular products caused, or threatened to cause, serious damage to the industry of the importing country. The MFA was a major departure from basic GATT rules and, in particular, the principle of non-discrimination.

2. The ATC commits WTO members to reduce import tariffs,[1] progressively integrate parts of their textile imports into the GATT framework, and enlarge remaining quotas (until they are removed) by increasing annual growth rates at subsequent liberalisation stages (Table 1). A special safeguard mechanism was established to deal with new cases of serious damage or threat thereof to domestic producers during the transition period. The Agreement established the Textiles Monitoring Body (TMB) as a standing body within the WTO, whose role it is to supervise the implementation of the ATC and to examine all measures taken and ensure that they are in conformity with the rules. The TMB provided comprehensive reports to the Council for Trade in Goods on the implementation of the ATC in the first and second stages (WTO documents G/L/179 and G/L/459) in July 1997 and July 2002, respectively.

Table 1: ATC integration scheme for textiles and clothing

	Integration * (Base: 1990 import volume)	Growth rate of residual quotas (Base: Previously agreed growth rates)
Stage I (1 January 1995)	16% (Total: 16%)	16% higher than initial rate (Example: From 3% to 3.48%)
Stage II (1 January 1998)	17% (Total: 33%)	25% increase (Example: From 3.48% to 4.35%)
Stage III (1 January 2001)	18% (Total: 55%)	27% increase (Example: From 4.35% to 5.52%)
End of transition period (1 January 2005)	49% (Total: 100%)	

**)* Importing countries are free to choose the products that they integrate at each stage, as long as products are included from the four groupings tops and yarn, fabrics, made-up textile products, and clothing.

Source: WTO.

3. At its meeting in September/October 2002, the OECD's Trade Committee Working Party initiated work to review the process of structural adjustment in the textiles and clothing sectors in OECD and selected non-OECD countries [TD/TC/WP(2002)43]. The focus of the work would be on structural adjustment issues, covering recent developments in textiles and clothing trade, trade-related labour adjustments, trade-related technology changes, and business facilitation. In addition, quantitative analysis based on empirical economic modelling would be considered as a means to address possible analytical gaps in existing research. In order to identify such gaps, a literature review of quantitative studies on textiles and clothing market liberalisation would be undertaken. This paper provides such a review.

4. There is a considerable body of analysis available that aims to quantify the economic and trade effects of textiles and clothing market liberalisation. A number of analysts at national and international institutions have provided their assessments. Different tools and approaches have thereby been used to evaluate the impacts of textiles trade reform at the regional or global level. Given the economic importance of the textiles and clothing sector in some OECD and non-OECD countries and the resulting economy-wide repercussions that changes in the scale and pattern of textiles production will tend to trigger, analysis using general equilibrium models has been dominant, even though in some cases partial equilibrium approaches have been pursued. Most of this research has been published during the 1990s, and the following review summarises and compares the findings of pertinent quantitative studies. References to earlier analysis that has aimed to assess the effects of liberalising textiles and clothing trade can be found, for example, in Pelzman (1983), Goto (1989) and Spinanger (1991).

5. The remainder of the document is organised in four parts. Section 2 provides background information for the subsequent literature review by discussing some of the major economic effects that would be expected from ATC reform, as well as the implications of different modelling approaches and assumptions. This overview aims to help the reader understand the factors that are driving the modelling results. Section 3 then reviews quantitative studies of ATC reform at the global level, while section 4 complements the survey by discussing relevant studies that have a country or regional focus. Finally, section 5 briefly summaries the main findings.

2. Quantitative aspects of trade liberalisation in the textiles and clothing sector

6. Under the MFA, developed and developing countries negotiated bilateral quotas regulating trade in textiles and clothing.[2] In order to implement these quantitative restrictions, it was agreed that exporting developing countries would voluntarily restrain their supplies. Export rights became scarce and turned into valuable assets, generating rents for internationally competitive suppliers. Governments generally distributed the quotas free of charge to domestic firms based on criteria such as past export performance (Hamilton, 1990). In most countries, quotas were not tradable. Such allocation schemes favouring *status-quo* exporters, as well as requirements that, for example, related annual quota renewal to export performance in unrestricted markets, generated substantial efficiency losses in developing countries over time (Trela and Whalley, 1995). In some cases, developing country exporters had to share parts of their quota rents with importing firms that were able to exercise market power at the individual product level (Krishna, Erzan and Tan, 1994). Yet, most of the rents generated under the MFA accrued to developing country exporters. Table 2 shows estimates of quota rents for a number of countries, as reported by Harrison, Rutherford, and Tarr (1997).

Table 2: Estimates of MFA quota rents and price premia for textiles and clothing, 1994

	Textiles				Clothing			
	Value of quota rents ($mn)	Share of exports constrained (%)	Quota premium (%)		Value of quota rents ($mn)	Share of exports constrained (%)	Quota premium (%)	
			EU	USA			EU	USA
Korea	119	16	10	10	555	55	19	23
Indonesia	97	24	17	12	512	52	48	47
Malaysia	65	100	12	10	330	100	32	37
Philippines	7	50	10	9	363	81	28	34
Singapore	7	11	10	8	365	100	28	31
Thailand	53	40	13	9	396	42	36	35
China	378	19	27	18	2 223	31	36	40
Hong Kong, China	48	13	8	8	1 249	100	16	18
Chinese Taipei	95	13	12	8	515	81	22	19
Brazil	65	100	14	9	43	77	18	20
Mexico	41	60	14	9	181	99	18	20
Latin America	46	45	14	9	619	86	18	20
Middle East & North Africa	84	78	7	5	390	97	9	10
Eastern Europe & FSU	87	78	9	6	430	97	12	13
South Asia	566	46	27	18	1 375	85	36	40

Source: Harrison, Rutherford and Tarr (1997).

7. The system of bilateral quotas has frequently been accompanied by high tariffs applied on imports of textiles and clothing. Countries engaged in tariff reduction commitments during the Uruguay Round, but tariffs on textiles and clothing frequently remain significant even after the cuts, and as illustrated in Table 3 for the case of the EU, are on average considerably higher than in the manufacturing sector overall. Also, textiles and clothing tariffs appear to be consistently high across a large number of products and show lower than average variation. Moreover, high tariffs on textiles and clothing exports are not confined to OECD countries. Large developing country exporters, like ASEAN, China, and South Asia have tariffs ranging from 20 to 33 per cent on textiles and 30 to 35 per cent on clothing, impeding the increasingly important trade among developing countries (Lankes, 2002).

Table 3: Structure of EU pre- and post-Uruguay Round tariffs in the textiles and clothing sector
(in per cent)

Pre-Uruguay Round (1994)				Tariff rate distribution (in per cent)										
	HS lines	Mean	CoV*	0-2	2-4	4-6	6-8	8-10	10-12	12-14	14-16	16-18	18-20	20-22
Textiles	3943	10.1	0.26	0.8	0.3	2.7	11.2	6.6	64.9	6.1	4.6	2.8	0.0	0.0
Clothing	447	12.3	0.26	0.4	1.1	5.6	4.7	5.4	2.7	13.6	66.4	0.0	0.0	0.0
All manuf.	17760	6.5	0.53	6.8	5.2	29.7	22.3	11.3	17.0	3.6	3.2	0.7	0.0	0.2
Post-Uruguay Round (2004)				Tariff rate distribution (in per cent)										
	HS lines	Mean	CoV*	0-2	2-4	4-6	6-8	8-10	10-12	12-14	14-16	16-18	18-20	20-22
Textiles	3941	7.3	0.25	0.9	0.4	16.2	2.5	68.0	8.1	2.7	0.5	0.8	0.0	0.0
Clothing	447	10.6	0.29	2.0	6.3	1.1	3.1	5.6	1.8	72.7	7.4	0.0	0.0	0.0
All manuf.	17324	4.0	0.96	14.6	27.4	24.6	11.4	17.7	2.8	3.1	0.6	0.4	0.0	0.0

*) Coefficient of variation.
Source: Spinanger (1999b).

8. The complexity of the quota system, the interaction between quotas and tariffs, and the simultaneous Uruguay Round changes in other sectors of the economy make the evaluation of ATC reform difficult. Empirical analysis to quantify the relative magnitude of different impacts becomes necessary. Some of the welfare effects from tariff reduction and quota phase-out that need to be considered are outlined in the following:

- The removal of quantitative restrictions eliminates the basis for quota rents. The latter are passed from exporters to consumers in previously import constrained markets in the form of lower prices. There are also efficiency gains from specialisation according to comparative advantage, which in the case of the US, the EU and other quota-constrained countries is likely to imply increasing domestic consumption and reducing production. As the MFA arrangements were motivated by potential adjustment problems within developed importing countries posed by surges of lower cost imports, the shift of labour and capital resources out of the textiles and clothing sector is likely to entail sizeable adjustment costs. Hence, there are advantages and disadvantages to developed importing countries from ATC reform.

- Importers of textiles and clothing that were previously unconstrained, such as Japan, could well experience reductions in welfare from the removal of textiles quotas. Exporters will tend to divert sales to previously constrained markets, possibly resulting in import price increases and a terms-of-trade deterioration in previously unconstrained importing countries.

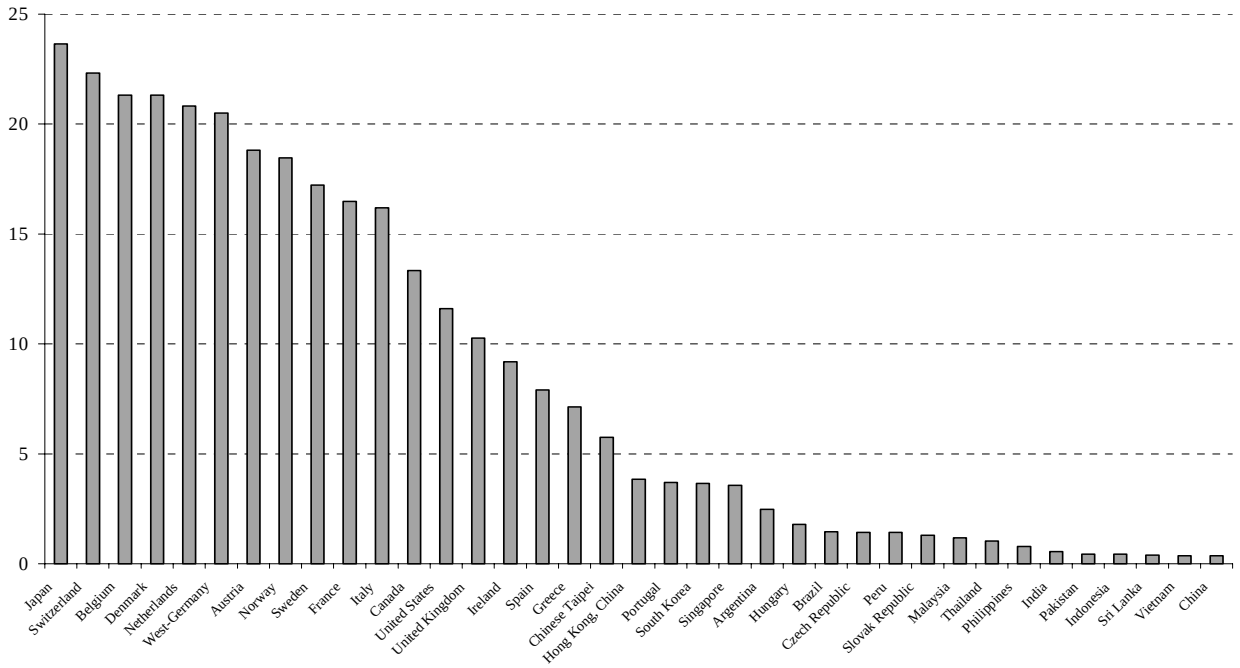
- The lowering of tariffs applied to textiles and clothing imports will affect the amount of tariff revenues collected by governments. If the demand for imports is very price elastic, such that a reduction in tariffs (to non-zero levels) triggers a large increase in imports, tariff revenue might increase. Otherwise it will decrease.

- For quota-constrained exporting countries, the welfare effects are mixed (Yang, Martin and Yanagishima, 1997). On the one hand, there is the loss of quota rent in export markets that were previously constrained. On the other hand, exporters could potentially gain in efficiency to the extent that they shift resources into textiles and clothing, assuming they have an *ex post* comparative advantage in these industries, which in many cases will be based on their low labour costs (Figure 1). In addition, there is the potential improvement in terms-of-trade on sales of textiles and clothing products to previously unconstrained markets, such as Japan. The size of the terms-of-trade effects will depend largely on the share of sales to previously constrained *versus* unconstrained markets.

- ATC reforms will also influence the country composition of exports, most likely in the direction of a concentration of suppliers. Whenever textiles and clothing quotas became binding in one country under the MFA, investment was directed to initially unconstrained exporting countries, who then later became constrained also, with investment flowing yet elsewhere. Removing the discriminatory restraints will tend to lead to a reversion to more country concentrated patterns of exports, with many higher cost developing countries, for which the production of textiles and clothing might have been the first stage of the industrialisation process, possibly losing out (Whalley, 1999).

- The implications for upstream sectors, like cotton production, are unclear. An overall increase in textiles and clothing production after trade liberalisation will also boost the demand for cotton to the benefit of fibre producers. However, textiles and clothing production will shift from industrialised to developing countries, and as the latter often run trade policies that favour domestic fibre producers, cotton producing countries without a significant processing industry might encounter stronger impediments to their export operations than before ATC reform.

Figure 1: Hourly Labour Costs in the Primary Textiles Industry, 1993 (in $US)



Source: Werner International, reproduced from Brugnoli and Resmini (1996).

9. One major challenge for applied economic modelling of textiles and clothing liberalisation is to represent existing quantitative restrictions appropriately. The restrictiveness of the applied MFA quotas varies from product to product, and from supplier to supplier, and aggregate measures have to be interpreted with care. Some researchers have modelled the phase-out of quotas as an increase in exporting efficiency in order to capture the effect of removing the constraint to exports (Diao and Somwaru, 2001), while most analysts liken the effects of the MFA quotas to price wedges and use estimates of export tax equivalents, such as those derived by Francois and Spinanger (2000) and generalised in the GTAP database, in their simulations.

10. There are a number of other differences between the available empirical studies. Analysts emphasise different economic relationships in the textiles and clothing sector and choose their methods and simplifying assumptions accordingly. It is then not surprising that different modelling approaches and sets of behavioural and structural hypotheses generate differing results. The following listing describes some major aspects of frequently encountered analytical approaches, as applied to ATC reform. Reviewing these aspects will provide the background for the subsequent discussion of individual studies.

- General equilibrium versus partial equilibrium analysis: Computable general equilibrium (CGE) models make it possible to consider changes simultaneously in different parts of the economy, linkages between sectors, and economy-wide resource constraints at the national and international level (Francois and Reinert, 1998). However, these tools rely on a number of simplifying assumptions, such as full employment of resources, and depend on a large amount of empirical information. If the sector to be analysed is small and not tightly linked to other parts of the economy, partial equilibrium analysis that focuses on the sector under consideration will tend to yield similar results, while being less data-intensive. Most ATC reform studies employ CGE models, though.

- Base year: The base year influences the modelling results in several ways. Prices and quantities change over time, so that models that are calibrated on data for different time periods are not fully comparable. Also, knowledge about policy parameters evolves. For example, available estimates of the export tax equivalents of MFA quota restrictions have undergone major revisions during the 1990s. Moreover, when comparing absolute welfare effects across studies that use different base periods, the effects of inflation should be taken into account.

- Level of aggregation: The sectoral and regional aggregation of a model varies with the objective of a study and data availability. Some aggregation seems inevitable, because it is virtually impossible to model the hundreds of product-lines that are involved in product-specific MFA quotas. A relatively high level of aggregation has the advantage of reducing computational complexity and the need to estimate unknown model parameters. However, aggregation reduces the dispersion of distortions in the economy, so that welfare estimates of the removal of these distortions will be biased downwards. For example, when using a 12 region model, Harrison, Rutherford and Tarr (1997) find global welfare gains from the Uruguay Round that are 5-10 per cent lower than those obtained from an otherwise identical model that differentiates between 24 regions.

- Homogenous versus heterogeneous imports: One important modelling issue concerns the degree to which domestically produced goods and imports from different countries are substitutes for each other. If imports from different countries are taken to be imperfect substitutes (the so-called Armington assumption), intra-industry trade can be represented. Most studies of ATC reform differentiate textiles and clothing products by place of origin and, hence, allow for intra-industry trade. This heterogeneity assumption tends to lead to smaller quantity changes in simulations than would be the case for homogenous products, as consumers are taken to express a preference for domestically produced goods over foreign goods.

- Constant versus increasing returns to scale: Several ATC studies depart from the standard framework of perfect competition and constant returns to scale by assuming that manufacturing, including textiles and clothing production, is characterised by increasing returns to scale. This assumption implies some degree of market power and the representation of firms' behaviour as monopolistic competition. Both domestic and imported products are heterogeneous, so that there is no "home bias" and import price changes are transmitted symmetrically to the domestic market. As a result, simulations of ATC reform generally show stronger impacts than under constant returns to scale and "Armington preferences".

- Static versus dynamic analysis: Analysis using comparative static models is generally based on a medium-term time horizon that allows for some adjustments, like employment shifts, to take place, while assuming a fixed stock of capital. Longer-run dynamic models incorporate additional linkages over time, such as those between policy reform, savings and investment. Changes in investment, in turn, trigger further changes in production and income. Hence, dynamic models tend to predict more pronounced economic effects from policy reform than static ones.

11. A number of analysts have aimed to quantify the impacts of the complex set of trade policy changes contained in the Uruguay Round Agreement. The information requirements for such an undertaking are considerable and analysts have had to compromise between the comprehensiveness of sector and country coverage and the detail of structural and trade policy representation. For example, Haaland and Tollefsen (1994) and Brown, Deardorff, Fox, and Stern (1997) place the emphasis of their CGE analysis on tariff and services trade liberalisation and do not model the phasing-out of MFA quotas. Their sectoral results contain estimates of the impact of the Uruguay Round on textiles and clothing, but as the central liberalisation feature in this sector was not represented, the findings should be interpreted with

care. The following discussion concentrates on quantitative analysis that explicitly deals with MFA quota elimination. Some structural features and the central results of some of the main studies are summarised in Annex tables 1 and 2.

3. Studies at the global level

12. The global effects of textiles trade liberalisation have been considered and quantified before the ATC was conceived. For example, Trela and Whalley (1990) analyse the removal of quotas and tariffs between Canada, the EU, the USA and 34 supplying developing countries using a static CGE model under assumptions of perfect competition and constant returns to scale.[3] Traded products are assumed to be homogenous. Their analysis is explicitly geared towards the textiles sector by specifying fourteen textiles and clothing categories and one composite other sector in their model. The researchers expect global welfare gains from quota and tariff elimination to total $23 billion per year, with the three developed country importers together accounting for about two-thirds of the gains and developing countries for one third. A number of developing countries are expected to be able to increase their exports by several hundred per cent at the expense of production in developed countries. Nevertheless, a few developing countries are expected to face welfare losses from textiles trade liberalisation, as the improved access to developed countries markets would in their cases not compensate for the loss in quota rents. These losses would be more widespread and pronounced, if the textiles market liberalisation would consist of eliminating quotas, but leaving tariffs unchanged, as assumed by the analysts in a second policy scenario.

13. In a follow-up study (Trela and Whalley, 1995), the authors expand their CGE model to capture effects related to internal quota-allocation schemes in exporting countries.[4] This is done by distinguishing two types of producers in exporting developing countries: established, high-cost producers that supply restricted export markets, and new and more efficient producers that are confined to supply the domestic market. Removal of MFA restrictions and quota-allocation procedures would allow textiles and clothing production to shift to the most efficient producer, both internationally and domestically. Trela and Whalley estimate that the welfare losses from inefficient quota-allocation schemes exceed those from the country quotas, so that the global benefits of quota and tariff elimination would amount to $49.7 billion annually. The benefits of removing the inefficient quota-allocation scheme would mainly accrue to developing country exporters, even though some of the efficiency improvements would be passed on to developed country importers in the form of lower prices.

14. Similar to Trela and Whalley, Yang (1994) concludes that the abolition of the MFA would benefit most countries and result in a substantial global welfare gain.[45] However, his study based on a partial equilibrium model of two sectors (textiles & clothing) across eight country groups finds aggregate welfare improvements that are substantially lower than those expected by Trela and Whalley. Moreover, the gains are not falling mainly on developed countries, but are about equally divided between developed and developing countries, even though internal inefficiencies from quota-allocation schemes in developing country exporters are not explicitly considered. The differences in findings seem to be mainly due to lower tariff equivalents used to represent the quota protection of developed country markets and to the differentiation between restricted and unrestricted products in the US, EU and other restricted markets in Yang's study.

15. The first quantitative assessments of the Uruguay Round Agreement predicted very substantial impacts from the opening of textiles and clothing markets. Nguyen, Perroni and Wigle (1993) evaluate the implications of the Draft Final Act of the Uruguay Round for nine sectors and ten country groups using a static CGE model.[4] They find that the aggregate welfare gains from textiles quota expansion would exceed those of the scheduled agriculture and service market liberalisation and account for $84.5 billion per year, or almost 40 per cent of the total Uruguay Round gains.[6] The welfare gains would fall roughly equally on

developed and developing countries. World trade in textiles is expected to increase by six per cent. Large-scale labour market adjustments are predicted, with the country group comprising South Korea, Chinese Taipei, Hong Kong/China, and Singapore expected to see employment in textiles and clothing production increase by more than 80 per cent, while the textiles labour force in Australia and New Zealand, Canada, the USA, and Western Europe is foreseen to contract by 22 to 36 per cent.[7]

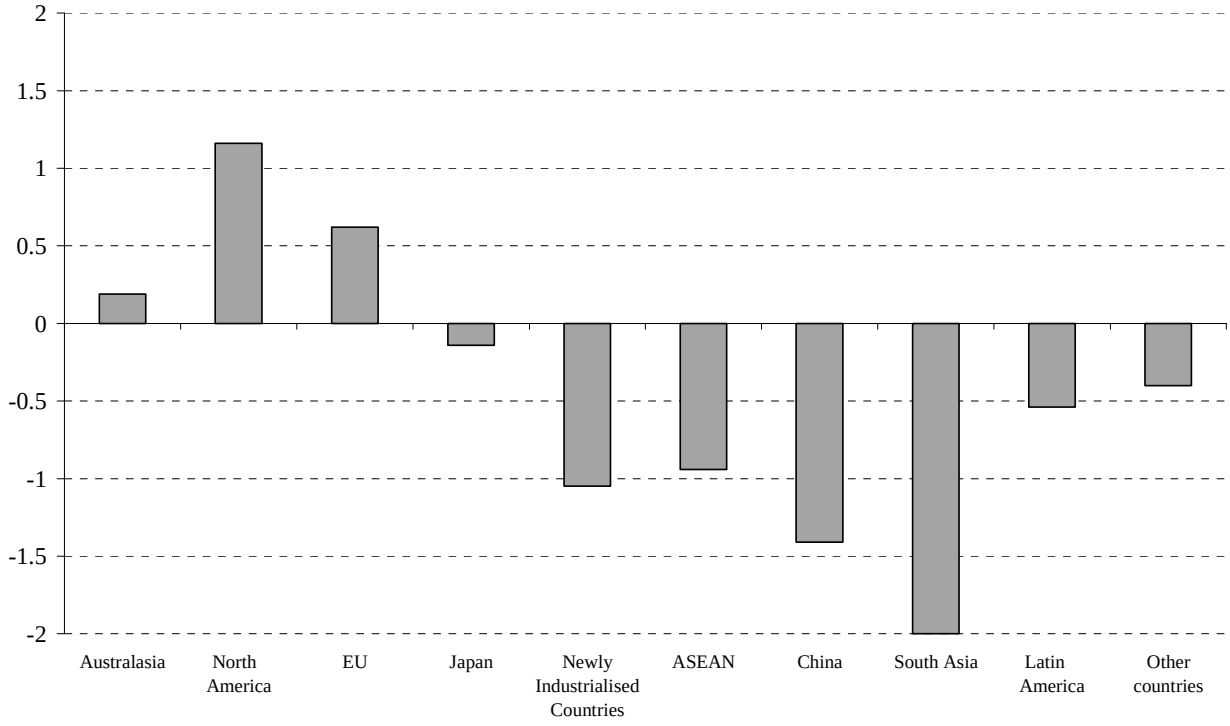
16. Large shares in overall Uruguay Round welfare gains from textiles trade liberalisation are also found by other analysts. Using a dynamic CGE model under assumptions of perfect competition and constant returns to scale, Francois, McDonald and Nordström (1994) estimate the global gains from textiles and clothing quota removal to amount to $47 billion annually,[8] which corresponds to 42 per cent of their estimate of total Uruguay Round welfare increases. In a second scenario, in which the authors assume monopolistic competition and increasing returns to scale, the predicted welfare gains from textiles market liberalisation are at $189 billion more than four times higher than in their first scenario and account for no less than two-thirds of all Uruguay Round gains. Moreover, in the second scenario all countries, including developing countries, see welfare improvements from textiles quota elimination, while developing countries lose in the case of perfect competition and constant returns to scale. This result is due to the greater price elasticity of import demand under monopolistic competition and increasing returns to scale,[9] so that the benefits from improved access of developing countries to developed country markets more easily compensate for the loss of quota rents.

17. In a subsequent study (Francois, McDonald and Nordström, 1996), the authors use a similar modelling set-up for a different baseline period and a more detailed sectoral and regional breakdown. In addition, they explore alternative linkages between trade, income and capital accumulation. In particular, different assumptions concerning the capital stock (fixed or endogenous) and the savings rate (fixed or endogenous) are considered in order to study longer-term capital accumulation effects that can magnify income gains or losses. The results indicated that incorporation of "full dynamics" (both capital stock and savings rate endogenous) leads to estimates of global welfare gains from textiles and clothing market liberalisation that are almost twice as high as those under the assumption of a fixed capital stock and a fixed savings rate.

18. Yang, Martin and Yanagishima (1997) analyse textiles and clothing market liberalisation using the Global Trade Analysis Project (GTAP) CGE model, calibrated on data for the year 1992. They distinguish 10 sectors, including two for textiles and clothing, and 10 regions. Their results suggest that the ATC would account for aggregate annual benefits of $28.6 billion, or 38 per cent of all global welfare gains from the Uruguay Round. The authors also report expected terms-of-trade changes due to the phase-out of MFA quotas, which show improvements in export to import price ratios for Australasia, North America and the EU, while Japan and developing countries are expected to see a worsening in their terms-of-trade (Figure 1).

Figure 1: Expected changes in terms-of-trade after MFA quota removal *

(in per cent)



Note: *) assuming no change in pre-Uruguay Round tariffs.
Source: Yang, Martin and Yanagishima (1997).

19. A version of the GTAP model is also used by Hertel, Martin, Yanagishima and Dimaranan (1996) when analysing the liberalisation of manufacturing trade. But their estimates are based on ATC reform in a projected economy of the year 2005. They find that MFA quotas would become more binding over time for virtually all exporters, taking into account projected economic growth, structural changes, and ATC quota growth. The increases in restrictiveness are particularly pronounced for exports of clothing from China, Indonesia, Malaysia and the Philippines. Removing textiles and clothing quotas under these circumstances would leads to global welfare gains of $37.3 billion per year.

20. Bach, Dimaranan, Hertel and Martin (2000) explicitly compare liberalisation scenarios with and without considering projected changes in the economy during the Uruguay Round implementation period. Simulations of MFA removal using the high export tax equivalents for 2005 yield estimates of global welfare gains that are more than 140 per cent higher (in 1992-US$) than those obtained using export taxes for the year 1992. The differences between simulation results for other parts of the Uruguay Round package, such as tariff reform, are much less pronounced, suggesting that economic growth and structural changes in the textiles and clothing sector warrant particular attention by analysts.

21. Yang (1996) also analyses MFA reform for an economy projected to the year 2005. He first evaluates the impacts of quota acceleration during the ATC transition period, before proceeding to an assessment of MFA quota elimination. He finds that the production and welfare impacts during the three phases of ATC transition are limited. One reason for the small effects might be that the integration requirements are defined in volume terms so that importing countries can minimise their adjustment needs

by first integrating product items that are high in volume but low in value (Bagchi, 1994). The global welfare improvement from full elimination of MFA quotas is projected to amount to $52.9 billion annually. In a further scenario, the author evaluates the implications of induced technological change on the liberalisation outcome and estimates that the benefits of reform would be magnified substantially and would, under his assumptions, lead to welfare gains for all country groups concerned.

22. The substantial size of the expected welfare gains in some of the early studies of ATC reform may be partly due to an overestimation of the tariff equivalents of textiles and clothing quotas and, hence, the benefits of removing existing protection. Using updated figures for tariff equivalents and a static CGE model under constant returns to scale, Harrison, Rutherford and Tarr (1997) estimated the annual benefits of ATC reform to amount to $16 billion, or 27 per cent of total Uruguay Round gains.[10] An increasing returns to scale version of their model predicted slightly higher global welfare gains from textiles and clothing liberalisation of $16.4 billion, and the simultaneous consideration of dynamic capital accumulation effects resulted in a benefit estimate of $20.3 billion. Similar to the analysis by Francois *et al*. (1996), the incorporation of dynamic linkages in the model led to more optimistic estimates concerning the impact of ATC reform on developing countries. Harrison *et al*. also conducted sensitivity analysis with respect to the elasticities of demand, and found that developing countries would experience higher and more widely spread welfare increases if demand was assumed to be relatively more inelastic, as reductions in import prices would trigger larger demand increases in developed importing countries and higher terms-of-trade gains in unconstrained markets. Moreover, larger elasticities of substitution between different export markets would benefit developing countries in the aggregate, but efficient producers, such as China, South Asia, Indonesia, Thailand, and Malaysia, would gain from the possibility of breaking more easily into previously constrained markets at the expense of high-cost producers in Latin America, the Middle East, North Africa, Eastern Europe and the former Soviet Union.

23. Diao and Somwaru (2001) stress the impacts of liberalisation over time in their analysis. They model ATC reform as a reduction in tariffs by 30-40 per cent and an annual increase in export efficiency by 0.5 per cent over 20 years. They predict that textiles and clothing trade levels after trade policy reform would be 5 to 16 per cent higher than they would have been without trade liberalisation, with trade in clothing products increasing twice as fast as textiles trade. Clothing and textiles exports from developing countries would increase, but so would to some extent textiles exports from industrialised countries. This finding hints at the international interrelationships in production patterns with lower prices for clothing stimulating demand in developed countries and exports from developing countries, who in turn increase their imports of capital-intensive textiles products used as inputs for the production of labour-intensive clothing. Asian and Middle Eastern exporters are expected to gain world market share, at the expense of producers in Eastern Europe, Latin America, and industrialised countries. As the authors assume that no MFA quota rents exist, the improved resource allocation after trade liberalisation leads to welfare gains in all countries. Global benefits are expected to amount to $88 billion annually in the short run (Year 5) and $203 billion in the long run (Year 20). More than two-thirds of all welfare gains accrue to developing countries.

24. Recent IMF analysis using the GTAP model covers impacts on labour market and upstream sectors (Lankes 2002). It is estimated that each job saved in a developed country by tariffs and quotas costs about 35 jobs in developing countries. Eliminating MFA quotas and tariffs on textiles and clothing in developed countries would generate employment for as many as 27 million workers in developing countries. Global welfare gains are estimated to amount to $34.7 billion per year, with more than two-thirds of the total accruing to developing countries. Some of these gains would be captured by fibre crop producers. For example, cotton exports from sub-Saharan Africa are expected to increase by 9 per cent, or $132 million, as a result of textiles and clothing liberalisation. The study also evaluates the impact of further liberalisation of textiles and clothing trade, including tariff reductions in developing countries, and

finds that developing countries would be able to capture almost all the welfare gains from such liberalisation efforts.

25. A major impact on textiles and clothing trade flows during the 1990s has ensued from regional trade agreements, like the Europe Agreements and NAFTA, as well as from the establishment of offshore processing legislation, which enabled firms to circumvent MFA quotas (Brugnoli and Resmini, 1996; Spinanger, 1999a). Fouquin, Morand, Avisse, Minvielle and Dumont (2002) quantify the impacts of further regional integration, in addition to analysis of MFA quota elimination. In particular, they simulate the impact of hypothetical free trade areas between the European Union and Mediterranean countries, and between North and Latin American countries. They find that removing the remaining EU tariffs on textiles and clothing imports from Mediterranean countries would boost production of textiles and clothing by 20 per cent and more than 50 per cent, respectively. Clothing exports to the EU would more than double. In terms of welfare effects, the Mediterranean countries would gain $3 billion per year compared to a welfare loss under a scenario of MFA quota elimination without regional preferences. Due to trade diversion, Asian exporters, notably China, would lose in exports and economic welfare. Qualitatively similar effects are predicted from the creation of a free trade area of the Americas, even though the quantitative impacts are expected to be less pronounced.

4. Studies with a regional focus

26. In addition to analysis that evaluates the global impacts of ATC reform, there are a number of studies that focus on the effects of liberalising textiles and clothing trade for particular regions. Francois, Glismann, and Spinanger (2000) analyse the impacts of ATC reform for the EU using a CGE model. In particular, they evaluate the relative effects of MFA quota phase-out and Uruguay Round tariff reductions. They find that the EU would reap total welfare gains of €25.3 billion per year, of which 97 per cent would derive from MFA elimination and 3 per cent from tariff reform. Moreover, they estimate the distribution of reform benefits across member countries (Table 4). Germany, France, and the United Kingdom are the main beneficiaries of ATC reform in absolute terms, while Denmark, Germany, and Austria gain most if the welfare increases are related to population size. Southern European countries would carry relatively large shares of negative sectoral impacts, but these would be more than compensated through estimated consumer gains. Nevertheless, Greek families would on average gain only about a fifth as much from ATC reform as Danish ones. The authors also assess the annual costs of protection per job saved. For textiles, the latter amount to about €28 500 per worker, and for clothing to about €41 100.

Table 4: Annual welfare gains from ATC reform in the European Union (1997-€)

	MFA elimination	UR tariff cuts	Total ATC reform	
	Million €	Million €	Million €	€ per family of four
Austria	639	18	661	327
Belgium/Lux.	789	22	815	307
Denmark	494	14	511	386
Finland	350	10	362	281
France	4 428	124	4 581	312
Germany	6 752	196	6 999	341
Greece	211	5	217	83
Ireland	175	5	181	196
Italy	3 356	83	3 453	240
Netherlands	1 101	32	1 140	291
Portugal	230	5	235	94
Spain	1 580	43	1 633	166
Sweden	517	15	536	242
United Kingdom	3 824	106	3 956	268
Total EU	24 446	677	25 282	270

Source: Francois, Glismann and Spinanger (2000).

27. The production and labour market effects of ATC reform on the German textiles and clothing sector have been investigated and quantified by Schöppenau, Egerer, Brenton, and Buelens (2002). They first simulate the impact of the EU's eastward enlargement on textiles and clothing markets, as the final stage of ATC reform is scheduled to take place after 10 new members have joined the Union. Enlargement is expected to have a moderately positive effect on textiles production (plus 2.9 per cent) and a moderately negative impact on clothing output (minus 1.5 per cent) in Germany. The removal of MFA quotas will have more pronounced though still limited effects, with expected reductions of textiles output and employment of about 4.4 per cent and a contraction of clothing production and employment by about 6.4 per cent. In a further simulation, the authors assess the impact of a world-wide cut in textiles and clothing tariffs by 20 per cent and find that such an additional liberalisation step would only have minimal effects in Germany and the EU. The general equilibrium analysis is complemented by partial equilibrium assessments of the effects on textiles and clothing related industries, such as spinning, weaving, and machinery. The expected impacts vary across these industries, as the latter are affected to a differing extent by the removal of MFA quotas and the subsequent adjustments in the textiles and clothing sector. The output of the spinning sector in Germany is expected to contract by 3.4 per cent, i.e. less than textiles and clothing, while production in the weaving and machinery industry is foreseen to fall more than proportionally (10.4 per cent and 9.2 per cent, respectively). The study did not report any estimates of welfare impacts, but, as indicated by Francois, Glismann and Spinanger (2000), Germany can be expected to be among the main beneficiaries of ATC reform in the EU, due to lower consumer prices and more efficient resource use.

28. The USA is also expected to gain considerably from liberalisation of textiles and clothing trade. Using a partial equilibrium approach, Cline (1987) estimates the net welfare gains from complete liberalisation to amount to $7.3 billion annually for clothing and $0.8 billion for textiles.[4] He also investigates the income distribution effects of textiles and clothing protection. When taking employment effects, consumption patterns and enterprise profits into account, he finds that protection tends to benefit primarily the higher income groups that obtain most of the protection-inflated industry profits.

29. De Melo and Tarr (1990) use a CGE model of the US economy to examine the effects of quota removal.[4] They estimate that improvements in efficiency would generate annual benefits of $5.9 billion and capturing rents from foreigners would result in additional gains of $6 billion, resulting in an overall annual welfare improvement of $11.9 billion. The authors also assess concerns regarding adjustment costs in the domestic quota-protected industries. When measuring social hardship as the earnings losses of displaced workers over six years, they estimate that the benefits of quota elimination would largely outweigh the adjustment costs, to the extent that for every dollar of worker income saved, the economy would lose $65.[11]

30. Reinert (1993) uses a similar approach as the one employed by De Melo and Tarr, while differentiating between the textiles and clothing sectors and explicitly considering five upstream supplier sectors: cotton, cellulosic man-made fibres, non-cellulosic organic fibres, textiles machinery, and needles, pins and fasteners.[4] He estimates US welfare gains from MFA quota elimination to amount to $7.3 billion. About 90 per cent of these gains are due to the removal of clothing quotas and 10 per cent to the liberalisation of textiles trade. Employment in the textiles and clothing sectors is expected to contract by 16 100 and 21 300 full-time equivalent employees, respectively, and by an aggregate 2 560 workers in the five upstream sectors.

31. In a related study, Hanson and Reinert (1997) investigate the distributional effects of textiles and clothing protection in the USA.[4] Using the CGE model of Reinert (1993), they disaggregate households into eleven income groups and assess the effects of MFA quota removal on the different groups. Contrary to Cline (1987), they find that textiles and clothing protection is slightly progressive. In particular, the losses in employment opportunities for low-wage workers in textiles and clothing production after MFA elimination are not entirely offset through lower consumer prices. Hence, removing quota-protection is predicted to affect the US income distribution slightly in the direction of greater inequality.[7]

32. The impact of ATC reform on some major developing country exporters, notably Asian countries, has also been subject to quantitative investigations. For example, Yang and Zhong (1998) use the GTAP-CGE model to compare projected annual changes in output and trade for some major textiles and clothing exporters with and without trade liberalisation. One of their findings is that while trade liberalisation would accelerate output growth in China, textiles output would continue to grow much less rapidly than GDP. In contrast, growth in clothing production exceeds overall economic growth. The group of newly industrialised economies (NIEs) shows an opposite growth pattern, pointing to fiercer competition from China in clothing production after trade liberalisation, while increased textiles demand in China and other efficient clothing producers helps boost textiles production in the NIEs. In a related study (Zhong and Yang, 2000), the authors estimate that China would realise welfare gains of as much as $8.6 billion per year from the phasing out of the MFA. This would correspond to almost two-thirds of the country's total gains from liberalising according to Uruguay Round patterns.

33. Ianchovichina, Martin and Fukase (2000) evaluate the impacts of China's accession to the WTO, based on the "accession offer" of November 1999. Their GTAP-analysis uses economic projections for the period 1995-2005. They find that the most important sectoral impacts of China's accession to the WTO would concern the clothing industry. Production of clothing is expected to rise by 249 per cent over the ten year period following accession, compared to 54 per cent in a counterfactual scenario of no accession. Exports would increase by 330 per cent, compared to 43 per cent without accession. The expansion of clothing production is predicted to stimulate input demand for imported textiles, to the extend that the latter would increase by 163 per cent.

34. Walmsley and Hertel (2000) use a dynamic version of the GTAP model to analyse the effects of alternative target dates for the elimination of China's MFA quotas following WTO accession. In particular, they compare a scenario in which quotas levied by North American and European countries are

assumed to be eliminated at the beginning of 2005 with one in which safeguards are invoked to delay the removal of quotas on Chinese textiles and clothing until 2010. The results indicate that China, North America and Europe would all experience lower welfare gains from deferred liberalisation. Moreover, the authors find that job losses in the textiles and clothing industry of industrialised countries are delayed, but not avoided, when quotas are phased out more gradually.

35. China's and Chinese Taipei's accession to the WTO is also the subject of analysis by Francois and Spinanger (2002). Similar to other analysts, they see textiles and clothing as a sector with very strong production and export potential in Greater China, particularly the People's Republic. ATC reform alone is expected to increase China's GDP by 1.1 per cent, which corresponds to about a fifth of the economy-wide growth impact of WTO accession. According to the authors' GTAP results, WTO accession and ATC reform will increase textiles exports significantly both in China (+39 per cent) and Chinese Taipei (+14 per cent). For clothing, exports from China are expected to explode (+168 per cent), while those from Chinese Taipei (-53 per cent) will likely contract. More generally, countries that have profited from preferential market access to industrial countries through the MFA are expected to suffer substantial losses in international market share. The authors also evaluate the prospective impact of China's WTO accession and ATC reform on Hong Kong/China and conclude that Hong Kong/China will remain a major sourcing hub for textiles and clothing production, but will face fiercer competition in world markets.

36. Another developing country beside China that is expected to experience significant production, export, and welfare increases from ATC reform is India. In their study of the impact of global trade policy, Chadha, Pratap, Bandyopadhyay, Sachdeva and Kurien (2000) expect India to experience welfare improvements of $1.9 billion (in 1995-US$) from the phase-out of MFA quotas, which corresponds to more than half of the country's total Uruguay Round gain.[12] These gains are likely to have further increased in recent years, as export tax equivalents of Indian MFA quotas for textiles and clothing have risen over time (Kathuria and Bhardwaj, 1998; Kathuria, Martin and Bhardwaj, 2001). Moreover, when studying the implications of domestic policy reforms in India in the context of trade liberalisation, Elbehri, Hertel and Martin (2003) find that if labour productivity in Indian textiles and clothing industries would increase by 67 per cent to reach the level enjoyed by China, the benefits from ATC reform for the country would more than double.

5. Summary

37. The preceding sections surveyed a considerable number of quantitative analyses of ATC reform. The key characteristics and main results of 29 assessments, drawn from 16 different studies, are summarised in annex tables 1 and 2. The ATC reform simulations rely on differing modelling approaches, base data, and structural assumptions, which, as discussed in section 2, drive the results. It seems *a priori* impossible to judge which analyst is right or wrong in his or her assessment. In any case, having several estimates derived under different circumstances can make it possible to increase one's confidence about some consistently obtained simulation outcomes, while at the same time help to identify issues that might warrant further analysis.

38. For example, the modelling results consistently indicate considerable shifts in textiles and clothing production and trade as the ATC is implemented. There is pressure for a large-scale reallocation of resources, with production of textiles and clothing expanding in Asian and other developing countries. In parallel, textiles and clothing production in industrialised countries is expected to contract significantly, while imports of textiles and clothing from developing countries increase.

39. All the reviewed studies foresee increases in global welfare as a result of a liberalisation of trade in textiles and clothing. But the estimates of welfare gains show considerable variation, with expected annual global benefits ranging from $6.5 billion to $324 billion. Some studies predict ATC reform to account for up to two-thirds of all gains from the Uruguay Round, while others put the contribution of textiles and clothing liberalisation at merely 5 per cent. There is similar discrepancy with respect to the distribution of welfare gains. A number of analysts see developing countries as the main beneficiaries of ATC reform, while others expect them in the aggregate to lose from the policy changes. There is also variation in the direction and magnitude of expected welfare impacts at the level of many individual developing countries.

40. In this context of uncertainty regarding the reform outcome, it is striking that developing countries have consistently been supporting the removal of the MFA. But, as some of the quantitative studies show, this stance is understandable in a dynamic world where capital accumulation effects are taken into account and the fact that inefficient quota-allocation schemes can lead to a dissipation of quota rents over time. Under these circumstances, elimination of the MFA might make it possible for developing countries to seize upon their comparative advantage in textiles and clothing and increase their export revenues and incomes.

41. Another significant result from the empirical studies is that Canada, the EU and the USA are again and again expected to experience substantial increases in welfare from ATC reform, while these countries had been among the initiators of the MFA in the first place. The optimistic modelling results seem partly due to the implicit assumption that resources that are released from some activity can switch to another one without major disruption. In other words, any potential short or medium-term adjustment problem is assumed away. This assumption makes it difficult to properly understand the purpose of quotas. Of the reviewed studies, only De Melo and Tarr (1990) try to incorporate adjustment costs into their assessment, and this in a rather *ad hoc* way. While substantial welfare gains for most OECD countries from lower consumer prices and more efficient resource allocation seem likely in the longer run, potential adjustment problems following MFA phase-out are an important policy consideration and might warrant further analysis.

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Endnotes:

[1] Article 7, paragraph 1, subparagraph (a) of the ATC states: "As part of the integration process and with reference to the specific commitments undertaken by the Members as a result of the Uruguay Round, all Members shall take such actions as may be necessary to abide by GATT 1994 rules and disciplines so as to achieve improved market access for textile and clothing products through such measures as tariff reductions and bindings, reduction or elimination of non-tariff barriers, and facilitation of customs, administrative and licensing formalities."

[2] The quotas on exports from developing countries were to grow by 6 per cent annually, although the growth rate of bilateral quotas often fell short of this target. The MFA also foresaw some limited flexibility that allowed countries to transfer a portion of an unfilled quota from one category to another ("swing"), to use the unfilled quota from the previous year ("carry-over"), or to borrow quota from the next year ("carry-forward").

[3] An earlier version of the analysis was published as a working paper (Trela and Whalley, 1988).

[4] This study was completed before the ATC came into effect, so that it does not assess the ATC as such.

[5] The analysis draws on a doctoral dissertation (Yang, 1992a) and a working paper (Yang, 1992b).

[6] In the Nguyen *et al*. analysis, textiles and clothing are grouped together with furniture into a 'light industries' sector, so that a part of the reported welfare gains from trade liberalisation will be due to improved furniture market access.

[7] Yet, employment losses have to be seen in the context of ongoing restructuring in the textiles and clothing sector, which in the USA, for example, has resulted in the contraction of employment by 725 000 jobs between 1994 and 2002.

[8] The estimates apply to the removal of industrial quotas, which in the authors' analysis comprise quotas on Japanese car exports alongside textile and clothing quotas.

[9] In the case of increasing returns to scale and imperfect competition, there is no dichonomy between homogenous domestic products and heterogenous imported products. Both domestic and imported products are heterogenous, while with perfect competition and constant returns to scale the use of the so called "Armington assumption", which implies that imports from different regions are imperfect substitutes, leads to an inherent home bias with a relatively low transmission of import price changes to the domestic market.

[10] The study was also published as a book chapter (Harrison, Rutherford and Tarr, 1996).

[11] Concerning adjustment impacts on capital owners in the textiles industry, the losses can be expected to be relatively modest, as the US textiles industry has consistently lagged the sector-average in terms of profitability.

[12.] This study is related to the earlier conference paper by Chadha, Pohit, Stern and Deardorff (1999).

Annex table 1: Structural characteristics of ATC reform studies

Study		Author affiliation	Approach	Base year	Dynamics	Competition	Imports	Sectors (T & C)	Regions	Policy reform
Trela & Whalley (1990)	a	Univ.-CAN	CGE	1986	Static	Perfect	Homogeneous	15 (14)	37	Quota & tariff elimination
	b		CGE	1986	Static	Perfect	Homogeneous	15 (14)	37	Quota elimination
Trela & Whalley (1995)	a	Univ.-CAN	CGE	1986	Static	Perfect	Homogeneous	15 (14)	37	Quota & tariff elimination
	b		CGE	1986	Static	Perfect	Homogeneous	15 (14)	37	Quota elimination
Nguyen *et al.* (1993).		Univ.-CAN	CGE	1986	Static	Perfect	Heterogeneous	9 (1)	10	Exp. of quotas by a factor of 4
Yang (1994)		Univ.-AUS	PE	1986	Static	Perfect	Heterogeneous	2 (2)	8	Quota elimination
Francois *et al.* (1994)	a	GATT	CGE	1990	Dynamic	Perfect	Heterogeneous	15 (2)	9	Quota elimination & tariff red.
	b		CGE	1990	Dynamic	Monop.	Heterogeneous	15 (2)	9	Quota elimination & tariff red.
	c		CGE	1990 & 2005	Dynamic	Perfect	Heterogeneous	15 (2)	9	Quota elimination & tariff red.
	d		CGE	1990 & 2005	Dynamic	Monop.	Heterogeneous	15 (2)	9	Quota elimination & tariff red.
Francois *et al.* (1996)	a	GATT	CGE	1992	Static	Perfect	Heterogeneous	19 (2)	13	Quota elimination & tariff red.
	b		CGE	1992	Semi-dyn.	Perfect	Heterogeneous	19 (2)	13	Quota elimination & tariff red.
	c		CGE	1992	Dynamic	Perfect	Heterogeneous	19 (2)	13	Quota elimination & tariff red.
	d		CGE	1992	Static	Monop.	Heterogeneous	19 (2)	13	Quota elimination & tariff red.
	e		CGE	1992	Semi-dyn.	Monop.	Heterogeneous	19 (2)	13	Quota elimination & tariff red.
	f		CGE	1992	Dynamic	Monop.	Heterogeneous	19 (2)	13	Quota elimination & tariff red.
Yang *et al.* (1997)		Univ.-AUS & WB	CGE	1992	Static	Perfect	Heterogeneous	10 (2)	10	Quota elimination & tariff red.
Hertel *et al.* (1996)		Univ.-USA & WB	CGE	1992	Static	Perfect	Heterogeneous	10 (2)	15	Quota elimination
Bach *et al.* (2000)	a	Univ.-DNK/USA & WB	CGE	1992	Static	Perfect	Heterogeneous	8 (2)	13	Quota elimination
	b		CGE	1992 & 2005	Static	Perfect	Heterogeneous	8 (2)	13	Quota elimination
Harrison *et al.* (1997)	a	Univ.-USA & WB	CGE	1992 & 94	Static	Perfect	Heterogeneous	22 (2)	24	Quota elimination & tariff red.
	b		CGE	1992 & 94	Static	Monop.	Heterogeneous	22 (2)	24	Quota elimination & tariff red.
	c		CGE	1992 & 94	Dynamic	Monop.	Heterogeneous	22 (2)	24	Quota elimination & tariff red.
Yang (1996)		UN	CGE	1992 & 2005	Static	Perfect	Heterogeneous	6 (2)	15	Quota elimination
Chadha *et al.* (2000)		R-Inst.-IND	CGE	1995	Static	Monop.	Heterogeneous	23 (2)	7	Quota elimination
Diao & Somwaru (2001)		IFPRI & Gov.-USA	CGE	1997	Dynamic	Perfect	Heterogeneous	7 (2)	13	Exp. efficiency incr. & tariff red.
Fouquin *et al.* (2002)		R-Inst.-FRA	CGE	1997	Static	Perfect	Heterogeneous	7 (2)	13	Quota elimination
Lankes (2002)		IMF	CGE	1997	Static	Perfect	Heterogeneous	7 (3)	17	Quota & tariff elimin. in ind. c.

Annex table 2: Estimates of annual welfare gains from ATC reform (base year billion US$)

Study		Global	CAN	EU	JPN	USA	CHN	IND	All dev. c'tries (% of tot gains)	Share of UR (% of tot gains)	Comment
Trela & Whalley (1990)	a	23.4	0.8	2.2		12.3	1.8	0.1	35%		
	b	21.9	0.9	3.0		15.0	0.9	-0.1	13%		
Trela & Whalley (1995)	a	49.7	1.1	3.7		16.4	1.9	0.5	57%		Capturing effects of inefficient quota-allocation.
	b	48.3	1.2	4.7		19.2	1.2	0.3	48%		Capturing effects of inefficient quota-allocation.
Nguyen *et al.* (1993).		84.5	1.6	17.2	-0.5	21.6			49%	40%	
Yang (1994)		7.3		1.0	-0.1	2.2	0.4		52%		
Francois *et al.* (1994)	a	47.0	1.7	26.4	-0.3	23.6	-1.0		-16%	42%	Dynamics through endogenous capital stock
	b	189.0	6.3	70.7	1.3	62.9	1.6		19%	65%	Dynamics through endogenous capital stock
	c	71.0	2.7	42.9	-0.4	38.4	-3.5		-24%	39%	Dynamics & 2005 projected economy
	d	324.0	10.2	115.1	2.1	102.3	5.4		23%	64%	Dynamics & 2005 projected economy
Francois *et al.* (1996)	a	18.4	0.3	5.9	-0.6	7.1	3.3		27%	46%	
	b	28.4	0.7	8.6	-0.8	10.8	5.4		28%	44%	Endogenous capital stock & fixed savings rate
	c	35.7	1.0	9.4	-0.6	11.9	5.9		36%	35%	Endogenous savings rate & end. capital stock.
	d	58.7	-0.2	10.3	2.0	11.7	9.4		61%	59%	
	e	118.1	-0.1	17.3	3.3	19.2	19.0		68%	61%	Endogenous capital stock & fixed savings rate
	f	107.7	0.4	18.5	4.2	22.6	11.2		59%	50%	Endogenous savings rate & end. capital stock.
Yang *et al.* (1997)		28.6		13.5	-1.7		5.6		-4%	38%	
Hertel *et al.* (1996)		37.3		24.9	0.8		5.9		-32%	14%	Based on 2005 projected economy
Bach *et al.* (2000)	a	16.2		8.1	0.2		1.9	1.4	-11%	30%	
	b	38.9		23.3	0.7		7.2	1.9	-20%	38%	Based on 2005 projected economy
Harrison *et al.* (1997)	a	16.0	0.9	7.6	-0.5	10.1	0.9		-14%	27%	
	b	16.4	0.9	7.6	-0.6	10.0	1.0		-9%	17%	
	c	20.3	1.0	7.8	-0.5	9.2	1.7		17%	12%	Dynamics through endogenous capital stock
Yang (1996)		52.9		30.7	3.7		5.1		-31%	49%	
Chadha *et al.* (2000)		6.5	0.8		-1.7	4.4	0.6	1.9	37%	5%	
Diao & Somwaru (2001)		203.0		19.4			23.7	10.8	72%		Welfare effects after year 20
Fouquin *et al.* (2002)		9.8		1.5	-0.8		6.0	4.1			
Lankes (2002)		34.7							69%		

Source: OECD Secretariat.