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Alternative Approaches in Estimating the Economic Effects of Non-Tariff Measures: Results from Newly Quantified Measures

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Abstract

This paper introduces a set of new estimates of NTM price gaps in a standard simulation model and studies the economic effects of their removal. The economic impact of removing the NTMs on footwear, wearing apparel, and processed foods are estimated and discussed using three different techniques (tariff equivalent, export tax equivalent and sand-in-the-wheels). For all of the considered sectors, NTM liberalization leads to a large increase in world trade, and an improved global welfare. Most of the gains from the elimination of NTMs accrue to the liberalizing regions.

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1. Introduction

Through successive multilateral as well as bilateral trade negotiations, the general level of tariffs has declined significantly during the past few decades. Concurrently, non-tariff measures (NTM) have become more visible and their relative importance has considerably grown. Indeed, it has been argued that the use of tari? s by governments has gradually been replaced by the use of NTMs in order to attain the policy goals formerly achieved with tari? s (see e.g., Baldwin, 1984).

A large literature has now emerged that aims at studying the different existing types of NTMs. Generally, one can distinguish three main types of contributions. The first type attempts to define and to provide an organized classification of the different non-tariff measures affecting international trade.[1] Another substantial part of this literature concerns itself with the quantification of the degree of restrictiveness of NTMs.[2] A final branch consists of the use of economic simulation models to estimate the economic effects of the removal of NTMs, based on quantitative estimates of their economic effects. This paper is a part of a larger research program that is currently being undertaken by economists at the U.S. International Trade Commission and which attempts to cover all the three branches of research. It falls into the last category—introducing newly estimated measures of NTM restrictiveness in a simulation model.

An important feature of the current research is that it attempts to assess the effects of NTMs globally, combining data at a product-specific level with more aggregated data in the simulation model in a manner which permits in principle comparisons across product sectors and regions.[3] This approach differs from that of much previous work on NTMs. For many purposes, the heterogeneous nature of both NTM policies and the products they are applied to indicates a "handcrafted" approach in which the effects of policies are estimated on narrow product categories bringing a large amount of specific institutional information to bear (Deardorff and Stern, 1997). The present work represents an attempt to "mass-produce" estimates of NTM effects which have previously been "handcrafted", a process which inevitably introduces a certain

[1] See for instance, Laird and Vossenaar (1991).
[2] For a thorough review of the main contributions in this literature, see Bora, Kuwahara, and Laird (2002).
[3] The most comparable work in this respect is that of Lawrence and Bradford (2003).

amount of noise into the estimates. It is hoped that the ability of the mass-produced estimates to provide a survey of the landscape of NTM effects compensates at least partly for the loss of handicraft precision in estimating the effects of particular policies in particular economies.[4]

Section 2 provides a conceptual framework and discusses different techniques regarding the implementation of NTM price wedges in a model. The techniques discussed in this section attempt to restore at least some of the "handicraft" tradition of NTM policy estimation by giving consideration to the manner in which policies in particular sectors are usually implemented. Section 3 characterizes a new set of estimated NTM price wedges as well as the computable general equilibrium (CGE) as well as that is used to simulate the likely economic effects of their removal. Section 4 presents the results of the simulation exercises for three sectors – footwear, apparel and miscellaneous processed foods. The fourth section concludes.

2. Conceptual and Analytical Framework

To the extent that they are designed to limit trade, NTMs create an artificial scarcity and an artificially high price. In general, the degree of restrictiveness of an NTM is measured by the price differential that it drives between the price of imported goods and the producer price of the domestic substitutes, or alternatively, between the domestic and the world price.[5] The "wedge" between the distorted and the non-distorted prices is the key input used in studying the potential economic effects of the removal of a given NTM. This section discusses alternative ways to implement a given price wedge into standard simulation models.

Because NTMs create a wedge between the world price and the domestic one, the most straightforward way to model them is as a "tariff equivalent" above and beyond the actual tariffs. This is generally appropriate, especially when the studied policy is implemented to directly affect the domestic price of the imported good. For this type of policy, economic rents that results from the higher import prices are captured by the importing economy. From the viewpoint of the liberalizing country, the NTM removal is in this case expected to deteriorate the terms of trade

[4] In the historical merchandise economy, consumers have frequently rejected mass-produced merchandise products such as cake mixes and cigarettes on their first introduction, because of concerns regarding quality. Subsequent improvements in quality caused the products to enter into widespread household use. It is to be hoped that a similar learning curve operated with respect to mass-produced estimates of NTM effects.

[5] Note that when foreign and domestic goods are not perfectly substitutes for each other, their price may diverge even in the absence of any trade restraints. The introduction of a NTM will further increase such divergence.

(i.e., pre-tariff prices of the imported good increase as demand for it increases) but to improve resource allocation. Estimates of the effects NTMs for footwear and for apparel (except for apparel importers imposing quotas under the Agreement on Textiles and Clothing) have been implemented as tariff equivalents in this exercise.

Alternatively, NTMs can be modeled as export tax equivalents, since they restrict the ability of exporters to ship their products. This approach hade been widely adopted in the study of "voluntary export restraints" (VERs), which are administered by means of the exporting economy granting licenses to particular firms to sell in the importing economy. For this type of policy, the exporter earns the economic (quota) rents that result from being granted the right to export. In contrast to the tariff-equivalent approach, the liberalizing country is in this case expected to experience an improvement in its terms of trade (i.e., availability of cheaper untaxed imports) as well as a better allocation of resources. Estimates of the effects of NTMs for apparel importers whose policies fall under the Agreement on Textiles and Clothing have been implemented as export tax equivalents in this exercise.

Another way to model NTMs is to introduce them as institutional frictions or "sand in the wheels" of trade – i.e., policies that do not really create economic rents, only efficiency losses. For instance, burdensome customs and administrative procedures, technical regulations, sanitary and phytosanitary (SPS) regulations, or other red tapes tend to produce an harassment effect and to discourage imports into an economy. Removing this type of NTMs can be modeled as an import-enhancing technological shock. The liberalizing country in this case is expected experience deterioration in its terms of trade (i.e., world price of the imported good increases as demand for it increases) combined with an improved resource allocation. The estimated effects of NTMs affecting the miscellaneous food processing sectors have been modeled in this manner.

For the study of any given NTM, the choice of the most appropriate approach should be made on a case by case basis. In the next section, we provide an illustration for each of those three approaches using a widely used general equilibrium model, in order to determine the potential economic effects of liberalizing newly estimated NTM price wedges.

3. Estimating the Effects of NTM Price Wedges - Methodology

As part of a large project on the quantification of NTMs, Dean, Feinberg and Ferrantino (2003) provide ranges of new estimates of the NTM price-wedge in three selected sectors (footwear, wearing apparel, and processed food)[6] for a number of economies or regional aggregates. They report different estimates for different model specifications (depending on which database or combination of database they use). In this exercise, we pick the estimates from the specification labeled "Composite".[7] These estimates are presented in Table 1.[8] The absence of an estimated wedge means one of three things: (a) the region had no NTMs on these products, (b) the policy data contained no information on NTMs, or (c) the policy data did contain such information, but the NTMs were not statistically associated with above-average prices given the characteristics of the economy in question.

[6] "Processed food" here refers to GTAP sector 25, "Food products nec." This sector refers to miscellaneous processed foods – in particular, it excludes meat and dairy products, processed rice and sugar, and vegetable oils and fats. See Dean, Feinberg and Ferrantino (2003) for a list of the products used. to estimate the wedges.

[7] This specification introduces a composite dummy which takes a value of 1 if either the TRAINS or ITC database records the presence of an NTM.

[8] At the time of writing, work is underway to provide similar estimates for approximately 15-18 additional GTAP sectors, which exhaust the available data and span the set of traded goods, though they exclude some for which price data are not at present available.

Table 1. Estimated NTM price wedges for three selected sectors (percent)

	Footwear	Apparel	Processed Food
Australia and New Zealand			
China			
Japan		71	
East Asia		43	
South Asia			
Southeast Asia			
Canada		34	
United States		24	
Mexico, Central America and Caribbean	38	146	
Mercosur	95	31	
Rest of Latin America		65	20
EU15		34	
EFTA			
Eastern Europe and Former Soviet Union		25	
Middle East and North Africa		37	
Sub Saharan Africa			58
Rest of the World			

Source: Dean, Feinberg and Ferrantino (2003)

The caveats presented in Dean et al. (2003) regarding these estimates should be borne in mind when looking at the simulation results. For instance, these wedges in general were estimated for relatively specific products but have been assigned to broader product categories for the purposes of CGE modeling. Similarly, in some cases the existence of the measures analyzed may have only been documented for one member of a regional grouping, but are applied to the import policies of the entire regions. These mappings in principle mean that the estimated effects are upper bounds. A computationally more expensive procedure, which would have provided lower bounds, would have been to weight the measures so that they applied only to the narrow product definitions of the price data used in the econometrics and only for the economies for which NTMs have been documented. The choice to present upper-bound estimates reflects the judgment that missing data for both product prices and NTM policies are extensive, and that the error involved in treating the missing data like the available data may be smaller than that involved in treating the missing data as if it represented situations that were completely free of NTM distortions.

In general, greater weight should be placed on the global effects and on the differences among sectors than on the differences among economies at this stage of research. Changes in the functional form, underlying data, or other details of the econometric exercise might redistribute

the estimated price-increasing effects of NTMs across economies, but are less likely to change the estimated global amount of distortion by a substantial amount.

The estimates presented here are in the nature of sectoral liberalization initiatives – it is assumed that all NTMs in a given sector are abolished worldwide on an MFN or "open regionalism" basis. Estimating effects for three sectors on a simultaneous basis would not add much additional information to that already presented. This method of presenting the results not only allows a (small) computational savings, it can be considered to be in the broader tradition of APEC initiatives. The Information Technology Agreement, which was a sectoral tariff initiative, began through discussions in APEC which were generalized to the WTO, and the APEC Automotive Dialogue and Chemicals Dialogue can be considered as examples of sectoral initiatives which cover a wide variety of topics.

To estimate the economic impact of removing the NTMs, we use the Global Trade Analysis Project (GTAP) framework which allows for the assessment and the decomposition of the welfare effects of various trade agreements.[9] GTAP has been widely used to study the likely effects of different trade agreements and other trade policy issues, it is readily available to the public and, the results reported in this paper can be easily replicated. [10]

The GTAP modeling framework consists of a comparative static CGE model and a global database. The CGE model is based on commonly applied assumptions of constant returns to scale, perfect competition and product differentiation by economy of origin (i.e., the Armington assumption). The database contains information on international and domestic markets and primary factors, as well as tariffs and other taxes. An additional component of the data is the set of parameters which, in the context of the model's equations, determines responses to changes in relative prices, among other things. The latest version of the standard GTAP database (base year 1997) is used to study the likely effects of removing the estimated price wedges.

The welfare impact of the removal of the studied NTMs is measured using the money metric equivalent variation (EV), which can be broken down into component parts in order to enable us to decompose the liberalization. The equivalent variation measures the welfare impact of a policy change in monetary terms and it is defined as the amount of income that would have to be given

[9] For additional information about the GTAP model and data, see Hertel and Tsigas (1997).
[10] Several analytical works conducted using GTAP can be accessed at http://www.gtap.agecon.purdue.edu/.

to (or taken away from) the economy before the policy change to leave the economy as well off as the economy would be after the policy change. A positive figure for equivalent variation implies that the policy change would improve economic welfare.[11] The equivalent variation of a policy change consists mainly of two components: allocative efficiency and terms-of-trade. Allocative efficiency contributions arise when the allocation of productive resources changes relative to pre-existing policies; terms-of-trade contributions arise from changes in the prices received from an economy's exports relative to the prices paid for its imports.[12]

4. Results

In this section, we introduce the estimated NTM policy measures into the GTAP modeling framework and discuss the effects of their removal on trade, production, and welfare of different regional aggregates.

a. Overall Characteristics

Four general equilibrium experiments are presented here – liberalizing respectively footwear, apparel among the economies applying ATC policies, apparel among all economies applying NTM policies, and miscellaneous processed foods. Of these, three of the experiments are similar in that the estimated NTMs are concentrated in only two or three regions. These three experiments share some common features. All of the liberalizing economies experience welfare gains, which represent the gains to consumers from lower prices. All of the liberalizing economies experience increases in both gross and net imports and decreases in production of the products previously covered by NTMs. While most of the global welfare gains accrue to the liberalizing economies, most other regions in the world economy experience at least some welfare gains due to increased market access, with estimated welfare losses unusual geographically and negligible in value when they do occur. Global production of the covered product falls, indicating that the NTMs led to overproduction in general.

The case of generalized apparel liberalization, in which 10 of the 17 regions are assumed to change policies, is more complex. In this case, at least some of the liberalizing regions

[11] For more on the concept, see Varian (1999, pp. 252-253).

[12] The standard GTAP simulations conducted here represent only the static impacts of a policy change, while dynamic effects due to increased investment, increased competition, and economies of scale might be important. It should also be pointed out that, under one of the central assumptions of the GTAP model, each region has large enough market power to be able to affect world price by changing its policies.

experience increases in apparel production and net exports in the context of a more general liberalization. Total global production increases, and the distributional effects of the policy are more problematic. While aggregate global welfare as measured on an equivalent-variation basis increases, welfare declines by a non-trivial amount in some liberalizing economies and some non-liberalizing economies, due to adverse terms-of-trade effects associated with increased global production.

b. Footwear

Dean, Feinberg and Ferrantino (2003) report price gaps for the footwear sector in Mexico, Central America, and Caribbean (38 percent) and in Mercosur (95 percent). An inspection of the underlying data reveals that the policy measures behind these wedges are mainly in the form of quantitative import restrictions. In the GTAP model, these are treated as equivalent to ad valorem tariffs, i.e., the quota rents are captured by the importing region in the form of government revenues.[13] Using a model closure which holds trade shares constant, the wedges are introduced *on top* of the existing GTAP protection data. Thus if the initial GTAP price wedge (consisting entirely of ad valorem tariffs) for Mexico, Central America, and Caribbean is around 20 percent, the adjusted wedge is will be 58 percent (38 percent plus 20 percent) once the NTMs are included.

The policy experiment conducted is the removal of the part of the price wedge which relates to the NTMs. The results are reported in Table 2. According to our simulations, shoes imports in Mexico, Central America, and Caribbean and in Mercosur would jump by 118 percent ($1.7 billion) and 258 percent ($2.6 billion), respectively. Footwear exports would increase in many regions, especially those in the Western Hemisphere (including those that are liberalizing) and in Asia. Global trade in shoes is estimated to increase by almost 6 percent ($5 billion), while global shoes output decreases by 0.6 percent (1.3 billion).

The removal of footwear NTMs in Mexico, Central America, and Caribbean and in Mercosur would lead to deterioration in those regions' terms of trade, in the sense that their increased demand for foreign shoes leads to an increase in the pre-tariff import prices. The welfare losses from the decline in the terms of trade ($227 million and $265 million, respectively), however, are more than offset by a large improvement in resource allocation ($425 million and $1.4 billion,

[13] The GTAP database does not have a broken out "footwear" sector. In our analysis, it is assumed that the quantified NTMs apply uniformly to the much more aggregated "leather products" sector, which contains footwear and other products.

respectively). Most regions in the model stand to gain from the NTM liberalization—welfare in China and the United States rise by $121 million and $252 million, respectively. Global welfare increases by $1.9 billion.

c. Wearing apparel

In the wearing apparel sector, Dean, Feinberg and Ferrantino (2003) estimate NTM wedges for a number of regions: Canada (34 percent), United States (24 percent), EU15 (34 percent), Japan (71 percent), East Asia (43 percent), Mexico, Central America, and Caribbean (146 percent) and Mercosur (31 percent), Rest of Latin America (65 percent), Eastern Europe and the Former Soviet Union (25 percent), Middle East and North Africa (37 percent).. The actual policy behind these wedges can be categorized into policies under the Agreement on Textiles and Clothing (ATC), which take the form of Voluntary Export Restrictions (VERs) for the first three regions, and general quantitative import restrictions (QRs) for the others. In the GTAP framework, the formers are treated as equivalent to export taxes that are uniformly applied in *all* source regions (i.e., the quota rents are captured by the exporting region), while the QRs are modeled as non-discriminatory ad valorem tariffs (i.e., the quota rents are captured by the importing region). The new export tax numbers are used *instead* of the existing ones in the GTAP protection data. On the other hand, the new QR wedges are introduced *on top* of the existing GTAP tariff data.

To analyze the apparel NTMs, we conduct two policy experiments. The first experiment is the removal of only the ATC quotas for Canada, United States, and EU15.[14] The second experiment studies the removal of all quantified apparel NTMs. The results of each experiment are reported in Table 3 and Table 4.

The removal of the ATC quotas is estimated to lead to large changes in the patterns of world trade. Global clothing import increases by more than 53 percent ($88 billion), with the imports of Canada, United States, and EU15 increasing by 173 percent, 84 percent, and 70 percent respectively. With the exception of the EU15, all regions in the model experience large increases in their clothing exports. [15] The lifting of the ATC quotas is expected to lead to a terms-of-trade

[14] As part of the Agreement on Textiles and Clothing (ATC), the MFA quotas are scheduled to be lifted by 2005. For a recent review of the literature on the MFA quotas, see OECD (2003).

[15] Our approach makes a very strong assumption that the ATC quotas are uniformly restrictive across all exporting regions – that is we assume that they are non-discriminatory. In reality, there is a great deal of discrimination and the restrictiveness of the quotas varies greatly from exporter to exporter. For instance, it is widely recognized that the quota is much more binding in Asia than in other regions. While interpreting our results (especially regarding the export pattern), this drawback should be kept in mind.

improvement (cheaper import prices) and a better resource allocation (less distortion) in the three liberalizing regions, so that total welfare in Canada, the United States, and the EU15 is expected to rise by $1.7 billion, $10 billion, and $14 billion, respectively. Total world welfare increases by $21 billion.[16]

The removal of all quantified NTMs (inclusive of the MFA quotas) leads to even larger changes in global clothing trade, with total import increasing by more than 242 percent ($297 billion). Simulation results suggest very large increases in the clothing imports of the Rest of Latin America (1506 percent), Japan (986 percent), Mexico, Central America, and Caribbean (1320 percent). These changes are much larger than the effects of the removal of the MFA quotas. The welfare impacts are also much larger with the biggest gainers being the EU15 ($27 billion), The United States ($17 billion) and China (7 billion). While some regions like Japan and Mexico, Central America, and Caribbean experience some welfare losses, global aggregate welfare increases by almost $21 billion.

d. *Miscellaneous Processed Foods*

The Dean, Feinberg and Ferrantino (2003) study reports price gaps for miscellaneous processed foods in Sub Saharan Africa (58 percent) and the rest of Latin America (20 percent). The policies policy measures behind these wedges are generally categorized as "non-automatic licensing" (or "prior authorization" needed to import for various health or safety reason). While not directly affecting the price or the amount of the imported good, these policies have a dampening or a harassment effect because they require some type of burdensome customs procedures, or in some case necessitate cost-increasing production improvements. In this analysis, they are consider as "sand in the wheels" of trade and their removal is modeled as an "import augmenting technical change" for which a parameter is readily available in the GTAP framework.[17] The shock applied

[16] It should be noted that the (non-discriminatory) ATC quota wedges here are different from those existing in the base GTAP model. For the United States, the wedge used here lies within the range of the discriminatory default wedges in GTAP, with wedges for imports from China higher on an *ad valorem* basis and the rest lower. For the EU15 and Canada, the estimated wedges are uniformly higher than those in base GTAP. The net effect of these changes is that the estimated effects from using the current wedges are larger than those in base GTAP. Estimated global welfare increases from eliminating the base GTAP wedges are about $7.6 billion as compared to the current $21 billion, and estimated global imports increase by $23.9 billion as compared to $88 billion in the experiment presented here.

[17] For the reader familiar with the GTAP framework, the technical parameter used here is "ams". This procedure is similar to that used in Hertel, Walmsley and Itakura (2001), and can be used to model the effects of trade facilitation more generally.

to technological parameter is calibrated in such a way that the difference between the import and the domestic prices declines by the quantified NTM price wedge.[18]

The simulation results are reported in Table 5. The removal of the food NTMs in the rest of Latin America and the SSA region would increase global trade in food by about 1 percent ($1.5 billion). Food imports of the two regions would increase by 19 percent ($307 million) and 48 percent ($1.1 billion) respectively. Given their small size, changes in other economies' trade and production are relatively small. Food exports by Mercosur increase by 1.56 percent ($54 million). Although, they experience deteriorations in their terms of trade, the efficiency gains (both in terms of resource allocation and import technological efficiency) lead to large welfare gains for the rest of Latin America ($368 million) and Sub Saharan Africa ($1.7 billion). Almost all regions in the world would gain from the trade liberalization, and global welfare would increase by almost $2.3 billion.

5. Conclusion

This paper introduces a set of new estimates of NTM price gaps in a simulation model, and studies the economic effects of their removal. Although its ambitions are modest, its contributions could be useful for both policymakers and economic researchers.

One main contribution is methodological in nature. We characterize and illustrate three different techniques to implement measures of NTM restrictiveness into a CGE modeling framework. NTMs could be modeled as tariff equivalent, as export tax equivalent, or as sand-in-the-wheels-of-trade. The choice of the most appropriate approach depends on the nature of the NTM that is being studied. Each technique is implemented for a specific sector.

The economic impact of removing the quantified NTMs on footwear, wearing apparel, and processed foods are discussed. For all of the considered sectors, NTM liberalization leads to a substantial jump in world trade, and an improved global welfare. Contrary to the frequently expressed neomercantilist view that the goal of trade policy should be to increase the merchandise trade surplus of a particular economy (i.e., increased exports are good, and increase imports are

[18] As noted before when foreign and domestic goods are not perfectly substitutes for each other, their price may diverge even in the absence of any trade restraints. The introduction of a NTM will further increase such divergence.

bad), most of the gains from the elimination of NTMs accrue to the liberalizing regions—suggesting that those barriers to trade are higher than their "optimal-tariff" level.

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Table 2. Effects of the removal of footwear NTMs on Trade, Production, and Welfare

	Percent Changes			Value Changes ($ millions)			Welfare effects (Equivalent Variation: $ millions)		
Region/Economy	Footwear Imports	Footwear Exports	Footwear Production	Footwear Imports	Footwear Exports	Footwear Production	Allocative Efficiency	Terms of Trade	Total EV
Australia and New Zealand	0.55	4.32	1.79	6	26	26	2	5	7
China	2.14	3.01	2.03	64	631	771	20	102	121
Japan	0.08	1.75	0.01	5	5	1	-5	5	0
East Asia	0.64	1.42	0.68	23	72	66	-4	10	5
South Asia	1.95	0.26	0.04	5	5	2	-4	-3	-7
Southeast Asia	2.35	2.44	1.84	41	178	167	-1	30	29
Canada	0.82	0.13	-0.73	15	0	-8	-1	-1	-2
United States	1.48	28.74	4.72	364	610	566	-15	267	252
Mexico, Central America and Caribbean	118.17	16.23	-18.96	1746	221	-1350	425	-227	198
Mercosur	258.11	37.85	-7.71	2606	1313	-1438	1444	-265	1179
Rest of Latin America	3.82	26.00	1.22	37	74	54	13	26	38
EU15	0.33	-0.16	-0.28	104	-44	-143	19	46	65
EFTA	0.10	-0.31	-0.31	2	-1	-2	1	4	5
Eastern Europe and Former Soviet Union	0.16	-0.56	-0.29	8	-16	-28	-1	4	3
Middle East and North Africa	0.22	0.11	-0.02	6	1	-5	0	1	1
Sub Saharan Africa	0.30	-0.17	-0.19	4	-1	-3	-1	-1	-2
Rest of the World	0.12	-0.56	-0.20	1	-4	-6	-2	-2	-4
Total	5.64	4.05	-0.65	5036	3071	-1331	1889	-1	1888

Regions with NTM wedges: Mexico, Central America, and Caribbean (38) and Mercosur (95)
Source: Authors' simulations using GTAP and NTM price wedges from Dean, Feinberg and Ferrantino (2003).

Table 3. Effects of the removal of wearing apparel quotas on Trade, Production, and Welfare – ATC policies only

	Percent Changes			Value Changes ($ millions)			Welfare effects (Equivalent Variation: $ millions)		
Region/Economy	Apparel Imports	Apparel Exports	Apparel Production	Apparel Imports	Apparel Exports	Apparel Production	Allocative Efficiency	Terms of Trade	Total EV
Australia and New Zealand	0.06	49.10	3.49	1	185	153	26	21	47
China	0.73	27.48	10.04	18	5915	4337	1336	-3782	-2446
Japan	0.58	64.36	0.82	82	621	502	56	-793	-738
East Asia	3.98	101.03	35.75	325	12086	8941	1729	-2644	-915
South Asia	42.29	105.36	56.60	71	10362	7794	1924	-2866	-942
Southeast Asia	7.90	100.49	41.60	81	9994	7773	1567	-2461	-894
Canada	173.58	122.09	-27.44	4749	1436	-1918	769	955	1724
United States	84.30	106.08	-28.41	35800	4322	-24476	3455	6777	10232
Mexico, Central America and Caribbean	8.89	96.21	39.46	546	9180	6602	1657	-2088	-431
Mercosur	0.91	80.74	0.74	9	350	256	65	-89	-24
Rest of Latin America	2.27	94.86	5.04	24	754	543	128	-116	12
EU15	70.64	-46.23	-46.71	44814	-15954	-45138	143	14297	14440
EFTA	2.90	195.22	54.66	111	1092	741	176	47	223
Eastern Europe and Former Soviet Union	9.56	185.24	55.61	688	14577	10132	2709	-2833	-124
Middle East and North Africa	9.81	160.55	51.88	551	16567	11504	3644	-3008	636
Sub Saharan Africa	1.68	137.89	37.76	20	1556	1120	282	-324	-42
Rest of the World	16.51	137.29	46.89	187	4395	3249	816	-926	-111
Total	53.76	60.40	-1.68	88078	77438	-7886	20481	167	20648

Regions with NTM wedges modeled as export tax equivalent in ALL partner countries: Canada (34), United States (24), EU15 (34).
Source: Authors' simulations using GTAP and NTM price wedges from Dean, Feinberg and Ferrantino (2003).

Table 4. Effects of the removal of wearing apparel NTMs on Trade, Production, and Welfare – policies in all economies

	Percent Changes			Value Changes ($ millions)			Welfare effects (Equivalent Variation: $ millions)		
Region/Economy	Apparel Imports	Apparel Exports	Apparel Production	Apparel Imports	Apparel Exports	Apparel Production	Allocative Efficiency	Terms of Trade	Total EV
Australia and New Zealand	-2.93	104.01	9.62	-56	391	420	-3	18	15
China	22.89	215.82	99.29	580	46452	42899	2794	4568	7362
Japan	986.87	145.60	-85.53	140276	1405	-52303	2393	-12209	-9816
East Asia	222.16	155.07	15.75	18155	18550	3939	3361	-2615	746
South Asia	33.89	80.31	45.51	57	7898	6267	1202	-2495	-1293
Southeast Asia	12.29	160.97	75.14	126	16009	14040	1348	-36	1313
Canada	175.51	131.31	-26.15	4802	1544	-1828	706	479	1184
United States	99.86	860.04	5.96	42408	35042	5133	3781	13632	17413
Mexico, Central America and Caribbean	1320.15	211.79	36.04	81066	20208	6030	-11840	-6916	-18756
Mercosur	351.31	326.80	-4.70	3651	1415	-1615	681	-553	127
Rest of Latin America	1506.44	384.51	-51.26	16011	3055	-5521	504	-1378	-874
EU15	113.03	204.63	13.77	71706	70620	13304	10922	16680	27602
EFTA	2.78	157.71	47.65	106	882	646	8	-162	-154
Eastern Europe and Former Soviet Union	95.61	121.93	7.55	6878	9596	1375	2584	-3794	-1210
Middle East and North Africa	194.17	126.77	8.78	10901	13081	1948	3213	-4463	-1251
Sub Saharan Africa	0.30	85.98	24.68	4	970	732	73	-449	-376
Rest of the World	13.61	105.36	38.43	154	3373	2663	411	-767	-355
Total	242.20	195.37	8.12	396826	250491	38126	22137	-460	21677

Regions with NTM wedges modeled as tariff equivalent: Japan (71), East Asia (43), Mexico, Central America, and Caribbean (146) and Mercosur (31), Rest of Latin America (65), RussiaEE (25), Middle East and North Africa (37). Regions with NTM wedges modeled as export tax equivalent in ALL partner countries: Canada (34), United States (24), EU15 (34).
Source: Authors' simulations using GTAP and NTM price wedges from Dean, Feinberg and Ferrantino (2003).

Table 5. Effects of removal of food processing NTMs on Trade, Production, and Welfare

	Percent Changes			Value Changes ($ millions)			Welfare effects ($ millions)			
Region/Economy	Food Imports	Food Exports	Food Production	Food Imports	Food Exports	Food Production	Allocative Efficiency	Tech. gains	Terms of Trade	Total EV
Australia and New Zealand	0.04	0.23	0.04	1	6	5	0	0	-1	0
China	0.1	0.04	0	3	2	0	0	0	2	2
Japan	0.05	0.35	0	12	7	-4	5	0	18	23
East Asia	0.04	0.08	0	3	3	1	0	0	4	4
South Asia	0.05	0.31	0.12	0	8	8	2	0	2	5
Southeast Asia	0.03	0.06	0.01	1	6	5	0	0	2	2
Canada	0.01	0.03	0	0	1	0	0	0	-1	-1
United States	0.07	0.56	0.02	11	61	55	6	0	30	36
Mexico, Central America and Caribbean	0.04	0.4	0.04	1	13	14	0	0	2	2
Mercosur	0.09	1.53	0.07	2	54	56	5	0	9	14
Rest of Latin America	19.27	2.7	-1.56	307	156	-461	77	317	-26	368
EU15	0.06	0.64	0.11	32	313	315	44	0	93	136
EFTA	0.07	0.3	0.11	4	15	15	4	0	3	6
Eastern Europe and Former Soviet Union	0.01	-0.03	-0.01	1	-1	-3	1	0	2	3
Middle East and North Africa	0.04	0.65	0.04	3	19	18	3	0	3	6
Sub Saharan Africa	47.83	6.72	-10.24	1113	190	-2209	577	1311	-143	1745
Rest of the World	0.01	0.03	0	0	0	0	0	0	0	0
Total	1.00	0.72	-0.20	1495	854	-2184	723	1629	0	2352

Regions with NTM wedges: Rest of Latin America (20) and Sub Saharan Africa (58)
Source: Authors' simulations using GTAP and NTM price wedges from Dean, Feinberg and Ferrantino (2003).