THE ECONOMIC EFFECTS OF SIGNIFICANT U.S. IMPORT RESTRAINTS, PHASE I: MANUFACTURING

Report to the Committee on Finance of the United States Senate on Investigation No. 332-262 Under Section 332 of the Tariff Act of 1930

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This report was prepared principally by

Donald J. Rousslang, Project Leader
Walker A. Pollard, Deputy Project Leader

Kenneth A. Reinert, Hugh M. Arce, Tracy Murray,
James T. H. Tsao, and Andrew M. Parks

with assistance from

the Office of Industries Commodity Divisions

Address all communications to
Kenneth R. Mason, Secretary to the Commission
United States International Trade Commission
Washington, DC 20436

Preface

On October 11, 1988, the United States International Trade Commission instituted investigation No. 332-262, The Economic Effects of Significant U.S. Import Restraints. The investigation, conducted under section 332(g) of the Tariff Act of 1930, is in response to a request from the Committee on Finance of the U.S. Senate (app. A). The purpose of the study is to assess the economic effects of significant U.S. import restraints on U.S. consumers, on the output and profits of U.S. firms, on the income and employment of U.S. workers, and on the net economic welfare of the United States.

The report includes assessments of economic effects of high tariffs in 20 product categories, of voluntary export restraints on steel, Japanese autos, and machine tools, escape-clause relief for specialty steel, and the Multifiber Arrangement for textiles and apparel. A summary of the Commission's findings begins on page iii. This report is the first of three requested by the Finance Committee. The report on the second phase of this study will assess the economic effects of restraints on imports of agricultural products and natural resources. The report on the third phase of this study will assess the economic effects of restraints on service industries.

The Commission received the request on September 12, 1988. Public notice of the investigation was given by posting a copy of the notice in the Office of the Secretary, U.S. International Trade Commission, Washington, DC, and by publishing the notice in the *Federal Register* of October 19, 1988 (vol. 53, No. 202, p. 40971) (app. B).

A public hearing in connection with the present investigation was held in the Commission's hearing room on April 5, 1989. The calendar of witnesses who appeared at the hearing appears in appendix C.

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Executive Summary

This study examines the effects that significant U.S. import restraints have on consumers, on the output and profits of firms, on the income and employment of workers, on the net economic welfare of the United States, and on major upstream suppliers and downstream customers of the protected industries. These effects are examined on an industry-by-industry basis. This first phase of the study is limited to the restraints on manufactured imports.

The study covers 20 high-tariff categories and all trade restraints on products covered by 5 nontariff measures. The high-tariff categories are a mix of Standard Industrial Classification categories, Harmonized Tariff System line items, and other categories. The nontariff measures are the voluntary restraint agreements on steel and machine tools, the section 201 quotas on specialty steel, the Japanese voluntary export restraints on automobiles, and the Multifiber Arrangement (MFA).

Import restraints resulting from final antidumping or countervailing duty investigations, section 337 investigations, or section 406 investigations are explicitly excluded per the request letter from the Senate Finance Committee. Senate Finance Committee staff advised that restraints resulting from section 301 actions and from actions taken under similar provisions were also to be excluded.

Results

Tariffs

Tables ES-1 and ES-2 summarize the estimates for the effects of unilaterally eliminating tariffs on 20 high-tariff categories in 1988. The estimates in the tables are the midpoints of the range of estimates presented in chapter 2. These are estimates of the short-run effects that occur in the first year after the tariff removals.

Table ES-1 provides estimates for the traditional measures of the effects of tariffs (the measures usually included in elementary textbook treatments of the effects of a tariff). These are the effects on consumers, producers, and net welfare. Removing an import restraint lowers the price of the affected imports and may lower the price of the competing domestic good. The fall in the prices of the import and the domestic good constitute the economic gain to U.S. consumers. The consumer gain includes the gains to all of the downstream industrial consumers of the protected industry as well as to final consumers. That is, the consumer gain includes the increased profits that all of the downstream industrial consumers get as a result of the lower input prices, plus the cost savings that are passed through to the final consumers. The gains to downstream industrial consumers and final consumers cannot be separately identified, but estimates of the effects on costs and output of major individual downstream users are provided in the text for each import restraint.

The producer loss results from the lower price to the protected domestic industry caused by removing the import restraint. The producer loss consists primarily of the reductions in profits to the protected industry and its upstream suppliers. (These are reductions in economic profit, not accounting net income). It is not possible to identify separately the reductions in profits of the protected industry and those of its upstream suppliers, but in most cases the bulk of the loss belongs to the protected industry. Estimates of the effects on the output of important upstream suppliers are provided in the text for each import restraint. The measure for the producer loss can be particularly sensitive to the value of the domestic supply elasticity, and estimates of this elasticity are subject to a wide margin of error. Therefore, estimates are constructed for a range of possible supply elasticities.

The traditional net welfare gain is equal to the gain to consumers, minus the producer loss, and minus lost tariff revenue.

Table ES-2 contains estimates for other effects of tariffs that are not included in the traditional calculations. These are estimates for the worker income loss, for the effects of domestic taxes, and for the response of exchange rates.

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Table ES-1

Summary of traditionally measured effects of unilaterally eliminating tariffs for high-tariff items, 1988[1]

Category	Consumer gain[2]	Effects on the protected industry			Traditional net welfare gain
		Change in shipments	Producer loss[3]	Change in employment	
	Millions of dollars			Thousands	Millions of dollars
Rubber and plastics footwear	272.2	-183.4	44.1	-2.4	37.9
Women's footwear, except athletic	325.1	215.5	54.6	3.5	17.1
Ceramic floor and wall tile	90.0	-35.1	10.0	-0.4	2.5
Luggage	186.3	-141.9	36.4	-1.8	10.2
Leather gloves and mittens	28.1	-43.1	10.8	-0.6	2.3
Vitreous china table and kitchen articles	43.8	-32.4	9.2	-0.6	1.4
Fine earthenware table and kitchen articles	34.7	-5.0	0.8	-0.2	0.3
Women's handbags and purses	134.4	-115.2	25.7	-1.6	5.4
Costume jewelry and costume novelties	86.7	-67.0	20.7	-1.0	6.7
Pressed and blown glassware, nec	185.8	-260.3	77.2	-2.5	9.6
Cyclic organic crudes and intermediates	685.3	-1188.4	386.3	-2.6	16.0
Electronic and electrical capacitors	74.8	-100.1	29.1	-1.5	3.4
Methyl alcohol	45.3	14.5	4.3	0.5	4.4
Polyethylene resins	93.1	-152.0	45.1	-0.8	9.4
Nonstuffed dolls	38.8	-32.8	6.0	-1.1	1.3
Certain bicycles	38.1	-47.3	10.0	-0.6	1.8
Ball bearings	50.3	-11.3	3.9	-0.1	0.5
Optical instruments	15.8	-14.0	4.1	-0.4	0.5
Canned tuna	61.3	-72.2	35.0	-0.8	4.9
Western red cedar shakes and shingles	25.3	-7.7	11.5	-0.1	-27.0

[1] Midpoints of ranges presented in ch. 2.
[2] Includes the gain in profits to all downstream consumers of the protected product plus the cost savings to final consumers.
[3] May include some losses to supplying industries.

Source: Estimated by USITC staff.

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Table ES-2

Summary of effects of unilaterally eliminating tariffs for high-tariff items, adjustments to the traditional measure, 1988[1]

(In millions of dollars)

Category	Worker income loss[2]	Domestic tax loss[3]	Terms-of-trade loss[4]	Adjusted net welfare gain[5]
Rubber and plastics footwear	6.2	28.5	51.3	-48.1
Women's footwear, except athletic	7.5	38.0	91.5	-119.9
Ceramic floor and wall tile	1.4	11.6	7.4	-18.0
Luggage	5.5	21.0	37.9	-54.1
Leather gloves and mittens	1.1	2.3	9.0	-10.0
Vitreous china table and kitchen articles	1.9	5.0	5.7	-11.2
Fine earthenware table and kitchen articles	0.3	5.1	2.1	-7.2
Women's handbags and purses	3.6	15.5	26.9	-40.7
Costume jewelry and costume novelties	2.3	8.9	48.2	-46.7
Pressed and blown glassware, nec	10.2	14.8	50.3	-65.8
Cyclic organic crudes and intermediates	18.1	42.5	120.0	-165.0
Electronic and electrical capacitors	3.8	6.3	23.5	-30.3
Methyl alcohol	0.3	5.5	18.3	-19.7
Polyethylene resins	2.1	5.8	39.1	-37.6
Nonstuffed dolls	0.4	4.7	7.0	-6.1
Certain bicycles	1.2	4.0	10.4	-13.7
Ball bearings	0.5	6.9	2.4	-9.3
Optical instruments	0.5	1.7	2.4	-4.1
Canned tuna	1.5	3.2	6.4	-6.1
Western red cedar shakes and shingles	0.3	6.1	3.5	-36.8

[1] Midpoints of ranges presented in ch. 2.
[2] The worker income loss calculation assumes a rigid wage in the sector under consideration. If the wage is flexible, the worker income loss would be included in the producer loss of the traditional analysis.
[3] The domestic tax loss calculation assumes that tariff revenue is replaced with a proportional increase in all existing domestic taxes. If the replacement tax were a uniform sales tax, this adjustment would be insignificant in size. If the federal income tax were used to replace the tariff revenue, the adjustment could be 3 times as great.
[4] The terms-of-trade adjustment is relevant only for a unilateral tariff elimination. The estimate presented here tends to overstate the true terms-of-trade loss, because it does not account for the fact that increased U.S. imports might cause foreign demand for U.S. exports to increase.
[5] Because the worker income loss and terms-of-trade loss are biased upward, the adjusted net welfare gain is biased toward overstating the loss from this elimination.

Source: Estimated by USITC staff.

The estimates labelled "worker income loss" refer to short-term earnings losses experienced by workers who are displaced from the domestic industry that loses protection. The change in employment refers only to the change in the domestic industry, not in aggregate employment. Estimates of the effects on aggregate employment would require a complete macroeconomic model and are beyond the scope of this study.

The estimates labelled "domestic tax adjustment" account for the effects of domestic taxes on the welfare consequences of a tariff. The traditional calculations ignore the effects of domestic taxes and this leads to two errors. First, the traditional calculations fail to account for the change in revenue from domestic taxes caused by the tariff, a change that usually serves to magnify the welfare cost of the tariff. Second, they fail to account for the welfare cost of replacing the tariff revenue. Since every existing tax imposes a welfare cost, the question is "does the tax used to replace the tariff revenue impose a greater or smaller welfare cost than the tariff?" The domestic tax adjustment accounts for both of these shortcomings of the traditional analysis. The adjustment for domestic taxes depends importantly on the tax used to replace the tariff revenue. The adjustment would be near zero if a sales or value-added tax were used to replace revenue, but higher than the reported level if the income tax were used. The estimates presented here assume that the tariff revenue is replaced using a uniform proportional increase in all existing domestic taxes.

The estimates labelled "terms-of-trade loss" account for the effects of unilaterally eliminating a tariff on the exchange rate. Eliminating a tariff tends to increase U.S. demand for foreign currencies. The resultant decline in the value of the dollar raises prices paid for U.S. imports and reduces the prices received for U.S. exports. These price effects are very small, because removing an individual tariff would have only a very small effect on the exchange rate. Nevertheless, because these price effects apply to all traded goods, their sum can be important relative to other effects of the tariff.

The adjustment for the response of exchange rates is needed only if foreign trading partners do not reciprocate for the tariff removal. When tariff reductions take place in a multilateral framework, foreign tariff concessions accompany the U.S. tariff concessions, so that an increase in foreign demand for U.S. exports accompanies the increase in U.S. demand for imports, and there is no need for an exchange rate adjustment.

The estimates labelled "adjusted net welfare gain" are the traditional net welfare gains minus the adjustments for the worker income loss, for the response of exchange rates to the tariff elimination, and for the effects of domestic taxes. These estimates tend to overstate the loss that each tariff removal would impose, because the worker income loss and the response of exchange rates are estimated under conditions that tend to overstate these adjustments.

The methods used to estimate the adjustments for the response of exchange rates and for domestic taxes are in the developmental stages and are still being refined. Also, estimates of the economic variables needed to apply these methods are subject to large errors. Consequently, estimates of these adjustments, and of the total net welfare effects after accounting for these adjustments, are somewhat unreliable.

The traditional calculations show that unilaterally eliminating the tariffs will result in a net improvement in overall economic welfare in every case except the tariff on Western red cedar shakes and shingles, but the net welfare effect is always negative after the adjustments are included. The inapplicability of the terms-of-trade adjustment for the multilateral tariff reductions and the sensitivity of the domestic tax loss to the nature of the substitute tax are important caveats to be kept in mind in interpreting these results. Also, only zero and the current tariff rates were compared. An intermediate unilateral tariff cut might result in higher adjusted net welfare than present tariffs. In the long run, the adjustments tend to become less important (except the adjustment for the effects of domestic taxes), so that the traditional net welfare calculations become a more acceptable method for determining the long-run effects of the tariff removal.

Nontariff measures

Tables ES-3 and ES-4 summarize the estimates for the effects of eliminating the 5 nontariff measures as well as tariffs on the products they cover. The estimates are the mid-points of the range of estimates presented in chapters 3 and 4. The results show adjusted net welfare losses in the short run (after all adjustments, including the effects of removing the tariffs) from removing the steel VRAs, the section 201 quotas on specialty steel, and the machine tool VRAs, but adjusted net welfare gains from terminating the Multifiber Arrangement (MFA). The net welfare gain from terminating the MFA is over twice as large as the welfare losses from terminating all of the other tariffs and quotas combined. No measurable effect was found for the Japanese auto export restraints.

These estimates are subject to the same caveats as the estimates for the effects of eliminating tariffs. In addition, the estimates tend to overstate the welfare gains from eliminating the MFA, because of assumptions used to construct the econometric model.

Factors not considered

This study does not consider several factors that may be important but could not be quantified. Distributional aspects are not considered. (For example, a dollar of losses concentrated among a few domestic firms and their employees should perhaps be weighted differently than a dollar of gains dispersed among a large number of consumers.) The expenditures by domestic firms to get or keep import restrictions are not counted. No allowance is made for the higher costs that protected firms may have if protection causes them to lose the incentives for efficiency that competition brings.

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Table ES-3

Summary of traditionally measured effects of unilaterally eliminating nontariff measures and tariffs on the products they cover, 1988 (except where indicated)[1]

Category	Consumer gain[2]	Effects on the protected industry: Change in shipments	Effects on the protected industry: Producer loss[3]	Effects on the protected industry: Change in employment	Traditional net welfare gain
	Millions of dollars			Thousands	Millions of dollars
Steel VRAs	820.6	-854.1	268.7	-3.8	66.0
Section 201 quotas on specialty steel	34.1	-31.8	9.9	-0.1	7.8
Machine tool VRAs	48.0	-39.1	11.3	-0.4	7.7
Japanese auto export restraints	([5])	([5])	([5])	([5])	([5])
Multifiber arrangement:[4]					
Textiles	[6]883.1	-678.2	303.6	-6.3	158.0
Apparel	[6]9,826.1	-2,405.1	4,054.3	-255.7	2,332.7

[1] Midpoints of ranges presented in chs. 3 and 4.
[2] Includes the gain in profits to all downstream consumers of the protected product plus the cost savings to final consumers.
[3] May include some losses to supplying industries.
[4] 1987
[5] No measurable effect
[6] In square-yard equivalents

Source: Estimated by USITC staff.

Table ES-4

Summary of effects of unilaterally eliminating nontariff measures and tariffs on the products they cover, adjustments to the traditional measure, 1988 (except where indicated)[1]

(In millions of dollars)

Category	Worker income loss[2]	Domestic tax gain[3]	Terms-of-trade loss[4]	Adjusted net welfare gain[5]
Steel VRAs	18.4	40.1	463.6	-376.0
Section 201 quotas on specialty steel	0.7	3.1	17.9	-7.6
Machine tool VRAs	1.9	4.6	22.9	-12.6
Japanese auto export restraints	([6])	([6])	([6])	([6])
Multifiber arrangement:[7]				
Textiles	86.8	235.3	-1.5	308.0
Apparel	224.3	2,741.1	972.1	3,877.3

[1] Midpoints of ranges presented in chs. 3 and 4.
[2] The worker income loss calculation assumes a rigid wage in the sector under consideration. If the wage is flexible, the worker income loss would be included in the producer loss of the traditional analysis.
[3] The domestic tax gain calculation assumes that tariff revenue is replaced with a proportional increase in all existing domestic taxes. If the replacement tax were a uniform sales tax, this adjustment would be somewhat larger. If the federal income tax were used to replace the tariff revenue, the adjustment would be somewhat smaller.
[4] The terms-of-trade adjustment is relevant only for a unilateral restraint elimination. The estimate presented here tends to overstate the true terms-of-trade loss, because it does not account for the fact that increased U.S. imports might cause foreign demand for U.S. exports to increase.
[5] Because the worker income loss and terms-of-trade loss are biased upward, the adjusted net welfare gain is biased toward overstating the loss from this elimination.
[6] No measurable effect
[7] 1987

Source: Estimated by USITC staff.

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Chapter 1

Introduction

This study examines the effects that significant U.S. import restraints have on consumers, on the output and profits of firms, on the income and employment of workers, on the net economic welfare of the United States, and on major upstream suppliers and downstream customers of the protected industries. These effects are examined on an industry-by-industry basis. This first phase of the study is limited to the restraints on manufactured imports.

A detailed analysis of all barriers is intractable owing to their large number. Therefore, the definition of a "significant" import restraint was determined mainly by the resources available for the study. For tariffs, it was decided to include only those products with an ad valorem equivalent tariff of 10 percent or more and those for which it was projected that free-trade import levels would be $100 million or more. For nontariff restraints, the main criterion was a projected free-trade import level of $100 million or more.

Summary of the Analysis

Effects of tariffs

Eliminating tariffs would lower the price consumers must pay for imports and would reduce their demand for the competing domestic output. The gain to consumers is thus accompanied by losses to domestic producers in these competing industries and to their upstream suppliers. The producer losses include a loss of profits and losses to workers in the industry. The U.S. Treasury would also lose the revenue it collects from the tariff.

The consumer gains, the producer losses, and the Treasury revenue loss are included in the traditional (textbook) analysis of the welfare effects of eliminating an import tariff. In this analysis, the gains to consumers usually outweigh the losses to domestic producers and to the Treasury, so that a net gain is calculated for the overall U.S. economy.[1]

There are several considerations missing from the simple traditional analysis. First, if workers are involuntarily displaced by a tariff removal, their losses will probably not be reflected in the traditional calculations.[2] Second, removing a tariff tends to cause the dollar to depreciate because it increases U.S. demand for imports and, hence, for foreign exchange. The dollar depreciation raises the foreign-currency prices paid for U.S. imports and lowers the foreign-currency prices received for U.S. exports.[3] Traditional calculations do not include these losses from the response of the exchange rate to the tariff removal. Third, the traditional calculations fail to account for the fact that tariff revenue (like other tax revenue) should be valued more highly than ordinary income, because every existing tax imposes a cost to taxpayers that exceeds the amount of revenue collected. That is, there is a cost attached to turning private income or wealth into tax revenue for the government.[4] Finally, the traditional calculations fail to account for the change in revenue from domestic taxes that is likely to accompany a tariff. The adjustments made to account for these considerations are described in detail in chapter 2.

After accounting for these adjustments, it is found that unilateral elimination of U.S. tariffs usually reduces overall economic welfare of the United States in the short run. In the longer run these adjustments tend to become smaller (except for the valuation of tariff revenue and the effect on domestic tax receipts) so that the welfare effects move closer to the gains calculated with the simple traditional analysis.

Effects of quotas and the Multifiber Arrangement (MFA)

Quotas affect U.S. consumers and producers in much the same way as tariffs. By restricting their supply, quotas raise the price of imports to U.S. consumers. An important difference between tariffs and quotas is that tariffs produce tax revenue for the Treasury, whereas quotas produce rents[5] that may be captured by U.S. importers or foreign exporters, or that may be squandered in efforts by various market participants to garner the quota rents for themselves.[6]

If foreign governments administer the quota, such as with a voluntary export restraint (VER) or a quota allocated on a country-by-country

[1] See, for example, the analysis in C.P. Kindleberger, *International Economics* (Homewood, Il: Irwin, 1968), ch. 7.

[2] See D.J. Rousslang and P.M. Young, "Calculating Short Run the Welfare Effect of a Tariff Reduction When Wages Are Rigid," *Canadian Journal of Economics*, Vol. 17, 1984, pp. 39–47.

[3] The first quantitative estimates of these terms-of-trade effects are in G. Basevi, "The Restrictive Effect of the U.S. Tariff and Its Welfare Value," *American Economic Review*, Vol 58, 1968, pp. 840–852.

[4] This point is raised by D.J. Rousslang, "The Opportunity Cost of Import Tariffs," *Kyklos*, Vol. 40, 1987, pp. 88–102.

[5] In economic terminology, "rent" refers to the payment to an owner of a factor of production in excess of its value in its best alternative use. In the case of trade quotas, rents are the excess profits accruing to the owners of the quota rights resulting from the artificial scarcity caused by the quotas.

[6] Another important difference between quantitative restraints and tariffs arises if domestic producers in the protected industry would have market power in the absence of foreign competition. Although this is an important possibility, the domestic industry is modeled as being perfectly competitive in all of the cases examined in this report.

basis, the quota rents are captured by foreign exporters. This is the case for all of the quantitative restrictions considered in this report. The fact that foreign exporters capture the quota rents causes the net welfare cost for each of these quotas to exceed that of the equivalent tariff (i. e., the tariff that would reduce imports to the same level as the quota and raise their price by the same amount) for two reasons.[7] First, the tariff yields revenue for the U.S. Treasury (which, as noted above, is worth more than the equivalent amount of private income or wealth), whereas an allocated quota or VER yields rents to foreign exporters. Second, since foreign exchange spent on imports is greater with these quantitative restraints than if the equivalent tariff were used, eliminating an allocated quota or VER causes the dollar to depreciate by a smaller amount, and may even cause it to appreciate. Thus, losses from the response of the exchange rate are smaller, or this response might even produce a welfare gain. A quota affects other domestic tax receipts in the same way as the equivalent tariff.

The effects of terminating the MFA are estimated with the same method as that used to estimate the effects of other quantitative restraints. However, several additional steps are undertaken to obtain estimates of the parameters needed to apply this method. Specifically, the needed demand and supply elasticities are estimated directly, rather than relying on estimates from the literature. Also, the price effect of the quota is estimated empirically using the method described in appendix C.

Factors not considered

Although the current study goes well beyond the simple traditional analysis to assess the welfare effects of tariff removal, it omits at least three potentially important factors needed for a complete welfare analysis. First, the calculations fail to account for distributional aspects of trade policy. For instance, the losses to domestic producers from tariff removal tend to be concentrated and in some industries might hurt workers who have lower incomes than the overall U.S. average, whereas the consumer gains tend to be dispersed over a large group of individuals with the gain to each being quite small. These differences between the "winners" and "losers" of trade liberalization suggest that a dollar of producer loss should perhaps weigh more heavily than a dollar of consumer gain. Unfortunately, there is no scientific way to account for these differences.

A second factor not considered is the rent-seeking behavior engendered by the existence of a Government policy to protect domestic producers by taxing or otherwise discouraging imports.[8] The existence of such a policy, it is argued, causes domestic firms to spend resources lobbying the Government for protection from import competition in order to gain economic rents. Resources spent in this manner are not accounted for in the traditional calculations, nor are they accounted for in this report.

Rational producers would spend no more on such efforts than the rents they expect to receive from the import protection. Indeed, they would make such expenditures only so long as the expected gain from an additional dollar spent in this effort would exceed 1 dollar. The law of diminishing returns should ensure that their total spending on lobbying efforts would be less than the total expected rent gain.[9]

If the Government announced that it is considering eliminating an existing import restriction, this would be unlikely to reduce, and might even increase, lobbying efforts by domestic firms for protection. Even eliminating an entire type of import restraint (such as tariffs or VERs) is unlikely to reduce this rent-seeking behavior as long as other import-discouraging measures are available. Thus, both the direction and size of the adjustment to the welfare calculations to account for rent-seeking behavior are unclear.

A third factor not considered is a managerial- and incentive-related factor called X-efficiency in the literature.[10] The traditional analysis and that presented in this study assume that firms purchase and utilize all inputs efficiently, that is, they are least-cost producers. Firms that are protected from competition do not have the same incentives to pare all costs to the bone that firms facing vigorous competition have. The costs of X-inefficiency arising from import protection are not accounted for in this report.

The fragile nature of the welfare estimates

As indicated earlier, estimates of the net welfare effect of trade restrictions are fragile and subject to a good deal of error. This is especially true for tariffs because the net welfare effect of a tariff is small relative to the other effects of the tariff. These other effects include the effects on the volume of the restrained imports; on the cost to consumers; on the output, employment, and profits for the competing domestic industry; on the revenues of the U.S. Treasury; and on the U.S. terms of trade (the exchange-rate adjust

[7] A good description of the tariff equivalent of a quota is in J. Bhagwati, "On the Equivalence of Tariffs and Quotas," in his *Trade, Balance of Payments and Growth*, London, 1969.

[8] An excellent discussion of this behavior can be found in A.O. Krueger, "The Political Economy of the Rent-Seeking Society," *American Economic Review*, 1974, pp. 291-303.

[9] Since rent-seeking activity is done in an atmosphere of uncertainty, expenditures on rent-seeking activities could theoretically exceed the actual value of the protection.

[10] Harvey Leibenstein, "Allocative Efficiency vs. 'X-Efficiency,'" *American Economic Review*, LVI, June 1966, pp.392-410.

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ment). The error in the estimates for any of these effects can be great. Since the overall welfare effect of a tariff is the net of a number of these effects the estimates of this net are particularly fragile in the sense that they are subject to wide margins of error (and might even have the wrong sign). For this reason, the current report shows the results of the traditional welfare calculations as well as those incorporating the adjustments for the exchange-rate response, the presence of domestic taxes, and the losses of involuntarily displaced workers.

The welfare cost of an allocated quota or VER contains an element that is large relative to the other effects of the quota—the quota rents. Therefore, estimates of the welfare costs of these measures tend to be somewhat less fragile than those for tariffs.

Organization of the study

The study is organized as follows. The remainder of this chapter reviews previous studies that are relevant to the trade restrictions considered in this report. Chapter 2 examines the effects of removing significant tariff restraints. Twenty products are covered: rubber and plastics footwear, women's footwear (except athletic), ceramic floor and wall tile, luggage, leather gloves and mittens, vitreous china table and kitchen articles, fine earthenware table and kitchen articles, women's handbags and purses, costume jewelry and costume novelties, pressed and blown glassware (not elsewhere classified), cyclic organic crudes and intermediates, electronic and electrical capacitors, methyl alcohol, polyethylene resins, nonstuffed dolls, certain bicycles, ball bearings, optical instruments, canned tuna, and western red cedar shakes and shingles. Chapter 3 examines the effects of removing significant quantitative restraints. The restraints covered are the voluntary restraint agreements on steel and machine tools, the section 201 relief for specialty steel, and the Japanese VERs on automobiles. Chapter 4 examines the effects of terminating the MFA.

Review of Previous Studies

The current study examines three categories of import restraints that are important to the U.S. economy: high tariffs; quota-type restraints on imports of automobiles, carbon and specialty steel and machine tools; and the MFA. For each of these categories, two bodies of literature are relevant. The first deals with estimation techniques. The second provides estimates for the economic effects of the import restraints. Some articles present a new estimating method together with resulting estimates. The current section of the study briefly reviews alternative estimating methods and then summarizes the results of existing studies that estimate the effects of the import restraints covered by the current study. Further details are given in later chapters.

Review of estimation methodology

Three modeling techniques are commonly used to estimate the economic effects of import restraints: (1) econometric models, (2) partial equilibrium models, and (3) general equilibrium models. Each of these three models will be discussed in turn.

Econometric models.—Econometric modeling involves specifying and estimating all of the significant economic relationships among the economic variables to be studied. In many cases there are problems with the initial specification because needed data are not available, important variables have been omitted from the model, or the specified relationship among the variables proves to be incorrect. In such cases, the model is respecified and reestimated until an acceptable result is obtained.[11] The estimated effects of import restraints on textiles and apparel reported in chapter 4 rely in part on an econometric model.

Partial equilibrium models.—A partial equilibrium model for a particular product generally specifies the supply and demand structure for domestic output of the product, for competing imports, and (sometimes) for domestic output and imports of other closely related products. These models generally abstract from any linkages between the markets for the product being studied and for other products. They also omit macro-economic factors.

The economic effects of a particular import restraint are analyzed by examining the effects on the demand and supply curves. For example, a tariff on imports creates a wedge between the price received by foreign exporters and the price paid by domestic purchasers. This wedge is modeled by specifying two import supply curves, one for the price received by the foreign exporter and another for the higher price paid by domestic purchasers. The economic effects of the tariff are analyzed by comparing the levels of trade and domestic output that occur with the tariff with the levels that would occur with no tariff.

There are two kinds of partial equilibrium models. In the first, imports and competing domestic output are assumed to be perfect substitutes for each other in demand, and they are incorporated into a single demand and supply structure. In the second, domestic and imported goods are differentiated and their prices are allowed to differ. The demand and supply structure is more complex in that a change in the

[11] The construction of a valid econometric model is not always possible given data and time limitations. A relatively recent and extensive survey of a number of econometric models used to examine alternative trade theories is contained in Alan V. Deardorff, "Testing Trade Theories and Predicting Trade Flows," in Ronald W. Jones and Peter B. Kenen (eds.), *Handbook of International Economics*, vol. 1 (Amsterdam: North-Holland, 1984).

price of only one good (say, imports) would result in a limited change in the demand for the other good (domestic output), depending upon the degree of substitutability. One of two economic parameters can be used to quantify the linkage between the demands for the two goods: either the "elasticity of substitution in demand" or the "cross-price elasticity of demand."[12]

It is difficult to find suitable estimates of cross-price or substitution elasticities of demand. A recent study reporting estimates of cross-price elasticities of demand is Clinton R. Shiells, Robert M. Stern and Alan V. Deardorff, "Estimates of the Elasticities of Substitution Between Imports and Home Goods for the United States," *Weltwirtschaftliches Archiv*, Bank 122, Heft 3, 1986, pp. 497-519. More typically, authors impute values for cross-price elasticities of demand using values for the import-demand elasticity and trade shares.[13]

Both perfect and imperfect substitutes models require estimates of the elasticities of demand and supply for the imports, competing domestic output, and related goods that are included in the model. Authors using partial equilibrium models seldom estimate the required demand and supply elasticities. Instead, they typically take estimates of these parameters from other studies. A large number of studies have estimated demand and supply elasticities. A widely cited reference to this literature is R. Stern, J. Francis, and B. Schumacher, *Price Elasticities in International Trade: An Annotated Bibliography*, (London: Trade Policy Research Centre, 1976). A recent survey of this literature is in Morris Goldstein and Mohsin S. Khan, "Income and Price Effects in Foreign Trade," in Ronald W. Jones and Peter B. Kenen (eds.), *Handbook of International Economics*, vol. 1 (Amsterdam: North-Holland, 1984). Most policy-oriented studies use partial equilibrium models. The current study uses a partial equilibrium, imperfect substitutes model.

General equilibrium models.—The major shortcoming of partial equilibrium models is that they ignore feedback and spillover effects of the import restraint. An example of a feedback effect is the effect of an import restraint on the value of the U.S. dollar, which, in turn, alters the price of the restricted import. In contrast, spillover effects occur outside the industry of concern. For example, the change in the value of the U.S. dollar caused by an import restraint affects the prices of all exports and of imports of other products besides the one being examined. Such feedback and spillover effects may be positively or negatively related to the primary, or direct, effects. General equilibrium models incorporate feedback and spillover effects by modeling the entire economy.

In order to be manageable, early general equilibrium models required that the economy be described in terms of a relatively small number of highly aggregated sectors. For example, a model might specify a government sector (with a single tax and a single spending component), an agriculture sector, a manufacturing sector, a mining sector, a service sector, and a trade sector (exports and imports). Such models are not useful for describing the effects of a particular import restraint.

It would be impossible to develop a model that specifies each economic decision-making unit. Recently, however, significant progress has been made in the construction of general equilibrium models that include more than a dozen individual product sectors, in addition to aggregate spending, budgetary and balance-of-trade constraints. Some of the early work in this area was done at the World Bank and relates to economic development issues. For example, see K. Dervis, J. de Melo and S. Robinson, *General Equilibrium Models for Development Policy*, (Cambridge, U.K.: Cambridge University Press, 1982). More recently, a multisector and multicountry semi-general equilibrium model was constructed for analyzing U.S. trade policy issues; see Alan V. Deardorff and Robert M. Stern, *The Michigan Model of World Production and Trade*, (Cambridge, Mass.: MIT Press, 1986).[14] A more standard general equilibrium model is reported in John Whalley, *Trade Liberalization Among Major World Trading Areas*, (Cambridge, Mass.: MIT Press, 1986). A recent survey of this literature is J. Shoven and J. Whalley, "Applied General Equilibrium Models of Taxation and International Trade," *Journal of Economic Literature*, vol. 22, September 1984, pp. 1007-1051. A model specifically designed to analyze more narrowly defined product sectors including some of the products covered by this study is developed and applied in David G. Tarr, *A General Equilibrium Analysis of the Welfare and Employment Effects of U.S. Quotas in Textiles, Autos and Steel*, Bureau of Economics Staff Report, (Washington, D.C.: Federal Trade Commission, 1989).

[12] The classic article that specifies the linkages in a differentiated products model is Paul Armington, "A Theory of Demand for Products Distinguished by Place of Production," *IMF Staff Papers*, vol. 16, 1969, pp. 159-178.

[13] The methodology underlying this technique was developed in Robert Baldwin and Tracy Murray, "MFN Tariff Reductions and Developing Country Trade Benefits Under the GSP," *Economic Journal*, vol. 87, March 1977, pp. 30-46. For an application of this method see Donald Rousslang and Stephen Parker, "Cross-price Elasticities of U.S. Import Demand," *Review of Economics and Statistics*, vol. LXVI, August 1984, pp. 518-523. A rigorous examination is contained in Dennis G. Beckmann, "On Estimating the Static Effects of Preferential Tariffs," *Eastern Economic Journal*, vol. XIII, December 1987, pp. 389-397.

[14] The Michigan model specifies general equilibrium goods markets but hold wages and expenditures fixed. Thus, for example, unemployment can exist without downward pressure on wages.

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While the progress that has been made to date can be described as truly path-breaking, estimates from these models are not widely accepted. The problem is that these models require a great number of parameters. For example, a standard 10-sector model would typically incorporate more than 100 economic parameters. Values of the needed parameters are typically assigned as "best guess" values, which are then adjusted to yield a benchmark solution to the model that is consistent with real world data.[15] Sensitivity analysis is then conducted to determine the extent to which the model solution depends on specific parameters. Special care is taken to select reasonable values for the sensitive parameters.

In order to conduct policy analysis the benchmark set of parameters must include specific values for the policy variables of interest. The economic effects of a policy change are estimated by comparing the benchmark solution with the solution that is obtained using the values of the policy variables that correspond to the new policy environment. Feedback and spillover effects are estimated together automatically with the primary effects on the sector of concern.

Summary.—Each of the three types of models has advantages and faults. Partial equilibrium models require less time and fewer resources. The quantitative results obtained from these models are generally reasonable and indicate the rough order of magnitude. But the estimates are often not precise because the parameter values used to generate them are typically taken from other studies and, therefore, might not apply to the particular circumstances under examination.

Econometric models are based on parameter estimates that do apply to the particular situation. The results obtained from the model can be justified within statistically determined confidence intervals. The problem with this approach is that often the necessary data are not available. At other times, the confidence intervals are so wide that the estimates have little practical value. Occasionally, the results are simply unacceptable because they contradict well-received economic theory, such as the assumption that demand curves slope downward.

At the present time general equilibrium models are costly to develop. Moreover, the large number of parameter values that must be specified—often based on best-guess information—often make policy analysis based on this class of model difficult to defend. The important advantage of these models is that feedback and spillover effects are included.

[15] Though this parameterization process might seem arbitrary, the initial best guesses are based upon a careful and thorough search of the literature reporting empirical estimates of the relevant economic parameters.

Review of empirical evidence

The empirical evidence reviewed here is limited to what is relevant to the current study, namely evidence on the effects of tariffs and of nontariff barriers.

Tariffs.—The economic effects of U.S. tariff reductions depend on whether the tariff cuts are unilateral or whether they result from a multilateral agreement whereby all major trading countries simultaneously reduce tariffs. If tariff cuts are multilateral, greater export opportunities occur for U.S. producers, as well as lower import prices for U.S. consumers. If tariffs were reduced by 50 percent multilaterally, it has been estimated that the net welfare gain to the United States would be slightly more than $1 billion.[16] The estimated effects on total domestic output and employment are small, although they differ substantially among industries. Employment would expand in export-related industries and decline in import-sensitive industries. Those industries estimated to be most adversely affected include food utensils and pottery, furniture and fixtures, rubber footwear, motorcycle and bicycles parts, and artificial flowers. Further, the net employment declines would be heavily concentrated. Six States (Ohio, New York, Massachusetts, Illinois, Michigan, and Pennsylvania) would account for two-thirds of the adverse employment effects.[17]

Studies of the economic effects of unilateral tariff reductions are generally confined to a particular product sector and tend to concentrate on particular effects such as those on economic welfare of consumers and producers, or on employment. A recent study published by the Institute for International Economics reports benefits to be derived from eliminating high tariffs on benzenoid chemicals, glassware, rubber footwear, ceramic tiles, orange juice and canned tuna.[18] The results are summarized at the top of the next page.

A general equilibrium model was recently used to estimate the effects of a unilateral 50-percent reduction in all tariffs on the welfare of the United States.[19] The efficiency gains are

[16] See R.E. Baldwin, J.H. Mutti and J.D. Richardson, "Welfare Effects on the United States of a Significant Multilateral Tariff Reduction," *Journal of International Economics*, vol. 10, August 1980, pp. 405–423. This study used 1971 trade and tariff data deflated to 1967 dollars; the welfare estimate is the discounted present value (using a 10% discount rate) of the annual flow of net welfare benefits.

[17] R.E. Baldwin and W.E. Lewis, "U.S. Tariff Effects on Trade and Employment in Detailed SIC Industries," in W.G. Dewald (ed.), *The Impact of International Trade and Investment on Employment*, U.S. Department of Labor, Bureau of International Labor Affairs, 1978.

[18] Gary Clyde Hufbauer, Diane T. Berliner and Kimberly Ann Elliott, *Trade Protection in the United States: 31 Case Studies*, (Washington, D.C.: Institute for International Economics, 1986).

[19] Lawrence H. Goulder and Barry Eichengreen, "Trade Liberalization in General Equilibrium: Intertemporal and Inter-industry Effects," (mimeo., March 1989).

Product category	Domestic price change(%)	Imports change(%)	Employment change(jobs)
	Percent	Percent	
Benzenoid chemicals	-4.5	21.8	-300
Glassware	-12.0	27.4	-1,000
Rubber footwear	-21.0	27.4	-7,800
Ceramic tiles	-17.3	21.0	-850
Orange juice	-35.0	54.3	-2,200
Canned tuna	-10.0	27.5	-1,200

more than offset by terms-of-trade losses;[20] total U.S. welfare in 1983 declines by 0.4 percent.

Nontariff barriers.—The available empirical evidence on nontariff barriers covered in this study deals with the United States-Japan agreement to limit Japan's exports of automobiles, the voluntary restraint program on steel, and the Multifiber Arrangement governing international trade in textiles and apparel. These three import restraint programs will be treated in turn.

(1) United States-Japan export restraint program for automobiles.—A recent study concludes that prices of Japanese autos for sale in the U.S. market increased, on average, by more than $2000 in 1984.[21] It also found that, rather than increasing market share, U.S. producers hiked their prices by an average $750–$1000. Higher prices contributed to an estimated increase in total cash flow for the domestic auto industry of $6–$8 billion, some of which ultimately went to supplier companies. The improved cash position of the domestic industry contributed to the dramatic increase in investment that occurred since 1984.

In noting the costs of this program to U.S. consumers, another study found that the income transfer to Japanese producers, owing to higher import prices, substantially exceeded the contribution of the program to profits in the domestic industry.[22] This study also found that the import restraints against Japanese autos did not significantly divert import demand in favor of third-country suppliers. A more recent general equilibrium model estimated the welfare costs to the U.S. economy of the automobile import restraint program to be $6 billion in 1984.[23] This model further estimated that the program only saved 1,100 jobs in the auto industry. Finally, the quota rents derived from the auto program were estimated to be $6.2 billion (in 1984 dollars) in income transferred to Japanese exporters; part of this transfer may have been captured by U.S. importers and dealers. This figure exceeds the net welfare loss because part of this transfer resulted from a reduction in Japanese production costs owing to the reduction in exports to the United States.[24]

Another category of studies analyzes the effects of the United States-Japan program in terms of the profit incentives created for Japanese exporters. In order to maintain their overall profit levels in the face of the export limits, exporters shift from low-priced and low-profit-margin vehicles to more high-priced and high-profit-margin vehicles. Feenstra concludes that two-thirds of the price increases on Japanese imports is the result of such quality upgrading and one-third is the result of income transfers.[25] Because he finds that the major impact of the import restraint program was quality upgrading, he estimates that the effects on employment and welfare are quite small.

A similar study examined the effects of the Japanese VERs on prices of U.S. imports of European autos.[26] This study found that the major effect of the VER was to increase prices of European autos in the U.S. market. There was a minimal increase in the volume of imports and quality upgrading. Consequently, the VER program produced a transfer of income from U.S. consumers to European auto producers of an estimated $3.4 billion in 1984. This loss exceeded the income transfer to Japan of $2.4 billion.

[20] Terms-of-trade effects arise because import restraints affect the exchange rate, and thus the price paid for U.S. imports and the prices received for U.S. exports. These effects are explained in chapter 2.

[21] Robert W. Crandall, "The Effects of U.S. Trade Protection for Autos and Steel," *Brookings Papers on Economic Activity*, 1987, pp. 271-288.

[22] David G. Tarr and Morris E. Morkre, *Aggregate Costs to the United States of Tariffs and Quotas on Imports*, Bureau of Economics Staff Report, (Washington, D.C.: Federal Trade Commission, 1984).

[23] David G. Tarr, *A General Equilibrium Analysis of the Welfare and Employment Effects of U.S. Quotas in Textiles, Autos and Steel*, Bureau of Economics Staff Report, (Washington, D.C.: Federal Trade Commission, 1989).

[24] The trade restraint increases the price to U.S. purchasers but reduces the unit costs of Japanese exporters because of the reduction in volume of production. This price gap is the source of the income transfer that is captured by Japanese exporters and U.S. importers. The reduction in the unit cost for Japanese exporters would be a source of welfare gain for the United States if the quota right were auctioned by the U.S. government.

[25] Robert C. Feenstra, "Voluntary Export Restraint in U.S. Autos, 1980-81: Quality, Employment, and Welfare Effects," in Robert E. Baldwin and Anne O. Krueger (eds.), *The Structure and Evolution of Recent U.S. Trade Policy*, A national Bureau of Economic Research Conference Report, (Chicago: The University of Chicago Press, 1984).

[26] Elias Dinopoulos and Mordechai E. Kreinin, "Effects of the U.S. Japan Auto VER on European Prices and on U.S. Welfare," *The Review of Economics and Statistics*, August 1988, pp. 484-491.

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(2) Voluntary restraint agreements (VRAs) on steel products.—Steel is a generic term used to describe a variety of iron-carbon alloys including carbon steel and specialty (stainless and tool) steel. The empirical studies on this industry differ on product coverage. Some deal with only carbon steel, whereas others deal with only specialty steel (which in turn may be limited to stainless steel), and still others combine carbon and specialty steel.

The current program of restraining steel imports began in 1984 and involves VRA agreements with 19 countries. The objective of this program is to limit U.S. imports to 18.5 percent of the U.S. market. Most agreements establish market share quotas although agreements with socialist countries of Eastern Europe specify fixed quantity limits. Since all major suppliers of steel imports face similar import restraints, the VRA program contains safeguards against trade diversion through nonrestrained countries.

A partial equilibrium study of the effects of the VRA program estimates that in 1983 U.S. consumers suffered by more than $1 billion and U.S. producers gained by less than $500 million.[27] Overall, the U.S. economy experienced a welfare loss of almost $800 million and generated income transfers to foreign exporters of more than $500 million. The annual costs to consumers for each job saved by the VRA program was estimated to be $113,622.

An important question concerning the VRA program is its effect on downstream steel-using industries. A recent study by the U.S. International Trade Commission estimated that the VRA program resulted in higher prices of both imported steel (up to 4-1/2 percent) and domestic steel (less than 1 percent). The weighted average of steel prices to U.S. downstream users increased by roughly 1 percent.[28] As a consequence, U.S. exports of steel-using industries declined by an estimated $1.7 billion during 1985–1988. During this same period U.S. imports of steel-using products increased by almost $2.5 billion.

Many of these same effects have also been estimated in a recent study that used a general equilibrium model.[29] The study concluded that in 1984 overall U.S. economic welfare declined by $0.6 to $2.6 billion, and between $0.5 and $2.9 billion was transferred to foreign producers. As a result of the VRA program, U.S. steel imports were estimated to decline by $1.15 billion, but this decline was offset by an equivalent decline in exports of steel-using industries. The steel industry gained an estimated 20 thousand to 22 thousand jobs; in addition, employment in mining increased. However, offsetting these employment gains was an equivalent number of jobs lost in other sectors, mainly other manufacturing industries, which experienced an estimated loss of roughly 15,000 jobs.

(3) The MFA for textiles and apparel.—The multi-national program was initially introduced to provide for an orderly adjustment to the change of international comparative advantage in textiles and apparel in favor of the developing countries. Today, most imports of textile and apparel products into the developed countries from the lower cost developing countries are governed by a system of export quotas; the United States has MFA quota agreements with 40 countries.

A recent and comprehensive study of the industry is reported in William R. Cline, *The Future of World Trade in Textiles and Apparel,* (Washington, D.C.: Institute for International Economics, 1987). This partial equilibrium study estimates that the MFA raised textile and apparel prices in 1986 by an average of 28 percent and 53 percent, respectively. Total annual consumer losses were $2.8 billion and $17.6 billion, respectively. The net welfare costs to the nation, after subtracting the benefits to producers and workers, exceeded $8 billion. Almost half of this was transferred to foreign exporters as quota rents. The employment benefits derived from the MFA were an estimated 20,700 jobs in the textile industry and 214,200 jobs in apparel. The consumer costs per job saved were estimated to be $135,000 for each textile job and $82,000 for each apparel job. Regarding distributional effects, the study concluded that the MFA is regressive and causes the lowest 20 percent of households (by income) to experience a decline in their standard of living by 3.6 percent.

A general equilibrium model of the industry estimated that terminating the MFA would increase national welfare in 1984 by $13 billion, just over one-half of this amount representing income now being transferred to foreign producers.[30] This would be accomplished through an increase in imports of textiles and apparel of an estimated $12.6 billion. Imports of other goods would decline by $1.9 billion and U.S. exports would increase by $3.8 billion. The initial worsening of the balance of trade would result in an estimated depreciation of the U.S. dollar by less than 1 percent. It was estimated that the MFA protects an estimated 158,000 jobs in the textiles and apparel industries.

Another study, addressing different aspects of the MFA, identifies the gains achieved from the MFA by the domestic industry.[31] This study hy-

[27] Tarr and Morkre, ibid.
[28] U.S. International Trade Commission, *The Effects of the Steel Voluntary Restraint Agreements on U.S. Steel-Consuming Industries,* USITC Publication 2182, May 1989.
[29] Tarr, ibid.
[30] Tarr, ibid.
[31] Joseph Pelzman, "The Multifibre Arrangement and Its Effect on the Profit Performance of the U.S. Textile Industry," in Robert E. Baldwin and Anne O. Krueger (eds.), *The Structure and Evolution of Recent U.S. Trade Policy,* A National Bureau of Economic Research Conference Report, (Chicago: The University of Chicago Press, 1984).

pothesized that protection from import competition created an environment in which the domestic industry could justify investing in innovative technology required to achieve the structural adjustments that were needed to regain a competitive position in the world industry. An econometric model was developed to test this hypothesis and it was concluded from the results that the MFA contributed to the performance of the textile and apparel industries. Other evidence presented in the paper showed that the performance of the textile industry far surpassed that of the apparel industry, which appears to be increasingly noncompetitive.

Chapter 2

The Costs and Benefits of Existing Significant Tariff Restraints on U.S. Manufactured Imports

Introduction

This chapter looks at the effects of significant tariff restraints on U.S. manufactured imports. More specifically, it examines how these restraints affect industrial output and profits of U.S. firms, income and employment of U.S. workers, the welfare of U.S. consumers, and the net economic welfare of the United States. It also examines the effects on outputs of important downstream customers and upstream suppliers of the protected industries. The analysis is partial equilibrium in nature, but some general equilibrium aspects are also included, such as the effects on exchange rates and overall tax revenues. The effects of each tariff are examined separately.

Two criteria were used to select tariffs that could be said to impose "significant" import restraints. The criteria were that the tariff rate must be significant and that the tariff must cover a significant amount of trade. Several problems arose in making the selections. One problem is choosing the tariff rate that can be used as the boundary between significant and insignificant. The choice is necessarily arbitrary. A tariff rate of 10 percent was chosen, because such a tariff is likely to be important relative to typical year-to-year changes in import prices caused by other factors such as exchange-rate changes and because the resources available for this study limit the number of restraints that can be examined. (The trade-weighted average for all tariffs on manufactured imports was 3.9 percent in 1988).

A second problem is determining the amount of potential trade covered by a tariff. The data on actual trade flows can seriously understate the potential trade if a tariff strongly discourages imports. To avoid this problem, the volume of imports that would occur if the tariff were zero was used as the amount of potential trade covered by the tariff.

A third problem is that the amount of imports for an industry category depends on how large the category is made. If industries are broken into small, disaggregate categories, the amount of trade in each is likely to be small. On the other hand, if large, aggregate categories are used, high tariffs in small components of the aggregate are likely to be hidden in the overall average. One solution is to use very small industry categories and to define significant imports in terms of the ratio of imports to competing output. However, the resources available for this study are limited, so the first priority was given to tariffs whose effects are large in an absolute sense, not just relative to the competing domestic industry. Therefore, two levels of aggregation of imports were considered. First, the 4-digit, Standard Industrial Classification (SIC) industries with at least $100 million in potential imports and an average tariff rate of 9 percent or more were selected.[1] Second, Harmonized Tariff System (HTS) lines (which are much more disaggregated than the 4-digit SIC industries) with at least $100 million in potential imports and an average tariff rate of 10 percent or more were selected.

Methodology

A formal presentation of the methodology used in this study is given in appendix D. What follows is a simplified discussion of the approach.

For each category of goods, imports and the competing domestic output are allowed to be imperfect substitutes in demand. For example, it is assumed that consumers distinguish between bicycles made in Japan and those made in the United States. The imperfect substitutes assumption has become standard in applied research in international trade and it is strongly supported by empirical evidence.[2]

To begin, the traditional analysis is presented. This analysis is then adjusted for the presence of domestic taxes, rigid wages, and terms-of-trade effects. Finally, the effects on outputs of important downstream customers and upstream suppliers of the protected industries are calculated.

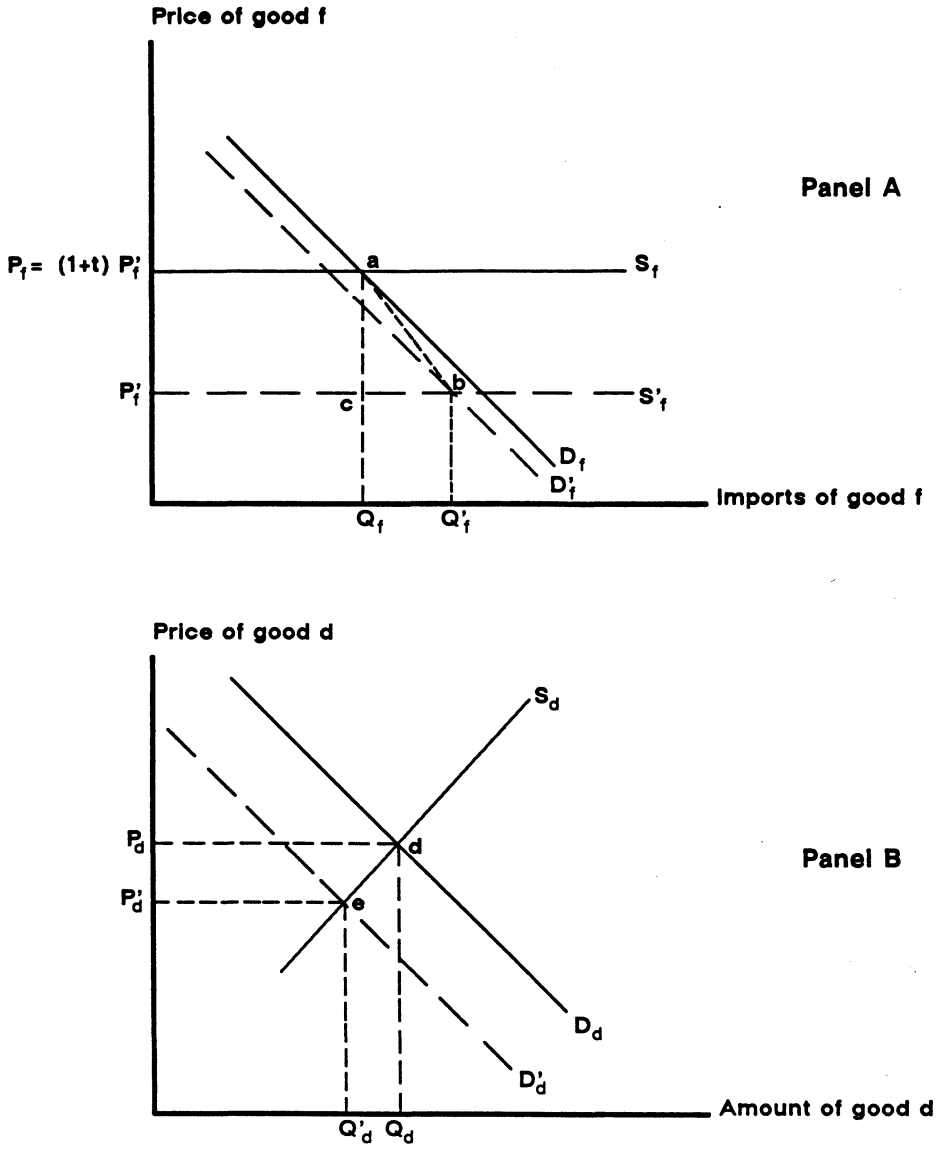
The traditional analysis

The traditional analysis is presented in figure 2-1. Panel A shows the demand and supply curves for imports of a tariff-ridden good. With the tariff in place, D_t is the import-demand curve and S_t is the import-supply curve. Without the

[1] Each SIC category typically contains a number of tariff rates. Since higher rates receive a lower weight in calculating the average for an SIC category, the overall average for the SIC category is understated. To account for this downward bias, the criteria for a "significant" tariff rate was lowered from 10 percent to 9 percent for the SIC aggregates.

[2] The imperfect substitutes assumption was first posited by P.S. Armington, "A Theory of Demand for Products Distinguished by Place of Production," *IMF Staff Papers*, March 1969, pp. 159-178. It first was applied to the analysis of U.S. tariffs by R.E. Baldwin, "Trade and Employment Effects in the United States of Multilateral Tariff Reductions," *American Economic Review*, May 1976, pp. 142-148 and by R.E. Baldwin, J.H. Mutti, and J.D. Richardson, "Welfare Effects on the United States of Significant Multilateral Tariff Reduction," *Journal of International Economics*, August 1980, pp. 405-423. Empirical evidence on the need for this assumption can be found in P. Isard, "How Far Can We Push the 'Law of One Price'?" *American Economic Review*, December 1977, pp. 942-948 and I.B. Kravis and R. Lipsey, *Price Competitiveness in World Trade*, New York: Columbia University Press, 1971. 2-1

Figure 2-1 The imperfect-substitutes market



Key:

P = price		f = foreign, imported good	
Q = quantity		d = domestic good	
S = supply		t = tariff	
D = demand			

tariff, the import-supply curve is S'_f. It is assumed that these supply curves are horizontal, indicating that U.S. consumers are unable to affect the world price of the imports, p'_f. The initial price to domestic consumers, p_f, is higher than the world price by the amount of the ad valorem tariff, t. That is, $p_f = (1 + t)p'_f$. The quantity of tariff-ridden imports is Q_f. Panel B shows the demand and supply curves for the competing domestic output. With the tariff, the demand curve is D_d, the supply curve is S_d, the domestic price is p_d, and the quantity of output is Q_d.

Removing the tariff lowers the domestic price of imports in panel A to p'_f. The lower import price induces U.S. consumers to substitute the imports for the competing domestic good. This substitution away from the domestic good is represented in panel B by a leftward shift of the demand curve from D_d to D'_d. Because the sup-

ply curve for the domestic good slopes upward, this shift in demand causes the domestic price to fall. This fall in price, in turn, causes the demand curve for imports in panel A to shift leftward from D_f to D'_f. Comparing the new tariff-free equilibrium with the original tariff-ridden equilibrium, one sees that imports are higher, domestic output is lower, and the prices to consumers are lower for both imports and the domestic good.

The fall in the price of the import and of the competing domestic good provides economic gains to U.S consumers. It seems clear that the direct gain to the consumers in each market should be measured as the reduction in price times the quantity purchased. But there are two different quantities purchased in each market: one before and one after the tariff is eliminated. In the import market, the price reduction times the quantity consumed before the tariff is removed understates the gain to consumers. It does not account for the benefits to consumers who are able to buy the good at the lower price but who were priced out of the market at the higher, tariff-ridden price. On the other hand, the price reduction times the free-trade quantity consumed obviously would overstate the gain to consumers, some of whom had presumably escaped at least part of the cost imposed by the tariff by shifting their purchases to other goods. This suggests that one use an average of the two quantities to calculate the gain to consumers, which is the procedure followed. An exactly analogous argument applies to the consumer gain in panel B. Thus, as the price falls from p_f to p'_f in panel A, the consumers gain trapezoid $p_fabp'_f$, and as the price falls from p_d to p'_d in panel B, the consumers gain trapezoid $p_dedep'_d$. The total gain to consumers is the sum of these two trapezoids.[3]

The protected U.S. producers suffer economic losses as a result of the tariff elimination and accompanying decline in the demand for their output. To measure this loss, note that the cost curve of the domestic producers (which is also the supply curve in a competitive industry) tells us the economic cost of producing each unit of output. That is, it tells us the value of other production that must be foregone in order to produce the good being examined. For example, p_d is the cost of producing a unit of output at the output level Q_d and the trapezoid Q'_dedQ_d is the value of alternative domestic output that must be sacrificed to expand output from Q'_d to Q_d. The gain to producers from supplying the industry output is the difference between the cost of their production and the price they receive. This gain is called the producers' surplus. The change in producers' surplus in panel B occasioned by the fall in output from Q_d to Q'_d is trapezoid $p_dedep'_d$. This trapezoid includes the loss in profits to the domestic industry, the loss in earnings of workers who are employed in the industry when the tariff is removed, and losses to firms and workers in supplier industries. Note that this decline in producers' surplus is exactly equal to the gain in consumers' surplus in the market for the competing domestic good. Therefore, when calculating the effect of the tariff on the net economic welfare of the country as a whole, these two amounts will cancel.[4]

Eliminating the tariff also involves a loss to the U.S. Treasury in the amount of tariff revenue foregone. This foregone revenue is given as the area of rectangle $p_facp'_f$ in panel A. In the traditional analysis, the effect of the tariff elimination on net economic welfare is equal to the net of the gain to U.S. consumers, the loss to U.S. producers, and the loss to the U.S. Treasury. This measure is called "traditional net welfare gain" in the tables.

Other adjustments

Wage rigidities.—In the presence of a rigid wage, a reduction in domestic output can cause workers in the industry to be displaced involuntarily, and the industry supply curve will overstate the amount of alternative domestic output that is gained by freeing resources from the industry. Thus, the loss in producers' surplus in panel B will understate the true loss caused by the tariff elimination if workers are displaced involuntarily as a result of a rigid wage.[5]

An adjustment for losses of displaced workers is not needed if the tariff elimination does not result in an absolute decline in the industry's output and employment. If the tariff removal merely reduces growth in the industry, no involuntary displacements would result. Employment would be at a lower level than if the tariff had remained in effect, but the reduction would come from fewer new hires being made rather than from layoffs.

[3] This procedure also was used by M.E. Morkre and D.G. Tarr, *Effects of Restrictions on United States Imports: Five Case Studies and Theory*, U.S. Federal Trade Commission, Bureau of Economics, June 1980.

[4] This statement contradicts the analysis used by G.C. Hufbauer, D.T. Berliner, and K.A. Elliot, *Trade Protection in the United States*, Washington, D.C.: Institute for International Economics, 1986. Their measure of the net welfare effect of a trade restriction contains an error. See T.A. Pugel, "Review of 'Trade Protection in the United States'," *Journal of Economic Literature*, March 1988, pp. 120–122.

[5] This is shown in D.J. Rousslang and P.M. Young, "Calculating the Short Run Welfare Effects of Tariff Reduction when Wages are Rigid," *Canadian Journal of Economics*, February 1984, pp. 39–47. If workers are not involuntarily displaced, their losses will be included in the producers' surplus loss shown in panel B. Determining whether workers are truly involuntarily displaced is not an easy matter. For instance, workers may negotiate a fixed wage contract fully realizing that the fixed wage may cause layoffs during future industry downturns. Such layoffs, when they materialize, should not be considered involuntary. (See M. Baily, "Wages and Employment Under Uncertain Demand," *Review of Economic Studies* 41, 1977, pp. 37–50.)

To measure the potential losses of displaced workers in panel B, the reduction in domestic output ($Q_d - Q'_d$) is first multiplied by the industry's employment-output ratio. This provides a measure of the reduction in employment in the industry. The results of a study by Jacobsen indicate that, on average, a displaced manufacturing worker loses about 15 percent of his or her earnings in the first year after displacement.[6] This private cost is added to the estimate of the producer surplus loss to obtain an upper-bound estimate of the total short-run losses to the industry caused by the tariff elimination.[7]

Accounting for the presence of domestic taxes.—It is well known from public finance theory that the welfare cost of a tax per dollar of revenue tends to increase as the tax rate rises. For example, an income tax of 10 percent would impose a greater welfare cost per dollar of revenue than an income tax of 5 percent. It follows that, if a tax is levied on top of an existing tax, it will impose a greater welfare burden for each dollar of revenue it generates than if there had been no pre-existing tax.

Domestic income and excise taxes impose important welfare costs by lowering real after-tax wages and thereby distorting the choice of workers between activities that produce money income and those that do not. A tariff raises the cost of imports and so can add to the work-leisure distortion by reducing real wages.[8] In this sense, the tariff comes on top of existing domestic taxes. This fact has been ignored in virtually all of the previous studies of the welfare cost of tariffs.

The error from ignoring preexisting domestic taxes (which tends to understate the welfare cost of the tariff or of the gains from removing the tariff) is offset to some extent in the previous studies because these studies also ignore the cost of replacing the tariff revenue with an alternative tax. A tariff imposes an efficiency cost on the economy, but so does every other practical tax. Thus, the true net gain from eliminating a tariff should be measured as the efficency cost of the tariff minus the efficiency cost of the tax used to replace the tariff revenue.

The net welfare implications of a tariff depend importantly on the form of the tax used to replace the tariff revenue. If the replacement tax is a flat sales tax on all final output, the adjustment to the standard welfare triangles of a tariff is likely to be small. If the replacement tax increase is progressive, however, a substantial adjustment to the traditional calculations may be necessary. This is true because the progressive tax increase can impose a much greater welfare cost than the flat tax increase. Indeed, such a tax increase can easily impose a greater welfare cost than the tariff it replaces.

Since overall U.S. taxes are progressive, a tax increase that consists of a proportional increase in all existing domestic taxes would also be progressive. This is the form of tax increase that is chosen in the present study to represent the alternative to the tariff. Calculations have already been performed by Browning for this type of tax increase and for a flat, per-unit tax added to existing taxes.[9] His calculations imply that the standard triangle for the welfare gain from eliminating a tariff must be adjusted by subtracting 15 percent of the lost tariff revenue to account for the presence of domestic taxes and the cost of replacing the tariff revenue.[10] This is the adjustment used in the welfare estimates for each of the individual tariffs considered in this study.

The terms-of-trade effects of exchange-rate depreciation.—The phrase "terms of trade" refers to the prices a country receives for its exports compared to the prices it pays for its imports. It is measured as the weighted average of export prices divided by the weighted average of import prices. A reduction in the terms of trade is also called a worsening of the terms of trade, because it implies that the home country must give up a greater amount of its output to sustain a given level of imports. Eliminating a tariff increases the imports of the United States and tends to move the U.S. trade balance towards deficit. The move toward deficit, in turn, causes the U.S. dollar to depreciate against other currencies, raising the dollar prices of U.S. imports and exports. Under normal conditions, the depreciation will worsen the terms of trade.[11]

[6] L.L. Jacobsen, "Earnings Losses of Workers Displaced from Manufacturing Industries," in W.G. Dewald (ed.), *The Impact of International Trade on Investment and Employment*, U.S. Department of Labor, 1978, pp. 87–98.

[7] Many researchers have adjusted the loss in producers' surplus to account for costs of worker displacements by adding the social cost of the unemployment of these workers. See, for example, S.P. Magee, "The Welfare Effects of Restrictions on U.S. Trade," *Brookings Papers on Economic Activity*, 1972, pp. 645–701; W.R. Cline et al., *Trade Negotiations in the Tokyo Round: A Quantitative Assessment*, Washington D.C.: The Brookings Institution, 1978; and J. Mutti, "Aspects of Unilateral Trade Policy and Factor Adjustment Costs," *Review of Economics and Statistics*, February 1978, pp. 102–110. The adjustment used in the present study is to add the private cost to the displaced workers. The reasons for using this adjustment are described in Rousslang and Young, ibid.

[8] The reduction in the real wage comes from the increase in consumer prices caused by the tariff. A tariff can also shift domestic factor demand toward or away from labor. The effects of such shifts are discussed later in this section.

[9] E.K. Browning, "On the Marginal Welfare Cost of Taxation," *American Economic Review*, March 1987, pp. 11–23.

[10] We use Browning's results for the case where tax revenue is spent in such a way that taxpayers are compensated for their taxes by the benefits they receive from government spending. It is also assumed that the income compensated labor supply schedule has an elasticity of 0.3. Browning shows that changing the assumption as regards the value of government spending to taxpayers or the value of the labor supply elasticity changes the results substantially. Estimates of the labor supply elasticity are subject to wide margins of error.

[11] See G. Basevi, "The Restrictive Effect of the U.S. Tariff and Its Welfare Value," *American Economic Review*, 58:4, September 1968, pp. 840–852.

2-4

Many studies ignore the exchange-rate effect on grounds that it is small. As Rousslang and Suomela point out, ignoring this effect is highly questionable.[12] Although the exchange rate change caused by a tariff on a single item generally will be quite small, it affects all traded goods, and the sum of these effects can be as important as any of the other welfare effects of the tariff.

Most studies that account for terms-of-trade effects of tariffs assume that the exchange rate changes to prevent the tariff from having any effect on the overall trade balance.[13] For instance, if removal of a tariff would increase imports of the formerly protected good, it is assumed that the home currency would depreciate to ensure that there was no net worsening of the overall trade balance. This procedure ignores the effects that the tariff change might have on international capital flows and it ignores the effect that exchange rate changes would have on earnings from overseas investments. The procedure used in this study takes the second of these factors into account. As is pointed out in Appendix D, the effects on capital flows may not be important.

The net welfare loss of the dollar depreciation is the loss to consumers resulting from higher import prices less the gain to producers resulting from higher export prices less the gain to those who receive income from foreign investments. This is refered to as the "terms-of-trade loss" in the tables.

An increase in imports need not cause a fall in the current-account balance by the full amount. An increase in U.S. imports increases the income of the foreign exporting countries. They, in turn, will increase their imports, some of which will be supplied by the United States. Since it ignores these "repercussion effects," the analysis used here generates an upwardly-biased estimate of the terms-of-trade loss.[14] The analysis is also based on a particular approach to exchange rate determination known as the elasticities approach. Other models, such as the monetary approach or portfolio theory models could give different results.[15]

The adjustment for the response of exchange rates is needed only if foreign trading partners do not reciprocate for the tariff removal. When tariff reductions take place in a multilateral framework, foreign tariff concessions accompany the U.S. tariff concessions, an increase in foreign demand for U.S. exports accompanies the increase in U.S. demand for imports, and there is no need for an exchange rate adjustment.

The amount of dollar depreciation caused by tariff elimination depends on the value of four own-price elasticities: the elasticities of aggregate import and export demand and the elasticities of aggregate import and export supply. There is a large degree of uncertainty concerning the values of these elasticities.[16] For this reason, the estimated depreciation involves a substantial degree of error, and the degree of error in the welfare loss is therefore also considerable.[17]

Total tariff elimination versus partial increase or reduction.—It should be noted that the welfare effects are calculated for the complete elimination of each tariff and do not tell us much about the effects of an increase in the tariff or of a partial reduction in the tariff. The traditional net welfare cost of the tariff increases geometrically as the tariff rate increases. For example, doubling the tariff rate causes the traditional net welfare cost to quadruple. In contrast, the adjustments for worker income loss, the response of exchange-rates and the effect of domestic taxes increase in proportion or less than in proportion to the tariff. (For example, doubling the tariff rate would yield less than twice as much tariff revenue and the cost of the replacement tax would be less than twice as great.) Thus, finding that eliminating a 10 percent tariff yields a welfare loss does not imply that raising the tariff to 11 percent would produce a welfare gain, or that reducing the tariff to 9 percent would produce a welfare loss.

Long-run effects of tariff elimination

In the long run, the adjustments for losses of displaced workers and for terms-of-trade effects become much less important. The results of the study by Jacobsen indicate that the bulk of the losses to displaced workers are incurred in the first 6 years after their displacement and that

[12] D.J. Rousslang and J.W. Suomela, *Calculating the Consumer and Net Welfare Costs of Import Relief*, Staff Research Study #15, U.S. International Trade Commission, 1985, p. 60.

[13] See, for example, Baldwin op. cit.; D.G. Tarr and M.E. Morkre, *Aggregate Costs to the United States of Tariff and Quotas on Imports*, Federal Trade Commission, December 1984; and J.H. Mutti, "Welfare Effects of Multilateral Tariff Reductions," *Southern Economic Journal*, January 1979, pp. 760–772.

[14] See chapter 3 of R. Dornbusch, *Open Economy Macroeconomics*, New York, 1980 for a discussion of repercussion effects.

[15] A portfolio approach is presented in C.E. Smith, "Output Effects of a Tariff under Flexible Exchange Rates," *Journal of International Economics*, May 1988, pp. 359–371.

[16] App. D contains estimates for the values of these elasticities.

[17] As an indication of the sensitivity of the terms-of-trade adjustment to the values of the four trade elasticities, consider the following. If all four elasticities were doubled, the welfare loss in 1988 resulting from a change in the terms-of-trade would fall roughly in half. If all four were halved, the welfare loss would be roughly 2.5 times higher. If only the import demand and export demand elasticities were doubled, the welfare loss would be about 25 percent of what is reported. If these two elasticities were halved, the welfare loss would be roughly 3.5 times as high.

losses in later years are minimal.[18] Also, in the longer run the elasticities of supply and demand for aggregate imports and exports increase, so theterms-of-trade effects become much smaller. Thus, the long-run effects of the tariff removal can be approximated reasonably well merely using the traditional calculations with long-run elasticities, adjusting for the effects of domestic taxes.

In the long run, the elasticity of demand facing the tariff-ridden good is also likely to increase, which will cause the welfare gain from eliminating a tariff to grow. Thus, there are three reasons why the welfare gains tend to grow in each succeeding year: The adjustment for worker losses becomes smaller; the terms-of-trade adjustment becomes smaller; and the welfare-gain triangle grows larger.

Upstream and downstream effects

Upstream and downstream effects are estimated using the most recent input-output table of the United States, compiled by the U.S. Department of Commerce for the year 1977. Also employed is the assumption of fixed coefficients, which is standard practice in input-output analysis.[19]

Any loss in producers' surplus to industries supplying intermediate inputs to the protected industry is already included in the protected industry's loss in producers' surplus. Cost curves are notoriously difficult to estimate, and as a result, it is usually impossible to separate the losses in producers' surplus in input-supplying industries from the loss in surplus to the protected industry. Therefore, the analysis in these upstream, input industries is limited to an examination of their output losses, which are estimated using the simple assumption of fixed coefficients for intermediate inputs. More specifically, the loss to each supplying industry is calculated as the loss in output of the protected industry (Q_d–Q'_d in panel B of figure 2–1) times the input required from the supplying industry per unit of this output.

The consumer welfare gains in panels A and B include the benefits to both final consumers and to intermediate, industrial consumers. The benefit to industrial consumers could be separated from the total consumer gain by using the appropriate derived demand curves, but the necessary information on these derived demands is usually not available. Accordingly, the analysis of the effects on downstream industries is limited to an examination of their gain in output. More specifically, it is assumed that the industrial consumers use inputs in fixed proportions to their outputs and that the tariff elimination affects only the prices of the tariff-ridden input (both the imported input and the competing domestic input)and not other input prices.[20] These assumptions are incorporated into the analysis of the market for output of an industrial consumer as depicted in figure 2–2. Owing to the assumptions, the industry's supply curve, S_c, is horizontal. Before the tariff on one of the inputs is eliminated, the output price is pc. After the tariff is eliminated, the production costs of the consumer industry are reduced, its supply curve shifts downward to S_c', and its output increases from Q_c to Q_c'.

Ordinary MFN Tariffs

This section covers 12 4-digit SIC industries and 6 8-digit HTS items protected by high, Most Favored Nation (MFN) tariffs, a list of which is presented in table 2-1. First, the products in each sector are described. Second, a brief history of the sector's tariff protection is given. Finally, estimates are given for the effects of removing the tariffs.

As explained in appendix D, the effects of eliminating a tariff depend on a number of parameters. One parameter is very difficult to measure: the price responsiveness or elasticity of domestic supply. For this reason, results are calculated for a range of values for this parameter (unity and ten).

In every case considered, the upper-bound, terms-of-trade losses more than outweigh the traditional, net welfare gains. This is consistent with other studies of unilateral tariff elimination.[21] Terms-of-trade losses would be much smaller in the case of multilateral tariff elimination, however. Domestic tax losses and worker income losses add to these negative values. The picture that emerges is one of short-term welfare losses and long-term welfare gains from tariff elimination.

Case 1, SIC No. 3021, Rubber and plastics footwear

This category includes protective footwear and rubber or plastic-soled footwear with fabric uppers. Protective footwear includes galoshes, hunting boots, overshoes, and firemen's boots. Fabric-upper footwear, which accounts for most of the trade in rubber footwear, includes sneakers, joggers, and other sports-type footwear, as well as slippers, scuffs, and casuals such as espadrilles.

[18] Jacobsen, ibid.

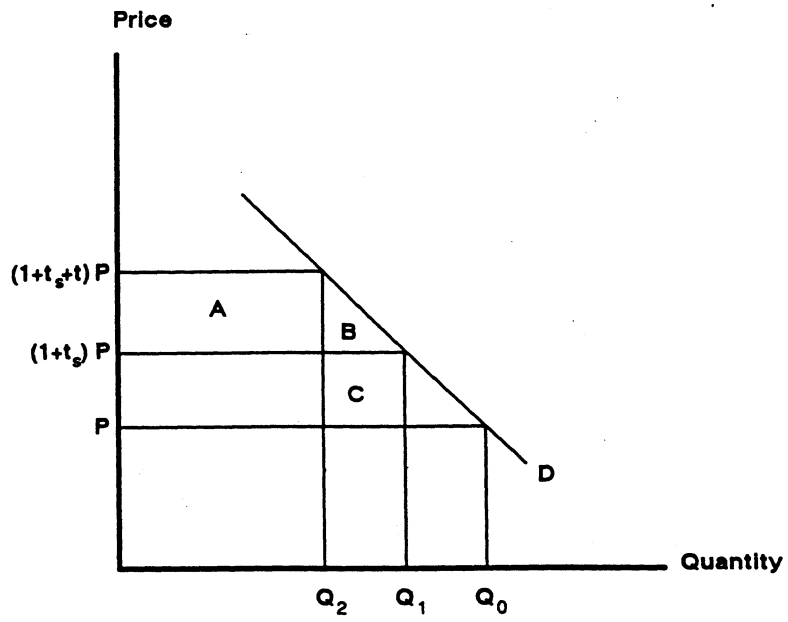
[19] For an introduction to input output techniques, see W.H. Miernyk, *The Elements of Input Output Analysis*, New York: Random House, 1965. A description of the 1977 input-output table can be found in U.S. Department of Commerce, "The Input-Output Structure of the U.S. Economy, 1977," *Survey of Current Business*, May 1984, pp. 42–84.

[20] Any tendency on the part of producers to shift purchases of imports as a result of the tariff (for example, away from imports of the tariff-ridden good towards the domestic substitute) is ignored. Accounting for such shifts, however, would have only a negligible effect on the calculations. This is explained in app. D.

[21] See for example, F. Brown and J. Whally, "General Equilibrium Evaluations of the Tariff-Cutting Proposals in the Tokyo Round and Comparisons with more Extensive Liberalization of World Trade," *Economic Journal*, December 1980, pp. 838–866 and L.H. Goulder and B. Eichengreen, "Trade Liberalization in General Equilibrium: Intertemporal and Inter-Industry Effects," Mimeo, March 1989.

Figure 2-2

Domestic taxes



Key:

P = price t_s = sales tax
Q = quantity t = tariff
D = demand

Table 2-1

Sectors with high MFN tariff rates

Case	*SIC or HTS No.*	*Product description*	*1987 AVE*[1]
1	3021	Rubber and plastics footwear	41.9
2	3144	Women's footwear, except athletic	10.0
3	3253	Ceramic floor and wallitle	19.1
4	3161	Luggage	16.3
5	3151	Leather gloves and mittens[2]	15.3
6	3262	Vitreous china table and kitchen articles	14.2
7	3263	Fine earthen waretable and kitchen articles	9.4
8	3171	Women's handbags and purses	12.5
9	3961	Costume jewelry and costume novelties except precious metal	9.9
10	3229	Pressed and blown glass and glassware, not elsewhere classified	12.9
11	2865	Cyclic organic crudes and intermediates, and organic dyes and pigments	13.2
12	3675 and 36291	Electronic and electrical capacitors[3]	10.0
13	29051120	Methyl alcohol[2]	18.0
14	39011000	Polyethylene resins	12.5
15	95021030	Non-stuffed dolls	12.3
16	871200	Certain bicycles	11.0
17	84821050	Ballbearings	11.0
18	90189020	Optical instruments	10.0

[1] Ad valorem equivalent, dutiable value basis.
[2] Greater than $100 million import value estimated at 0 percent tariff rate.
[3] Capacitor imports are subject to a 10 percent duty. SIC No. 3675 includes electronic capacitors only, but import data for SIC No. 3675 includes both electronic and electrical capacitors. We therefore include data for SIC No. 36291, electrical capacitors, in the study. The AVE for this category is based on calculated duties collected. However, in the calculations for this report, we account for the fact that a significant portion of capacitor imports fall under item 807.00 of the tariff schedule. Adjustments were made using the assumption that 70 percent of 807 capacitor imports are duty free. This figure is from U.S. International Trade Commission, *Imports under Items 806.30 and 807.00 of the Tariff Schedule of the United States, 1984-1987*, USITC Publication 2144, December 1988.

Source: Calculated from official statistics of the U.S. Department of Commerce.

History of tariff reductions.—The rubber footwear industry has been protected by high tariffs which have remained largely unchanged since the Tariff Act of 1930 (Smoot-Hawley). In 1933, the industry was granted increased tariff protection when the American selling price (ASP) method for valuing imports was adopted. Under the ASP, the selling price of similar U.S.-made footwear was used as the price of imports for purposes of levying tariffs. The ASP often resulted in higher appraised values and duty payments because U.S. footwear usually costs more than imported goods. The ASP was terminated in July 1981 as part of the Tokyo Round of multilateral trade negotiations. To provide tariff protection equivalent to that of the ASP, the Tariff Schedule of the United States (TSUS) item 700.60, which covered imports of fabric-upper footwear and had a duty rate of 20 percent, was subdivided into nine new tariff items with rates of duty ranging from 20 percent to an ad valorem equivalent of 67.5 percent.

Economic effects.—The traditional economic effects of eliminating the tariff on rubber and plastics footwear are presented in table 2-2. This tariff elimination would have reduced the dollar value of shipments in this sector by approximately $143 to $196 million in 1986 and $154 to $212 million in 1988. These declines are large relative to shipment values of less that $600 million. The reduction in shipments would have caused employment in the industry to fall by approximately 2,300 to 3,100 employees in 1986 and 2,000 to 2,800 employees in 1988. Losses to these displaced workers would have been approximately $5 to $7 million. The traditional net welfare measure, which accounts for consumer gains, producer losses, and tariff revenue losses, would have been approximately $15 to $25 million in 1986 and $29 to $47 million in 1988. Other adjustments to the traditional economic effects are presented in table 2-3.

Eliminating the tariff on rubber footwear would have caused significant upstream effects for two input-output sectors: Broadwoven Fabric Mills and Fabric Finishing Plants (16.0100) and Synthetic Rubber (28.0200). The estimated effects are presented in table 2-43.

Case 2, SIC No. 3144, Women's footwear, except athletic

This category includes women's dress and work shoes, boots, sandals, clogs and other casual footwear, except athletic shoes and house slippers. This footwear is made primarily of leather or vinyl and is usually referred to as nonrubber footwear.

History of tariff reductions.—The 1962 Trade Expansion Act (after the 'Kennedy Round' of tariff negotiations) reduced tariffs on women's leather and vinyl footwear by more than 50 percent from the Smoot-Hawley rates. From 1968 to 1972, duties were reduced on leather footwear from 18 percent to 10 percent in staged reductions. On vinyl footwear, the duties fell from 12.5 percent to 6 percent.

Table 2-2

Traditional measures of the economic effects of unilaterally eliminating import tariffs: Case 1, Rubber and plastics footwear

Item	*1986*	*1987*	*1988*
Sector data:			
Shipments (millions of dollars)[1]	573.3	590.0	588.0
Employment (thousands)[2]	9.2	8.3	7.6
Imports, c.i.f. duty paid (millions of dollars)[3]	401.4	521.9	676.1
Economic effects:			
	Elasticity of supply = to 1		
Shipments (millions of dollars)	-142.7	-151.9	-154.4
Employment (thousands)	-2.3	-2.1	-2.0
Consumer gain (millions of dollars)	189.1	236.2	290.8
Producer loss (millions of dollars)	66.9	71.1	72.1
Tariff revenue loss (millions of dollars)	107.0	143.9	190.1
Traditional net welfare gain (millions of dollars)	15.2	21.2	28.5
	Elasticity of supply = to 10		
Shipments (millions of dollars)	-196.2	-208.9	-212.3
Employment (thousands)	-3.1	-2.9	-2.8
Consumer gain (millions of dollars)	147.3	195.0	253.5
Producer loss (millions of dollars)	15.1	15.9	16.1
Tariff revenue loss (millions of dollars)	107.0	143.9	190.1
Traditional net welfare gain(millions of dollars)	25.2	35.1	47.2

[1] The 1986 value is from U.S. Department of Commerce, Office of Business Analysis. 1987 and 1988 values are from U.S. Department of Commerce, *1989 U.S. Industrial Outlook*, January 1989.
[2] The 1986 value is from Office of Business Analysis, U.S. Department of Commerce.
[3] U.S. Department of Commerce, Bureau of the Census.

Source: Estimated by the staff of the U.S. International Trade Commission except where indicated.

Table 2-3

Other adjustments to the economic effects of unilaterally eliminating import tariffs: Case 1, Rubber and plastics footwear

(In millions of dollars)

Item	1986	1987	1988
	Elasticity of supply = to 1		
Worker income loss[1]	5.1	5.3	5.2
Domestic tax loss[2]	16.1	21.6	28.5
Terms-of-trade loss[3]	23.9	31.7	34.6
Adjusted net welfare gain	-29.9	-37.4	-39.8
	Elasticity of supply = to 10		
Worker income loss[1]	7.0	7.3	7.2
Domestic tax loss[2]	16.1	21.6	28.5
Terms-of-trade loss[3]	46.2	61.0	67.9
Adjusted net welfare gain	-44.0	-54.7	-56.4

[1] The worker income loss calculation assumes a rigid wage in the sector under consideration. If the wage is flexible, the worker income loss would be included in the producer loss of the traditional analysis.
[2] The domestic tax loss calculation assumes that tariff revenue is replaced with a proportional increase in all existing domestic taxes. If the replacement tax were a uniform sales tax, this adjustment would be insignificant in size. If the federal income tax were used to replace the tariff revenue, the adjustment could be 3 times as great.
[3] The terms-of-trade adjustment is relevant only for a unilateral tariff elimination. The estimate presented here tends to overstate the true terms-of-trade loss, because it does not account for the fact that increased U.S. imports might cause foreign demand for U.S. exports to increase.

Source: Estimated by the staff of the U.S. International Trade Commission.

Women's leather footwear, which accounts for most of the imports under SIC category 3144, is imported under item 700.45 of the TSUS with a duty of 10 percent. Other TSUS items, which have smaller amounts of imports, are subject to duties ranging from 12.5 to 16 percent. TSUS 700.45 is not eligible under the Generalized System of Preferences (GSP), nor is it afforded preferential duty rates if imported from the least developed nations. U.S. rates of duty on women's leather footwear were not reduced during the Tokyo Round negotiations. Footwear was excluded from the Caribbean Basin Economic Recovery Act (CBERA), and nonrubber footwear was excluded from the United States-Israel free-trade area agreement.

Economic effects.—The traditional economic effects of eliminating the tariff on women's footwear are presented in table 2-4. This tariff elimination would have reduced the dollar value of shipments in this sector by approximately $165 to $227 million in 1986 and $182 to $250 million in 1988. The reduction in shipments would have caused employment in the industry to fall by approximately 3,500 to 4,800 employees in 1986 and 2,900 to 4,000 employees in 1988. Losses to these displaced workers would have been approximately $6 to $9 million. The traditional net welfare measure, which accounts for consumer gains, producer losses, and tariff revenue losses, would have been approximately $12 to $18 million in 1986 and $14 to $20 million in 1988. Other adjustments to the traditional economic effects are presented in table 2-5.

Eliminating the tariff on women's footwear would have caused significant upstream effects for two input-output sectors: Leather Tanning and Finishing (33.0001) and Boot and Shoe Cut Stock and Findings (34.0100). The estimated effects are presented in table 2-43.

Case 3, SIC No. 3253, Ceramic floor and wall tile

This category covers ceramic tile used to cover floors or walls, either glazed or unglazed.

History of tariff reductions.—The Smoot-Hawley tariffs on tiles ranged from 50 to 70 percent. By the time the TSUS was implemented in 1963, separate tariff rates had been developed for three tile categories on the basis of size or glazing (mosaic, glazed nonmosaic, and unglazed nonmosaic tiles), and tariffs had been reduced to 24.5 percent on mosaic tiles, 22.5 percent on glazed nonmosaic tiles, and 24 percent on unglazed nonmosaic tiles. Tariffs on tiles were not reduced under the Kennedy Round and were reduced only slightly under the Tokyo Round, down to 20 percent on mosaic tiles, 19 percent on glazed nonmosaic tiles, and 20 percent on unglazed nonmosaic tiles. The HTS tends to blur the distinction between mosaic and nonmosaic tiles, but the existence of the three separate duty categories remains largely intact.

Economic effects.—The traditional economic effects of eliminating the tariff on ceramic floor and wall tile are presented in table 2-6. This tariff elimination would have reduced the dollar value of shipments in this sector by approximately $28

Table 2-4

Traditional measures of the economic effects of unilaterally eliminating import tariffs: Case 2, Women's footwear, except athletic

Item	*1986*	*1987*	*1988*
Sector data:			
Shipments (millions of dollars)[1]	1425.9	1493.0	1554.0
Employment (thousands)[2]	30.2	27.1	25.2
Imports, c.i.f. duty paid (millions of dollars)[3]	2578.0	2795.7	2893.3
Economic effects:			
	Elasticity of supply = to 1		
Shipments (millions of dollars)	-165.0	-172.7	-181.5
Employment (thousands)	-3.5	-3.1	-2.9
Consumer gain (millions of dollars)	316.2	339.7	355.5
Producer loss (millions of dollars)	80.1	83.9	88.1
Tariff revenue loss (millions of dollars)	223.8	242.6	253.4
Traditional net welfare gain (millions of dollars)	12.3	13.3	14.0
	Elasticity of supply = to 10		
Shipments (millions of dollars)	-226.9	-237.5	-249.5
Employment (thousands)	-4.8	-4.3	-4.0
Consumer gain (millions of dollars)	260.6	281.7	294.6
Producer loss (millions of dollars)	19.1	20.0	21.0
Tariff revenue loss (millions of dollars)	223.8	242.6	253.4
Traditional net welfare gain (millions of dollars)	17.6	19.1	20.1

[1] The 1986 value is from U.S. Department of Commerce, Office of Business Analysis. 1987 and 1988 values are from U.S. Department of Commerce, *1989 U.S. Industrial Outlook*, January 1989.
[2] The 1986 value is from U.S. Department of Commerce, Office of Business Analysis.
[3] U.S. Department of Commerce, Bureau of the Census.

Source: Estimated by the staff of the U.S. International Trade Commission except where indicated.

Table 2-5

Other adjustments to the economic effects of unilaterally eliminating import tariffs: Case 2, Women's footwear, except athletic

(In millions of dollars)

Item	*1986*	*1987*	*1988*
	Elasticity of supply = to 1		
Worker income loss[1]	5.9	6.1	6.3
Domestic tax loss[2]	33.6	36.4	38.0
Terms-of-trade loss[3]	73.7	79.8	69.2
Adjusted net welfare gain	-101.0	-109.0	-99.5
	Elasticity of supply = to 10		
Worker income loss[1]	8.2	8.4	8.7
Domestic tax loss[2]	33.6	36.4	38.0
Terms-of-trade loss[3]	119.5	128.9	113.7
Adjusted net welfare gain	-143.6	-154.6	-140.3

[1] The worker income loss calculation assumes a rigid wage in the sector under consideration. If the wage is flexible, the worker income loss would be included in the producer loss of the traditional analysis.
[2] The domestic tax loss calculation assumes that tariff revenue is replaced with a proportional increase in all existing domestic taxes. If the replacement tax were a uniform sales tax, this adjustment would be insignificant in size. If the federal income tax were used to replace the tariff revenue, the adjustment could be 3 times as great.
[3] The terms-of-trade adjustment is relevant only for a unilateral tariff elimination. The estimate presented here tends to overstate the true terms-of-trade loss, because it does not account for the fact that increased U.S. imports might cause foreign demand for U.S. exports to increase.

Source: Estimated by the staff of the U.S. International Trade Commission.

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Table 2-6

Traditional measures of the economic effects of unilaterally eliminating import tariffs: Case 3, Ceramic floor and wall tile

Item	*1986*	*1987*	*1988*
Sector data:			
Shipments (millions of dollars)[1]	665.9	729.0	805.0
Employment (thousands)[1]	9.6	9.7	9.5
Imports, c.i.f. duty paid (millions of dollars)[2]	441.6	519.2	559.0
Economic effects:			
	Elasticity of supply = to 1		
Shipments (millions of dollars)	-27.7	-30.0	-33.7
Employment (thousands)	-0.4	-0.4	-0.4
Consumer gain (millions of dollars)	76.3	87.8	96.5
Producer loss (millions of dollars)	13.7	14.8	16.7
Tariff revenue loss (millions of dollars)	60.8	70.9	77.6
Traditional net welfare gain (millions of dollars)	1.8	2.1	2.3
	Elasticity of supply = to 10		
Shipments (millions of dollars)	-29.9	-32.4	-36.4
Employment (thousands)	-0.4	-0.4	-0.4
Consumer gain (millions of dollars)	65.5	76.1	83.4
Producer loss (millions of dollars)	2.7	2.9	3.2
Tariff revenue loss (millions of dollars)	60.8	70.9	77.6
Traditional net welfare gain (millions of dollars)	2.0	2.3	2.6

[1] The 1986 value is from U.S. Department of Commerce, Office of Business Analysis. 1987 and 1988 values are from U.S. Department of Commerce, *1989 U.S. Industrial Outlook*, January 1989.
[2] U.S. Department of Commerce, Bureau of the Census.

Source: Estimated by the staff of the U.S. International Trade Commission except where indicated.

to $30 million in 1986 and $34 to $36 million in 1988. The reduction in shipments would have caused employment in the industry to fall by approximately 400 employees in 1986–1988. Losses to these displaced workers would have been approximately $1 million. The traditional net welfare measure, which accounts for consumer gains, producer losses, and tariff revenue losses, would have been approximately $2 million in 1986 and $2.5 million in 1988. Other adjustments to the traditional economic effects are presented in table 2–7.

Eliminating the tariff on ceramic tile would have caused significant upstream effects for two input-output sectors: Industrial Inorganic and Organic Chemicals (27.0100) and Clay, Ceramic, and Refractory Minerals Mining (9.0003). The estimated effects are presented in table 2–43.

Case 4, SIC No. 3161, Luggage

This category includes trunks, suitcases, backpacks, kitbags, dufflebags, attache cases, briefcases, portfolios, schoolbags, photographic equipment bags, golf bags, camera cases, binocular cases, and occupational luggage (such as physicians' bags and sample cases). Luggage is made primarily from plastics, textiles, and leather.

History of tariff reductions.—Prior to the TSUS, only leather luggage was specifically enumerated in the U.S. tariff provisions. Luggage of other materials, when imported, entered under a large number of so-called basket provisions determined mostly by the material from which they were made. The Smoot-Hawley rates of duty on these categories ranged from 35 percent to 90 percent. For most leather luggage, the rate was 35 percent. For most luggage made from textiles, the rate varied from 40 percent to 65 percent. For luggage made from plastics, the rate was 45 percent. Prior to the TSUS, a clear tariff history is available only for leather luggage. The rate of duty on luggage of reptile leather was reduced to 17.5 percent in 1941. The rate for other leather luggage was lowered to 20 percent in 1948. The Kennedy Round further reduced these rates by 50 percent to 8.5 percent and 10 percent, respectively. These rates were reduced in the Tokyo Round to 5.3 percent and 8 percent, respectively. With the conversion to the HTS, the rate line for reptile luggage was eliminated and other leather luggage now enters under two HTS subheadings at 8 percent and 6.8 percent.

For the remaining luggage of other materials, the TSUS rates of duty ranged from 13.5 percent to 42 percent, reflecting 32- to 66-percent tariff reductions in the Smoot-Hawley rates, which ranged from 40 percent to 90 percent. These rates generally were reduced by an additional 50 percent or more in the Kennedy Round to between 6.5 percent and 21 percent. However, the rate of duty on most plastic luggage remained unchanged at 20 percent, which was 56 percent below the 1930 rate. During the Tokyo Round,

Table 2-7

Other adjustments to the economic effects of unilaterally eliminating import tariffs: Case 3, Ceramic floor and wall tile

(In millions of dollars)

Item	1986	1987	1988
	Elasticity of supply = to 1		
Worker income loss[1]	1.1	1.2	1.3
Domestic tax loss[2]	9.1	10.6	11.6
Terms-of-trade loss[3]	6.4	7.4	6.7
Adjusted net welfare gain	-14.8	-17.2	-17.4
	Elasticity of supply = to 10		
Worker income loss[1]	1.2	1.3	1.4
Domestic tax loss[2]	9.1	10.6	11.6
Terms-of-trade loss[3]	7.7	8.9	8.1
Adjusted net welfare gain	-15.9	-18.5	-18.6

[1] The worker income loss calculation assumes a rigid wage in the sector under consideration. If the wage is flexible, the worker income loss would be included in the producer loss of the traditional analysis.
[2] The domestic tax loss calculation assumes that tariff revenue is replaced with a proportional increase in all existing domestic taxes. If the replacement tax were a uniform sales tax, this adjustment would be insignificant in size. If the federal income tax were used to replace the tariff revenue, the adjustment could be 3 times as great.
[3] The terms-of-trade adjustment is relevant only for a unilateral tariff elimination. The estimate presented here tends to overstate the true terms-of-trade loss, because it does not account for the fact that increased U.S. imports might cause foreign demand for U.S. exports to increase.

Source: Estimated by the staff of the U.S. International Trade Commission.

reductions were made on items that were small in trade volume. These reductions ranged from 28 percent to 60 percent below the levels at the end of the Kennedy Round. No reductions were made for most luggage of textiles and of plastics because imports of these articles increased rapidly in the late 1960s and throughout the 1970s and were considered to be import sensitive. Most of these luggage items also were excluded from the GSP and the CBERA. (Also, in 1984, bilateral quotas under the Multifiber Arrangement were applied to important U.S. suppliers of certain textile luggage.) In 1987, the average ad valorem equivalent for imports comparable with SIC 3161 was 16.3 percent.

Economic effects.—The traditional economic effects of eliminating the tariff on luggage are presented in table 2-8. This tariff elimination would have reduced the dollar value of shipments in this sector by approximately $104 to $133 million in 1986 and $124 to $159 million in 1988. The reduction in shipments would have caused employment in the industry to fall by approximately 2,000 employees in 1986-1988. Losses to these displaced workers would have been approximately $4 to $6 million. The traditional net welfare measure, which accounts for consumer gains, producer losses, and tariff revenue losses, would have been approximately $3 to $8 million in 1986 and $6 to $14 million in 1988. Other adjustments to the traditional economic effects are presented in table 2-9.

Eliminating the tariff on luggage would have caused significant upstream effects for two input-output sectors: Coated Fabrics, Not Rubberized (17.0600) and Hardware, Not Elsewhere Classified (42.0300). The estimated effects are presented in table 2-43.

Case 5, SIC No. 3151, Leather gloves and mittens

This category includes leather dress gloves and leather work gloves. The leather for dress gloves is made primarily from sheepskin, whereas leather work gloves are usually made of cowhide leather.

History of tariff reductions.—Leather gloves, for tariff purposes, can be divided between gloves of horsehide or cowhide leather and those of other leather. When Smoot-Hawley was enacted, gloves of horsehide and cowhide leather, which now account for the great bulk of the trade in leather gloves, consisted almost entirely of work gloves. Because import competition in work gloves was much weaker than that in dress gloves, the tariff for the work gloves was set at a much lower rate. For 1988, the weighted average tariff for work gloves was 25 percent and that for other leather gloves was 55 percent. The work glove rate was reduced to 15 percent in 1939 and remained unchanged until 1987, when it was reduced to its current level of 14 percent in the Tokyo Round. The average rate for other leather gloves is also now 14 percent after the Tokyo Round concessions.

Economic effects.—The traditional economic effects of eliminating the tariff on leather gloves and mittens are presented in table 2-10. This tariff elimination would have reduced the dollar

Table 2-8

Traditional measures of the economic effects of unilaterally eliminating import tariffs: Case 4, Luggage

Item	*1986*	*1987*	*1988*
Sector data:			
Shipments (millions of dollars)[1]	665.8	708.0	746.0
Employment (thousands)[2]	11.4	9.9	9.2
Imports, c.i.f. duty paid (millions of dollars)[3]	633.1	1082.8	1062.2
Economic effects:			
		Elasticity of supply = to 1	
Shipments (millions of dollars)	-104.0	-115.9	-124.4
Employment (thousands)	-1.8	-1.6	-1.5
Consumer gain (millions of dollars)	131.2	201.4	205.5
Producer loss (millions of dollars)	50.0	55.6	59.6
Tariff revenue loss (millions of dollars)	78.0	139.8	139.8
Traditional net welfare gain (millions of dollars)	3.2	6.0	6.1
		Elasticity of supply = to 10	
Shipments (millions of dollars)	-133.2	-148.4	-159.3
Employment (thousands)	-2.3	-2.1	-2.0
Consumer gain (millions of dollars)	96.5	166.1	167.1
Producer loss (millions of dollars)	11.0	12.2	13.1
Tariff revenue loss (millions of dollars)	78.0	139.8	139.8
Traditional net welfare gain (millions of dollars)	7.5	14.0	14.3

[1] The 1986 value is from U.S. Department of Commerce, Office of Business Analysis. 1987 and 1988 values are from U.S. Department of Commerce, *1989 U.S. Industrial Outlook*, January 1989.
[2] The 1986 value is from U.S. Department of Commerce, Office of Business Analysis.
[3] U.S. Department of Commerce, Bureau of the Census.

Source: Estimated by the staff of the U.S. International Trade Commission except where indicated.

Table 2-9

Other adjustments to the economic effects of unilaterally eliminating import tariffs: Case 4, Luggage

(In millions of dollars)

Item	*1986*	*1987*	*1988*
		Elasticity of supply = to 1	
Worker income loss[1]	3.9	4.4	4.8
Domestic tax loss[2]	11.7	21.0	21.0
Terms-of-trade loss[3]	13.0	23.1	19.2
Adjusted net welfare gain	-25.4	-42.5	-38.8
		Elasticity of supply = to 10	
Worker income loss[1]	5.0	5.6	6.1
Domestic tax loss[2]	11.7	21.0	21.0
Terms-of-trade loss[3]	37.6	66.3	56.6
Adjusted net welfare gain	-46.8	-78.9	-69.4

[1] The worker income loss calculation assumes a rigid wage in the sector under consideration. If the wage is flexible, the worker income loss would be included in the producer loss of the traditional analysis.
[2] The domestic tax loss calculation assumes that tariff revenue is replaced with a proportional increase in all existing domestic taxes. If the replacement tax were a uniform sales tax, this adjustment would be insignificant in size. If the federal income tax were used to replace the tariff revenue, the adjustment could be 3 times as great.
[3] The terms-of-trade adjustment is relevant only for a unilateral tariff elimination. The estimate presented here tends to overstate the true terms-of-trade loss, because it does not account for the fact that increased U.S. imports might cause foreign demand for U.S. exports to increase.

Source: Estimated by the staff of the U.S. International Trade Commission.

Table 2-10

Traditional measures of the economic effects of unilaterally eliminating import tariffs: Case 5, Leather gloves and mittens

Item	*1986*	*1987*	*1988*
Sector data:			
Shipments (millions of dollars)[1]	202.9	214.0	221.0
Employment (thousands)[2]	3.5	3.1	2.8
Imports, c.i.f. duty paid (millions of dollars)[3]	97.7	107.1	120.6
Economic effects:			
	Elasticity of supply = to 1		
Shipments (millions of dollars)	-36.4	-36.2	-36.5
Employment (thousands)	-0.6	-0.5	-0.5
Consumer gain (millions of dollars)	31.9	32.3	33.8
Producer loss (millions of dollars)	17.4	17.4	17.5
Tariff revenue loss (millions of dollars)	13.3	13.7	15.0
Traditional net welfare gain (millions of dollars)	1.2	1.2	1.3
	Elasticity of supply = to 10		
Shipments (millions of dollars)	-49.6	-49.3	-49.6
Employment (thousands)	-0.9	-0.7	-0.6
Consumer gain (millions of dollars)	20.3	20.7	22.3
Producer loss (millions of dollars)	4.0	4.0	4.0
Tariff revenue loss (millions of dollars)	13.3	13.7	15.0
Traditional net welfare gain (millions of dollars)	3.1	3.0	3.2

[1] The 1986 value is from U.S. Department of Commerce, Office of Business Analysis. 1987 and 1988 values are from U.S. Department of Commerce, *1989 U.S. Industrial Outlook*, January 1989.
[2] The 1986 value is from U.S. Department of Commerce, Office of Business Analysis.
[3] U.S. Department of Commerce, Bureau of the Census.

Source: Estimated by the staff of the U.S. International Trade Commission except where indicated.

value of shipments in this sector by approximately $36 to $50 million in 1986–1988. The reduction in shipments would have caused employment in the industry to fall by approximately 600 to 900 employees in 1986 and 500 to 600 employees in 1988. Losses to these displaced workers would have been approximately $1 million. The traditional net welfare measure, which accounts for consumer gains, producer losses, and tariff revenue losses, would have been approximately $1 to $3 million in 1986 and 1988. Other adjustments to the traditional economic effects are presented in table 2–11.

Eliminating the tariff on leather gloves would have caused significant upstream effects for the input-output sector Leather Tanning and Finishing (33.0001). The estimated effects are presented in table 2–43.

Case 6, SIC No. 3262, Vitreous china table and kitchen articles

This category includes household and commercial chinaware including bone chinaware.

History of tariff reductions.—Under Smoot-Hawley, two different tariffs were imposed on chinaware depending on whether it was decorated. The tariff on undecorated chinaware was 10 cents per dozen pieces plus 60 percent ad valorem. The tariff on decorated chinaware was 10 cents per dozen pieces plus 70-percent ad valorem.

Prior to the Kennedy Round, duties on chinaware ranged from 35-percent ad valorem for bone chinaware to 10 cents per dozen pieces plus 60 percent ad valorem for miscellaneous moderately valued nonbone chinaware or subporcelain. As a result of the Kennedy Round duty modifications, the rates of duty on chinaware declined to a range of 17.5-percent ad valorem (bone chinaware) to 10 cents per dozen pieces plus 55-percent ad valorem (certain moderate-valued chinaware sets).

At completion of the Tokyo Round, tariffs on chinaware ranged from 8 percent to 35 percent. Products receiving the higher duties typically have had a rising import/consumption ratio or have been the subject of trade investigations initiated by U.S. industry.

Economic effects.—The traditional economic effects of eliminating the tariff on china table and kitchen articles are presented in table 2–12. This tariff elimination would have reduced the dollar value of shipments in this sector by approximately $33 to $34 million in 1986 and $32 to $33 million in 1988. The reduction in shipments would have caused employment in the industry to fall by approximately 700 employees in 1986 and 600 employees in 1988. Losses to these displaced workers would have been approximately $2 mil-

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Table 2-11

Other adjustments to the economic effects of unilaterally eliminating import tariffs: Case 5, Leather gloves and mittens

(In millions of dollars)

Item	1986	1987	1988
		Elasticity of supply = to 1	
Worker income loss[1]	0.9	0.9	0.9
Domestic tax loss[2]	2.0	2.1	2.3
Terms-of-trade loss[3]	4.5	4.7	4.3
Adjusted net welfare gain	-6.2	-6.4	-6.1
		Elasticity of supply = to 10	
Worker income loss[1]	1.2	1.2	1.2
Domestic tax loss[2]	2.0	2.1	2.3
Terms-of-trade loss[3]	13.9	14.4	13.6
Adjusted net welfare gain	-14.1	-14.6	-13.8

[1] The worker income loss calculation assumes a rigid wage in the sector under consideration. If the wage is flexible, the worker income loss would be included in the producer loss of the traditional analysis.
[2] The domestic tax loss calculation assumes that tariff revenue is replaced with a proportional increase in all existing domestic taxes. If the replacement tax were a uniform sales tax, this adjustment would be insignificant in size. If the federal income tax were used to replace the tariff revenue, the adjustment could be 3 times as great.
[3] The terms-of-trade adjustment is relevant only for a unilateral tariff elimination. The estimate presented here tends to overstate the true terms-of-trade loss, because it does not account for the fact that increased U.S. imports might cause foreign demand for U.S. exports to increase.

Source: Estimated by the staff of the U.S. International Trade Commission.

Table 2-12

Traditional measures of the economic effects of unilaterally eliminating import tariffs: Case 6, Vitreous china table and kitchen articles

Item	1986	1987	1988
Sector data:			
Shipments (millions of dollars)[1]	268.3	259.5	271.5
Employment (thousands)[2]	5.6	5.1	5.0
Imports, c.i.f. duty paid (millions of dollars)[2]	279.2	285.9	293.2
Economic effects:			
		Elasticity of supply = to 1	
Shipments (millions of dollars)	-33.2	-30.5	-31.9
Employment (thousands)	-0.7	-0.6	-0.6
Consumer gain (millions of dollars)	50.4	48.2	49.7
Producer loss (millions of dollars)	16.1	14.8	15.5
Tariff revenue loss (millions of dollars)	33.4	32.4	33.3
Traditional net welfare gain (millions of dollars)	1.0	0.9	0.9
		Elasticity of supply = to 10	
Shipments (millions of dollars)	-34.2	-31.4	-32.8
Employment (thousands)	-0.7	-0.6	-0.6
Consumer gain (millions of dollars)	38.2	36.9	37.9
Producer loss (millions of dollars)	2.9	2.7	2.8
Tariff revenue loss (millions of dollars)	33.4	32.4	33.3
Traditional net welfare gain (millions of dollars)	1.9	1.7	1.8

[1] The 1986 value is from U.S. Department of Commerce, Office of Business Analysis.
[2] U.S. Department of Commerce, Bureau of the Census.

Source: Estimated by the staff of the U.S. International Trade Commission except where indicated.

lion. The traditional net welfare measure, which accounts for consumer gains, producer losses, and tariff revenue losses, would have been approximately $1 to $2 million during 1986–1988. Other adjustments to the traditional economic effects are presented in table 2–13.

Case 7, SIC No. 3263, Fine earthenware table and kitchen articles

This category includes both fine earthenware (made of materials that have been washed or ground) and coarse-grained earthenware, whether for household or commercial use.

Table 2-13

Other adjustments to the economic effects of unilaterally eliminating import tariffs: Case 6, Vitreous china table and kitchen articles

(In millions of dollars)

Item	1986	1987	1988
	Elasticity of supply = to 1		
Worker income loss[1]	1.9	1.7	1.8
Domestic tax loss[2]	5.0	4.9	5.0
Terms-of-trade loss[3]	4.2	4.1	3.5
Adjusted net welfare gain	-10.1	-9.8	-9.3
	Elasticity of supply = to 10		
Worker income loss[1]	1.9	1.8	1.9
Domestic tax loss[2]	5.0	4.9	5.0
Terms-of-trade loss[3]	9.3	9.1	7.9
Adjusted net welfare gain	-14.4	-14.0	-13.0

[1] The worker income loss calculation assumes a rigid wage in the sector under consideration. If the wage is flexible, the worker income loss would be included in the producer loss of the traditional analysis.
[2] The domestic tax loss calculation assumes that tariff revenue is replaced with a proportional increase in all existing domestic taxes. If the replacement tax were a uniform sales tax, this adjustment would be insignificant in size. If the federal income tax were used to replace the tariff revenue, the adjustment could be 3 times as great.
[3] The terms-of-trade adjustment is relevant only for a unilateral tariff elimination. The estimate presented here tends to overstate the true terms-of-trade loss, because it does not account for the fact that increased U.S. imports might cause foreign demand for U.S. exports to increase.

Source: Estimated by the staff of the U.S. International Trade Commission.

History of tariff reductions.—Under Smoot-Hawley, rates of duty for fine earthenware ranged from 50 percent for fine-grained, undecorated earthenware to 55 percent for fine-grained, decorated earthenware. Prior to the Kennedy Round, duties ranged from 10 cents per dozen pieces plus 21-percent ad valorem for fine-grained earthenware sets of moderate to high value to 10 cents per dozen pieces plus 40-percent ad valorem for miscellaneous moderately valued earthenware articles. After the Kennedy Round duty reductions, tariffs on earthenware articles had been reduced to a range of 5 cents per dozen pieces plus 10.5-percent ad valorem for high-valued earthenware sets to 10 cents per dozen pieces plus 21 percent ad valorem for certain moderately-valued earthenware articles.

After the Tokyo Round duty reductions, duties on fine-grained earthenware articles ranged from 4.5 percent for high-valued earthenware articles to 35 percent for commercial earthenware. Products subject to the higher duties typically have experienced rising import/consumption ratios or trade investigations initiated by U.S. industry.

Economic effects.—The traditional economic effects of eliminating the tariff on earthenware table and kitchen articles are presented in table 2-14. This tariff elimination would have reduced the dollar value of shipments in this sector by approximately $3 to $13 million in 1986 and $2 to $8 million in 1988. The reduction in shipments would have caused employment in the industry to fall by approximately 100 to 500 employees in 1986 and 100 to 300 employees in 1988. Losses to these displaced workers would have been less than $1 million. The traditional net welfare measure, which accounts for consumer gains, producer losses, and tariff revenue losses, would have been less than $1 million in 1986–1988. Other adjustments to the traditional economic effects are presented in table 2-15.

Case 8, SIC No. 3171, Women's handbags and purses

This category includes pocketbooks, purses, shoulder bags, clutch bags, and similar articles customarily carried by women or girls. Leather and plastics are the two most important materials used in domestic handbag manufacture, but textile materials have increased in importance in recent years.

History of tariff reductions.—Prior to the implementation of the TSUS in 1963, only leather handbags were specifically enumerated in the U.S. tariff provisions. Imported handbags of other materials entered under a large number of basket provisions depending largely on the material from which they were made. The Smoot-Hawley tariffs ranged from 35 percent to 90 percent. The rate was 35 percent for most leather handbags, 40 percent to 65 percent for most textile handbags, and 45 percent for most plastics handbags. Prior to the implementation of the TSUS, a clear tariff history is available only for handbags of leather. The rate of duty on handbags of reptile leather was reduced to 17.5 percent in 1941. The rate applicable to handbags of other leather was lowered to 20 percent in 1948. Both of these rates were in effect when the

Table 2-14

Traditional measures of the economic effects of unilaterally eliminating import tariffs: Case 7, Fine earthenware table and kitchen articles

Item	*1986*	*1987*	*1988*
Sector data:			
Shipments (millions of dollars)[1]	22.5	16.8	14.5
Employment (thousands)[1]	0.9	0.7	0.5
Imports, c.i.f. duty paid (millions of dollars)[2]	393.8	447.6	442.5
Economic effects:			
	Elasticity of supply = to 1		
Shipments (millions of dollars)	-3.4	-2.5	-2.1
Employment (thousands)	-0.1	-0.1	-0.1
Consumer gain (millions of dollars)	33.4	35.7	34.7
Producer loss (millions of dollars)	1.7	1.2	1.0
Tariff revenue loss (millions of dollars)	31.7	34.4	33.7
Traditional net welfare gain (millions of dollars)	0.1	0.1	0.1
	Elasticity of supply = to 10		
Shipments (millions of dollars)	-12.8	-9.2	-7.8
Employment (thousands)	-0.5	-0.4	-0.3
Consumer gain (millions of dollars)	33.0	35.5	34.7
Producer loss (millions of dollars)	0.9	0.6	0.5
Tariff revenue loss (millions of dollars)	31.7	34.4	33.7
Traditional net welfare gain(millions of dollars)	0.5	0.5	0.5

[1] The 1986 value is from U.S. Department of Commerce, Office of Business Analysis.
[2] U.S. Department of Commerce, Bureau of the Census.

Source: Estimated by the staff of the U.S. International Trade Commission except where indicated.

Table 2-15

Other adjustments to the economic effects of unilaterally eliminating import tariffs: Case 7, Fine earthenware table and kitchen articles

(In millions of dollars)

Item	*1986*	*1987*	*1988*
	Elasticity of supply = to 1		
Worker income loss[1]	0.2	0.2	0.1
Domestic tax loss[2]	4.8	5.2	5.1
Terms-of-trade loss[3]	0.5	0.5	0.4
Adjusted net welfare gain	-5.4	-5.8	-5.5
	Elasticity of supply = to 10		
Worker income loss[1]	0.9	0.6	0.5
Domestic tax loss[2]	4.8	5.2	5.1
Terms-of-trade loss[3]	4.1	4.5	3.8
Adjusted net welfare gain	-9.3	-9.8	-8.9

[1] The worker income loss calculation assumes a rigid wage in the sector under consideration. If the wage is flexible, the worker income loss would be included in the producer loss of the traditional analysis.
[2] The domestic tax loss calculation assumes that tariff revenue is replaced with a proportional increase in all existing domestic taxes. If the replacement tax were a uniform sales tax, this adjustment would be insignificant in size. If the federal income tax were used to replace the tariff revenue, the adjustment could be 3 times as great.
[3] The terms-of-trade adjustment is relevant only for a unilateral tariff elimination. The estimate presented here tends to overstate the true terms-of-trade loss, because it does not account for the fact that increased U.S. imports might cause foreign demand for U.S. exports to increase.

Source: Estimated by the staff of the U.S. International Trade Commission.

TSUS was implemented. The Kennedy Round further reduced these rates to 8.5 percent and 10 percent, respectively. In the Tokyo Round, the rate on handbags of reptile leather was reduced to 5.3 percent. The rate on handbags of other leather, valued at over $20 each, was reduced to 9 percent, and the rate on other leather handbags, valued under $20 each, was not changed.

The rates of duty for the remaining handbags of other materials ranged from 35 percent to 110 percent under Smoot-Hawley. These rates ranged from 13.5 percent to 42 percent just before TSUS was implemented. They were further reduced in the Kennedy Round to between 6.5 percent and 21 percent. However, the rate of duty applicable to most handbags of plastics remained unchanged at 20 percent. The rates of duty on handbags of beads and of paper yarns were also not reduced and remained at 20 percent and 17.5 percent, respectively. During the Tokyo Round, reductions from 28 percent to 60 percent were made on items of less importance in terms of trade. No reductions were made for most handbags of textiles and of plastics because they were considered to be import sensitive. Also, most of these items were excluded from the GSP and the CBERA, and in 1984 bilateral quotas under the Multifiber Arrangement were applied to important U.S. suppliers of certain textile handbags. In 1987, the average ad valorem equivalent for imports in SIC 3171 was 12.5 percent.

Economic effects.—The traditional economic effects of eliminating the tariff on women's handbags and purses are presented in table 2-16. This tariff elimination would have reduced the dollar value of shipments in this sector by approximately $70 to $125 million in 1986 and $83 to $148 million in 1988. The reduction in shipments would have caused employment in the industry to fall by approximately 1,500 to 2,600 employees in 1986 and 1,100 to 2,000 employees in 1988. Losses to these displaced workers would have been approximately $2 to $4 million in 1986 and $3 to $5 million in 1988. The traditional net welfare measure, which accounts for consumer gains, producer losses, and tariff revenue losses, would have been approximately $2 to $6 million in 1986 and $3 to $8 million in 1988. Other adjustments to the traditional economic effects are presented in table 2-17.

Table 2-16

Traditional measures of the economic effects of unilaterally eliminating import tariffs: Case 8, Women's handbags and purses

Item	*1986*	*1987*	*1988*
Sector data:			
Shipments (millions of dollars)[1]	438.4	474.0	507.0
Employment (thousands)[2]	9.2	7.6	6.8
Imports, c.i.f. duty paid (millions of dollars)[3]	729.7	944.1	977.9
Economic effects:			
	Elasticity of supply = to 1		
Shipments (millions of dollars)	-69.8	-75.5	-82.6
Employment (thousands)	-1.5	-1.2	-1.1
Consumer gain (millions of dollars)	110.8	136.2	145.5
Producer loss (millions of dollars)	33.5	36.2	39.6
Tariff revenue loss (millions of dollars)	75.5	97.7	103.4
Traditional net welfare gain (millions of dollars)	1.8	2.3	2.5
	Elasticity of supply = to 10		
Shipments (millions of dollars)	-125.1	-135.2	-147.8
Employment (thousands)	-2.6	-2.2	-2.0
Consumer gain (millions of dollars)	91.3	116.0	123.3
Producer loss (millions of dollars)	9.9	10.7	11.7
Tariff revenue loss (millions of dollars)	75.5	97.7	103.4
Traditional net welfare gain (millions of dollars)	5.9	7.6	8.2

[1] The 1986 value is from U.S. Department of Commerce, Office of Business Analysis. 1987 and 1988 values are from U.S. Department of Commerce, *1989 U.S. Industrial Outlook*, January 1989.
[2] The 1986 value is from U.S. Department of Commerce, Office of Business Analysis.
[3] U.S. Department of Commerce, Bureau of the Census.

Source: Estimated by the staff of the U.S. International Trade Commission except where indicated. 2-18

Table 2-17

Other adjustments to the economic effects of unilaterally eliminating import tariffs: Case 8, Women's handbags and purses

(In millions of dollars)

Item	1986	1987	1988
	Elasticity of supply = to 1		
Worker income loss[1]	2.4	2.5	2.6
Domestic tax loss[2]	11.3	14.6	15.5
Terms-of-trade loss[3]	8.9	11.5	10.1
Adjusted net welfare gain	-20.9	-26.3	-25.7
	Elasticity of supply = to 10		
Worker income loss[1]	4.3	4.4	4.6
Domestic tax loss[2]	11.3	14.6	15.5
Terms-of-trade loss[3]	37.6	48.2	43.7
Adjusted net welfare gain	-47.3	-59.6	-55.6

[1] The worker income loss calculation assumes a rigid wage in the sector under consideration. If the wage is flexible, the worker income loss would be included in the producer loss of the traditional analysis.
[2] The domestic tax loss calculation assumes that tariff revenue is replaced with a proportional increase in all existing domestic taxes. If the replacement tax were a uniform sales tax, this adjustment would be insignificant in size. If the federal income tax were used to replace the tariff revenue, the adjustment could be 3 times as great.
[3] The terms-of-trade adjustment is relevant only for a unilateral tariff elimination. The estimate presented here tends to overstate the true terms-of-trade loss, because it does not account for the fact that increased U.S. imports might cause foreign demand for U.S. exports to increase.

Source: Estimated by the staff of the U.S. International Trade Commission.

Eliminating the tariff on handbags and purses would have caused significant upstream effects for four input-output sectors: Broadwoven Fabric Mills and Fabric Finishing Plants (16.0100), Coated Fabrics Not Rubberized (17.0600), Plastics Materials and Resins (28.0100), and Leather Tanning and Finishing (33.0001). The estimated effects are presented in table 2-43.

Case 9, SIC No. 3961, Costume jewelry and costume novelties except precious metal

There are three major categories of jewelry: articles of personal adornment, small articles ordinarily carried on the person or in a handbag, and religious articles. Articles of personal adornment typically include rings, bracelets, earrings and clips, brooches, collar pins and clips, cuff links, tie pins and clips, dress-studs, fobs, military, fraternal and similar emblems, pendants, and necklaces. Small articles include money clips, key chains, coin purses, powder or pill boxes, lipstick holders, spectacle cases, and cigar and cigarette holders and cases, among others. Religious articles consist principally of rosaries, chaplets, crucifixes, and medals. All costume jewelry articles are made of nonprecious materials and may often be set with synthetic or imitation gemstones or imitation pearls.

History of tariff reductions.—The Smoot-Hawley duty rates were 45 percent to 55 percent for the vast majority of costume jewelry articles. Religious articles not made of or plated with precious metal were dutiable at 15 percent, but trade in such articles was limited.

Duties remained at or near the Smoot-Hawley rates until 1972, when the Kennedy Round lowered them to a range of 10 percent to 35 percent. The duty on most costume jewelry imported during the 1970's ranged from 27.5 percent to 35 percent.

After the Tokyo Round, the tariff rates on costume jewelry ranged approximately from 6 percent to 14 percent. The tariff on the majority of imports of costume jewelry during 1988 was 11 percent.

Economic effects.—The traditional economic effects of eliminating the tariff on costume jewelry and novelties are presented in table 2-18. This tariff elimination would have reduced the dollar value of shipments in this sector by approximately $61 to $72 million in 1986 and 1988. The reduction in shipments would have caused employment in the industry to fall by approximately 1,000 employees in 1986-1988. Losses to these displaced workers would have been approximately $2 million. The traditional net welfare measure, which accounts for consumer gains, producer losses, and tariff revenue losses, would have been approximately $1 to $2 million in 1986 and $5 to $8 million in 1988. Other adjustments to the traditional economic effects are presented in table 2-19.

Eliminating the tariff on costume jewelry would have caused significant upstream effects for three input-output sectors: Primary Nonferrous Metals, Not Elsewhere Classified (38.0500), Jeweler's Materials and Lapidary Work (64.0102), and Wholesale Trade (69.0100). The estimated effects are presented in table 2-43.

Table 2-18

Traditional measures of the economic effects of unilaterally eliminating import tariffs: Case 9, Costume jewelry and costume novelties except precious metal

Item	1986	1987	1988
Sector data:			
Shipments (millions of dollars)[1]	1292.3	1307.0	1252.0
Employment (thousands)[1]	18.5	18.7	17.6
Imports, c.i.f. duty paid (millions of dollars)[2]	216.4	522.6	793.5
Economic effects:			
	Elasticity of supply = to 1		
Shipments (millions of dollars)	-72.3	-69.0	-72.7
Employment (thousands)	-1.0	-1.0	-1.0
Consumer gain (millions of dollars)	52.6	72.6	100.5
Producer loss (millions of dollars)	35.6	34.1	35.8
Tariff revenue loss (millions of dollars)	15.6	35.7	59.5
Traditional net welfare gain (millions of dollars)	1.3	2.8	5.2
	Elasticity of supply = to 10		
Shipments (millions of dollars)	-61.0	-58.3	-61.3
Employment (thousands)	-0.9	-0.8	-0.9
Consumer gain (millions of dollars)	23.1	45.2	72.9
Producer loss (millions of dollars)	5.4	5.2	5.5
Tariff revenue loss (millions of dollars)	15.6	35.7	59.5
Traditional net welfare gain (millions of dollars)	2.0	4.3	7.9

[1] The 1986 value is from U.S. Department of Commerce, Office of Business Analysis. 1987 and 1988 values are from U.S. Department of Commerce, *1989 U.S. Industrial Outlook*, January 1989.
[2] U.S. Department of Commerce, Bureau of the Census.

Source: Estimated by the staff of the U.S. International Trade Commission except where indicated.

Table 2-19

Other adjustments to the economic effects of unilaterally eliminating import tariffs: Case 9, Costume jewelry and costume novelties except precious metal

(In millions of dollars)

Item	1986	1987	1988
	Elasticity of supply = to 1		
Worker income loss[1]	2.5	2.4	2.4
Domestic tax loss[2]	2.3	5.4	8.9
Terms-of-trade loss[3]	9.6	21.9	30.2
Adjusted net welfare gain	-13.2	-26.8	-36.4
	Elasticity of supply = to 10		
Worker income loss[1]	2.1	2.0	2.1
Domestic tax loss[2]	2.3	5.4	8.9
Terms-of-trade loss[3]	16.8	38.4	53.8
Adjusted net welfare gain	-19.3	-41.4	-56.9

[1] The worker income loss calculation assumes a rigid wage in the sector under consideration. If the wage is flexible, the worker income loss would be included in the producer loss of the traditional analysis.
[2] The domestic tax loss calculation assumes that tariff revenue is replaced with a proportional increase in all existing domestic taxes. If the replacement tax were a uniform sales tax, this adjustment would be insignificant in size. If the federal income tax were used to replace the tariff revenue, the adjustment could be 3 times as great.
[3] The terms-of-trade adjustment is relevant only for a unilateral tariff elimination. The estimate presented here tends to overstate the true terms-of-trade loss, because it does not account for the fact that increased U.S. imports might cause foreign demand for U.S. exports to increase.

Source: Estimated by the staff of the U.S. International Trade Commission.

Case 10, SIC No. 3229, Pressed and blown glass and glassware, not elsewhere classified

The category includes household glassware (tableware, stemware, cookware, and tumblers) and art and ornamental glassware (e.g. giftware, Christmas ornaments, smokers' articles, and novelty glassware), illuminating glassware (e.g. globes, chimneys, lenses, and lamp parts), scientific and laboratory glassware (e.g. tubing, microscope slides, and beakers), and other glass-

ware (optical glass, glass fibers, industrial glassware, technical glassware, and other miscellaneous glass articles).

History of tariff reductions.—The glassware included in this SIC category was subject to a wide range of tariffs reflecting the variety of products. Most of the Smoot-Hawley rates were in the range of 50 percent to 85 percent for groups of items such as illuminating glassware, household glassware, and laboratory glassware. Other glassware groups, such as bulbs, lenses, and tubing, were subject to lower duty rates, in the range of 20 percent to 40 percent.

Prior to the Kennedy Round, duties on most of the glassware in this category had been reduced to a range of 20 percent to 50 percent. Certain lower-value-added articles, such as rods and tubes, were subject to somewhat lower rates of duty. As a result of the Kennedy Round, duty rates on most articles fell to between 12 percent to 30 percent.

As a result of the Tokyo Round of duty modifications, tariffs were reduced to a range of 2.4 percent to 15 percent for illuminating glassware, Christmas ornaments, and other miscellaneous glassware, whereas the rates of duty for household glassware remained at a higher level, in the range of 6 percent to 38 percent. Products subject to the higher range of duties typically are those that have experienced rising import/consumption ratios.

Economic effects.—The traditional economic effects of eliminating the tariff on pressed and blown glass and glassware are presented in table 2–20. This tariff elimination would have reduced the dollar value of shipments in this sector by approximately $250 to $270 million in 1986 and 1988. The reduction in shipments would have caused employment in the industry to fall by approximately 2,700 to 2,900 employees in 1986 and 2,400 to 2,600 employees in 1988. Losses to these displaced workers would have been approximately $10 million. The traditional net welfare measure, which accounts for consumer gains, producer losses, and tariff revenue losses, would have been approximately $6 to $11 million in 1986 and $7 to $12 million in 1988. Other adjustments to the traditional economic effects are presented in table 2–21.

Eliminating the tariff on pressed and blown glass and glassware would have caused significant downstream effects on the input-output sector Electron Tubes (57.0100). The estimated effects are presented in table 2–44.

Case 11, SIC No. 2865, Cyclic organic crudes and intermediates, and organic dyes and pigments

This category includes certain benzenoid intermediate chemicals and mixtures used to produce various types of plastics, synthetic fibers, dyes, organic pigments, pharmaceuticals, and pesticides.

Table 2-20

Traditional measures of the economic effects of unilaterally eliminating import tariffs: Case 10, Pressed and blown glass and glassware, not elsewhere classified

Item	*1986*	*1987*	*1988*
Sector data:			
Shipments (millions of dollars)[1]	3241.9	3155.4	3274.3
Employment (thousands)[1]	35.0	32.4	31.2
Imports, c.i.f. duty paid (millions of dollars)[2]	925.2	1005.1	1076.6
Economic effects:			
	Elasticity of supply = to 1		
Shipments (millions of dollars)	-272.1	-261.2	-270.6
Employment (thousands)	-2.9	-2.7	-2.6
Consumer gain (millions of dollars)	226.0	227.1	238.6
Producer loss (millions of dollars)	133.2	127.9	132.5
Tariff revenue loss (millions of dollars)	86.4	92.6	99.0
Traditional net welfare gain (millions of dollars)	6.4	6.7	7.2
	Elasticity of supply = to 10		
Shipments (millions of dollars)	-251.3	-241.2	-249.9
Employment (thousands)	-2.7	-2.5	-2.4
Consumer gain (millions of dollars)	119.1	125.0	132.9
Producer loss (millions of dollars)	22.0	21.2	21.9
Tariff revenue loss (millions of dollars)	86.4	92.6	99.0
Traditional net welfare gain (millions of dollars)	10.7	11.3	12.0

[1] The 1986 value is from U.S. Department of Commerce, Office of Business Analysis.
[2] U.S. Department of Commerce, Bureau of the Census.

Source: Estimated by the staff of the U.S. International Trade Commission except where indicated.

Table 2-21

Other adjustments to the economic effects of unilaterally eliminating import tariffs: Case 10, Pressed and blown glass and glassware, not elsewhere classified

(In millions of dollars)

Item	1986	1987	1988
	Elasticity of supply = to 1		
Worker income loss[1]	10.6	10.3	10.6
Domestic tax loss[2]	13.0	13.9	14.8
Terms-of-trade loss[3]	35.2	37.7	33.6
Adjusted net welfare gain	-52.5	-55.2	-51.9
	Elasticity of supply = to 10		
Worker income loss[1]	9.8	9.5	9.8
Domestic tax loss[2]	13.0	13.9	14.8
Terms-of-trade loss[3]	69.2	73.7	67.0
Adjusted net welfare gain	-81.3	-85.9	-79.7

[1] The worker income loss calculation assumes a rigid wage in the sector under consideration. If the wage is flexible, the worker income loss would be included in the producer loss of the traditional analysis.
[2] The domestic tax loss calculation assumes that tariff revenue is replaced with a proportional increase in all existing domestic taxes. If the replacement tax were a uniform sales tax, this adjustment would be insignificant in size. If the federal income tax were used to replace the tariff revenue, the adjustment could be 3 times as great.
[3] The terms-of-trade adjustment is relevant only for a unilateral tariff elimination. The estimate presented here tends to overstate the true terms-of-trade loss, because it does not account for the fact that increased U.S. imports might cause foreign demand for U.S. exports to increase.

Source: Estimated by the staff of the U.S. International Trade Commission.

History of tariff reductions.—Just after World War I, the domestic output in SIC 2865 consisted primarily of dyes and organic pigments for the textiles and printing industries. The United States was not a major producer of commodity petrochemicals during this period, and the supply disruption resulting from the war illustrated the need to develop the domestic industry. In order to protect this developing industry, imports of these chemicals, considered then to be strategic materials, were subject to very high duty rates. During the interval between World War I and World War II there was little change in the commercial technology within the domestic industry, or in the types of products available. However, during World War II, many new products were developed to serve the war effort, such as plastics, certain pesticides, and pharmaceuticals. After the war, these new products were commercialized on an international scale, and the earlier protective tariffs soon became a major problem in world trade. Consequently, reductions in these tariffs were made during the Kennedy and Tokyo rounds. Also, the ASP method was eliminated in favor of a simpler mixture of compound and ad valorem tariffs. Duties on products such as aniline, anthracene, benzaldehyde, chlorobenzene, nitrobenzene, and phthalic anhydride were reduced, while duties on certain other chemicals, such as cresylic acid, were completely removed.

Economic effects.—The traditional economic effects of eliminating the tariff on these organic chemicals are presented in table 2-22. This tariff elimination would have reduced the dollar value of shipments in this sector by approximately $600 to $930 million in 1986 and $930 to $1,440 million in 1988. The reduction in shipments would have caused employment in the industry to fall by approximately 1,900 to 2,900 employees in 1986 and 2,000 to 3,100 employees in 1988. Losses to these displaced workers would have been approximately $10 to $15 million in 1986 and $14 to $22 million in 1988. The traditional net welfare measure, which accounts for consumer gains, producer losses, and tariff revenue losses, would have been less than $1 to $17 million in 1986 and less than $1 to $31 million in 1988. Other adjustments to the traditional economic effects are presented in table 2-23.

Eliminating the tariff on this sector would have caused significant downstream effects for eight input-output sectors: Greenhouse and Nursery Products (2.0702), Adhesives and Sealants (27.0402), Printing Ink (27.0404), Plastics Materials and Resins (28.0100), Synthetic Rubber (28.0200), Organic Fibers, Noncellulosic (28.0400), Soaps and Other Detergents (29.0201), and Surface Active Ingredients (29.0203). The estimated effects are presented in table 2-44.

Case 12, SIC Nos. 3675 and 36291, Electronic and electrical capacitors

Capacitors are used in virtually all electronic products to block the flow of direct current, permit the flow of alternating current, and store electrical energy. Capacitors may be produced as discrete components and installed on printed circuit boards or other electronic devices, or they may be directly incorporated into an electronic circuit design. They are usually distinguished by their dielectric material and voltage rating.22

Table 2-22

Traditional measures of the economic effects of unilaterally eliminating import tariffs: Case 11, Cyclic organic crudes and intermediates, and organic dyes and pigments

Item	*1986*	*1987*	*1988*
Sector data:			
Shipments (millions of dollars)[1]	7013.4	7570.0	8730.0
Employment (thousands)[2]	22.0	19.7	18.7
Imports, c.i.f. duty paid (millions of dollars)[3]	2802.1	2914.5	3425.9
Economic effects:			
	Elasticity of supply = to 1		
Shipments (millions of dollars)	-933.3	-1182.8	-1443.0
Employment (thousands)	-2.9	-3.1	-3.1
Consumer gain (millions of dollars)	637.8	796.3	975.2
Producer loss (millions of dollars)	451.1	568.3	691.7
Tariff revenue loss (millions of dollars)	186.7	228.0	283.5
Traditional net welfare gain (millions of dollars)	[4]0	[4]0	[4]0
	Elasticity of supply = to 10		
Shipments (millions of dollars)	-603.9	-765.4	-933.7
Employment (thousands)	-1.9	-2.0	-2.0
Consumer gain (millions of dollars)	255.9	317.9	395.3
Producer loss (millions of dollars)	52.8	66.4	80.8
Tariff revenue loss (millions of dollars)	186.7	228.0	283.5
Traditional net welfare gain (millions of dollars)	16.5	23.6	31.0

[1] The 1986 value is from U.S. Department of Commerce, Office of Business Analysis. 1987 and 1988 values are from U.S. Department of Commerce, *1989 U.S. Industrial Outlook*, January 1989.
[2] The 1986 value is from U.S. Department of Commerce, Office of Business Analysis.
[3] U.S. Department of Commerce, Bureau of the Census.
[4] Less than $1 million dollars.

Source: Estimated by the staff of the U.S. International Trade Commission except where indicated.

Table 2-23

Other adjustments to the economic effects of unilaterally eliminating import tariffs: Case 11, Cyclic organic crudes and intermediates, and organic dyes and pigments

(In millions of dollars)

Item	*1986*	*1987*	*1988*
	Elasticity of supply = to 1		
Worker income loss[1]	14.7	18.2	21.9
Domestic tax loss[2]	28.0	34.2	42.5
Terms-of-trade loss[3]	0.2	0.2	0.2
Adjusted net welfare gain	-42.8	-52.6	-64.6
	Elasticity of supply = to 10		
Worker income loss[1]	9.5	11.8	14.2
Domestic tax loss[2]	28.0	34.2	42.5
Terms-of-trade loss[3]	186.8	222.8	239.7
Adjusted net welfare gain	-207.8	-245.2	-265.3

[1] The worker income loss calculation assumes a rigid wage in the sector under consideration. If the wage is flexible, the worker income loss would be included in the producer loss of the traditional analysis.
[2] The domestic tax loss calculation assumes that tariff revenue is replaced with a proportional increase in all existing domestic taxes. If the replacement tax were a uniform sales tax, this adjustment would be insignificant in size. If the federal income tax were used to replace the tariff revenue, the adjustment could be 3 times as great.
[3] The terms-of-trade adjustment is relevant only for a unilateral tariff elimination. The estimate presented here tends to overstate the true terms-of-trade loss, because it does not account for the fact that increased U.S. imports might cause foreign demand for U.S. exports to increase.

Source: Estimated by the staff of the U.S. International Trade Commission.

History of tariff reductions.—The tariff on U.S. imports of capacitors was 12.5 ad valorem percent prior to 1967. This rate was reduced to 10 percent in 1971 under the Kennedy Round. The duty on capacitors was not subject to negotiation under the Tokyo Round, so the tariff remains at 10 percent.

Economic effects.—The traditional economic effects of eliminating the tariff on capacitors are presented in table 2-24. This tariff elimination would have reduced the dollar value of shipments in this sector by approximately $91 to $100 million in 1986-1988. The reduction in shipments would have caused employment in the industry to fall by approximately 1,500 employees in 1986 and 1988. Losses to these displaced workers would have been approximately $4 million. The traditional net welfare measure, which accounts for consumer gains, producer losses, and tariff revenue losses, would have been approximately $2 to $3 million in 1986 and $3 to $4 million in 1988. Other adjustments to the traditional economic effects are presented in table 2-25.

Eliminating the tariff on capacitors would have caused significant upstream effects for two input-output sectors: Miscellaneous Plastics Products (32.0400) and Wholesale Trade (69.0100). The estimated upstream effects are presented in table 2-43. There also would have been significant downstream effects for two input-output sectors: Radio and TV Receiving Sets (56.0100) and Radio and TV Communication Equipment (56.0400). The estimated downstream effects are presented in table 2-44.

Case 13, HTS No. 29051120, Methyl alcohol

Methyl alcohol is also known as methanol or wood alcohol. The primary end uses for methyl alcohol are as a fuel and as an intermediate in the manufacture of formaldehyde and dimethyl terephthalate. It is also used in the production of many other downstream chemicals. Other end-use applications include the use of methyl alcohol as a solvent, as a denaturant for ethyl alcohol, and in the extraction of proteins in continuous biological fermentation processes.

History of tariff reductions.—The Smoot-Hawley tariff on methyl alcohol was relatively high, 18 cents per gallon. This rate was reduced during the Fifth Round of trade negotiations (1956-58), to 15.3 cents per gallon. As a result of the Kennedy Round, the rate was reduced to 7.6 cents per gallon. Section 1 of Public Law 93-482 (1974) eliminated the tariff on methyl alcohol imported only for use in producing synthetic natural gas or for direct use as a fuel (TSUS 427.96) in order to facilitate safer transportation of natural gas in the form of methyl alcohol. It also set the rate on other methyl alcohol (TSUS 427.97) at 19.5 percent. The Tokyo Round reduced the rate on TSUS 427.97 to 18 percent. No further reductions have been made.

Table 2-24

Traditional measures of the economic effects of unilaterally eliminating import tariffs: Case 12, Electronic and electrical capacitors

Item	*1986*	*1987*	*1988*
Sector data:			
Shipments (millions of dollars)[1]	1480.4	1469.7	1560.9
Employment (thousands)[1]	25.0	23.2	22.7
Imports, c.i.f. duty paid (millions of dollars)[2]	434.7	508.5	596.1
Economic effects:			
	Elasticity of supply = to 1		
Shipments (millions of dollars)	-90.8	-91.3	-100.1
Employment (thousands)	-1.5	-1.4	-1.5
Consumer gain (millions of dollars)	75.9	81.9	94.1
Producer loss (millions of dollars)	44.7	44.9	49.3
Tariff revenue loss (millions of dollars)	29.5	34.9	42.3
Traditional net welfare gain (millions of dollars)	1.7	2.0	2.5
	Elasticity of supply = to 10		
Shipments (millions of dollars)	-90.8	-91.3	-100.1
Employment (thousands)	-1.5	-1.4	-1.5
Consumer gain (millions of dollars)	40.3	46.4	55.4
Producer loss (millions of dollars)	8.0	8.1	8.8
Tariff revenue loss (millions of dollars)	29.5	34.9	42.3
Traditional net welfare gain (millions of dollars)	2.8	3.4	4.2

[1] The 1986 value is from U.S. Department of Commerce, Office of Business Analysis.
[2] U.S. Department of Commerce, Bureau of the Census.

Source: Estimated by the staff of the U.S. International Trade Commission except where indicated.

Table 2-25

Other adjustments to the economic effects of unilaterally eliminating import tariffs: Case 12, Electronic and electrical capacitors

(In millions of dollars)

Item	1986	1987	1988
	Elasticity of supply = to 1		
Worker income loss[1]	3.5	3.5	3.8
Domestic tax loss[2]	4.4	5.2	6.3
Terms-of-trade loss[3]	13.3	15.7	15.7
Adjusted net welfare gain	-19.5	-22.4	-23.3
	Elasticity of supply = to 10		
Worker income loss[1]	3.5	3.5	3.8
Domestic tax loss[2]	4.4	5.2	6.3
Terms-of-trade loss[3]	25.9	30.5	31.3
Adjusted net welfare gain	-31.0	-35.9	-37.2

[1] The worker income loss calculation assumes a rigid wage in the sector under consideration. If the wage is flexible, the worker income loss would be included in the producer loss of the traditional analysis.
[2] The domestic tax loss calculation assumes that tariff revenue is replaced with a proportional increase in all existing domestic taxes. If the replacement tax were a uniform sales tax, this adjustment would be insignificant in size. If the federal income tax were used to replace the tariff revenue, the adjustment could be 3 times as great.
[3] The terms-of-trade adjustment is relevant only for a unilateral tariff elimination. The estimate presented here tends to overstate the true terms-of-trade loss, because it does not account for the fact that increased U.S. imports might cause foreign demand for U.S. exports to increase.

Source: Estimated by the staff of the U.S. International Trade Commission.

Economic effects.—The traditional economic effects of eliminating the tariff on methyl alcohol are presented in table 2-26. This tariff elimination would have reduced the dollar value of shipments in this sector by approximately $9 to $10 million in 1986 and $14 to $15 million in 1988. The reduction in shipments would have caused employment in the industry to fall by approximately 300 to 400 employees in 1986 and 500 employees in 1988. Losses to these displaced workers would have been less than $1 million. The traditional net welfare measure, which accounts for consumer gains, producer losses, and tariff revenue losses, would have been approximately less than $1 million in 1986 and $4 to $5 million in 1988. Other adjustments to the traditional economic effects are presented in table 2-27.

Eliminating the tariff on methyl alcohol would have caused significant downstream effects for three input-output sectors: Adhesives and Sealants (27.0402), Chemical Preparations, Not Elsewhere Classified (27.0406), and Plastic Materials and Resins (28.0100). The estimated effects are presented in table 2-44.

Case 14, HTS No. 39011000, Polyethylene resins having a specific gravity of less than 0.94

Polyethylene resins having a specific gravity of less than 0.94 consists of low density polyethylene resin and linear low density polyethylene resin. These resins are thermoplastic materials that are produced from ethylene, which is normally obtained from either natural gas liquids or crude petroleum liquids. Film accounts for about 67 percent of the domestic consumption of low density and linear low density polyethylene resins. The main domestic use for this film is packaging applications, followed by trash bags.

History of tariff reductions.—The Smoot-Hawley tariff on polyethylene resins was 4 cents per pound plus 30-percent ad valorem. This rate stayed in effect until the Fifth Round of GATT negotiations, when the rate was reduced to 3.8 cents per pound plus 28.5-percent ad valorem in 1956, and then to 3.4 cents per pounds plus 25.5-percent ad valorem in 1958. The tariff on polyethylene resins was further reduced in the Dillon Round to 2.75 cents per pound plus 20-percent ad valorem in 1963. The Kennedy Round reduced the tariff to 1.3 cents per pound plus 10 percent ad valorem by 1972. The Tokyo Round reduced the tariff further to the current rate of 12.5 percent ad valorem.

Economic effects.—The traditional economic effects of eliminating the tariff on polyethylene resins are presented in table 2-28. This tariff elimination would have reduced the dollar value of shipments in this sector by approximately $91 to $95 million in 1986 and $149 to $155 million in 1988. The reduction in shipments would have caused employment in the industry to fall by approximately 800 during 1986-1988. Losses to these displaced workers would have been approximately $1 to $2 million. The traditional net welfare measure, which accounts for consumer gains, producer losses, and tariff revenue losses, would have been approximately $4 to $5 million in 1986 and $9 to $10 million in 1988. Other adjustments to the traditional economic effects are presented in table 2-29.

Table 2-26

Traditional measures of the economic effects of unilaterally eliminating import tariffs, Case 13, Methyl alcohol

Item	*1986*	*1987*	*1988*
Sector data:			
Shipments (millions of dollars)	150.1	162.0	162.0
Employment (thousands)	5.4	5.6	5.6
Imports, c.i.f. duty paid (millions of dollars)	116.8	105.7	349.0
Economic effects:			
	Elasticity of supply = to 1		
Shipments (millions of dollars)	-9.8	-11.8	-15.1
Employment (thousands)	-0.4	-0.4	-0.5
Consumer gain (millions of dollars)	14.1	15.2	48.0
Producer loss (millions of dollars)	4.8	5.8	7.4
Tariff revenue loss (millions of dollars)	8.6	8.6	36.6
Traditional net welfare gain (millions of dollars)	0.7	0.7	4.0
	Elasticity of supply = to 10		
Shipments (millions of dollars)	-9.0	-10.8	-13.9
Employment (thousands)	-0.3	-0.4	-0.5
Consumer gain (millions of dollars)	10.2	10.5	42.6
Producer loss (millions of dollars)	0.8	1.0	1.2
Tariff revenue loss (millions of dollars)	8.6	8.6	36.6
Traditional net welfare gain (millions of dollars)	0.8	0.9	4.7

Source: Estimated by the staff of the U.S. International Trade Commission.

Table 2-27

Other adjustments to the economic effects of unilaterally eliminating import tariffs, Case 13, Methyl alcohol

(In millions of dollars)

Item	*1986*	*1987*	*1988*
	Elasticity of supply = to 1		
Worker income loss[1]	0.2	0.2	0.3
Domestic tax loss[2]	1.3	1.3	5.5
Terms-of-trade loss[3]	4.7	4.7	16.1
Adjusted net welfare gain	-5.5	-5.5	-17.9
	Elasticity of supply = to 10		
Worker income loss[1]	0.1	0.2	0.2
Domestic tax loss[2]	1.3	1.3	5.5
Terms-of-trade loss[3]	5.9	5.9	20.5
Adjusted net welfare gain	-6.6	-6.5	-21.5

[1] The worker income loss calculation assumes a rigid wage in the sector under consideration. If the wage is flexible, the worker income loss would be included in the producer loss of the traditional analysis.
[2] The domestic tax loss calculation assumes that tariff revenue is replaced with a proportional increase in all existing domestic taxes. If the replacement tax were a uniform sales tax, this adjustment would be insignificant in size. If the federal income tax were used to replace the tariff revenue, the adjustment could be 3 times as great.
[3] The terms-of-trade adjustment is relevant only for a unilateral tariff elimination. The estimate presented here tends to overstate the true terms-of-trade loss, because it does not account for the fact that increased U.S. imports might cause foreign demand for U.S. exports to increase.

Source: Estimated by the staff of the U.S. International Trade Commission.

Table 2-28

Traditional measures of the economic effects of unilaterally eliminating import tariffs: Case 14, Polyethylene resins

Item	1986	1987	1988
Sector data:			
Shipments (millions of dollars)	2840.2	3313.8	4678.8
Employment (thousands)	24.0	24.0	24.0
Imports, c.i.f. duty paid (millions of dollars)	167.7	205.6	368.2
Economic effects:			
	Elasticity of supply = to 1		
Shipments (millions of dollars)	-94.8	-112.2	-155.2
Employment (thousands)	-0.8	-0.8	-0.8
Consumer gain (millions of dollars)	68.7	82.7	124.2
Producer loss (millions of dollars)	47.0	55.6	76.9
Tariff revenue loss (millions of dollars)	17.7	22.0	38.6
Traditional net welfare gain (millions of dollars)	4.0	5.0	8.7
	Elasticity of supply = to 10		
Shipments (millions of dollars)	-90.9	-107.5	-148.8
Employment (thousands)	-0.8	-0.8	-0.8
Consumer gain (millions of dollars)	30.5	37.5	61.9
Producer loss (millions of dollars)	8.1	9.6	13.3
Tariff revenue loss (millions of dollars)	17.7	22.0	38.6
Traditional net welfare gain (millions of dollars)	4.6	5.8	10.0

Source: Estimated by the staff of the U.S. International Trade Commission.

Table 2-29

Other adjustments to the economic effects of unilaterally eliminating import tariffs: Case 14, Polyethylene resins

(In millions of dollars)

Item	1986	1987	1988
	Elasticity of supply = to 1		
Worker income loss[1]	1.3	1.5	2.1
Domestic tax loss[2]	2.7	3.3	5.8
Terms-of-trade loss[3]	19.4	24.0	35.1
Adjusted net welfare gain	-19.3	-23.8	-34.3
	Elasticity of supply = to 10		
Worker income loss[1]	1.2	1.5	2.0
Domestic tax loss[2]	2.7	3.3	5.8
Terms-of-trade loss[3]	23.6	29.2	43.1
Adjusted net welfare gain	-22.9	-28.2	-40.9

[1] The worker income loss calculation assumes a rigid wage in the sector under consideration. If the wage is flexible, the worker income loss would be included in the producer loss of the traditional analysis.
[2] The domestic tax loss calculation assumes that tariff revenue is replaced with a proportional increase in all existing domestic taxes. If the replacement tax were a uniform sales tax, this adjustment would be insignificant in size. If the federal income tax were used to replace the tariff revenue, the adjustment could be 3 times as great.
[3] The terms-of-trade adjustment is relevant only for a unilateral tariff elimination. The estimate presented here tends to overstate the true terms-of-trade loss, because it does not account for the fact that increased U.S. imports might cause foreign demand for U.S. exports to increase.

Source: Estimated by the staff of the U.S. International Trade Commission.

Eliminating the tariff on polyethylene resins would have caused significant downstream effects for input-output sector Bags, Except Textile (24.0702). The estimated effects are presented in table 2-44.

Case 15, HTS No. 95021020, Non-stuffed dolls

This category includes only those dolls having a human likeness and generally made of plastic or vinyl. Domestic production is concentrated primarily in larger baby dolls and collectible dolls. Most of the fashion/action-adventure dolls, and all of the electronic dolls, are supplied by imports.

History of tariff reductions.—Under Smoot-Hawley, dolls containing laces or embroidery were dutiable at 90 percent. Dolls made of cellulose with movable parts were dutiable at 1 cent plus 60-percent ad valorem, whereas cellulose dolls without moving parts were dutiable at 1 cent plus 50-percent ad valorem. All other dolls were dutiable at 70-percent ad valorem. In 1943, the duty rate for dolls containing embroidery or lace was reduced to 45 percent, and the rate on other dolls, except those containing cellulose, was reduced to 35 percent. The tariff on all cellulose dolls was reduced to one-half cent plus 30-percent ad valorem in 1952. The tariff on dolls containing lace or embroidery was reduced to 38 percent from 1956 to 1958. With the changeover to TSUS in 1963, the classifications for dolls containing cellulose and those with lace or embroidery were dropped, and the tariff for all dolls was set at 35 percent. As a result of the Kennedy Round, the tariff on dolls was reduced, to 17.5 percent by 1972. As a result of the Tokyo Round, the tariff on dolls was reduced to 12 percent by 1987, where it remains today.

Economic effects.—The traditional economic effects of eliminating the tariff on nonstuffed dolls are presented in table 2-30. This tariff elimination would have reduced the dollar value of shipments in this sector by approximately $17 to $44 million in 1986 and $18 to $48 million in 1988. The reduction in shipments would have caused employment in the industry to fall by approximately 900 to 2,300 employees in 1986 and 600 to 1,600 employees in 1988. Losses to these displaced workers would have been less than $1 million. The traditional net welfare measure, which accounts for consumer gains, producer losses, and tariff revenue losses, would have been approximately $1 to $2 million in 1986 and 1988. Other adjustments to the traditional economic effects are presented in table 2-31.

Eliminating the tariff on nonstuffed dolls would have caused significant upstream effects for input-output sector Wholesale Trade (69.0100). The estimated effects are presented in table 2-43.

Table 2-30

Traditional measures of the economic effects of unilaterally eliminating import tariffs: Case 15, Non-stuffed dolls

Item	*1986*	*1987*	*1988*
Sector data:			
Shipments (millions of dollars)	98.0	92.6	102.2
Employment (thousands)	5.0	4.0	3.5
Imports, c.i.f. duty paid (millions of dollars)	313.5	323.4	313.4
Economic effects:			
	Elasticity of supply = to 1		
Shipments (millions of dollars)	-16.8	-16.5	-18.1
Employment (thousands)	-0.9	-0.7	-0.6
Consumer gain (millions of dollars)	39.1	41.1	40.6
Producer loss (millions of dollars)	8.1	7.9	8.6
Tariff revenue loss (millions of dollars)	30.7	32.8	31.5
Traditional net welfare gain (millions of dollars)	0.4	0.5	0.4
	Elasticity of supply = to 10		
Shipments (millions of dollars)	-44.2	-43.3	-47.5
Employment (thousands)	-2.3	-1.9	-1.6
Consumer gain (millions of dollars)	35.8	38.1	37.0
Producer loss (millions of dollars)	3.2	3.1	3.4
Tariff revenue loss (millions of dollars)	30.7	32.8	31.5
Traditional net welfare gain (millions of dollars)	2.0	2.2	2.1

Source: Estimated by the staff of the U.S. International Trade Commission.

Table 2-31

Other adjustments to the economic effects of unilaterally eliminating import tariffs: Case 15, Non-stuffed dolls

(In millions of dollars)

Item	1986	1987	1988
	Elasticity of supply = to 1		
Worker income loss[1]	0.3	0.2	0.2
Domestic tax loss[2]	4.6	4.9	4.7
Terms-of-trade loss[3]	2.2	2.3	1.8
Adjusted net welfare gain	-6.6	-7.0	-6.4
	Elasticity of supply = to 10		
Worker income loss[1]	0.7	0.6	0.6
Domestic tax loss[2]	4.6	4.9	4.7
Terms-of-trade loss[3]	13.8	14.6	12.1
Adjusted net welfare gain	-17.1	-17.9	-15.3

[1] The worker income loss calculation assumes a rigid wage in the sector under consideration. If the wage is flexible, the worker income loss would be included in the producer loss of the traditional analysis.
[2] The domestic tax loss calculation assumes that tariff revenue is replaced with a proportional increase in all existing domestic taxes. If the replacement tax were a uniform sales tax, this adjustment would be insignificant in size. If the federal income tax were used to replace the tariff revenue, the adjustment could be 3 times as great.
[3] The terms-of-trade adjustment is relevant only for a unilateral tariff elimination. The estimate presented here tends to overstate the true terms-of-trade loss, because it does not account for the fact that increased U.S. imports might cause foreign demand for U.S. exports to increase.

Source: Estimated by the staff of the U.S. International Trade Commission.

Case 16, HTS No. 871200, Certain bicycles

Small and medium bicycles have both wheels not exceeding 65 centimeters (approximately 25.6 inches) in diameter. These bicycles range from small sidewalk bicycles to lightweights with smaller wheel diameters. Large bicycles have both wheels exceeding 65 centimeters (approximately 25.6 inches) in diameter and weigh more that 36 pounds. These bicycles have the sturdy wide tires and upright handlebars of the old-fashioned, single-speed bicycle, but they usually have several speeds. The conventional-sized lightweights with 26-inch and 27-inch wheel diameters are not included in this sector.

The market for this type of bicycle has been the fastest growing in recent years. These bicycles are especially popular among middle-aged riders who prefer the more comfortable ride afforded by upright handlbars, wide tires, and padded seats.

History of tariff reductions.—The Smoot-Hawley tariff for bicycles was 30 percent. However, if any country imposed a tariff in excess of 30 percent on U.S. bicycles, the U.S. rate facing that country was increased to match the foreign rate up to a rate of 50 percent.

A trade agreement with the United Kingdom reduced the duty to not less than 15 percent and not more than 30 percent. Because of an escape-clause finding of injury to the domestic bicycle industry, these rates were increased to not less than 22.5 percent and not more than 30 percent in 1955. At the end of the Kennedy Round, the tariffs ranged from 11 percent to 15 percent.

During the Tokyo Round, the tariffs were reduced on only two of the six TSUS items covering small and medium bicycles, and these items were obsolete value brackets. Also, the tariff on one TSUS item covering large bicycles was reduced, but imports in this category were quite small. Under the HTS system, the rate on both of these types of bicycles was set at 11 percent. Owing to import sensitivity, bicycles were excluded from the GSP.

Economic effects.—The traditional economic effects of eliminating the tariff on bicycles are presented in table 2-32. This tariff elimination would have reduced the dollar value of shipments in this sector by approximately $30 to $61 million in 1986 and $31 to $64 million in 1988. The reduction in shipments would have caused employment in the industry to fall by approximately 400 to 800 employees in 1986-1988. Losses to these displaced workers would have been approximately $1 to $2 million. The traditional net welfare measure, which accounts for consumer gains, producer losses, and tariff revenue losses, would have been approximately $1 to $3 million in 1986 and 1988. Other adjustments to the traditional economic effects are presented in table 2-33.

Eliminating the tariff on these bicycles would have caused significant upstream effects for two input-output sectors: Blast Furnaces and Steel Mills (37.0101) and Wholesale Trade (69.0100). The estimated effects are presented in table 2-43.

Table 2-32

Traditional measures of the economic effects of unilaterally eliminating import tariffs: Case 16, Certain bicycles

Item	1986	1987	1988
Sector data:			
Shipments (millions of dollars)	200.0	215.0	205.0
Employment (thousands)	2.5	2.7	2.5
Imports, c.i.f. duty paid (millions of dollars)	266.8	343.4	282.7
Impact:			
	Elasticity of supply = to 1		
Shipments (millions of dollars)	-29.8	-32.1	-31.1
Employment (thousands)	-0.4	-0.4	-0.4
Consumer gain (millions of dollars)	39.5	47.9	42.1
Producer loss (millions of dollars)	14.3	15.4	15.0
Tariff revenue loss (millions of dollars)	24.5	31.5	26.4
Traditional net welfare gain (millions of dollars)	0.7	0.9	0.8
	Elasticity of supply = to 10		
Shipments (millions of dollars)	-60.9	-65.6	-63.5
Employment (thousands)	-0.8	-0.8	-0.8
Consumer gain (millions of dollars)	31.8	40.0	34.1
Producer loss (millions of dollars)	4.8	5.1	5.0
Tariff revenue loss (millions of dollars)	24.5	31.5	26.4
Traditional net welfare gain (millions of dollars)	2.5	3.3	2.8

Source: Estimated by the staff of the U.S. International Trade Commission.

Table 2-33

Other adjustments to the economic effects of unilaterally eliminating import tariffs: Case 16, Certain bicycles

(In millions of dollars)

Item	1986	1987	1988
	Elasticity of supply = to 1		
Worker income loss[1]	0.7	0.8	0.8
Domestic tax loss[2]	3.7	4.7	4.0
Terms-of-trade loss[3]	3.9	5.0	3.5
Adjusted net welfare gain	-7.6	-9.6	-7.4
	Elasticity of supply =.to 10		
Worker income loss[1]	1.5	1.6	1.6
Domestic tax loss[2]	3.7	4.7	4.0
Terms-of-trade loss[3]	18.8	24.0	17.2
Adjusted net welfare gain	-21.4	-27.0	-20.0

[1] The worker income loss calculation assumes a rigid wage in the sector under consideration. If the wage is flexible, the worker income loss would be included in the producer loss of the traditional analysis.
[2] The domestic tax loss calculation assumes that tariff revenue is replaced with a proportional increase in all existing domestic taxes. If the replacement tax were a uniform sales tax, this adjustment would be insignificant in size. If the federal income tax were used to replace the tariff revenue, the adjustment could be 3 times as great.
[3] The terms-of-trade adjustment is relevant only for a unilateral tariff elimination. The estimate presented here tends to overstate the true terms-of-trade loss, because it does not account for the fact that increased U.S. imports might cause foreign demand for U.S. exports to increase.

Source: Estimated by the staff of the U.S. International Trade Commission.

2-30

Case 17, HTS No. 84821050, Ball bearings

Ball bearings are used in a wide variety of machinery, such as automobiles, farm implements, materials-handling equipment, motors, pumps, compressors, various home appliances, and aircraft engines. Ball bearings are better suited for high-speed applications than roller bearings (the other class of antifriction bearings) because they have a smaller area of contact with the moving surfaces.

History of tariff reductions.—The Smoot-Hawley tariff on ball and roller bearings was 45 percent plus 10 cents per pound. With the advent of the MFN tariffs, the rate on these items was reduced to 3.4 cents per pound plus 15-percent ad valorem. As a result of the Kennedy Round, the rate was reduced to 1.7 cents per pound plus 7.5-percent ad valorem by 1972. In 1974, following a Commission investigation under Section 301(b) of the Trade Expansion Act of 1962, the President increased the tariff on radial ball bearings with an outside diameter of 9mm to 100mm. Duties ranged from 3.4 cents per pound plus 15-percent ad valorem, to 20-percent ad valorem. Duties subsequently were reduced in 1976 and again in 1977. In 1978, these rates reverted to the 1972 rates. Duties on ball bearings, other than those having integral shafts, were not reduced during the Tokyo Round, probably due to the Commission's findings. However, in 1980, the tariff for ball bearings, other than those with integral shafts, was changed to a "pure" ad valorem rate of 11 percent, which is the current rate.

Economic effects.—The traditional economic effects of eliminating the tariff on ball bearings are presented in table 2-34. This tariff elimination would have reduced the dollar value of shipments in this sector by approximately $9 to $14 million in 1986 and 1988. The reduction in shipments would have caused employment in the industry to fall by approximately 100 employees in 1986–1988. Losses to these displaced workers would have been less than $1 million. The traditional net welfare measure, which accounts for consumer gains, producer losses, and tariff revenue losses, would have been less than $1 million in 1986–1988. Other adjustments to the traditional economic effects are presented in table 2-35.

Eliminating the tariff on ball bearings would have caused significant upstream effects on input-output sector Blast Furnaces and Steel Mills (37.0101). The estimated effects are presented in table 2-43.

Case 18, HTS No. 90189020, Optical instruments

This category includes bronchoscopes, arthroscopes, endoscopes, extoscopes, rhinoscopes, gastroscopes, colonscopes, and other medical optical and endoscopic devices. In general, these devices consist of a tube and optical system for observing the inside of a hollow organ or cavity of the body, such as a knee joint, the stomach, the intestine, or the ear.

Table 2-34

Traditional measures of the economic effects of unilaterally eliminating import tariffs: Case 17, Ball bearings

Item	*1986*	*1987*	*1988*
Sector data:			
Shipments (millions of dollars)	1298.6	1302.3	1367.4
Employment (thousands)	12.3	11.9	11.7
Imports, c.i.f. duty paid (millions of dollars)	330.5	357.6	514.7
Economic effects:			
	Elasticity of supply = to 1		
Shipments (millions of dollars)	-14.4	-13.6	-14.1
Employment (thousands)	-0.1	-0.1	-0.1
Consumer gain (millions of dollars)	39.3	39.5	53.4
Producer loss (millions of dollars)	7.2	6.8	7.0
Tariff revenue loss (millions of dollars)	31.7	32.3	45.9
Traditional net welfare gain (millions of dollars)	0.4	0.3	0.5
	Elasticity of supply = to 10		
Shipments (millions of dollars)	-8.6	-8.2	-8.4
Employment (thousands)	-0.1	-0.1	-0.1
Consumer gain (millions of dollars)	32.9	33.4	47.1
Producer loss (millions of dollars)	0.8	0.7	0.8
Tariff revenue loss (millions of dollars)	31.7	32.3	45.9
Traditional net welfare gain (millions of dollars)	0.4	0.4	0.5

Source: Estimated by the staff of the U.S. International Trade Commission.

Table 2-35

Other adjustments to the economic effects of unilaterally eliminating import tariffs: Case 17, Ball bearings

(In millions of dollars)

Item	1986	1987	1988
	Elasticity of supply = to 1		
Worker income loss[1]	0.6	0.5	0.6
Domestic tax loss[2]	4.8	4.8	6.9
Terms-of-trade loss[3]	1.9	2.0	2.3
Adjusted net welfare gain	-6.9	-7.0	-9.3
	Elasticity of supply = to 10		
Worker income loss[1]	0.3	0.3	0.3
Domestic tax loss[2]	4.8	4.8	6.9
Terms-of-trade loss[3]	2.1	2.1	2.5
Adjusted net welfare gain	-6.8	-6.9	-9.2

[1] The worker income loss calculation assumes a rigid wage in the sector under consideration. If the wage is flexible, the worker income loss would be included in the producer loss of the traditional analysis.
[2] The domestic tax loss calculation assumes that tariff revenue is replaced with a proportional increase in all existing domestic taxes. If the replacement tax were a uniform sales tax, this adjustment would be insignificant in size. If the federal income tax were used to replace the tariff revenue, the adjustment could be 3 times as great.
[3] The terms-of-trade adjustment is relevant only for a unilateral tariff elimination. The estimate presented here tends to overstate the true terms-of-trade loss, because it does not account for the fact that increased U.S. imports might cause foreign demand for U.S. exports to increase.

Source: Estimated by the staff of the U.S. International Trade Commission.

History of tariff reductions.—Because of the critical need for optical instruments in the manufacture of military equipment, the tariffs on most optical goods have been determined by national security needs. This has resulted in higher than average tariffs for most optical instruments, including those used for medical and veterinary purposes. The Smoot-Hawley tariffs for the articles considered here ranged from 45 to 60 percent. The tariff was reduced to 50 percent in 1967, following the GATT negotiations concluded that year. In the Kennedy Round, the tariff was reduced to 25 percent by 1972. In the Tokyo Round, the tariff was further reduced to 10 percent by 1987.

Economic effects.—The traditional economic effects of eliminating the tariff on optical instruments are presented in table 2-36. This tariff elimination would have reduced the dollar value of shipments in this sector by approximately $14 million in 1986-1988. The reduction in shipments would have caused employment in the industry to fall by approximately 400 employees in 1986 and 300 to 400 employees in 1988. Losses to these displaced workers would have been less than $1 million. The traditional net welfare measure, which accounts for consumer gains, producer losses, and tariff revenue losses, would have been less than $1 million in 1986 and 1988. Other adjustments to the traditional economic effects are presented in table 2-37.

Eliminating the tariff on optical instruments would have caused significant upstream effects for input-output sector Miscellaneous Plastics Products (32.0400). The estimated effects are presented in table 2-43.

Extraordinary Tariff Measures

This section covers two items protected by restraints that are not ordinary MFN tariffs: canned tuna and western red cedar shakes and shingles.

Canned tuna

Canned tuna is either packed in oil or in some other medium such as water or brine. These products are for human consumption and do not include tuna-base canned pet food. The most common species of tuna used in canned tuna are albacore, skipjack, yellowfin, euthynnus, and tongol, the latter two being used only in imported canned tuna (especially from Thailand).

Background of restraints.—A tariff-rate quota for canned tuna in water[22] imported into the United States was established in March 1956. Canned tuna qualifies for a duty rate of 6 percent ad valorem when the following conditions are met:

1. The product is prepared or preserved in any manner other than oil;
2. It is packed in airtight containers weighing with their contents not over 15 pounds (6,804 grams) each;
3. The aggregate quantity of such tuna imported during the calendar year has not exceeded a quota amount (which equals 20 percent of the U.S. pack of canned tuna during the immediately preceding

[22] Tuna in water enter under the following HS item numbers: 1604.14.20.20; 1604.14.20.40; 1604.14.30.20; and 1604.14.30.40.

2-32

Table 2-36

Traditional measures of the economic effects of unilaterally eliminating import tariffs: Case 18, Optical instruments

Item	1986	1987	1988
Sector data:			
Shipments (millions of dollars)	245.0	260.0	300.0
Employment (thousands)	7.1	7.1	7.4
Imports, c.i.f. duty paid (millions of dollars)	115.1	116.8	125.8
Economic effects:			
	Elasticity of supply = to 1		
Shipments (millions of dollars)	-14.2	-12.4	-14.2
Employment (thousands)	-0.4	-0.3	-0.4
Consumer gain (millions of dollars)	20.0	16.9	18.6
Producer loss (millions of dollars)	7.0	6.1	7.0
Tariff revenue loss (millions of dollars)	12.5	10.4	11.2
Traditional net welfare gain (millions of dollars)	0.5	0.4	0.4
	Elasticity of supply = to 10		
Shipments (millions of dollars)	-13.6	-11.9	-13.7
Employment (thousands)	-0.4	-0.3	-0.3
Consumer gain (millions of dollars)	14.4	11.9	12.9
Producer loss (millions of dollars)	1.2	1.1	1.2
Tariff revenue loss (millions of dollars)	12.5	10.4	11.2
Traditional net welfare gain (millions of dollars)	0.7	0.5	0.5

Source: Estimated by the staff of the U.S. International Trade Commission.

Table 2-37

Other adjustments to the economic effects of unilaterally eliminating import tariffs: Case 18, Optical instruments

(In millions of dollars)

Item	1986	1987	1988
	Elasticity of supply = to 1		
Worker income loss[1]	0.6	0.5	0.5
Domestic tax loss[2]	1.9	1.6	1.7
Terms-of-trade loss[3]	2.5	2.1	1.9
Adjusted net welfare gain	-4.4	-3.8	-3.7
	Elasticity of supply = to 10		
Worker income loss[1]	0.5	0.5	0.5
Domestic tax loss[2]	1.9	1.6	1.7
Terms-of-trade loss[3]	3.6	3.0	2.8
Adjusted net welfare gain	-5.3	-4.6	-4.4

[1] The worker income loss calculation assumes a rigid wage in the sector under consideration. If the wage is flexible, the worker income loss would be included in the producer loss of the traditional analysis.
[2] The domestic tax loss calculation assumes that tariff revenue is replaced with a proportional increase in all existing domestic taxes. If the replacement tax were a uniform sales tax, this adjustment would be insignificant in size. If the federal income tax were used to replace the tariff revenue, the adjustment could be 3 times as great.
[3] The terms-of-trade adjustment is relevant only for a unilateral tariff elimination. The estimate presented here tends to overstate the true terms-of-trade loss, because it does not account for the fact that increased U.S. imports might cause foreign demand for U.S. exports to increase.

Source: Estimated by the staff of the U.S. International Trade Commission.

calendar year, as reported by the National Marine Fisheries Service of the U.S. Department of Commerce).

Tuna imports that meet the first two conditions but exceed the tariff-rate quota limit are charged a higher duty rate of 12.5-percent ad valorem.

The U.S. Customs Service establishes the canned tuna quota limit for any year by computing 20 percent of the U.S. canned tuna production for the prior year as reported by the National Marine Fisheries Service (NMFS). U.S. production data are voluntarily reported by U.S. tuna canneries to the NMFS, which does not verify such data. Two canneries that provide production data also operate plants in American Samoa, a U.S. possession falling within the United States for duty purposes. However, for quota purposes, the tuna packed by the American Samoa plants is not included as part of U.S. production.

Tuna canned in oil[23] was originally dutiable at 30-percent ad valorem under Smoot- Hawley. In 1934, the rate was increased to 45 percent. The rate was reduced to 22.5 percent in 1943 pursuant to a trade agreement with Mexico. Upon termination of that agreement, the rate reverted to 45 percent in 1951. The rate was reduced to 35 percent in 1955, and this rate is still in effect.

The United States periodically has imposed embargoes on imports of tuna products. These embargoes are imposed under the authority of two acts, the Magnuson Fisheries Conservation and Management Act of 1976 (MFCMA) and the Marine Mammal Protection Act (MMPA). Embargoes under the MFCMA usually are the result of the seizure of U.S. tuna-fishing vessels by foreign governments in what the U.S. Government regards as international waters. Embargoes of imports of tuna are imposed under the MMPA when the foreign tuna fishermen do not take sufficient precautions to avoid killing porpoises. (Porpoises are commonly harvested incidentally by tuna fishermen because they tend to swim directly above schools of tuna.) Table 2-38 presents information on U.S. embargoes of tuna products from 1978 to the present.

[23] Tuna canned in oil enters under HS item number 1604.14.10.00.

Economic effects

(1) *Water-pack.*—During the past 4 years, the quota on tuna canned in water has been filled in the first 5 months.[24] Since the quota is always filled, the tariff rate quota raises the price of imports the same amount as if the 12.5-percent tariff were imposed year-round. The only difference for the welfare calculations between the year-round tariff of 12.5 percent and the tariff rate quota that charges 12.5 percent on over quota imports is that the tariff rate quota yields less tariff revenue and provides some rents to importers.

In what follows, the effects on consumers and producers of removing the tariffs on tuna canned in water (both the below-quota rate of 6 percent and the above-quota rate of 12.5 percent) are estimated as if the tariff were constant at 12.5 percent. To get the net welfare gain from eliminating the tariff rate quota, the tariff revenue and rents to importers must be subtracted. The tariff revenue must be adjusted as described in the methodology section to account for the social cost of replacing this tax revenue.

[24] The annual quotas for the years of 1985 through 1988 were filled by May 7, 1985, Mar. 28, 1986, Apr. 2, 1987, and Mar. 21, 1988. The 1989 quota was filled after the first 3 weeks in January. Many shipments of foreign canned tuna arrived at U.S. ports in December 1988. The importers claimed them at the U.S. customs offices in the early part of January in order to pay a lower tariff.

Table 2-38
U.S. embargoes on tuna products, 1978 to present

Country	*Effective date of embargo*	*Date embargo rescinded*	*Statute*
Peru	Jan. 1, 1978	July 1, 1983	MMPA
Costa Rica	Feb. 16, 1979	Aug. 13, 1979	MFCMA
Peru	May 1, 1979	Oct. 17, 1979	MFCMA
Canada	Sept. 12, 1979	Sept. 4, 1980	MFCMA
Costa Rica	Feb. 1, 1980	Feb. 26, 1982	MFCMA
Peru	Feb. 22, 1980	Apr. 19, 1983	MFCMA
Mexico	July 14, 1980	Aug. 13, 1986	MFCMA
Ecuador	Nov. 3, 1980	Apr. 19, 1983	MFCMA
Mexico	Feb. 1, 1981	May 21, 1986	MMPA
Papua New Guinea	(1)	(1)	MFCMA
Solomon Islands	Aug. 23, 1984	Apr. 17, 1985	MFCMA

[1] A U.S. tuna vessel was seized by Papua New Guinea on Feb. 10, 1982, but an embargo was not imposed owing to ongoing negotiations for a fishing license agreement between the American Tunaboat Association and the Government of Papua New Guinea, which was concluded on Apr. 8, 1982.

Source: U.S. Department of State.

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The traditional effects of eliminating the tariff on canned tuna are summarized in table 2–39. Eliminating this tariff would have reduced the value of shipments for this industry by approximately $53 million to $67 million in 1986 and $64 to $80 million in 1988. Domestic employment is estimated to decline by approximately 700 to 900 employees in 1986 and 700 to 800 employees in 1988. Losses to these displaced workers would have been approximately $1 million. The traditional net welfare measure, which accounts for consumer gains, producer losses, and tariff revenue losses, would have been approximately $2.5 million to $4.9 million in 1986 and $4.6 million to $5.2 million in 1988. Other adjustments to the traditional economic effects are presented in table 2–40.

Eliminating the tariff on canned tuna would have caused significant upstream effects for two input-output sectors: Commercial Fishing (3.0002) and Metal Cans (39.0100). The estimated upstream effects are presented in table 2–43.

(2) *Oil-pack.*—The 35-percent tariff for tuna canned in oil is collected year-round and virtually eliminates imports of oil-pack tuna. Oil-pack and water-pack tuna are highly substitutable in production. Both types can be canned on the same production lines with negligible changeover costs. If oil-pack tuna were subject to the same tariff treatment as water-pack, the welfare effects would be minimal. Total imports of canned tuna would remain about the same, as would U.S. production. Only the mix between oil- and water-pack tuna would change.

Western red cedar shakes and shingles (HTS 4418.50.00.00)

Between 85 percent and 95 percent of the shakes and shingles produced in the United States is manufactured from western red cedar. The remainder is produced mainly from northern white cedar and redwood, with other species being used less frequently. Shakes and shingles are thin, rectangular pieces of wood that have been split (shakes) or sawed (shingles) from a block or bolt[25] of wood. Shakes and shingles are used in similar applications—primarily as a covering for the roof or side of a building.

Background of restraints.—Prior to 1986, all types of wood shakes and shingles entered duty-free. The tariff for western red cedar shakes and shingles imported into the United States was established by the President in 1986. The tariff was to be reduced in staged reduction of tariffs from 35 percent, to 20 percent in December 1988, to 8

[25] A bolt is a short, cylindrical section of a log.

Table 2–39

Traditional measures of the economic effects of unilaterally eliminating import tariffs: Case 19, Canned tuna

Item	*1986*	*1987*	*1988*
Sector data:			
Shipments[1]	881.5	1018.7	1174.8
Employment (thousands)[1]	12.1	11.5	12.1
Imports, c.i.f. duty paid	251.2	226.3	244.3
Economic effects:			
		Elasticity of supply = to 1	
Shipments (millions of dollars)	-52.7	-55.4	-63.9
Employment (thousands)	-0.7	-0.6	-0.7
Consumer gain (millions of dollars)	78.9	78.6	88.8
Producer loss (millions of dollars)	51.1	53.9	62.2
Tariff revenue loss (millions of dollars)	22.9	20.9	21.4
Traditional net welfare gain (millions of dollars)	4.9	3.8	5.2
		Elasticity of supply = to 10	
Shipments (millions of dollars)	-66.5	-69.7	-80.4
Employment (thousands)	-0.9	-0.8	-0.8
Consumer gain (millions of dollars)	31.8	30.8	33.7
Producer loss (millions of dollars)	6.4	6.5	7.7
Tariff revenue loss (millions of dollars)	22.9	20.9	21.4
Traditional net welfare gain (millions of dollars)	2.5	3.4	4.6

[1] U.S. Department of Commerce, *Fisheries of the United States*, various issues.

Source: Estimated by the staff of the U.S. International Trade Commission except where indicated.

Table 2-40

Other adjustments to the economic effects of unilaterally eliminating import tariffs: Case 19, Canned tuna

(In millions of dollars)

Item	1986	1987	1988
	Elasticity of supply = to 1		
Worker income loss[1]	1.1	1.0	1.3
Domestic tax loss[2]	3.4	3.1	3.2
Terms-of-trade loss[3]	8.2	7.3	6.5
Adjusted net welfare gain	-7.8	-7.6	-5.8
	Elasticity of supply = to 10		
Worker income loss[1]	1.3	1.4	1.6
Domestic tax loss[2]	3.4	3.1	3.2
Terms-of-trade loss[3]	9.1	6.9	6.2
Adjusted net welfare gain	-11.3	-8.0	-6.4

[1] The worker income loss calculation assumes a rigid wage in the sector under consideration. If the wage is flexible, the worker income loss would be included in the producer loss of the traditional analysis.
[2] The domestic tax loss calculation assumes that tariff revenue is replaced with a proportional increase in all existing domestic taxes. If the replacement tax were a uniform sales tax, this adjustment would be insignificant in size. If the federal income tax were used to replace the tariff revenue, the adjustment could be 3 times as great.
[3] The terms-of-trade adjustment is relevant only for a unilateral tariff elimination. The estimate presented here tends to overstate the true terms-of-trade loss, because it does not account for the fact that increased U.S. imports might cause foreign demand for U.S. exports to increase.

Source: Estimated by the staff of the U.S. International Trade Commission.

percent in December 1990 and then to zero in June 1991. However, in December 1988, the President amended the staged reductions to 10 percent in December 1989, to 5 percent in December 1990, and to zero in June 1991.

Economic effects.—The assumptions concerning domestic and import supply elasticities for shakes and shingles differ from those used for other sectors. Unlike for the other cases, both domestic and import supplies are believed to be moderately inelastic, with import supply being somewhat more elastic than domestic supply. Based on this information, a range of 0.4 to 0.8 was used for the domestic supply elasticity, with the import supply elasticity being 0.5 and 0.9, respectively.[26]

The traditional effects of removing the 35-percent tariff, which has been imposed since 1987, are summarized in table 2-41. Eliminating the tariff on shakes and shingles would have reduced the value of shipments in this sector by approximately $2.7 million to $11.8 million in 1987 and $3.1 million to $12.3 million in 1988. The reduction in shipments would have caused employment in the industry to fall by approximately 42 to 177 employees in 1987 and 33 to 129 employees in 1988. Other adjustments to the traditional economic effects are presented in table 2-42.

The traditional net welfare measure, which accounts for consumer gains, producer losses, and tariff revenue losses, would have been approximately -$22.0 million to -$30.8 million in 1987 and -$22.6 million and -$31.3 million in 1988. These negative values are due to the inelastic import supply. These losses would be exacerbated by the worker income loss, replacement tax loss, and terms-of-trade loss.

Eliminating the tariff on shakes and shingles would have caused significant upstream effects for the input-output sector Logging Camps and Logging Equipment (20.0100). For the year 1987 and supply elasticities 0.4 and 0.8, shipments of this sector would have fallen by $0.9 million and $1.0 million, respectfully. For the year 1988 and the supply elasticities 0.4 and 0.8, shipments would have fallen by $4.0 million and $4.1 million, respectively.

A new tariff rate of 20 percent is in effect for the period of December 7, 1988, through December 6, 1990. The effects of eliminating this tariff should be smaller than those caused by removing the 35-percent duty, and the effects of removing 5- or 10-percent tariff should be smaller then those caused by removing a 20-percent tariff. The 10-percent and 5-percent ad valorem tariffs on western red cedar shakes and shingles are scheduled to come into effect on December 7, 1989, and December 7, 1990, respectively.

[26] The major input for domestic and Canadian shake and shingle producers is cedar logs. Red cedar logs are harvested along with other species of timber but generally account for a small portion of the total harvest. Thus, the supply of cedar logs in not very responsive to changes in cedar log prices, and the supply of shakes and shingles is also most likely to be relatively inelastic. However, because western red cedar is more abundant in Canada and can still be found in purer stands than those that exist in the United States, import supply is most likely to be somewhat more elastic than domestic supply. See U.S. International Trade Commission, *Western Red Cedar Shakes and Shingles*, Publication 2131, October 1988.

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Table 2-41

Traditional measures of the economic effects of unilaterally eliminating import tariffs: Case 20, Western red cedar shakes and shingles

Item	*1987*	*1988*
Sector data:		
Shipments (millions of dollars)	119.9	165.0
Employment (number)	1906	1732
Imports, c.i.f. duty paid (millions of dollars)	161.2	167.8
Economic effects:		
	Elasticity of supply = to 0.4	
Shipments (millions of dollars)	-2.7	-3.1
Employment (number)	-42	-33
Consumer gain (millions of dollars)	17.1	17.3
Producer loss (millions of dollars)	7.5	7.9
Tariff revenue loss (millions of dollars)	40.4	40.7
Traditional net welfare gain (millions of dollars)	-30.8	-31.3
	Elasticity of supply = to 0.8	
Shipments (millions of dollars)	-11.8	-12.3
Employment (number)	-117	-129
Consumer gain (millions of dollars)	32.7	33.2
Producer loss (millions of dollars)	14.3	15.1
Tariff revenue loss (millions of dollars)	40.4	40.7
Traditional net welfare gain (millions of dollars)	-22.0	-22.6

Source: Estimated by the staff of the U.S. International Trade Commission.

Table 2-42

Other adjustments to the economic effects of unilaterally eliminating import tariffs: Case 20, Western red cedar shakes and shingles

(In millions of dollars)

Item	*1987*	*1988*
	Elasticity of supply = to 0.4	
Worker income loss[1]	0.1	0.1
Domestic tax loss[2]	6.1	6.1
Terms-of-trade loss[3]	2.8	2.3
Adjusted net welfare gain	-39.8	-39.8
	Elasticity of supply = to 0.8	
Worker income loss[1]	0.4	0.4
Domestic tax loss[2]	6.1	6.1
Terms-of-trade loss[3]	5.6	4.7
Adjusted net welfare gain	-34.1	-33.8

[1] The worker income loss calculation assumes a rigid wage in the sector under consideration. If the wage is flexible, the worker income loss would be included in the producer loss of the traditional analysis.
[2] The domestic tax loss calculation assumes that tariff revenue is replaced with a proportional increase in all existing domestic taxes. If the replacement tax were a uniform sales tax, this adjustment would be insignificant in size. If the federal income tax were used to replace the tariff revenue, the adjustment could be 3 times as great.
[3] The terms-of-trade adjustment is relevant only for a unilateral tariff elimination. The estimate presented here tends to overstate the true terms-of-trade loss, because it does not account for the fact that increased U.S. imports might cause foreign demand for U.S. exports to increase.

Source: Estimated by the staff of the U.S. International Trade Commission.

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Table 2-43
Reduction in output for important upstream industries when tariff restraints are removed, 1986-88

Case: Upstream supplier[1]	Year	Change in output, in millions of dollars: Elasticity of one[2]	Elasticity of ten[3]
1 Rubber footwear:			
Broadwoven fabric mills and fabric-finishing plants (16.0100)	1986	-21.7	-29.8
	1987	-23.1	-31.8
	1988	-23.5	-32.3
Synthetic rubber (28.0200)	1986	- 8.4	-11.6
	1987	- 9.0	-12.3
	1988	- 9.1	-12.5
2 Women's footwear:			
Leather tanning and finishing (33.0001)	1986	-64.8	-89.0
	1987	-67.8	-93.2
	1988	-71.2	-97.9
Boot and shoe cut stock and findings (34.0100)	1986	-15.5	-21.3
	1987	-16.2	-22.3
	1988	-17.1	-23.5
3 Ceramic tile:			
Industrial inorganic and organic chemicals (27.0100)	1986	- 1.5	- 1.6
	1987	- 1.6	- 1.7
	1988	- 1.8	- 1.9
Clay, ceramic, and refractory minerals mining (9.0003)	1986	- 1.2	- 1.3
	1987	- 1.3	- 1.4
	1988	- 1.5	- 1.6
4 Luggage:			
Coated fabrics, not rubberized (17.0600)	1986	-10.0	-12.8
	1987	-11.1	-14.2
	1988	-11.9	-15.3
Hardware, NEC (42.0300)	1986	- 5.8	- 7.5
	1987	- 6.5	- 8.3
	1988	- 7.0	- 8.9
5 Leather gloves:			
Leather tanning and finishing (33.0001)	1986	-14.5	-19.7
	1987	-14.4	-19.6
	1988	-14.5	-19.7
8 Handbags, purses:			
Broadwoven fabric mills and fabric-finishing plants (16.0100)	1986	- 4.7	- 8.4
	1987	- 5.0	- 9.1
	1988	- 5.5	- 9.9
Coated fabrics, not rubberized (17.0600)	1986	- 4.3	- 7.6
	1987	- 4.6	- 8.2
	1988	- 5.0	- 9.0
Plastics materials and resins (28.0100)	1986	- 3.4	- 7.1
	1987	- 4.3	- 7.7
	1988	- 4.7	- 8.4
Leather tanning and finishing (33.0001)	1986	-10.0	-17.9
	1987	-10.8	-19.3
	1988	-11.8	-21.1
9 Costume jewelry:			
Primary nonferrous metals, NEC (38.0500)	1986	- 3.7	- 3.1
	1987	- 3.5	- 3.0
	1988	- 3.7	- 3.1
Jewelers' materials and lapidary work (64.0102)	1986	- 5.1	- 4.3
	1987	- 4.8	- 4.1
	1988	- 5.1	- 4.3

See footnotes at end of table.

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Table 2-43—Continued

Reduction in output for important upstream industries when tariff restraints are removed, 1986-88

Case: Upstream supplier[1]	Year	Change in output, in millions of dollars: Elasticity of one [2]	Elasticity of ten[3]
9 Costume jewelry:—Continued			
Wholesale trade	1986	- 4.6	- 3.9
(69.0100)	1987	- 4.4	- 3.7
	1988	- 4.7	- 3.9
12 Elec. capacitors:			
Miscellaneous plastics	1986	- 5.9	- 5.9
products	1987	- 5.9	- 5.9
(32.0400)	1988	- 6.5	- 6.5
Wholesale trade	1986	- 5.1	- 5.1
(69.0100)	1987	- 5.1	- 5.1
	1988	- 5.6	- 5.6
15 Non stuffed dolls:			
Wholesale trade	1986	- 1.1	- 2.8
(69.0100)	1987	- 1.1	- 2.8
	1988	- 1.2	- 3.0
16 Certain bicycles:			
Blast furnaces and	1986	- 2.0	- 4.1
steel mills	1987	- 2.2	- 4.5
(37.0101)	1988	- 2.1	- 4.3
Wholesale trade	1986	- 3.0	- 6.1
(69.0100)	1987	- 3.2	- 6.6
	1988	- 3.1	- 6.4
17 Ball bearings:			
Blast furnaces and	1986	- 2.4	- 1.4
steel mills	1987	- 2.3	- 1.4
(37.0101)	1988	- 2.4	- 1.4
Wholesale trade	1986	- 0.8	- 0.5
(69.0100)	1987	- 0.7	- 0.4
	1988	- 0.7	- 0.4
18 Optical instruments:			
Miscellaneous plastics	1986	- 0.8	- 0.7
products	1987	- 0.7	- 0.7
(32.0400)	1988	- 0.8	- 0.8
19 Canned tuna:			
Commercial fishing	1986	-20.3	-25.6
(3.0002)	1987	-21.3	-26.8
	1988	-24.6	-30.9
Metal cans	1986	- 3.0	- 3.9
(39.0100)	1987	- 3.2	- 4.1
	1988	- 3.7	- 4.7

[1] Numbers in parentheses are input-output sectors.
[2] Elasticity of supply for the domestic import-competing industry is one.
[3] Elasticity of supply for the domestic import-competing industry is ten.

Source: Estimated by the staff of the U.S. International Trade Commission.

Table 2-44

Proportional changes in costs and output for important downstream industries when tariff restraints are removed, 1986-88

Case Downstream user[1]	Year	Domestic supply Elasticity of one Cost[2]	 Output[3]	Domestic supply Elasticity of ten Cost[2]	 Output[3]
10 Glass:					
Electron tubes	1986	-.0076	.00921	-.0037	.00450
(57.0100)	1987	-.0076	.00921	-.0039	.00475
	1988	-.0077	.00926	-.0040	.00484
11 Cyclic crudes:					
Greenhouse and	1986	-.0099	.00918	-.0037	.00340
nursery products	1987	-.0116	.01069	-.0041	.00386
(02.0702)	1988	-.0123	.01137	-.0045	.00419
Adhesives and	1986	-.0106	.01033	-.0039	.00383
sealants	1987	-.0124	.01202	-.0044	.00434
(27.0402)	1988	-.0131	.01280	-.0048	.00471
Printing ink	1986	-.0187	.01819	-.0069	.00674
(27.0404)	1987	-.0218	.02118	-.0078	.00765
	1988	-.0232	.02254	-.0085	.00830
Plastics materials	1986	-.0244	.02543	-.0090	.00943
and resins	1987	-.0284	.02960	-.0102	.01069
(28.0100)	1988	-.0302	.03150	-.0111	.01160
Synthetic rubber	1986	-.0316	.03295	-.0117	.01222
(28.0200)	1987	-.0368	.03836	-.0133	.01386
	1988	-.0392	.04082	-.0144	.01503
Organic fibers,	1986	-.0203	.02111	-.0075	.00782
noncellulosic	1987	-.0236	.02457	-.0085	.00887
(28.0400)	1988	-.0251	.02615	-.0092	.00963
Soap and other	1986	-.0142	.01377	-.0052	.00510
detergents	1987	-.0165	.01603	-.0059	.00579
(29.0201)	1988	-.0175	.01706	-.0064	.00628
Surface active	1986	-.0091	.00890	-.0034	.00330
ingredients	1987	-.0106	.01036	-.0038	.00374
(29.0203)	1988	-.0113	.01102	-.0041	.00406
12 Elec. capacitors:					
Radio and TV	1986	-.0041	.00402	-.0021	.00205
receiving sets	1987	-.0042	.00416	-.0023	.00226
(56.0100)	1988	-.0044	.00436	-.0025	.00244
Radio and TV	1986	-.0045	.00449	-.0023	.00229
communication	1987	-.0047	.00464	-.0026	.00253
equipment	1988	-.0049	.00487	-.0028	.00273
(56.0400)					
13 Methyl alcohol:					
Adhesives and	1986	-.0081	.00786	-.0056	.00543
sealants	1987	-.0086	.00834	-.0057	.00553
(27.0402)	1988	-.0138	.01339	-.0118	.01145
Chemical preparations,	1986	-.0088	.00854	-.0060	.00582
nec	1987	-.0093	.00902	-.0062	.00601
(27.0406)	1988	-.0149	.01445	-.0127	.01232
Plastic materials	1986	-.0186	.01934	-.0129	.01342
and resins	1987	-.0198	.02059	-.0131	.01362
(28.0100)	1988	-.0316	.03286	-.0271	.02818
14 Polyethylene resins:					
Bags, except textile	1986	-.0032	.00319	-.0012	.00127
(24.0702)	1987	-.0032	.00324	-.0013	.00132
	1988	-.0034	.00340	-.0015	.00151

[1] Numbers in parentheses are input-output sectors.
[2] This column presents the proportional decreases in costs.
[3] This column presents the proportional increases in output.

Source: Estimated by the staff of the U.S. International Trade Commission.

2-40

Chapter 3

Restraints Other Than Tariffs

This chapter considers significant quantitative import restraints on manufactured imports, except for the restraints on textiles and apparel. These restraints were deemed to be significant if imports of affected products exceeded $100 million in 1987. Included are voluntary restraints on steel, autos and machine tools, and quotas on specialty steel. Senate Finance Committee staff advised that restraints resulting from section 301 actions and from actions taken under similar provisions were also to be excluded. The analysis of the effects of quantitative restraints is given below.

The Effects of Quotas

Quotas reduce the quantity of imports and raise their price. Their effects on sales, profits, and employment of the protected domestic industry, and on upstream suppliers and downstream customers of these industries, are therefore similar to those of tariffs. A major distinction between tariffs and quotas is that tariffs generate tax revenue, whereas quotas create extra profits for those traders (importers or exporters) who control the rights to clear the restrained imports through customs. The type of quota determines who controls these rights (and hence gets the extra profits).

The different types of quotas are listed below:

Import Quota

Global with import licenses

Global with first-come-first-served

Country-specific with unrestrained suppliers

Export Quota

Country-specific with export licenses

Country-specific with first-come-first-served.

An import quota is administered by the importing country, which sets the total volume of imports to be admitted from the restrained sources. A global quota limits the total volume of a product to be imported from all countries combined. A country-specific quota only limits imports from specified countries (generally major supplying countries); imports from other countries are permitted without limit.

Global import quotas are typically administered under two alternative regimes. Under one regime, the importing country issues import licenses that identify the importer and the volume of imports covered by the license—only imports accompanied by a valid license are cleared through customs. The licensing authority issues licenses with an accumulated volume of imports equal to the prespecified global quota limit. Under the other regime, the importing country permits imports on a first-come-first-served basis until the total volume of imports reaches the prespecified limit.[1]

The main difference between the two regimes is the distribution of extra profits associated with the quota. Under the licensing system, the importer is assigned monopoly power over imports. In contrast, under the first-come-first-served system importers have an incentive to race goods to the border for clearance through Customs. Those importers who succeed get the monopoly power; however, their costs of importation typically are higher owing to costs incurred in the race to the border. Thus, the monopoly profits in this latter case are partially eaten up by higher trading costs and some are shared with those exporters able to meet the race-the-goods-to-the-border requirements; the residual is kept by the importer.

The same import-limiting objective of a U.S. country-specific import quota can be achieved if the target country limits its exports to the United States. Such export quotas can be administered by the foreign government using export licenses or on a first-come-first-served basis.

One difference between import and export quotas is that monopoly profits associated with an export quota accrue to foreign exporters rather than to U.S. importers. In the case of first-come-first-served export quotas, the monopoly profits are partially eaten up by increased costs associated with racing goods to the border and partially shared with U.S. importers.

A second difference between import and export quotas is that export quotas are always country-specific, which often leaves unrestrained sources of imports. This distinction is important. Under global import quotas, the only alternative to the restricted imports is domestic output, but when imports are limited by country-specific quotas, domestic purchasers can often buy from unrestrained foreign suppliers. In general, domestic producers benefit less and domestic consumers suffer less from country-specific quotas than global quotas.

A critical factor in determining the effects of quotas is the degree of substitutability between the restricted imports and the competing domestic good. The greater the substitutability, the greater the increase in demand for the domestic competing good that results from the quota, and thus the greater the benefit to the domestic producers from the quota. In a sense, the "efficiency" of

[1] If, under the licensing system, some of the licenses are allocated to producers of import-competing goods, some of the licenses may go unused. However, this tendency is reduced to the extent that the Government issues import licenses on the basis of the volume of imports actually cleared through customs in previous years.

3-1

the quota is greater the greater is the substitutability between the controlled imports and the competing domestic supply. For example, if imports and competing domestic output were poor substitutes for each other, an import quota would yield little benefit to the domestic producers in exchange for the costs it would impose on domestic consumers.

Methodologies for Estimating the Effects of a Quota[2]

The restrictiveness of a quota depends on the degree to which it reduces the quantity imported. Scholars typically quantify the effects of quotas or similar trade restraints using one of two techniques.[3] The first is to examine the effect on the price of the product, generally measured as an *ad valorem* "price effect." The second is to concentrate on the "quantity effect," or the extent to which the restraint reduces the import volume. These two techniques are discussed in turn below.

Estimating the price effect

The price effect of a trade restraint is the difference between the actual market price in the presence of the restraint and the price that would prevail if the restraint did not exist. This difference is generally measured as a percentage of the free-trade price. Unfortunately, only actual market prices can be observed, i.e., the price of the domestic good or the price of the imported good cleared through customs. The problem is in estimating the price that would have occurred in the absence of the restraint.

If the imported and domestic competing goods are perfect substitutes, markets are competitive, and the supply of imports is horizontal,[4] the hypothetical price would equal the world price of the good including transportation costs and tariff, i.e., the c.i.f. duty-paid price of imports.

Unfortunately, there are serious data problems with using price comparisons as a technique to estimate the hypothetical price. First, data on import prices are seldom available for unique products; instead, they are averages for categories that include several products. To compound the problem, the definition of product categories differs by classification system. U.S. price data are reported by Standard Industrial Classification (SIC) product categories, imports by Tariff Schedules of the USA (TSUSA), and exports by schedule B. Moreover, import and export data report values and quantities, not prices, so these data can be used only to calculate unit values, which are often poor proxies for actual product prices.

It is improper to use price comparison to gauge the effect of a quota on the price of competing domestic output if the import and domestic good are not perfect substitutes or if the import supply is not perfectly elastic. These conditions are virtually never met. In particular, the imported good and the domestic good are virtually always imperfect substitutes. Product differentiation arises from a number of attributes, such as differences in quality and differences in product mixes for commodity categories. Even if imports and the domestic good are physically identical, their prices can differ owing to different conditions of sale (e.g., credit terms, minimum volume orders, lead times, after-sales services and buyback arrangements).

A final problem with any type of price comparison technique is that the resulting measure includes the price effects of all border measures combined. Without substantial additional information, it is quite difficult to estimate the price effects of individual nontariff measures when more than one such measure affect a given product.

One case in which the price effects of a quota can be directly estimated is when the quota rights are sold in an active market, such as Hong Kong's export quotas for apparel. Similarly, if quota rights (import or export) were sold through an auction in the restraining country rather than issued free of charge, the auction prices would provide information on the price effect of the quota. Unfortunately, few cases exist in which either of these techniques can be used.

An alternative to the price comparison technique is to use price elasticities of demand and supply to estimate the price effect of the quota. This approach involves first estimating the quantity effect.

Estimating the quantity effect

The quantity effect is measured as the difference between actual imports (i.e., with the quota in force) and hypothetical imports (i.e., in the absence of the quota). There is no indirect method of observing the hypothetical volume of imports as there is for the hypothetical price (e.g., using the world price as a proxy for the hypothetical price). Instead, the hypothetical volume of imports (and the quantity effect) must be estimated. The methods for estimating the hypothetical volume of imports fall into two categories:

[2] Methodologies for estimating the effects of tariffs on the U.S. economy are presented in ch. 2 and app. C. These same methodologies can be used for quotas once the quota has been converted to its tariff equivalent. The remainder of this appendix will be devoted to methods of estimating the price effect of a quota, from which one can calculate the tariff equivalent of a quota.

[3] Two good surveys of methods for estimating the effects of quotas are Alan V. Deardorff and Robert M. Stern, *Methods of Measurement of Non-tariff Barriers*, document UNCTAD/ST/MD/28 (Geneva: U.N. Conference on Trade and Development, 1985), and Robert E. Baldwin, "Measuring Non-tariff Trade Policies," University of Wisconsin-Madison, unpublished paper, 1988.

[4] The problems of estimating the effects of quotas are compounded enormously if markets are noncompetitive.

extrapolation methods and econometric models. These will be discussed in turn.

Methods.—Probably the most popular method is to extrapolate postquota trade patterns from the prequota time period. For example, hypothetical imports might be estimated by assuming that their growth rate would have been constant absent the quota. An alternative is to assume that the import market share would have remained constant absent the quota. In this case, the prequota market share of imports would be multiplied by the postquota level of consumption (or production) to estimate the hypothetical postquota volume of imports. There is an implicit bias in this method depending upon the variable selected as the base for the market share. In particular, an effective quota would limit imports. This would result in an increase in the domestic price of the product, thereby stimulating production and dampening consumption. As a consequence, the hypothetical volume of imports would be biased upward if estimated using domestic production as the base and biased downward if estimated using domestic consumption. It is sometimes possible to use other normalizers for the market share approach. For example, in the case of country-specific import or export quotas, one could use the share of imports from unrestrained suppliers, noting that this procedure yields an overestimate of the hypothetical volume of imports, because the quota will tend to shift demand toward the unrestrained suppliers and thereby increase their market share.

Finally, care must be taken to distinguish between the effects of the quota on imports from restrained suppliers and the effects of the quota on overall imports of the restrained product. If the quota were an effective global quota with no unrestrained suppliers, these two effects would be the same. However, in the case of a country-specific quotas with some unrestrained suppliers, these two effects can differ substantially.

Elasticity models.—It is sometimes feasible to estimate the hypothetical volume of trade using an economic model with price elasticities. There are two main requirements for this approach. First, one must have a very good understanding of the economic structure of the industry being modeled. Secondly, data needed to estimate the parameters of the model must be available. Importantly, the data must include periods during which trade is relatively free.

The costs of quotas compared to tariffs

Quotas tend to be much costlier than tariffs for affording import protection to U.S. producers. This is true for several reasons. First, the quota rents often go to foreign suppliers, or are wasted in increased trading costs. Second, even if all quota rents are garnered by U.S. importers, their value to the U.S. economy as a whole is smaller than that of the tax revenue that would come from an equivalent tariff. This is true because a dollar of tax revenue is worth more than one dollar of ordinary income. Finally, quotas sometimes create monopoly power for domestic producers, which leads to greater costs to consumers. On the other hand, quotas can have important advantages over tariffs. For instance, if import prices tend to vary substantially relative to domestic costs and the domestic demand curve is fairly stable, a quota will generate a more stable pattern of protection over time than will a tariff. Also, when quota rents are given to foreign suppliers (such as occurs under voluntary restraint agreements), quotas may be less likely than tariffs to incite foreign retaliation.

The effect of domestic taxes

The traditional analysis of the welfare cost of a quota needs to be adjusted to account for the effects of domestic taxes. This adjustment is different for a quota than for the equivalent tariff because a quota yields no tax revenue. Referring to figures D–1 and D–2 in appendix D, if the tariff equivalent of the quota were t, then the quota rents would be given by the area rectangle D plus rectangle H and the net reduction in revenue from domestic taxes would be rectangle E.

As in the previous chapter, an income compensated labor supply elasticity of .3 is used for the economy as a whole. Thus the ratio of the loss in domestic taxes to the quota rents (the ratio of rectangle E to the sum of rectangles D and H) is given as $.3/(1 - t_s - t)$. The tax rate t is quite small and usually can be ignored in calculating this ratio. (It is approximately equal to the quota rent divided by total consumption expenditures.) The marginal rate of domestic taxes on wage income (t_s) is difficult to determine, but recent studies have placed it at about 43 percent.[5] Thus, the effect of domestic taxes is to increase the welfare cost of a quota by an amount equal to about 53 percent of the quota rents. That is, the traditional welfare cost of the quota must be increased by 53 percent of the quota rents to account for the effects of domestic taxes.

If part of the quota rent is taxed away by a tariff, the rent should be measured gross of the tariff revenue for purposes of calculating the domestic tax adjustment, but an adjustment is necessary to account for the effects of the tariff. Namely, the tariff revenue valued at its replacement cost should be subtracted from the welfare

[5] See the studies by M.J. McKee, J.J.C. Visser, and P.G. Saunders, "Marginal Tax Rates on the Use of Labor and Capital in OECD Countries," in *OECD Economic Studies*, No. 7, 1986, pp. 45–101; C.L. Stuart, "Welfare Cost per Dollar of Additional Tax Revenue in the United States," *American Economic Review*, 1987, pp. 352–362; and E.K. Browning, "On the Marginal Welfare Cost of Taxation," *American Economic Review*, 1987, pp. 11–23.

cost of the quota. In the presence of a binding quota, a tariff is an optimum tax, because it imposes no efficiency cost. Thus, the welfare effect of eliminating such a tariff is equal to the loss in revenue, where this revenue loss is valued at the full cost of raising revenue by increasing the alternative tax. Using the assumptions of the previous chapter (the compensated labor supply elasticity is .3, government spending compensates taxpayers for their taxes, and the alternative tax is a proportional increase in all domestic tax rates), an additional dollar of tax revenue would cost the taxpayer about $1.47.[6]

Results

VRAs on steel mill products

Products covered by the restraint.—Steel is a generic term used to describe a variety of iron-carbon alloys. Although steel grades are generally classified into the subcategories of carbon, stainless, tool, and other alloy, for purposes of this analysis two categories are used: carbon steel and specialty steel. "Specialty steel" refers to stainless and alloy tool steel, products which contain quantities of carbon, chromium, and other alloy elements in ratios significantly different from those in carbon steel.

After production in a semifinished form, steel is generally formed into sheets and strip (widely used by the automotive industry), plates and structural products (used in construction, machinery, and industrial equipment), wire and wire products, rails and accessories, and pipe and tubing.

Description and major provisions of the restraint.—In 1984, the United States Trade Representative (USTR) began the negotiation of Voluntary Restraint Agreements (VRAs) that were eventually finalized with 19 countries and the European Community (EC) (excluding Portugal and Spain, which negotiated separate agreements).[7]

The VRAs are designed primarily to limit foreign countries' exports of carbon steel to the United States, but they also cover some stainless steel products. For example, all but the VRA with Finland include stainless steel flat-rolled products.

Export restraint levels for both specialty and carbon steel products generally are expressed as a percentage of projected annual U.S. consumption and so operate as market share quotas. However, for some countries, import levels are expressed strictly as quantitative limits. All the steel agreements have some flexibility, (such as carryovers to other export periods and short supply provisions), but there are also provisions which limit flexibility by preventing product shifting.

VRAs are jointly administered by the United States and the exporting country. Under the VRAs, none of the covered products from a signatory country can enter the United States without an export certificate, issued by foreign governments and subsequently monitored by the U.S. Department of Commerce, which can instruct Customs to stop entries of a product if an agreement is being violated.[8]

Background of the restraints.—Both specialty and carbon steel products have been subject to a number of import restraint programs during the past decade.[9] In 1976, following an affirmative "escape clause" determination, the President sought to negotiate Orderly Marketing Agreements (OMAs) with the leading sources of specialty products. Failing this,[10] he initiated a program of import relief for certain stainless and alloy tool steel products for a period of 3 years.[11] Subsequent steel restraints included the Trigger Price Mechanism (TPM) in 1978, which covered carbon steel products, the U.S.-E.C. VRA in 1982, another specialty steel restraint program in 1983, and finally, the current form of VRAs in 1984. The VRA program was expected to return the share of imports in the U.S. market to a level of approximately 18.5 percent.

Economic effects.—The VRA quotas were, for the most part, binding from their initiation, in 1985, through 1986. In 1987, many of the VRA quotas became nonbinding for some major exporting countries in some product categories

[6] This figure is calculated in E.K. Browning, ibid., pp. 11-23. The cost per additional dollar of taxes varies widely with changes in these assumptions. For example, if taxpayers receive no benefits from their tax dollars, each additional dollar of tax revenue would cost them only $1.32. If tax shortfalls were made up with the income tax instead of the proportional increase in all taxes (maintaining our other assumptions), each dollar of tax revenue would cost taxpayers $1.85.

[7] The countries with which agreements have been reached are Australia, Austria, Brazil, Czechoslovakia, East Germany, Finland, Hungary, Japan, Mexico, China, Poland, Portugal, Korea, Rumania, South Africa, Spain, Trinidad and Tobago, Venezuela, Yugoslavia, and the European Communities (Belgium, Denmark, France, Greece, Ireland, Italy, Luxembourg, the Netherlands, the United Kingdom, and West Germany).

[8] Export certificates permit shipment within 3 months of being issued.

[9] For a more detailed description of steel restraints see U.S. International Trade Commission, *U.S. Global Competitiveness: Steel Sheet and Strip Industry,* USITC Publication 2050, 1988.

[10] Only Japan expressed a willingness to negotiate such an agreement, and did, in fact, conclude an agreement limiting imports of specialty steel for a period of 3 years, beginning June 14, 1976.

[11] The six sources/supplier groups designated in Proclamation 4445 were Japan (whose quantitative restrictions reflected the terms previously agreed upon), the European Community (EC), Canada, Sweden, all other countries entitled to col. 1 rates of duty, and all other countries.

primarily because of the dollar's depreciation and the rise in demand for steel worldwide. For instance, based on 1987 data provided by the International Trade Administration (ITA), on a global basis, only 94 percent of the total export ceiling established under the VRAs was filled in 1987. By product category and on a global basis, the quotas were binding only for semifinished and plates and were nonbinding for other steel product categories. In 1988, ITA data indicate that the quotas became nonbinding for an even greater number of exporting countries than in 1987.[12] Table 3-1 shows the extent to which aggregated VRA ceilings exceeded total imports from all VRA countries in 1987.

When VRA quotas are binding, the typical result is a greater proportion of exports of higher valued products within each steel category subject to export restriction. Since the cost of using an export quota right is the same for one unit of exports, regardless of the value of the export, the proportional price increase for the higher valued product is less than for the lower valued product. Thus, after imposition of the VRA, consumers may purchase fewer units of the lower valued product in place of each unit of the higher valued product.[13]

When VRA quotas are binding, the resulting increase in import prices encourages U.S. consumers to substitute domestic and non-VRA supplied steel products for VRA country-sourced steel products.[14] Domestic suppliers, in turn, respond to increased demand with higher prices and greater shipments. Since the demands for both capital and labor used in the steel industry are derived from the demand for steel, greater demand for steel results in higher wages and returns on capital in the steel industry.

The simultaneous removal of both VRA quotas and regular tariffs on carbon- and specialty-steel products in 1986 through 1988 will be examined in this analysis. The methodology employed will be similar to the one used in chapter 2 and described in appendix C. The main difference between the two methodologies is that $\hat{p}f$, the percentage decline in the price of imports resulting from the removal of all import restraints, will be calculated from

$$\hat{p}_f = (t + q + qt)/(1 + q)(1 + t)$$

[12] See U.S. International Trade Commission, *The Effects of the Steel Voluntary Restraint Agreements on U.S. Steel Consuming Industries,* USITC Publication 2182, May 1989, for a tabulation of the extent to which the quotas were filled on an individual country basis from 1985 through 1988.

[13] See, for instance, Eugene Silberberg, *The Structure of Economics: A Mathematical Analysis,* 1978, pp. 345-349.

[14] The insight that imports are often not perfectly substitutable for domestic product is attributable to Paul S. Armington, "A Theory of Demand for Products Distinguished by Place of Production," *IMF Staff Papers,* March 1969, pp. 159-176. Specifically with respect to steel, direct evidence strongly suggests product differences between imported and domestic steel products. See James M. Jondrow, David E. Chase, and Christopher L. Gamble, *The Price Differential between Domestic and Imported Steel,* Public Research Institute of the Center for Naval Analyses, October 1977. These authors found important differences in optimal inventory level, order size, and inventory costs between use of domestic and imported steel. In a recent Commission report, representatives of service centers confirmed repeatedly that lead times for acquiring imported steel far exceed lead times for domestic steel. See U.S. International Trade Commission, *The Western U.S. Steel Market: Analysis of Market Conditions and Assessment of the Effects of Voluntary Restraint Agreements on Steel Producing and Steel-Consuming Industries,* USITC Publication 2165, March 1989.

Table 3-1

World total steel exports from VRA countries, total export ceilings negotiated under the VRAs, and share of the total export ceiling filled, by product categories, 1987

Category	Total	Final 1987 export ceiling	Share of export ceiling filled
	Metric tons		Percent
Semifinished	1,667,166	1,673,204	99.64
Plates	544,758	545,920	99.79
Sheet/strip	6,184,247	6,521,617	94.83
Bars	484,615	607,743	79.74
Wire rods	701,186	776,342	90.32
Wire/wire products	624,349	742,873	84.05
Structural shapes	1,530,536	1,643,914	93.10
Rails/rail products	107,845	123,383	87.41
Pipe/tube	1,684,432	1,772,089	95.05
Other steel products	103,968	130,112	79.91
Totals	13,638,271	14,537,197	93.82

Source: Calculated by the staff of the USITC from U.S. Department of Commerce, International Trade Administration data.

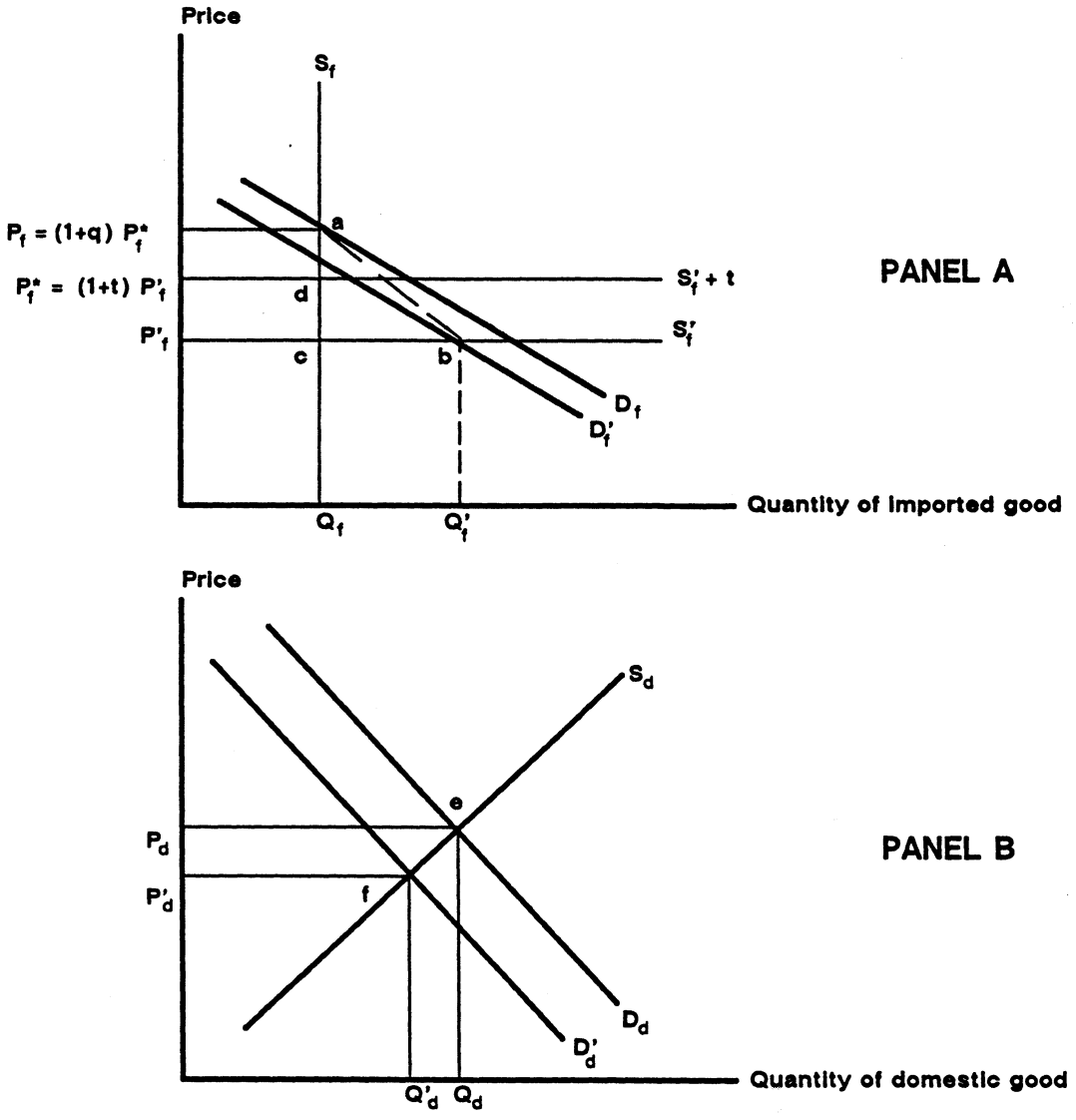
where t is the average ad valorem tariff rate for steel mill products and q is the percent increase in the import price caused by the quota.[15] The decline in the price of imported steel that results from the removal of both the quotas and tariffs is illustrated in figure 3-1A by the movement from equilibrium point a to equilibrium point b.

Estimates of both the quantity effects of the quotas on steel imports and of the value of quota premiums were taken from a recent USITC publication.[16] These estimates, along with the average ad valorem tariff rates, are summarized in table 3-2.

[15] This increase is expressed as a percentage of the c.i.f. price of imported steel gross of duties. In the section analyzing MFAs, the quota induced price increase is expressed as a percentage of the c.i.f. price net of duties.

[16] *The Effects of the Steel Voluntary Restraint Agreement on U.S. Steel Consuming Industries*, USITC Publication 2182, May 1989, provides further discussion on the methodology used to estimate the quota premiums and on the upward bias present in these estimates.

Figure 3-1
The effects of simultaneously removing quotas and tariffs



Key:

P = price
Q = quantity
S = supply
D = demand
f = foreign, imported good
d = domestic good
t = tariff
q = quota

3-6

Table 3-2

Total import shares of U.S. apparent consumption and quota premiums resulting from the steel VRA quotas, and ad valorem tariff rates of steel mill products

Year	Total imports as a share of apparent consumption		Estimated percentage decrease in steel imports	Estimated percentage quota premium on import price		Average Ad-valorem tariff rates
	Estimate without VRA	Actual		ed=1.38	ed=3.5	
1986	28.12	24.70	16.15	4.33	3.96	4.34
1987	24.83	21.76	15.83	4.24	3.88	4.16
1988	21.73	21.38	2.03	0.54	0.50	4.28

Source: U.S. Department of Commerce and USITC, *The Effects of the Steel Voluntary Restraint Agreements on U.S. Steel-Consuming Industries.* (332-270), USITC Publication 2182, May 1989.

The elimination of both the VRA quotas and tariffs on carbon- and specialty-steel products covered by the VRAs would have reduced the dollar value of shipments in this sector by approximately $1.15 to $1.21 billion in 1986 and $.82 to $.89 billion in 1988. The reduction in shipments would have caused employment in the industry to fall by approximately 7,000 to 7,300 employees in 1986 and 3,600 to 3,900 employees in 1988. Losses to these displaced workers would have been approximately $18 to $35 million. The traditional net welfare measure, which accounts for consumer gains, producer losses, and tariff revenue losses, would have been approximately $403 to $433 million in 1986 and $65 to $67 million in 1988. The traditional economic effects of eliminating tariffs and quotas on carbon- and specialty-steel products subject to VRAs are presented in table 3-3. Other adjustments to the traditional economic effects are presented in table 3-4.

Elimination of both the VRA quotas and tariffs on carbon- and specialty-steel products would have caused significant upstream losses in the iron- and ferroalloy-ores-mining and coal-mining sectors and significant downstream gains in ten industries, most notably, the metal container, screw machine products and stamping, and construction and mining machinery sectors. These results are summarized in tables 3-5 and 3-6.

Indirect effects of VRAs on producers and purchasers.—

(1) *VRAs as future export option rights.*—When exports to the United States under a given VRA fall short of the annual export ceiling, the U.S. and foreign governments will typically negotiate a partial or full carryover of unused export rights to the following year's ceiling. From the U.S. standpoint, allowing a carryover discourages exporters from feeling compelled to use or lose export rights in the current year.

Carryovers from one year to the next, however, mean that VRAs that appear to be nonbinding in a given year may be binding if one looks at a period covering more than one year. In other words, exporters may intend to use all currently available export rights, but not necessarily in the current year. Thus, currently allocated export rights represent valuable assets, since exporters likely would expand overseas sales if additional rights were made available.[17] In order to export a unit of steel, an enterprise must bear marginal production costs plus the opportunity cost of using a scarce VRA export right. The export price must cover both types of costs, and hence will often be higher than in the absence of VRAs, even if the annual ceiling exceeds current annual exports.

(2) *Use of VRA quota rights.*—The steel VRAs are scheduled to expire at the end of September 1989.[18] Some U.S. producers allege that exporters were trying to fill current export quotas in order to establish historically higher market shares in anticipation of the possible negotiation of new agreements for 1990 and beyond.[19] Other market participants deny that this has occurred.[20] VRA export ceilings have typically been linked to historical export rates or market share.[21]

The potential of fully using quotas now in anticipation of increased VRA allocations of greater worth in the future depends on several factors. For instance, exporters must believe that revenue earned would increase if the VRA export quotas are expanded.[22] Exporters must also believe that their own governments will allocate VRA

[17] See, for instance, James E. Anderson, "Quotas as Options: Optimality and Quota License Pricing under Uncertainty," *Journal of International Economics,* August 1987, pp. 21-39.
[18] The VRAs have recently been extended to the end of March 1992.
[19] See USITC, *Western U.S. Steel Market.*
[20] Ibid.
[21] Ibid.
[22] Technically, exporters will believe that revenue would be greater with more export rights if they expect that future demand will be elastic, i.e., that a 1-percent decrease in price would lead to more than a 1-percent increase in quantity purchased.

Table 3-3

Traditional measures of the economic effects of unilaterally eliminating import tariffs and VRA import quotas: Carbon- and specialty-steel products subject to the VRAs, 1986-1988

Item	*1986*	*1987*	*1988*
Sector data:			
Shipments (millions of dollars)	28,966.1	31,172.5	36,340.0
Employment (thousands)	175.1	148.5	160.5
Imports, c.i.f. duty paid (millions of dollars)	8,898.1	9,213.8	11,011.2
Economic effects:			
	Elasticity of supply = to 1.38		
Shipments (millions of dollars)	-1,150.0	-1,200.9	-819.7
Employment (thousands)	-7.0	-5.7	-3.6
Consumer gain (millions of dollars)	1,312.5	1,334.5	895.5
Quota rent loss to exporters (millions of dollars)	323.0	331.8	22.6
Producer loss (millions of dollars)	478.2	499.4	343.0
Tariff revenue loss (millions of dollars)	401.0	396.0	486.0
Traditional net welfare gain (millions of dollars)	433.3	439.2	66.6
	Elasticity of supply = to 3.5		
Shipments (millions of dollars)	-1,208.9	-1,263.2	-888.4
Employment (thousands)	-7.3	-6.0	-3.9
Consumer gain (millions of dollars)	1,069.4	1,082.4	745.7
Quota rent loss to exporters (millions of dollars)	294.0	302.4	18.5
Producer loss (millions of dollars)	265.0	276.1	194.4
Tariff revenue loss (millions of dollars)	401.0	396.0	486.0
Traditional net welfare gain (millions of dollars)	403.3	410.3	65.4

Source: U.S. International Trade Commission, *Annual Survey Concerning Competitive Conditions in the Steel Industry and Industry Efforts to Adjust and Modernize* and *Monthly Report on the Status of the Steel Industry*, various issues. Effects estimated by USITC staff.

Table 3-4

Other adjustments to the economic effects of unilaterally eliminating import tariffs and VRA quotas: Carbon- and specialty-steel products subject to the VRAs, 1986-1988

(In millions of dollars)

Item	*1986*	*1987*	*1988*
	Elasticity of supply = to 1.38		
Worker income loss[1]	33.6	27.7	17.6
Domestic tax gain[2]	195.3	199.6	41.2
Terms-of-trade loss[3]	680.4	679.4	444.4
Adjusted net welfare gain	-85.5	-68.3	-354.4
	Elasticity of supply = to 3.5		
Worker income loss[1]	35.4	29.2	19.1
Domestic tax gain[2]	179.9	184.0	39.0
Terms-of-trade loss[3]	725.0	724.9	482.7
Adjusted net welfare gain	-177.2	-159.7	-397.5

[1] The worker income loss calculation assumes a rigid wage in the sector under consideration. If the wage is flexible, the worker income loss would be included in the producer loss of the traditional analysis.
[2] The domestic tax gain calculation assumes that tariff revenue is replaced with a proportional increase in all existing domestic taxes. If the replacement tax were a uniform sales tax, this adjustment would be somewhat larger. If the federal income tax were used to replace the tariff revenue, the adjustment would be somewhat smaller.
[3] The terms-of-trade adjustment is relevant only for a unilateral elimination of both tariffs and VRA quotas. The estimate presented here tends to overstate the true terms-of-trade loss, because it does not account for the fact that increased U.S. imports might cause foreign demand for U.S. exports to increase.

Source: Estimated by USITC staff.

Table 3-5

Reduction in output for important upstream industries when VRA quotas and tariffs for carbon- and specialty-steel products subject to the VRAs are removed, 1986-88

Case: Upstream supplier[1]	Year	Change in output: Elasticity of 1.38[2]	Change in output: Elasticity of 3.5[3]
		Million dollars	
Iron and ferroalloy ores mining (5)	1986	57.5	60.5
	1987	60.1	63.2
	1988	41.0	44.4
Coal mining (7)	1986	56.4	59.2
	1987	58.9	61.9
	1988	40.2	43.5

[1] Numbers in parentheses are input-output sectors.
[2] Elasticity of supply for the domestic import-competing industry is 1.38.
[3] Elasticity of supply for the domestic import-competing industry is 3.5.

Source: Estimated by USITC staff.

Table 3-6

Proportional changes in costs and output for important downstream industries when VRA quotas and tariffs for carbon- and specialty-steel products subject to the VRAs are removed, 1986-88

Case: Downstream user[1]	Year	Domestic supply elasticity of 1.38: Cost[2]	Domestic supply elasticity of 1.38: Output[3]	Domestic supply elasticity of 3.5: Cost[2]	Domestic supply elasticity of 3.5: Output[3]
Other furniture and fixtures (23)	1986	-.00353	.00354	-.00282	.00282
	1987	-.00338	.00339	-.00268	.00269
	1988	-.00200	.00200	-.00164	.00164
Metal containers (39)	1986	-.00928	.00928	-.00740	.00740
	1987	-.00888	.00888	-.00705	.00705
	1988	-.00524	.00525	-.00430	.00430
Screw machine products and stampings (41)	1986	-.00848	.00849	-.00676	.00677
	1987	-.00812	.00812	-.00644	.00645
	1988	-.00479	.00480	-.00393	.00394
Other fabricated metal products (42)	1986	-.00463	.00473	-.00369	.00377
	1987	-.00443	.00452	-.00352	.00359
	1988	-.00261	.00267	-.00214	.00219
Engines and turbines (43)	1986	-.00423	.00445	-.00337	.00355
	1987	-.00405	.00425	-.00321	.00338
	1988	-.00239	.00251	-.00196	.00206
Farm and garden machinery (44)	1986	-.00394	.00427	-.00315	.00340
	1987	-.00377	.00408	-.00300	.00324
	1988	-.00223	.00241	-.00183	.00198
Construction and mining machinery(45)	1986	-.00518	.00399	-.00413	.00318
	1987	-.00495	.00382	-.00393	.00303
	1988	-.00292	.00226	-.00240	.00185
Materials handling machinery and equipment (46)	1986	-.00420	.00399	-.00335	.00319
	1987	-.00402	.00382	-.00319	.00304
	1988	-.00237	.00226	-.00195	.00185
General industrial machinery and equipment (49)	1986	-.00400	.00401	-.00319	.00320
	1987	-.00383	.00384	-.00304	.00305
	1988	-.00226	.00227	-.00185	.00186
Motor vehicles and equipment (59)	1986	-.00256	.00277	-.00204	.00221
	1987	-.00245	.00265	-.00195	.00211
	1988	-.00145	.00157	-.00119	.00129

[1] Numbers in parentheses are input-output sectors
[2] This column presents the proportional decreases in costs.
[3] This column presents the proportional increases in output.

Source: Estimated by USITC Staff.

quota rights directly to existing exporters rather than by other methods, such as by auction. (The revenue benefits of auctioned quotas would accrue to the exporter's government, rather than to the exporter itself.) Moreover, the expected future benefits have to be sufficiently large and certain relative to current losses to ensure that the discounted benefits of future profits exceed the current cost of foregone profits entailed by this strategy.

(3) *Investment risk and market stability.*—Many steel producers and users, including some service centers, contend that the VRAs, although not currently binding (as shown in table 3–1), help stabilize the domestic market.[23] Basically, VRAs in effect with nonbinding quotas limit potential price reductions by imposing an upper bound on imports that could be reached with a lower import price. To the extent downward price movements are limited, holders of domestic steel inventory and owners of capital specific to the U.S. steel industry face a smaller downside risk of unexpected losses.

In effect, even when VRA quotas are nonbinding (as they have largely been in the 1987–88 period), they offer valuable insurance benefits to steel inventory and capital owners because steel prices are implicitly subject to a lower bound. This insurance, however, is not financed by premiums charged to the steel industry beneficiaries, but rather is paid for by intermediate steel users. The insurance benefits conferred by VRAs appear consistent with support for VRAs by the U.S. steel industry and some U.S. inventory holders, the apparent nonbinding status of the export quotas, and the expressed concern by domestic market participants about the relation between VRAs and market stability.[24]

(4) *Short-supply considerations.*—Although the VRAs to a large extent are not currently binding, export quotas on particular subproducts from particular countries may be binding. If binding quotas result in sufficiently severe material availability problems for U.S. downstream producers, the Commerce Department, upon application, may grant a short-supply license for additional imports. However, there is often a considerable time lag involved in obtaining short-supply licenses.

Section 201 relief for specialty steel

"Specialty steel" refers to stainless and alloy tool steel products which contain quantities of carbon, chromium, and other alloying elements in ratios significantly different from those in carbon steel.

Description and major provisions of the restraint.—The temporary import relief for specialty steel products, first specified for four years in July 1983, was extended through September 30, 1989 to expire coincident with the VRA program. The form of the extension for these Orderly Marketing Arrangements (OMAs) was as follows: for the flat-rolled products (stainless steel sheets and strip and stainless steel plate), tariffs will be decreased from 3-percent ad valorem in the first year to 2-percent ad valorem in the second year, and to 1 percent in the final period (July 20, 1989 to September 30, 1989). In addition to these provisions, OMAs continue annual quotas for imports of specified nonflat-rolled stainless and alloy tool steel products from both non-VRA and most VRA countries (except the EC countries, Brazil, and Austria).

Although designed primarily to limit U.S. carbon steel imports, the VRAs also replaced increased tariffs on imports of stainless steel sheets, strips and plates.[25] Additional tariffs remain in effect for specialty steel imports from countries that have not signed a VRA agreement. In addition, the EC-country OMAs on the nonflat-rolled specialty products (i.e., bar, wire rod, and alloy tool steel) were incorporated into the VRAs.

Export restraint levels in the VRAs are generally expressed as percentages of projected annual U.S. consumption and thus operate as market share quotas. However, in some agreements, import levels are expressed as quantitative limits. All the steel agreements contain a similar degree of flexibility with respect to export periods and short supply provisions. There are also provisions to prevent product shifting.

Background of the restraints.—Specialty steel products have been subject to a number of import restraint programs during the past decade.[26] In 1976, following an affirmative section 201 determination, the President sought to negotiate OMAs with the leading sources of specialty products. Failing this,[27] he initiated a program of import relief for certain stainless and alloy tool steel products for a period of 3 years under section 203. These restraints were supplemented in 1978 by the TPM which covered carbon steel products, the U.S.-E.C. VRA (1982), OMAs for specialty steel products (1983), and finally, the current form of VRAs (1984).

Economic Effects.—This analysis focuses only on those specialty-steel products that face quotas—i.e., stainless steel bar, stainless steel wire rod, and alloy tool steel. The method employed is similar to the one used to analyze steel products subject to the VRA quotas. However, in this

[23] See USITC, *Western U.S. Steel Market.*
[24] Other inventory holders, who might not support the VRA's, are primarily importers who benefit more from lower import prices.
[25] The exception to this is Finland, whose VRA does not include stainless steel flat-rolled products.
[26] For a more detailed description of steel restraints refer to USITC, *Steel Sheet and Strip.*
[27] Only Japan expressed a willingness to negotiate such an agreement, and did, in fact, conclude an agreement limiting imports of specialty steel for a period of 3 years, beginning June 14, 1976.

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case, the issue is complicated by the fact that countries that export specialty steel products are subject to 201 quotas although they are not subject to VRAs. The experiment considered, therefore, is the simultaneous elimination of the 201 quotas, the VRA quotas and all regular tariffs.

Since accurate data are not readily available on the extent to which the 201 or VRA quotas are being filled, it is not possible to directly estimate the quota premium for specialty steel. However, since each VRA country can choose between 201 and VRA restraints for its specialty steel, it is reasonable to suppose that the premium on the specialty steel is no greater than that on other steel covered by the VRAs. Thus, the VRA premium is used to provide an upperbound estimate of the premium on specialty steel. The resulting specialty-steel quota premiums and the average ad valorem tariff rates are presented in table 3-7.

The reduction in the value of domestic shipments resulting from the elimination of the VRA and 201 quotas and the tariffs on stainless steel bar and wire rod and alloy tool steel would have reduced the dollar value of shipments in this sector by approximately $49 to $51 million in 1986 and $31 to $33 million in 1988. The reduction in shipments would have caused employment in the industry to fall by approximately 278 to 290 employees in 1986 and 117 to 125 employees in 1988. Losses to these displaced workers would have been approximately $1 million. The traditional net welfare measure, which accounts for consumer gains, producer losses, and tariff revenue losses, would have been approximately $36 to $38 million in 1986 and $8 million in 1988. The traditional economic effects of eliminating tariffs and quotas on specialty-steel products subject to VRA and 201 quotas are presented in table 3-8. Other adjustments to the traditional economic effects are presented in table 3-9.

Eliminating VRA and 201 quotas and the regular tariffs would not have caused significant upstream losses and would have caused significant downstream gains in the ball and roller bearings, household appliances, and motor vehicles parts and accessories sectors. These results are summarized in table 3-10.

Machine Tool VRA

Description and uses of products covered by the restraint.—The VRA with Taiwan covers machining centers, computer-controlled and noncomputer-controlled lathes, and milling machines. The VRA with Japan covers these products and also covers computer-controlled and noncomputer-controlled punching and shearing machines. The VRAs cover knock-down kits of machine tools for later assembly in the United States and certain machine tool subassemblies, as well as finished products.

Machining centers are metal-cutting machine tools that consist of a table that holds the workpiece, a vertical or horizontal spindle that drives the cutting tool against the workpiece, and an automatic tool changer. Lathes, also called turning machines, are metal-cutting machine tools for shaping workpieces that are generally cylindrical. Milling machines are metal-cutting machine tools that remove metal by moving the workpiece into a rotating cutting tool that has one or more cutting teeth. Punching and shearing machines are metal-forming machine tools, since they do not remove metal from the workpiece.

Description of major provisions of the restraint.—The VRAs with Japan and Taiwan both have the same duration and require the exporting country to issue export licenses.[28] Also, both VRAs establish an independent forecaster for projecting apparent consumption, a review procedure, and a procedure for monitoring third-country exports to the United States.

[28] The VRA with Taiwan requires export licenses for all the products covered. The VRA with Japan requires export licenses only for numerically controlled lathes, machining centers and numerically controlled punching and shearing machines. The remaining products are limited through administrative guidance from the Government of Japan.

Table 3-7

Quota premiums and average ad valorem tariff rates for specialty steel products subject to VRA and 201 quotas: Stainless steel bar and wire rod and alloy tool steel, 1986-1988

(In percent)

Year	Estimated percentage increase in import price caused by the quota		Average ad valorem tariff rates
	e_d= 1.38	e_d=3.5	
1986	19.01	17.38	8.14
1987	17.81	16.30	7.95
1988	2.61	2.42	8.02

Source: Calculated by USITC staff.

Table 3-8

Traditional measures of the economic effects of unilaterally eliminating import tariffs and quotas for specialy-steel products subject to VRA and 201 quotas: Stainless steel bar, stainless steel wire rod, and alloy tool steel, 1986-1988

Item	1986	1987	1988
Sector data:			
Shipments (millions of dollars)	450.7	495.4	645.4
Employment (number)	2,600.0	2,300.0	2,400.0
Imports, c.i.f. duty paid (millions of dollars)	161.3	154.2	210.3
Economic effects:			
	Elasticity of supply = to 1.38		
Shipments (millions of dollars)	-49.0	-50.5	-30.5
Employment (number)	-278.0	-241.0	-117.0
Consumer gain (millions of dollars)	70.8	66.0	36.8
Quota rent loss to exporters (millions of dollars)	23.1	20.9	4.1
Producer loss (millions of dollars)	20.0	20.0	12.5
Tariff revenue loss (millions of dollars)	12.8	12.0	16.4
Traditional net welfare gain (millions of dollars)	38.0	34.0	7.9
	Elasticity of supply = to 3.5		
Shipments (millions of dollars)	-51.1	-53.9	-33.1
Employment (number)	-290.0	-251.0	-125.0
Consumer gain (millions of dollars)	59.8	55.8	31.3
Quota rent loss to exporters (millions of dollars)	21.4	19.3	3.8
Producer loss (millions of dollars)	10.9	11.5	7.2
Tariff revenue loss (millions of dollars)	12.8	12.0	16.4
Traditional net welfare gain (millions of dollars)	36.1	32.3	7.7

Source: U.S. International Trade Commission, *Annual Survey Concerning Competitive Conditions in the Steel Industry and Industry Efforts to Adjust and Modernize* and *Monthly Report on the Status of the Steel Industry*, various issues. Effects estimated by USITC staff.

Table 3-9

Other adjustments to the economic effects of unilaterally eliminating import tariffs and quotas for specialty-steel products subject to VRA and 201 quotas: Stainless steel bar, stainless steel wire rod, and alloy tool steel, 1986-1988

(In millions of dollars)

Item	1986	1987	1988
	Elasticity of supply = to 1.38		
Worker income loss[1]	1.2	1.1	0.6
Domestic tax gain[2]	13.0	11.8	3.2
Terms-of-trade loss[3]	31.7	29.0	17.2
Adjusted net welfare gain	18.1	15.7	-6.7
	Elasticity of supply = to 3.5		
Worker income loss[1]	1.3	1.2	0.7
Domestic tax gain[2]	12.1	11.0	3.0
Terms-of-trade loss[3]	33.7	30.9	18.6
Adjusted net welfare gain	13.2	11.2	-8.5

[1] The worker income loss calculation assumes a rigid wage in the sector under consideration. If the wage is flexible, the worker income loss would be included in the producer loss of the traditional analysis.
[2] The domestic tax gain calculation assumes that tariff revenue is replaced with a proportional increase in all existing domestic taxes. If the replacement tax were a uniform sales tax, this adjustment would be somewhat larger. If the federal income tax were used to replace the tariff revenue, the adjustment would be somewhat smaller.
[3] The terms-of-trade adjustment is relevant only for a unilateral elimination of both tariffs and quotas. The estimate presented here tends to overstate the true terms-of-trade loss, because it does not account for the fact that increased U.S. imports might cause foreign demand for U.S. exports to increase.

Source: Estimated by USITC staff.

Table 3-10

Proportional changes in costs and output for important downstream industries when quotas and tariffs are removed on specialty steel products subject to VRA and 201 quotas: Stainless steel bar, stainless steel wire, and alloy tool steel, 1986-88

Case: Downstream user[1]	Year	Domestic supply elasticity of 1.38		Domestic supply elasticity of 3.5	
		Cost[2]	Output[3]	Cost[2]	Output[3]
Ball and roller bearings (490200)	1986	-.01552	.01553	-.01251	.01251
	1987	-.01386	.01386	-.01121	.01121
	1988	-.00653	.00653	-.00541	.00541
Household cooking equipment (540100) ..	1986	-.00940	.00931	-.00757	.00750
	1987	-.00839	.00831	-.00679	.00672
	1988	-.00395	.00392	-.00327	.00324
Household laundry equipment (540700) ..	1986	-.01096	.01086	-.00883	.00875
	1987	-.00979	.00969	-.00792	.00784
	1988	-.00461	.00457	-.00382	.00378
Household appliances n.e.c. (540700) ...	1986	-.01222	.01210	-.00985	.00975
	1987	-.01091	.01081	-.00882	.00874
	1988	-.00514	.00509	-.00426	.00422
Motor vehicles parts and accessories (590302)	1986	-.00953	.01030	-.00768	.00830
	1987	-.00851	.00919	-.00688	.00744
	1988	-.00401	.00433	-.00332	.00359

[1] Numbers in parentheses are input-output sectors. The input-output coefficients used in this table are for all steel products produced by blast furnaces and steel mill products (370101). It is assumed that the coefficients for downstream users of all steel products are close approximations of the coefficients for downstream users of specialty steel.
[2] This column presents the proportional decreases in costs.
[3] This column presents the proportional increases in output.

Source: Estimated by USITC staff.

The VRAs are to last 5 years, covering the period January 1, 1987, through December 31, 1991. Under both VRAs, exports to the United States are limited to a specified share of U.S. apparent consumption for each of the product categories. Japan's exports of machining centers, computer-controlled lathes, and computer-controlled punching and shearing machines are limited to its 1981 shares of the U.S. market. Its exports of milling machines, noncomputer-controlled lathes and noncomputer-controlled punching and shearing machines are limited to its 1985 market shares. Taiwan's exports of noncomputer-controlled lathes and milling machines are limited to its 1981 U.S. market shares. Taiwan's exports of machining centers and computer-controlled lathes are limited to its 1985 market shares. Japan and Taiwan are also required to maintain their 1985 product mix within categories to prevent shifts into higher valued product lines.

In late 1986, the U.S. Government informed both West Germany and Switzerland that their exports should not exceed specified limits during 1987-1991. West German exports of noncomputer-controlled punching and shearing machines are limited to its 1981 market share. Its exports of machining centers, computer-controlled and noncomputer-controlled lathes and computer-controlled punching and shearing machines are restricted to its 1985 market share. Exports from Switzerland of computer-controlled punching and shearing machines are limited to its 1985 share of the U.S. market. The U.S. Government stated it would take unilateral action to restrain these exports if the limits are exceeded.

Background of the restraint.—In March 1983, the National Machine Tool Builders Association submitted a petition under section 232 of the Trade Expansion Act of 1962 recommending quotas on certain U.S. imports of metalworking machine tools, based on the view that such imports threaten the U.S. national security. After considering mobilization, defense, and economic planning factors, the President announced on May 20, 1986, that VRAs would be sought with Taiwan, West Germany, Japan, and Switzerland. In December 1986, agreements were concluded with Japan and Taiwan. West Germany and Switzerland were informed that their exports to the United States should not exceed certain levels, and that their exports would be monitored.

Economic effects.—In quantity terms, the VRA market share of U.S. apparent consumption ranged from 16 to 76 percent for different types of machine tools. (See table 3-11). The VRA market shares and their corresponding quantity ceilings for 1987 are presented in table 3-12.

Exporting licenses monitored by ITA show that on a global basis, only the import restraints of NC Lathes and non-NC punching and shearing machines were nonbinding in 1987. Indeed, in 1987, Taiwan significantly overfilled all of its quota limits. Remedies to this overage of Taiwanese

Table 3-11

Machine Tools: VRA imports, U.S. apparent consumption, and VRA market shares of U.S. apparent consumption, 1986 and 1987

	VRA imports		U.S. apparent consumption		VRA market share	
	1986	1987	1986	1987	1986	1987
	Value					
	Thousands $				Percent	
NC Lathes[1]	233,228	232,073	470,412	481,148	50	48
Non-NC Lathes[2]	49,879	17,914	164,959	111,028	30	16
Machining centers	324,414	258,855	554,731	482,127	58	54
Milling machines	41,890	36,802	257,797	276,373	16	13
Punching and shearing machines	53,418	33,916	184,150	199,527	29	17
	Quantity					
	Units				Percent	
NC Lathes[1]	4,591	3,426	6,914	5,685	66	60
Non-NC Lathes[2]	3,032	1,557	6,279	4,998	48	31
Machining centers	3,687	2,551	4,842	3,738	76	68
Milling machines	3,436	2,414	14,457	10,619	24	23
Punching and shearing machines	795	451	5,105	4,297	16	10

[1] "NC" denotes numerically controlled.
[2] "Non-NC" denotes nonnumerically controlled.

Source: U.S. Department of Commerce.

Table 3-12

Forecast U.S. consumption, unadjusted export ceilings[1], and agreement market shares of exports of machine tools from Japan and Taiwan, 1987

Item	U.S. consumption	Export ceiling	Agreement market share
	Units	Units	Percent
Japan:			
NC lathes[2]	5,897	3,389	57.47
Non-NC lathes[3]	4,521	217	4.81
Machining centers	3,806	1,962	51.54
Milling machines	11,275	355	3.15
NC punching and shearing machines[2]	770	148	19.25
NON-NC punching and shearing mach.[3]	3,780	345	9.14
Taiwan:			
NC lathes[2]	5,897	190	3.23
Non-NC lathes[3]	4,521	1,117	24.70
Machining centers	3,806	177	4.66
Milling machines	11,275	2,175	19.29

[1] The 1987 export ceiling (quota) was calculated by ITA from a forecast by Data Resources, Inc. of 1987 consumption. The ITA later adjusted the ceiling by taking transition period overages into account. See table 3-3.
[2] "NC" denotes numerically controlled.
[3] "Non-NC" denotes nonnumerically controlled.

Source: U.S. Department of Commerce, ITA.

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imports are currently being negotiated by the ITA and Taiwan. (See table 3-13.) Preliminary figures tabulated by the ITA indicate that, in 1988, Taiwan again filled all of its quotas. However, Japan fell significantly short of all of its quota limits for all product categories.[29]

The estimates of the effects of the machine tool VRAs are based on the same methodology as that used to estimate the effects of the steel VRAs. Again, the experiment considered is the elimination of both the VRAs and regular tariffs. The effect of the VRA quotas on the level of imports, the resulting quota premiums, and the average ad valorem tariff rates are presented in table 3-14.[30]

The elimination of VRA quotas and tariffs on machine tools subject to the VRAs would have reduced the dollar value of shipments in this sector by approximately $61 to $62 million in 1986 and $39 million in 1988. The reduction in shipments would have caused employment in the industry to fall by approximately 658 to 671 employees in 1988. Losses to these displaced workers would have been approximately $1.8 to $2.9 million. The traditional net welfare measure, which accounts for consumer gains, producer losses, and tariff revenue losses, would have been approximately $38 to $41 million in 1986 and $8 million in 1988. The traditional economic effects of eliminating tariffs and VRA quotas on machine tools subject to VRAs are presented in table 3-15. Other adjustments to the traditional economic effects are presented in table 3-16.

No downstream industries would have been significantly affected by the elimination of these import restraints. The upstream sectors that would have experienced significant losses were blast furnaces and steel mills and iron and steel foundries. The upstream sector effects are summarized in table 3-17.

Japanese voluntary export restraints on automobiles

This trade restraint applies to on-the-highway automobiles, vans, and 4-wheel-drive utility vehicles, designed primarily to transport passengers. With the exception of a few vehicles like the elongated sedans used to transport passengers to and from airports, motor vehicles that carry more than nine passengers are not normally considered automobiles.

[29] From conversations with the staff of the ITA, January 1989.
[30] See USITC, *The Effects of the Steel Voluntary Restraint Agreements on U.S. Steel Consuming Industries*, p. 2, for a discussion of the method used to calculate the effects of the quotas on import quantities.

Table 3-13

Machine tool exports from VRA countries, total export ceilings negotiated under the VRAs, and the share of the total export ceiling filled, by country and product categories, 1987

Item	Exports	Adjusted[1] export ceiling	Share of export ceiling filled
	Units		Percent
Taiwan:			
NC lathes[2]	178	161	110.56
Non-NC lathes[3]	1,141	817	139.66
Machining centers	275	126	218.25
Milling machines	2,108	1,867	112.91
Japan:			
NC lathes[2]	3,182	3,389	93.89
Non-NC lathes[3]	36	64	56.25
Machining centers	1,949	1,962	99.34
Milling machines	164	355	46.20
NC punching and shearing machines[2]	148	148	100.00
Non-NC punching and shearing machines[3]	180	345	52.17
Japan & Taiwan:			
NC lathes[2]	3,360	3,550	94.65
Non-NC lathes[3]	1,177	881	133.60
Machining centers	2,224	2,088	106.51
Milling machines	2,272	2,222	102.25
NC punching and shearing machines[2]	148	148	100.00
Non-NC punching and shearing machines[3]	180	345	52.17

[1] The 1987 export ceiling (quota) was calculated by ITA from a forecast by DRI of 1987 consumption. The ITA later adjusted the ceiling by taking transition period overages into account.
[2] "NC" denotes numerically controlled.
[3] "Non-NC" denotes nonnumerically controlled.

Source: U.S. Department of Commerce, ITA.

Table 3-14

Total imports and quota premiums resulting from machine tool VRA quotas, and ad valorem tariff rates of machine tools

Year	Total imports: Estimate without VRA	Total imports: Actual	Estimated percentage reduction in machine tool imports	Estimated percentage increase in import price caused by the quota: ed= 1	Estimated percentage increase in import price caused by the quota: ed=10	Average ad-valorem tariff rates
	Millions of dollars		Percent			
1987	917	791	13.79	4.88	4.41	3.96
1988	745	725	2.67	0.94	0.85	4.20

Source: Calculated by USITC staff.

Table 3-15

Traditional measures of the economic effects of unilaterally eliminating import tariffs and VRA quotas: machine tools subject to the VRA quotas, 1987-1988

Item	1987	1988
Sector data:		
Shipments (millions of dollars)	718.9	758.8
Employment (number	7,800.0	7,820.0
Imports, c.i.f. duty paid (millions of dollars)	763.8	701.3
Economic effects:		
	Elasticity of supply = to 1	
Shipments (millions of dollars)	-61.8	-38.7
Employment (number)	-671.0	-399.0
Consumer gain (millions of dollars)	100.9	56.0
Quota rent loss to exporters (millions of dollars)	33.3	5.5
Producer loss (millions of dollars)	30.3	19.1
Tariff revenue loss (millions of dollars)	30.0	29.0
Traditional net welfare gain (millions of dollars)	40.7	7.9
	Elasticity of supply = to 10	
Shipments (millions of dollars)	-60.7	-39.4
Employment (number)	-658.0	-406.0
Consumer gain (millions of dollars)	72.9	40.0
Quota rent loss to exporters (millions of dollars)	30.1	4.9
Producer loss (millions of dollars)	5.3	3.5
Tariff revenue loss (millions of dollars)	30.0	29.0
Traditional net welfare gain (millions of dollars)	37.5	7.5

Source: U.S. Department of Commerce. Effects estimated by USITC staff.

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Table 3-16

Other adjustments to the economic effects of unilaterally eliminating import tariffs and VRA quotas: machine tools subject to VRA quotas, 1987-1988

(In millions of dollars)

Item	1987	1988
	Elasticity of supply = to 1	
Worker income loss[1]	2.9	1.8
Domestic tax gain[2]	19.4	4.7
Terms-of-trade loss[3]	41.5	21.8
Adjusted net welfare gain	15.7	-11.1
	Elasticity of supply = to 10	
Worker income loss[1]	2.8	1.9
Domestic tax gain[2]	17.8	4.4
Terms-of-trade loss[3]	45.0	24.0
Adjusted net welfare gain	7.4	-14.0

[1] The worker income loss calculation assumes a rigid wage in the sector under consideration. If the wage is flexible, the worker income loss would be included in the producer loss of the traditional analysis.
[2] The domestic tax gain calculation assumes that tariff revenue is replaced with a proportional increase in all existing domestic taxes. If the replacement tax were a uniform sales tax, this adjustment would be somewhat larger. If the federal income tax were used to replace the tariff revenue, the adjustment would be somewhat smaller.
[3] The terms-of-trade adjustment is relevant only for a unilateral elimination of both tariffs and VRA quotas. The estimate presented here tends to overstate the true terms-of-trade loss, because it does not account for the fact that increased U.S. imports might cause foreign demand for U.S. exports to increase.

Source: Estimated by USITC staff.

Table 3-17

Reduction in output for important upstream industries when import restraints are removed on machine tools (metal forming types), 1987-1988

Case: Upstream supplier[1]	Year	Change in output: Elasticity of 1[2]	Change in output: Elasticity of 10[3]
		Million dollars	
Blast furnaces and steel mills (370101)	1987	4.3	4.3
	1988	2.7	2.8
Iron and steel foundries (370200)	1987	3.1	3.0
	1988	1.9	2.0

[1] Numbers in parentheses are input-output sectors.
[2] Elasticity of supply for the domestic import-competing industry is one.
[3] Elasticity of supply for the domestic import-competing industry is ten.

Source: Estimated by USITC staff.

Description of major provisions of the restraint.—The Japanese Ministry of International Trade and Industry (MITI) administers restraints on exports of motor vehicles to the United States. Included in the restraints are passenger automobiles with a limit of 2.3 million units per Japan fiscal year, vans and 4-wheel-drive utility vehicles with a limit of 113,000 units, and cars into Puerto Rico with a limit of 96,000 units. The quotas are allocated by company. Actual company quotas are not officially published, but estimates of these quotas are available. The Japan Automobile Manufacturers Association (JAMA) monitors exports for MITI.

Background of the restraint.—During the late 1970's and early 1980's, the U.S. automobile market underwent a significant shift in the shares held by foreign and domestic producers, with the U.S. share of apparent domestic consumption declining from 74 percent in 1978 to 67 percent in 1981. The U.S. auto industry experienced record losses of $4 billion in 1980. Sales of U.S.-made cars decreased from 9.0 million units in 1978 to 6.0 million units in 1981. Imports of Japanese autos, conversely, rose from 14 percent of U.S. apparent consumption in 1978 to 22 percent in 1981.

In June 1980, a petition for relief from imports under section 201 of the Trade Act of 1974 was filed. In November 1980, the Commission determined that increased imports of on-the-highway passenger automobiles were not a substantial

cause of serious injury, or threat of serious injury, to the domestic industry.

By early 1981, legislation to restrict U.S. imports of cars from Japan to 1.6 million units gained support and the President indicated that a veto of such a bill would be politically difficult.

In 1981, MITI announced a voluntary restraint on Japanese auto exports to the United States. MITI stated that Japan's exports of cars to the United States would be reduced by 7.7 percent for the Japanese fiscal year of April 1, 1981, through March 31, 1982 (JFY 1981), compared with the previous fiscal year's level. The Voluntary Export Restraint, in effect, reduced Japan's U.S. car sales from the 1980 level of 1.82 million units to 1.68 million units. MITI indicated a second year of restraint would be considered after observing 1981 U.S. market performance. At a later date, MITI announced that exports to the United States of vehicles such as 4-wheel-drive station wagons and "jeep"-type vehicles would be limited to 82,500 units, and exports to Puerto Rico would not exceed 70,000 units. Thus, total Japanese exports of autos and the above types of vehicles to the United States were set at 1,832,500 units for the Japanese fiscal year 1981. There were no changes in these restraint levels during the next 2 Japan fiscal years (JFYs) (1982-83).

In November 1983, the Japanese Government announced that it would increase its voluntary export limit from 1.68 million to 1.85 million automobiles during JFY. In addition, it also announced that the passenger van and "jeep"-type vehicle limit would be increased to 90,848 units and exports to Puerto Rico would rise to 77,083 units. Thus, the total number of quota-limited Japanese motor vehicles exported to the United States during JFY 1984 increased from 1,832,500 to 2,017,931 units, or by 10 percent.

The U.S. Government did not ask that the VER be extended past March 31, 1985, but on March 28, 1985, MITI announced that it would limit annual auto exports to the United States to 2.3 million units. This represented an increase of about 25 percent over the previous year limit of 1.85 million units. Japan has announced each year since that it would hold the annual quota level at 2.3 million units.

Economic effects.—The demand for Japanese passenger cars subject to VERs has dropped considerably in recent years, primarily because of the sharp rise in the value of the yen since 1985 and increased production by Japanese-owned assembly plants in the United States. Passenger car exports subject to VERs in JFY 1987 totaled 2.214 million units, coming in below the VER limits (2.3 million units in JFY 87) for the first time. In JFY 1988, passenger car exports totaled 2.178 million units, again coming in below the VER limits.

Although total exports were below the limit in JFYs 1987 and 1988, most companies were probably constrained by their individual allocations. It is difficult to say definitively whether companies met their quotas in JFYs 1987 and 1988 because MITI does not make company quotas public.[31] However, an unofficial Japanese source told the U.S. embassy in Tokyo that the quota allocations shown in table 3-18 seem to be correct.[32] Company exports can be compared with these quota estimates to obtain the number of units and the percent that companies were short of their quotas, as shown in table 3-18. Nissan was clearly not constrained by its quota in JFY 1987. Fuji (Subaru) also seems not to have been constrained but others might have been—the small numbers by which they are short of their quotas are easily attributed to mistakes in timing of shipments or deliberate shortfalls.[33]

Other evidence that VERs might have had a restraining effect in JFY 1987 comes from an informal MITI poll in the fall of 1988. Several companies, including, Toyota, Honda, Isuzu and Suzuki indicated plans to increase exports to the United States if the VER were allowed to expire. Toyota reportedly changed its position later.[34]

The situation in JFY 1988 was similar to that in JFY 1987. Nissan accounted for the bulk of the shortfall. Daihatsu apparently was not constrained by its quota, and Mitsubishi may not have been constrained. The other companies exported their exact quota allocations or were very close to them.

Estimates of the price effect of the quotas in JFYs 1987 and 1988 have not been made because the effect was probably small relative to errors inherent in available estimation techniques. The following example is meant to provide some notion of the likely size of the price effect.

If cars made by different Japanese companies are very close substitutes for each other, then Nissan's shortfall means the overall quota is not very binding and the price effect is negligible. Even if Toyota were strongly constrained, the excess demand for Toyotas would have spilled over into the demand for Nissans, which were not constrained. Thus, unless Nissans are considered by consumers to be very different from other Japanese autos, the price effect of the quotas was very small in JFYs 1987 and 1988.

[31] USITC staff telephone conversation with Mr. Urata, MITI counselor at the Japanese Embassy, Washington, DC, Jun. 28, 1989.
[32] U.S. Embassy, Tokyo, Cable No. 12866, July 1989.
[33] There was a report that MITI urged several auto makers to restrain year end shipments so their quotas would not be filled, (Masayoshi Kanaboyashi, "MITI Makes Only Slight Modifications to Car Companies' U.S. Export Quotas," *Asian Wall Street Journal Weekly*, Apr. 18, 1988, p. 10).
[34] U.S. Embassy, Tokyo, Cable No. 828, January 1989.

3-18

Table 3-18

Japanese passenger auto quotas, exports to the United States, and absolute number and percentage under quota, by company, JFYs 1987 and 1988

Company	Quota	Actual exports	Under quota	Percent under quota
		(JFY 1987)		
Toyota	613,816	607,816	6,000	0.98
Nissan	541,778	481,674	60,104	11.09
Honda	424,865	422,365	2,500	0.59
Mazda	226,661	223,919	2,742	1.21
Mitsubishi	194,125	187,125	7,000	3.61
Isuzu	119,798	118,474	1,324	1.11
Fuji	107,062	101,476	5,586	5.22
Suzuki	60,397	60,000	397	0.66
Daihatsu	11,498	11,300	198	1.72
Total	2,300,000	2,214,149	85,851	3.73
		(JFY 1988)		
Toyota	612,340	612,340	0	0.00
Nissan	540,475	425,962	114,513	21.19
Honda	423,844	423,844	0	0.00
Mazda	226,116	226,116	0	0.00
Mitsubishi	193,658	189,711	3,947	2.04
Isuzu	119,510	119,510	0	0.00
Fuji	106,805	105,912	893	0.08
Suzuki	60,252	60,252	0	0.00
Daihatsu	17,000	14,219	2,781	16.36
Total	2,300,000	2,177,866	122,134	5.31

Source: Calculated by USITC staff from JAMA data.

Other studies have treated autos made by different Japanese companies as perfect substitutes.[35] Thus, the authors of these studies apparently believed the effect of brand differences to be small. Lacking a measure of the importance of these brand-name differences, it is not possible to provide meaningful estimates of the effects of the Japanese auto VER when the quota is not binding overall.

Another type of analysis can be used to support the view that the quotas did not reduce Japanese exports to the United States in JFY 1988 as much as in previous years. In the period JFY 1977–80 exports in any given month were on average within a range of 12.5 percent of the monthly average for the fiscal year, as illustrated in table 3-19. Exports tended to be highest in December and March and lowest in August and April.

During the quota years JFY 1981–87, the pattern was very different, as illustrated in table 3-19. March exports tended to be 48 percent below the monthly average, while April exports tended to be 37 percent above the monthly average for the fiscal year. Presumably companies tended to overship early in the quota year, battling for market share, and found themselves constrained in March.

Exports in JFY 1988, however, show a pattern much closer to that of the unconstrained, pre-quota period. Exports in March rose to about the monthly average and actually fell in April of the next fiscal year. Some companies are constrained by their quotas, but there has been a dramatic movement back toward the unconstrained pattern of exports.

[36] For a recent example see Robert C. Feenstra, "Quality Change Under Trade Restraints in Japanese Autos," *Quarterly Journal of Economics*, February 1988, pp. 131–146. For other examples, see the list of references in Feenstra. Feenstra and others using hedonic regressions to separate the price effects of quality upgrading and quotas implicitly treat autos from different companies with the same characteristics as perfect substitutes. Product differentiation is explicitly modeled, but brand name is not a factor that is included.

Table 3-19

Japanese passenger automobile exports to the United States, deviation from JFY monthly average, Japanese fiscal years 1977-88

(In percent)

Month	Average		Actual	
	JFY 1977-80	JFY 1981-87	JFY 1987	JFY 1988
April	- 6.91	36.55	36.05	16.46
May	- 2.11	12.44	7.73	- 8.46
June	- 1.63	5.57	- 4.29	-19.46
July	- 1.00	15.19	23.69	5.46
August	-12.47	-10.76	- 4.74	-16.98
September	- 1.87	4.84	17.15	14.96
October	- 3.19	4.79	12.98	10.28
November	0.70	9.20	6.35	13.00
December	10.43	- 3.73	0.21	6.73
January	1.80	-11.75	-23.05	-12.00
February	6.64	-14.74	-25.54	- 9.93
March	9.59	-47.58	-46.54	- 0.06

Source: Calculated by USITC staff from JAMA data.

Chapter 4

Textiles And Apparel[1]

Introduction

Textile and apparel items are subject to both quantitative restraints (the Multifiber Arrangement or MFA) and high tariff rates. This chapter examines the effects of removing all tariffs and quotas on textile and apparel imports. It does not present separate results for tariff and quota elimination. For some countries and products, the quota is binding and therefore the tariff does not further discourage imports. In many cases, a binding quota for one country and product leads to an increase in production of the product in another country, as evidenced by the overall growth in imports during the 1980s. The existence of such unconstrained supplies tends to reduce the effect of the MFA quotas on imports and prices.

Description and uses

The product category called "textiles" is often broken down into two major components: (1) textile mill products (or textiles for short) and (2) apparel. These two components correspond to Standard Industrial Classification (SIC) groups 22 and 23, respectively. Textile mills are primarily engaged in spinning, weaving, and knitting operations. In most cases, their products are further processed in other industries making apparel or household items, or industrial products such as automobiles. However, some knitting mills produce finished apparel items such as hosiery, underwear, or knit outerwear, and some weaving mills produce finished carpets, towels, or sheets. Apparel establishments classified in SIC 23 primarily cut and assemble garments, but some establishments in SIC 23 also produce fabricated textile products such as curtains and other house furnishings.

The MFA covers products such as tops, yarns, piece-goods, made-up articles, garments and other manufactured textile products which derive their chief characteristics from their textile components. Originally only textile products of cotton, wool, manmade fiber, or blends of these materials were covered. In 1986, coverage was extended to include products of silk blends and of noncotton vegetable fibers.

A set of 3-digit categories has been developed to monitor international trade in textile and apparel items. These categories are listed in table 4-1.[2]

[1] This chapter is primarily the product of Professor Joseph Pelzman of George Washington University. All major decisions were made in close collaboration with, and cleared by, the Commission staff.

[2] A full list of textile categories along with their corresponding Harmonized Tariff Schedule (HTS) import numbers is contained in the U.S. Department of Commerce publication "Correlation: Textile and Apparel Categories With Harmonized Tariff Schedule of the United States Annotated."

The Multifiber Arrangement

Major provisions of 1986 MFA

The MFA provides the framework for the negotiation of bilateral agreements between importing and exporting countries (article 4), or for unilateral action by importing countries in the absence of an agreement (article 3), to control textile and apparel trade among its signatories and prevent market disruption. The original MFA was in effect during 1974–77. The agreement has been extended three times, 1977–81 (MFA II), 1982–1986 (MFA III), and 1986–1991 (MFA IV), and is scheduled to expire July 31, 1991.

The third extension (the 1986 Protocol) includes guidelines for administering the arrangement. These relate to appropriate measures of market disruption, imposition of unilateral restraints, levels of growth and flexibility, underutilized quotas, special treatment for certain countries such as new suppliers, circumvention of quotas, and other areas of concern to participants. All textile and apparel products made of vegetable, wool or manmade fibers and silk blends are subject to control under the MFA except for certified handloomed and folklore products and traditional products of noncotton vegetable fibers.

The mechanisms most used by the United States to control imports of textiles and apparel are bilateral agreements with exporting countries under article 4 of the MFA. These bilateral agreements have increased in number since the MFA was established in 1974 and have become more detailed and comprehensive in terms of setting specific limits on individual product categories and aggregate limits. In late 1977, the United States had agreements limiting imports with 18 countries, by mid-1984 with 28 countries, and by 1988 with more than 40 countries.

Some agreements set limits on both specific categories and groups of categories. Most agreements provide that the United States may request consultations on additional categories if imports of these products are disrupting domestic markets and may unilaterally limit imports in the "called" category during negotiations. The MFA specifies that unilateral limits shall not be less than actual imports in a recent 12-month period and that, other than in exceptional cases, an annual increase of 6 percent shall be allowed. MFA II allowed "reasonable departures" from the 6-percent growth rate and the category flexibility specified in annex B. MFA III eliminated the "reasonable departures" provision but reaffirmed the right of importing countries to negotiate bilateral agreements that specify growth rates

Table 4-1
Tariffs and tariff equivalents of MFA quotas

(Percentages)

Category	*Description*[1]	*Tariff rate*	*Quota equivalent*
300	Carded cotton yarn	7.2	19.3
301	Combed cotton yarn	10.4	21.0
310	Gingham fabric	14.2	21.4
311	Velveteen fabric	20.2	27.9
312	Corduroy fabric	25.4	39.0
313	Cotton sheeting	7.9	13.9
314	Poplin and broadcloth	11.1	16.5
315	Cotton printcloth	9.0	12.9
316	Cotton shirting	14.4	8.2
317	Twills and sateens	8.2	13.8
318	Other yarn-dyed fabrics	13.2	14.9
319	Duck	6.9	14.6
320	Other cotton woven fabrics	11.9	15.4
330	Handkerchiefs	12.0	13.2
331	Cotton gloves and mittens	23.7	42.2
332	Cotton hosiery	18.7	38.4
333	MB suit-type coats	10.5	14.6
334	Other MB coats	10.1	15.5
335	WGI coats	9.8	0.0
336	Cotton dresses	13.5	0.0
337	Cotton playsuits, sunsuits	9.5	0.0
338	MB knit shirts	21.0	25.0
339	WGI knit shirts and blouses	20.9	32.9
340	MB shirts, not knit	20.9	33.7
341	WGI shirts, not knit	16.5	23.9
342	Cotton skirts	8.9	17.8
345	Cotton sweaters	20.8	44.2
347	MB trousers and shorts	16.9	22.9
348	WGI trousers and shorts	16.9	19.5
349	Brassieres, etc.	21.9	34.8
350	Dressing gowns, etc.	8.8	41.8
351	Cotton nightwear and pajamas	10.6	14.2
352	Cotton underwear	10.6	13.2
353	MB down-filled coats, etc.	4.7	13.8
354	WGI down-filled coats, etc.	4.7	17.4
359	Other cotton apparel	9.1	63.0
410	Woolens and worsteds	32.1	35.9
411	Tapestry and upholstery	7.5	0.0
425	Wool knit fabrics	19.9	28.5
429	Other wool fabrics	9.4	18.8
431	Wool gloves and mittens	9.4	0.0
432	Wool hosiery	12.2	53.4
433	MB suit-type coats	22.5	31.0
434	Other MB coats	24.0	48.3
435	WGI wool coats	22.9	31.1
436	Wool dresses	18.4	0.0
438	Knit shirts and blouses	18.4	48.7
440	Shirts, not knit	22.7	26.6
442	Wool skirts	17.2	19.1
443	MB wool suits	22.7	39.3
444	WGI wool suits	17.8	26.8
445	MB wool sweaters	16.4	23.0
446	WGI wool sweaters	17.0	25.4
447	MB trousers and shorts	22.4	31.7
448	WGI trousers and shorts	17.3	25.0
459	Other wool apparel	12.5	27.2
600	Textured MMF yarns	9.6	0.0
601	Continuous cellulosic	11.1	13.0
602	Continuous noncellulosic	10.8	23.8
603	Noncontinuous cellulosic	11.5	0.0
604	Noncontinuous noncellulosic	11.9	20.3
605	Other MMF yarns	13.9	15.8
610	Woven of cont. cellulosic	18.7	99.5
611	Woven of spun cullulosic	17.3	45.6
612	Woven of cont. non-cell.	18.4	20.3
613	Woven of spun non-cellul.	17.0	0.0
614	Other woven MMF fabrics	17.0	0.0
625	Knit MMF fabrics	17.0	21.8
626	Pile and tufted fabrics	17.0	0.0
627	MMF specialty fabrics	17.0	92.0
630	Handkerchiefs	14.6	23.6
631	MMF gloves and mittens	19.6	25.6
632	MMF hosiery	20.5	22.6
633	MB suit-type coats	25.2	46.3

4-2

See footnote at end of table.

Table 4-1—*Continued*

Tariffs and tariff equivalents of MFA quotas

(Percentages)

Category	*Description*[1]	*Tariff rate*	*Quota equivalent*
634	Other MB coats	24.7	25.5
635	WGI MMF coats	27.3	51.9
636	MMF dresses	21.4	35.3
637	MMF playsuits, sunsuits	20.6	28.1
638	MB knit shirts	34.5	35.2
639	WGI knit shirts	34.5	43.6
640	MB shirts, not knit	29.2	42.5
641	WGI shirts, not knit	29.2	34.1
642	MMF skirts	18.0	28.0
643	MB suits	27.5	33.5
644	WGI suits	27.9	31.7
645	MB sweaters	34.1	48.8
646	WGI sweaters	34.4	53.3
647	MB trousers and shorts	29.2	52.0
648	WGI trousers and shorts	29.8	51.7
649	Brassieres, etc.	27.6	29.1
650	Dressing gowns	20.3	0.0
651	MMF nightwear and pajamas	20.6	26.7
652	MMF underwear	21.9	32.7
653	MB down-filled coats	4.7	10.4
654	WGI down-filled coats	4.7	5.4
659	Other MMF apparel	16.7	22.2

[1] "MB" denotes mens' and boys'. "WGI" denotes women's, girls' and infants'. "MMF" denotes manmade fiber.

Source: Estimated by the staff of the USITC.

other than 6 percent. Under MFA IV, negotiated agreements may specify growth rates other than 6 percent and recent U.S. bilateral agreements with major suppliers such as Hong Kong, Korea, and Taiwan provide for growth rates that are substantially less than 6 percent. The flexibility provisions in annex B allow for exports of a single product to exceed the agreed level by up to 7 percent, provided the aggregate level for all restrained products is not exceeded. It also allows for carryover of unused quota to a subsequent year or "borrowing" from the next year's quota (carryforward). The combined limit suggested in annex B for carryforward and carryover is 10-percent additional to the agreed limit. These combined limits vary from one percent to 11 percent, however, in agreements negotiated by the United States.

Currently, 147 individual categories have been established for purposes of setting restraint levels for U.S. imports. These categories comprise groupings of numbers in the annotated HTS, which became effective on January 1, 1989. There are 11 categories for yarn, 34 for fabric, 86 for apparel, and 16 for made-up household items and miscellaneous textiles. Generally, there are separate categories by fiber, i.e., categories numbered in the 300 series are of cotton, 400 series of wool, 600 series of manmade fiber, and 800 series of silk blends or other. However, about a dozen categories, mostly for fabrics in the 200 series, include both cotton and manmade fibers. The number of categories under restraint varies widely from country to country. Some large suppliers may have as many as 100 categories under restraint but some new or smaller suppliers may have fewer than a dozen categories under restraint.

Background of the MFA

Pre-MFA Period.—Efforts by the U.S. textile industry and actions by the U.S. Government to control textile imports began in the 1950s, largely in response to increased imports of cotton fabrics and blouses from Japan. The industry filed several escape-clause petitions and pressured Congress and the administration to impose quotas. In response to this pressure, Japan offered to voluntarily control exports of cotton textiles and in 1957 set up a 5-year program of annual export limits. However, by 1961 U.S. imports from other countries, especially Hong Kong, had increased sharply. During this period, total imports increased but Japan's share of U.S. imports dropped from 63 to 34 percent and the share held by other countries increased to 66 percent.

The United States felt that broader controls were needed to prevent market disruption. In 1961, it convened a conference between exporters and importers of textiles and apparel in order to devise a mechanism by which less developed country (LDC) exports of textiles and apparel could increase under a set of mutually acceptable controls. The Short-Term Arrangement Regarding International Trade in Cotton Textiles (STA) was the outcome of this conference. The STA outlined three goals: (1) to increase significantly LDC access to markets that were then restricted; (2) to maintain orderly access to markets that were relatively open; and (3) to secure a measure of restraint on the part of exporting countries in order to avoid disruption. This agreement was to

last for a year beginning in October 1961, while a Provisional Cotton Textile Committee was established to work out the text of a Long-Term Arrangement Regarding International Trade in Cotton Textiles (LTA). The initial LTA came into force in October 1962 for a period of 5 years. It was then extended twice through 1973. Imports of cotton textiles were controlled in 64 product categories.

Since imports of cotton textiles were restricted, foreign exports increasingly shifted to products of other fibers, especially manmade fibers. This led to efforts by importing countries to broaden the arrangements. In 1971, the United States reached bilateral agreements with its larger Asian suppliers (Japan, Hong Kong, Taiwan and South Korea) to control the flow of wool and manmade textile and apparel products. Finally, in 1973, about 50 countries participated in negotiations leading to the signing of the MFA covering products of manmade fibers, wool, cotton and blends of these materials. Two extensions kept the original 4-year agreement in effect through July 1986.[3]

The current extension of the MFA was agreed to after intensive negotiations over a period of several months before the scheduled expiration of the previous agreement on July 31, 1986. U.S. objectives in the negotiations included (1) controls on products made of fibers not covered in the existing MFA (silk and noncotton vegetable fibers), (2) prevention of "surges" in imports, and (3) lower growth rates for major suppliers. These objectives were accomplished to a large degree. Some U.S. textile interests in industry and in the Congress had proposed more stringent measures such as limiting total imports of textiles and apparel to a growth rate equal to growth in the domestic market, allowing reductions or "roll-backs" of imports from predominant suppliers, and allowing strong unilateral action against countries that circumvent quotas.

Even while the negotiations on extension of the MFA were being conducted, the United States was engaged in discussions with its major suppliers regarding renegotiation of their bilateral agreements and suggesting a 3-year freeze on import levels. Textile quota legislation (HR1562) had been passed by the Congress in 1985. The President vetoed the bill in December 1985, but promised to "aggressively renegotiate the MFA." A vote in Congress to override the veto was pending but had been postponed until later in the year. The override vote was taken up in August 1986 after the MFA was renewed, and the veto was sustained.

Methodology

Estimation of tariff equivalents

The method used to estimate the tariff equivalents of the MFA quotas is based on Pelzman[4] and summarized in appendix E. In essence, this approach relies on estimating the hypothetical supply of imported textile and apparel products in the absence of quotas. This hypothetical supply curve is then used to estimate the free-trade equilibrium price. The difference between the quota-free price and the actual quota-bound price is the tariff equivalent of the MFA quotas.

The methodology used to calculate the welfare gains and losses from elimination of the MFA quotas and tariffs is presented in appendix F. The results presented here are for the combined removal of MFA quotas and tariffs. In most cases, the MFA quota was calculated to be binding in 1987 and the tariff had no effect on price. In cases where the MFA quota was not binding, the quota had no effect on price.

The analysis for the effects of removing tariffs and quotas on textile and apparel imports involves three markets: controlled, uncontrolled and domestic. This analysis is briefly outlined in figure 4-1. Panel A shows the demand and supply curves for controlled imports. In this panel, t represents the ad valorem equivalent tariff, and q represents the quota premium. With the quota and tariff in place, S_c is the supply curve of controlled imports. With both the quota and the tariff on uncontrolled imports in place, D_c is the demand curve for controlled imports. Panel B presents the demand and supply curves for uncontrolled imports. With the tariff in place, Su is the supply curve of uncontrolled imports. With the quota on controlled imports in place, Du is the demand curve for uncontrolled imports. Panel C shows the supply curve for domestic output (S_d) and the demand curve when tariffs and quotas on imports are in place (D_d).

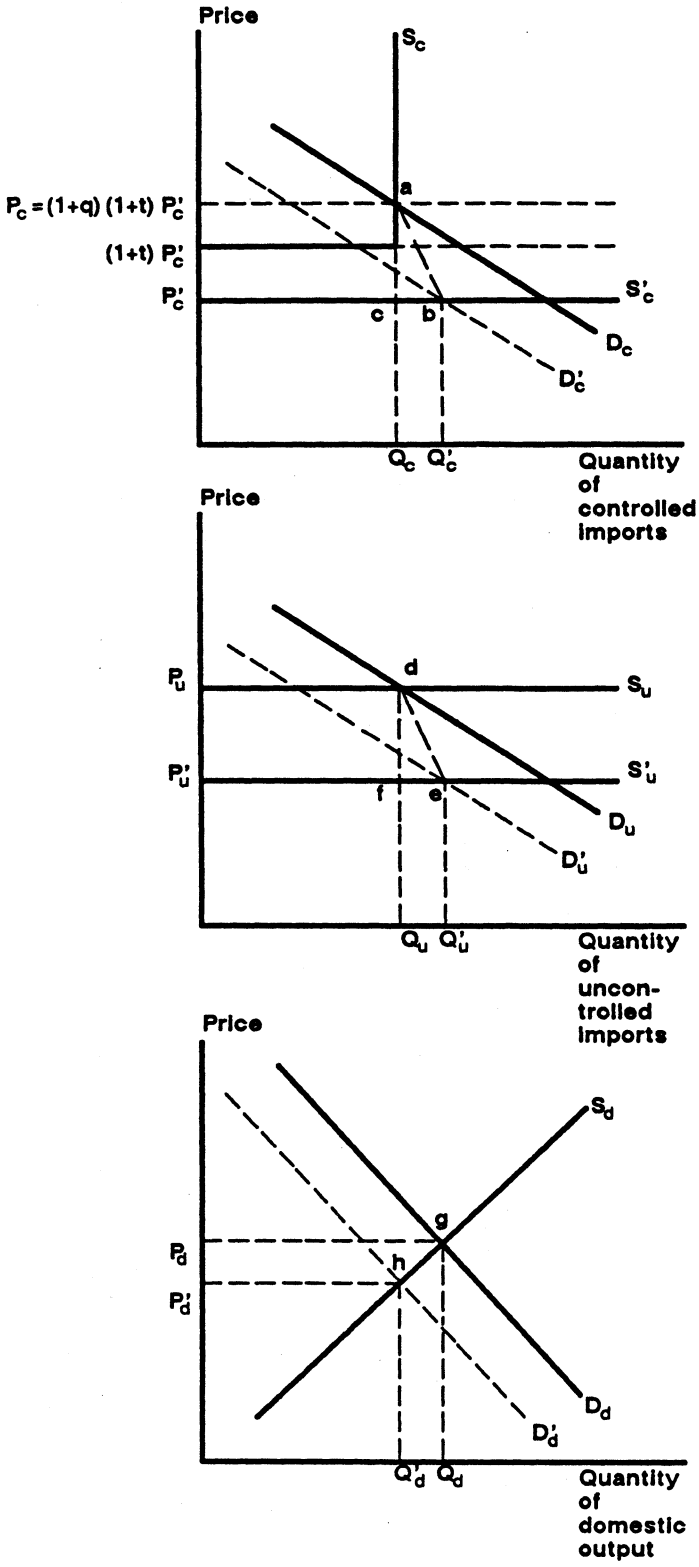
In estimating the welfare effects in this industry, the following methods are used to obtain

[3] A history of the early agreements is provided in Donald B. Keesing and Martin Wolf, *Textile Quotas Against Developing Countries*, 1980. London: Trade Policy Research Center. A discussion of MFA III and IV is provided in Joseph Pelzman, "The Multifiber Arrangement: The Third Reincarnation," in I. William Zartman (ed.) *Positive Sum: Improving North-South Negotiations*. 1987. New Brunswick: Transaction Books, pp. 149-170. Joseph Pelzman, "The MFA: U.S. Refinements or on with the Cartels," in Sarath Rajaptirana and Alasdair MacBean (eds.) *Trade Issues in the 1980s*. forthcoming, and Joseph Pelzman, "The Multifiber Arrangement: Is There a Future Post Uruguay Round?," in R.E. Baldwin and D. Richardson (eds.) *Issues in the Uruguay Round.*, 1988, Cambridge: National Bureau of Economic Research, Inc., pp. 47-59. The texts of the STA, LTA and MFA can be found in U.S. International Trade Commission, "The History and Current Status of the Multifiber Arrangement," USITC Publication No. 850, 1978.

[4] Joseph Pelzman, "The Tariff Equivalents of the Existing Quotas Under the Multifiber Arrangement," 1988, U.S. Department of Labor, Bureau of International Labor Affairs, contract No. B9K63381.

4-4

Figure 4-1
Textile and apparel markets



Panel A. Controlled

Panel B. Uncontrolled

Panel C. Domestic

missing parameters. First, since the elasticity of domestic supply is unknown, values of one and ten are used. Second, to obtain estimates for the own-price and cross-price elasticities of demand for domestic output, it is assumed that there is a unit-for-unit displacement (in square-yard equivalents) between imports and domestic output. Because the value of imported textile and apparel products is generally lower than their domestic counterpart, the unit-for-unit assumption tends to overstate the adverse effects on domestic output when the import restraints are removed.

Removing the quota and tariff shifts the supply curves for controlled and uncontrolled imports down to S_c' and S_u', respectively. The fall in the prices of controlled and uncontrolled imports and the fall in the price of the domestic good cause D_c and D_u to shift left to D_c' and D_u', respectively. By assumption, $Q_d - Q_d' = (Q_c' - Q_c) + (Q_u' - Q_u)$.

Consumers gain from the fall in the prices in all three markets. The consumers' gain in the market for controlled imports is p_cabp_c', their gain in the market for uncontrolled imports is p_udep_u', and their gain in the market for domestic output is p_dghp_d'. To measure this last consumer gain, an estimate of p_d is needed. Since textile and apparel trade is governed by the MFA, the estimates must be based on the textile category nomenclature. This presents a problem, because domestic and foreign price data are not collected for these categories. Consequently, unit values were used as proxies for import prices, both controlled and uncontrolled (see table 4-4), and for domestic textile and apparel prices.[5] Errors in these unit values will cause errors in the welfare calculations.

The loss in producers' surplus is trapezoid p_dghp_d' in panel C. This loss can include wage reductions as well as profit reductions if the wage is flexible, as well as losses to industries that supply intermediate inputs.

Eliminating the tariff on uncontrolled imports causes a loss in tariff revenue of rectangle p_udfp_u' in panel B. Rectangle p_cacp_c' in panel A is composed of both tariff revenue and quota rents. Eliminating the tariff causes a loss in tariff revenue to the United States, but eliminating the quota rents, which accrue to foreigners, provides a gain to the United States.

The traditional net welfare estimates reported in table 4-8 are therefore the sum of the consumers' gain trapezoids in panels A, B, and C minus the producers' surplus loss in panel C, minus the tariff revenues for both controlled and uncontrolled imports.

[5] Estimates of the value of domestic production were available at the product level, but were not broken out by fiber. Unit values were computed on a product basis. Unit values for uncontrolled imports were used as proxies for prices of domestic production of textile products.

The potential losses of workers displaced from the industry are measured as follows. First, the reduction in domestic output ($Q_d - Q_d'$) is multiplied times the industry employment-output ratio. This provides a measure of the reduction in employment in the industry. It is assumed that the displaced workers are able to get the minimum wage, so earnings at this rate are subtracted from the earnings they would have had at their old jobs. The resultant earnings reduction is then added to the loss in producers' surplus to estimate the total losses to the industry caused by eliminating the import restrictions.[6] The adjustments for domestic taxes are the same as those described in the previous chapter.

The welfare losses attributable to terms of trade effects, the losses of involuntarily displaced workers, and the adjustments for the effects of domestic taxes are presented in table 4-9. The downstream effects of removing tariffs and quotas are presented in tables 4-10 through 4-13.

Results

The textile and apparel categories considered in this section are presented in the nomenclature used by the U.S. Department of Commerce to regulate textile and apparel trade.

The tariff equivalents of the MFA restrictions for the year 1987 were calculated for each 3-digit textile category according to the methodology outlined in appendix E. These estimates, along with the calculated tariff rates are listed in table 4-1. As noted above, these quota rates represent the difference between the current price paid and the hypothetical price that would have been charged had the MFA quotas not been in effect during 1987. In most cases, the MFA quotas were binding with an ad valorem equivalent charge exceeding that of the tariff by at least 10 percent. On average, the tariff rate on cotton textiles and apparel was 13.4 percent with the estimated quota rate of 21.7 percent. For wool textiles and apparel, the average tariff rate was 18.1 percent and the tariff equivalent of the average quota was 27.0 percent. The average tariff on manmade fiber textiles and apparel was 20.7 percent, and the tariff equivalent of the average quota was 29.8 percent. The data in table 4-1 confirm the general expectation that tariffs and and the effects of quotas are higher in the apparel industry than for the textile industry. The average tariff for textiles was 14.1 percent and the quota rate was 21.8 percent. For apparel, the average tariff rate was 19.0 and the quota rate was 28.3 percent.

The data in table 4-1 also confirm the fact that the MFA quotas were not binding for all items. In cases where the tariff equivalent of the

[6] Data on output to employment ratios are collected on a 4-digit SIC basis. These data are allocated to the 3-digit textile categories using a concordance of textile category to Tariff Schedules of the United States, Annotated (TSUSA), and the latter to SIC.

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quota is less than the existing tariff rate, the quota is considered not to be binding. During 1987, the quotas were not binding for the following categories: velveteen fabric, cotton coats for WGI, cotton dresses, cotton playsuits, wool tapestry, wool gloves, wool dresses, textured yarns, noncontinuous cellulosic yarn, yarns woven of spun noncellulosic, other MMF fabrics, pile and tufted fabrics and MMF dressing gowns.[7]

The proportional changes in the controlled and uncontrolled import prices are presented in table G-1. These price changes along with the estimated demand elasticities for controlled (table G-2) and uncontrolled imports (table G-3) are used to calculate the changes in domestic prices for the domestic supply elasticities of one and ten. The calculated changes in domestic output, and in controlled and uncontrolled imports are presented in table 4-2 for a domestic supply elasticity equal to one and in table 4-3 for a domestic supply elasticity of ten.

Due to the lack of data on domestic output, welfare gains/losses could not be calculated for the following textile categories:[8]

310 Gingham fabric
311 Velveteen fabric
316 Cotton shirting
353 MB down-filled coats, etc.
354 WGI down-filled coats, etc.
359 Other cotton apparel
411 Tapestry and upholstery
429 Other wool fabric
459 Other wool apparel
605 Other MMF yarns
653 MB down-filled coats, etc.
654 WGI down-filled coats, etc.
659 Other MMF apparel.

The textile and apparel trade data used in the calculations are presented in table 4-4. Calculated changes in consumer welfare are presented in table 4-5 for a domestic supply elasticity of one and in table 4-6 for a domestic supply elasticity of ten. The tariff revenue for both controlled and uncontrolled imports as well as the quota rent applicable to controlled imports are presented in table 4-7.

In the current study, all textile and apparel imports from countries subject to MFA restrictions are considered to be controlled. For the years 1985 through 1987, this definition does not diverge significantly from the Commerce Department's calculation. For earlier years, when the textile program was not as restrictive, this definition will tend to overstate the degree of restrictiveness, mainly for small country suppliers. One should keep in mind that the MFA restrains textile and apparel imports under a variety of quota instruments, including specific limits, designated consultation limits, minimum consultation levels, agreed limits, restraint limits, export-type restraints, consultation provisions and other miscellaneous limits. Given this basket of control measures, it is difficult to determine which are binding and which are not. Therefore, it is assumed that from the exporting country perspective, once one of its textile products is placed on the control list, regardless of severity of control, there is a high probability that its other successful textile products will be placed under control in due course. Therefore, the total textile exports of such a country are considered to be controlled exports. This definition has been used for the entire 1978-87 trade data base. However, some countries have only a few products subject to MFA controls. For these countries, our assumption would overstate the restrictiveness of the MFA, thereby tending to overstate the welfare gains to the United States of eliminating quotas.[9]

Another difficulty in estimating the welfare effect of the MFA is the impact of textile and apparel imports which circumvent U.S. trade regulations. This phenomenon adds a degree of market flexibility which is not evident in the trade data. A number of different methods of circumventing the MFA quotas have been documented, including transshipment, port shopping, split shipments, and false import declarations. In a Congressional investigation, it was estimated that textile and apparel imports that were either unreported or in violation of U.S. trade regulations totaled about $5.5 billion annually, roughly one-third of U.S. imports under the MFA in 1985.[10] These shipments dilute the restraining effect of the quota program, and therefore would tend to lessen the consumer gains and producer losses expected from the removal of MFA quotas.

According to the estimates in table 4-7, total textile and apparel quota rent in 1987 was $5.16 billion. Of that total over 92 percent was charged on apparel imports. Second, tariffs collected on controlled imports equalled $3.52 billion, of which over 92 percent was charged on apparel imports. Finally, tariffs on uncontrolled imports totaled $502 million, of which 67 percent was charged on apparel imports.

[7] "WGI" denotes women's, girls', and infants'. "MMF" denotes manmade fiber.
[8] "MB" denotes men's and boys'.

[9] For a discussion of the spread of quota restrictions see the analysis of the U.S. MFA bilateral with the PRC as presented in: Joseph Pelzman, "PRC Textile Trade and Investment: Impact of the U.S.-PRC Bilateral Textile Agreements," in U.S. Congress, Joint Economic Committee, *China's Economy Looks Toward the Year 2000. Volume 2: Economic Openness in Modernizing China.* May 21, 1986. 384-431.
[10] U.S. Congress, House Committee on Government Operations, *Federal Enforcement of Textile and Apparel Import Quotas,* 99th Cong., 1st sess., H. Rept. 305 (Washington, DC.: GPO, 1985), pp. 45-50.

Table 4-2

Calculated changes in domestic output, controlled and uncontrolled imports with domestic supply elasticity = 1

(Proportional changes based on square yard equivalents for 1987)

Category	Description[1]	Controlled imports	Uncontrolled imports	Domestic output
300	Carded cotton yarn	0.34	-0.27	-0.02
301	Combed cotton yarn	0.37	-0.39	-0.03
312	Corduroy fabric	0.39	0.12	-0.01
313	Cotton sheeting	0.06	0.05	-0.05
314	Poplin and broadcloth	0.09	0.07	-0.05
315	Cotton printcloth	0.06	0.06	-0.04
317	Twills and sateens	0.11	0.05	-0.03
318	Other yarn-dyed fabrics	0.04	0.08	-0.06
319	Duck	0.02	0.05	-0.06
320	Other cotton woven fabrics	0.15	0.07	-0.02
330	Handkerchiefs	0.03	0.26	-0.03
331	Cotton gloves and mittens	0.06	-0.36	-0.01
332	Cotton hosiery	0.73	-0.11	-0.01
333	MB suit-type coats	0.21	-0.13	-0.13
334	Other MB coats	0.49	0.32	-1.00
335	WGI coats	0.02	0.06	-0.07
336	Cotton dresses	0.22	-0.30	-0.06
337	Cotton playsuits, sunsuits	0.04	-0.05	-0.05
338	MB knit shirts	0.83	-1.00	-0.50
339	WGI knit shirts and blouses	0.53	0.93	-1.00
340	MB shirts, not knit	0.81	-0.04	-1.00
341	WGI shirts, not knit	0.34	-0.47	-0.51
342	Cotton skirts	0.21	-0.36	-0.25
345	Cotton sweaters	1.60	-0.35	-0.68
347	MB trousers and shorts	0.19	0.21	-0.10
348	WGI trousers and shorts	0.24	0.47	-0.26
349	Brassieres, etc.	0.41	-0.66	-0.10
350	Dressing gowns, etc.	-0.03	0.61	-0.13
351	Cotton nightwear and pajamas	0.09	-0.06	-0.04
352	Cotton underwear	0.08	-0.03	-0.01
410	Woolens and worsteds	0.29	-0.13	-0.02
425	Wool knit fabrics	0.26	0.12	-0.01
431	Wool gloves and mittens	0.01	-0.04	0.01
432	Wool hosiery	0.78	0.12	-0.04
433	MB suit-type coats	0.39	0.02	-0.10
434	Other MB coats	1.16	0.74	-0.55
435	WGI wool coats	0.25	0.16	-0.13
436	Wool dresses	0.28	-0.39	-0.08
438	Knit shirts and blouses	1.39	-1.00	-1.00
440	Shirts, not knit	0.67	0.05	-0.99
442	Wool skirts	0.38	-0.12	-0.14
443	MB wool suits	0.47	-0.44	-0.06
444	WGI wool suits	0.57	-0.02	-0.10
445	MB wool sweaters	0.79	-0.18	-0.99
446	WGI wool sweaters	0.68	-0.78	-1.00
447	MB trousers and shorts	0.18	0.28	-0.15
448	WGI trousers and shorts	0.28	0.50	-0.29
600	Textured MMF yarns	0.17	0.02	-0.01
601	Continuous cellulosic	0.23	0.08	-0.01
602	Continuous noncellulosic	0.43	-0.03	0.00
603	Noncontinuous cellulosic	0.11	0.01	-0.02
604	Noncontinuous noncellulosic	0.34	-0.01	-0.01
610	Woven of continuous cellulosic	0.53	0.05	-0.02
611	Woven of spun cullulosic	0.22	-0.09	-0.06
612	Woven of cont. noncellulosic	0.17	0.06	-0.01
613	Woven of spun noncellulosic	0.13	0.05	-0.02
614	Other woven MMF fabrics	0.13	0.05	-0.02
625	Knit MMF fabrics	0.20	0.08	0.00
626	Pile and tufted fabrics	0.16	0.08	0.00
627	MMF specialty fabrics	0.50	0.02	-0.02
630	Handkerchiefs	0.11	0.11	-0.03
631	MMF gloves and mittens	0.01	-0.19	0.00
632	MMF hosiery	0.59	0.00	-0.02
633	MB suit-type coats	0.49	-0.07	-0.16
634	Other MB coats	0.82	0.57	-0.69
635	WGI MMF coats	0.22	0.10	-0.24
636	MMF dresses	0.47	-0.89	-0.10
637	MMF playsuits, sunsuits etc.	0.23	0.04	-0.07
638	MB knit shirts	1.07	-1.00	-0.28
639	WGI knit shirts and blouses	0.67	1.24	-0.78
640	MB shirts, not knit	0.95	0.00	-1.00
641	WGI shirts, not knit	0.45	-0.55	-0.24

See footnote at end of table.

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Table 4-2—*Continued*

Calculated changes in domestic output, controlled and uncontrolled imports with domestic supply elasticity = 1

(Proportional changes based on square yard equivalents for 1987)

Category	*Description*[1]	*Controlled imports*	*Uncontrolled imports*	*Domestic output*
642	MMF skirts	0.46	-0.30	-0.25
643	MB suits	0.45	-1.46	-0.11
644	WGI suits	0.31	0.62	-0.23
645	MB sweaters	1.33	-0.31	-1.00
646	WGI sweaters	1.17	-1.00	-1.00
647	MB trousers and shorts	0.38	0.46	-0.15
648	WGI trousers and shorts	0.54	0.82	-0.39
649	Brassieres, etc.	0.28	-0.11	-0.14
650	Dressing gowns	0.17	0.87	-0.04
651	MMF nightwear and pajamas	0.28	-0.58	-0.04
652	MMF underwear	0.16	-0.06	-0.04

[1] "MB" denotes mens' and boys'. "WGI" denotes women's, girls' and infants'. "MMF" denotes manmade fiber.

Source: Estimated by the staff of the USITC.

Table 4-3

Calculated changes in domestic output, controlled and uncontrolled imports with domestic supply elasticity = 10

(Proportional changes based on square yard equivalents for 1987)

Category	*Description*[1]	*Controlled Imports*	*Uncontrolled Imports*	*Domestic output*
300	Carded cotton yarn	0.45	-0.67	-0.05
301	Combed cotton yarn	0.51	-0.68	-0.04
312	Corduroy fabric	0.41	0.12	-0.01
313	Cotton sheeting	0.15	0.05	-0.12
314	Poplin and broadcloth	0.18	0.06	-0.10
315	Cotton printcloth	0.14	0.05	-0.10
317	Twills and sateens	0.17	0.05	-0.04
318	Other yarn-dyed fabrics	0.16	0.07	-0.15
319	Duck	0.11	0.05	-0.28
320	Other cotton woven fabrics	0.19	0.06	-0.03
330	Handkerchiefs	0.09	-0.02	-0.08
331	Cotton gloves and mittens	0.08	-0.58	-0.03
332	Cotton hosiery	0.73	-0.11	-0.01
333	MB suit-type coats	0.21	0.07	-0.15
334	Other MB coats	0.49	0.32	-1.00
335	WGI coats	0.12	0.09	-0.37
336	Cotton dresses	0.22	-0.30	-0.06
337	Cotton playsuits, sunsuits, etc.	0.13	0.08	-0.18
338	MB knit shirts	0.83	0.43	-0.73
339	WGI knit shirts and blouses	0.53	0.93	-1.00
340	MB shirts, not knit	0.81	-0.04	-1.00
341	WGI shirts and blouses, not knit	0.34	-0.47	-0.51
342	Cotton skirts	0.51	-0.06	-0.75
345	Cotton sweaters	1.60	-0.35	-0.68
347	MB trousers, slacks, and shorts	0.37	0.74	-0.19
348	WGI trousers, slacks, and shorts	0.46	0.41	-0.47
349	Brassieres, etc.	0.59	-1.00	-0.15
350	Dressing gowns, etc.	0.37	1.52	-0.47
351	Cotton nightwear and pajamas	0.20	-0.48	-0.14
352	Cotton underwear	0.10	-0.04	-0.02
410	Woolens and worsteds	0.31	-0.10	-0.03
425	Wool knit fabrics	0.27	0.15	-0.01
431	Wool gloves and mittens	0.01	-0.06	0.07
432	Wool hosiery	0.78	0.12	-0.04
433	MB suit-type coats	0.39	0.17	-0.11
434	Other MB coats	1.16	0.74	-0.55
435	WGI wool coats	0.61	0.25	-0.27
436	Wool dresses	0.28	-0.39	-0.08
438	Knit shirts and blouses	1.39	-1.00	-1.00
440	Shirts and blouses, not knit	0.67	0.05	-0.99
442	Wool skirts	0.58	0.07	-0.25
443	MB wool suits	0.47	-0.03	-0.20
444	WGI wool suits	0.83	-0.72	-0.18
445	MB wool sweaters	0.79	-0.18	-0.99
446	WGI wool sweaters	0.68	-0.78	-1.00
447	MB trousers, slacks, shorts	0.45	0.93	-0.33
448	WGI trousers, slacks, shorts	0.53	0.44	-0.44
600	Textured MMF yarns	0.20	0.03	-0.01
601	Continuous cellulosic	0.26	0.09	-0.01
602	Continuous noncellulosic	0.44	-0.03	0.00
603	Noncontinuous cellulosic	0.21	0.03	-0.05
604	Noncontinuous noncellulosic	0.38	-0.01	-0.01
610	Woven of continuous cellulosic	0.57	0.10	-0.02
611	Woven of spun cullulosic	0.33	0.06	-0.13
612	Woven of continuous noncellulosic	0.19	0.10	-0.02
613	Woven of spun noncellulosic	0.16	0.09	-0.02
614	Other woven MMF fabrics	0.16	0.09	-0.02
625	Knit MMF fabrics	0.20	0.09	0.00
626	Pile and tufted fabrics	0.17	0.09	0.00
627	MMF specialty fabrics	0.54	0.09	-0.03
630	Handkerchiefs	0.18	-0.21	-0.04
631	MMF gloves and mittens	0.01	-0.34	-0.02
632	MMF hosiery	0.59	0.00	-0.02
633	MB suit-type coats	0.49	0.18	-0.17
634	Other MB coats	0.82	0.57	-0.69
635	WGI MMF coats	0.78	0.25	-0.81
636	MMF dresses	0.47	-0.89	-0.10
637	MMF playsuits, sunsuits etc.	0.41	0.30	-0.13
638	MB knit shirts	1.07	1.20	-0.28
639	WGI knit shirts and blouses	0.67	1.24	-0.78
640	MB shirts, not knit	0.95	0.00	-1.00
641	WGI shirts and blouses, not knit	0.45	-0.55	-0.24

See footnote at end of table.

Table 4-3—*Continued*

Calculated changes in domestic output, controlled and uncontrolled imports with domestic supply elasticity = 10

(Proportional changes based on square yard equivalents for 1987)

Category	*Description*[1]	*Controlled imports*	*Uncontrolled imports*	*Domestic output*
642	MMF skirts	0.81	0.04	-0.46
643	MB suits	0.45	-0.57	-0.11
644	WGI suits	0.82	-0.37	-0.76
645	MB sweaters	1.33	-0.31	-1.00
646	WGI sweaters	1.17	-1.00	-1.00
647	MB trousers, slacks, shorts	0.66	1.35	-0.26
648	WGI trousers, slacks, shorts	0.88	0.71	-0.63
650	Dressing gowns	0.34	1.29	-0.08
651	MMF nightwear and pajamas	0.41	-1.00	-0.06
652	MMF underwear	0.22	-0.09	-0.05

[1] "MB" denotes mens' and boys'. "WGI" denotes women's, girls' and infants'. "MMF" denotes manmade fiber.

Source: Estimated by the staff of the USITC.

Table 4-4

U.S. 1987 Imports of controlled and uncontrolled textiles and apparel

(Thousands of dollars and thousands of square yard equivalents)

Category	Description[1]	Controlled imports		Uncontrolled imports	
		Quantity	Value	Quantity	Value
300	Carded cotton yarn	327160	91918	80807	24788
301	Combed cotton yarn	104118	35196	6071	3437
310	Gingham fabric	13452	14335	1926	4990
311	Velveteen fabric	1001	2633	13	97
312	Corduroy fabric	3915	7039	380	817
313	Cotton sheeting	508238	262477	101785	67277
314	Poplin and broadcloth	93588	73141	5208	5558
315	Cotton printcloth	346586	162103	35144	19312
316	Cotton shirting	3658	4829	210	690
317	Twills and sateens	241796	202671	41729	50714
318	Other yarn-dyed fabrics	32661	41938	14898	20227
319	Duck	130605	80610	2835	3967
320	Other cotton woven fabrics	231236	144751	50988	107581
330	Handkerchiefs	7245	9756	115	1104
331	Cotton gloves and mittens	56221	47232	3807	1875
332	Cotton hosiery	3358	6628	1288	4925
333	MB suit-type coats	5601	25626	483	4087
334	Other MB coats	68535	232407	2904	19651
335	WGI coats	102008	327290	6737	38480
336	Cotton dresses	81768	161086	13828	48048
337	Cotton playsuits, sunsuits	76541	95465	2339	8936
338	MB knit shirts	92192	603625	6281	39908
339	WGI knit shirts and blouses	107448	602650	18424	129064
340	MB shirts, not knit	311341	740247	24011	73110
341	WGI shirts, not knit	189140	723852	9296	46731
342	Cotton skirts	82564	337179	10967	69331
345	Cotton sweaters	57550	188679	20767	85307
347	MB trousers and shorts	208650	761310	12583	48871
348	WGI trousers and shorts	278918	1002084	18413	83916
349	Brassieres, etc.	2922	7105	78	706
350	Dressing gowns, etc.	36512	65523	3366	10998
351	Cotton nightwear and pajamas	141615	134495	5219	8178
352	Cotton underwear	136552	94178	14205	20978
353	MB down-filled coats, etc.	2732	20917	4	125
354	WGI down-filled coats, etc.	3302	22787	15	261
359	Other cotton apparel	301330	405931	15196	33997
410	Woolens and worsteds	20239	80265	16353	93967
411	Tapestry and upholstery	400	2336	4469	42293
425	Wool knit fabrics	455	1801	902	5272
429	Other wool fabrics	4	5	464	5611
431	Wool gloves and mittens	1058	9155	77	1168
432	Wool hosiery	239	2476	533	5980
433	MB suit-type coats	4117	36855	1737	36045
434	Other MB coats	5146	31677	3571	36983
435	WGI wool coats	17839	93666	5154	62134
436	Wool dresses	4901	30405	1686	22792
438	Knit shirts and blouses	10521	83802	526	9219
440	Shirts, not knit	4868	17056	318	5733
442	Wool skirts	5707	53519	3345	51835
443	MB wool suits	6905	70627	5178	116574
444	WGI wool suits	4566	33469	1398	20840
445	MB wool sweaters	12675	99880	7425	97317
446	WGI wool sweaters	21224	220841	6068	109161
447	MB trousers and shorts	3967	36160	2215	33921
448	WGI trousers and shorts	3637	35041	1619	23214
459	Other wool apparel	7400	41531	6889	58388
600	Textured MMF yarns	160068	62450	197930	66533
601	Continuous cellulosic	12275	4955	49333	16891
602	Continuous noncellulosic	272304	31595	365418	45862
603	Noncontinuous cellulosic	21213	2419	4859	1975
604	Noncont. noncellulosic	83336	36808	70976	32305
605	Other MMF yarns	44170	27008	39377	30098
610	Woven of cont. cellulosic	12947	14937	3130	11531
611	Woven of spun cullulosic	35917	42408	17358	40728
612	Woven of cont. noncellulosic	296864	364651	49196	49281
613	Woven of spun noncellulosic	164589	90226	7959	18739
614	Other woven MMF fabrics	86768	110687	92022	162623
625	Knit MMF fabrics	26797	13658	16813	20180
626	Pile and tufted fabrics	3439	7998	1563	5855
627	MMF specialty fabrics	100930	69160	249691	126699
630	Handkerchiefs	1761	2249	21	222
631	MMF gloves and mittens	34025	71806	320	661

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See footnote at end of table.

Table 4-4—*Continued*

U.S. 1987 imports of controlled and uncontrolled textiles and apparel

(Thousands of dollars and thousands of square yard equivalents)

Category	Description[1]	Controlled imports		Uncontrolled imports	
		Quantity	Value	Quantity	Value
632	MMF hosiery	39871	43453	9047	16413
633	MB suit-type coats	12093	73644	1082	6823
634	Other MB coats	130849	326612	1082	6823
635	WGI MMF coats	163750	444712	10224	21176
636	MMF dresses	133836	310802	7234	27715
637	MMF playsuits, sunsuits	36583	43271	414	1762
638	MB knit shirts	171924	467259	1450	4015
639	WGI knit shirts	313930	914512	1906	6480
640	MB shirts, not knit	307231	563639	1872	5742
641	WGI shirts, not knit	129703	557957	3765	24502
642	MMF skirts	49630	233064	4315	30430
643	MB suits	10496	61745	253	2879
644	WGI suits	26763	110414	2474	14904
645	MB sweaters	99246	197755	4120	10197
646	WGI sweaters	333430	716161	9328	15335
647	MB trousers and shorts	155168	483286	1620	9618
648	WGI trousers and shorts	222471	525168	3049	16775
649	Brassieres, etc.	68266	216205	7212	25592
650	Dressing gowns	27952	28905	629	1532
651	MMF nightwear and pajamas	128451	103672	3420	2124
652	MMF underwear	174282	85695	12234	10227
653	MB down-filled coats	6142	40763	25	445
654	WGI down-filled coats	4320	26720	31	501
659	Other MMF apparel	508665	431236	30539	74849

[1] "MB" denotes mens' and boys'. "WGI" denotes women's, girls' and infants'. "MMF" denotes manmade fiber.

Source: Compiled from official statistics of the U.S. Department of Commerce.

Table 4-5

Calculated changes in consumer welfare from MFA quota and tariff elimination for controlled, uncontrolled imports and domestic output, 1987 (domestic supply elasticity = 1)

(Thousands of dollars)

Category	Description[1]	Controlled imports	Uncontrolled imports	Domestic output[2]
300	Carded cotton yarn	18,676	1,533	13,444
301	Combed cotton yarn	7,976	288	20,412
312	Corduroy fabric	2,960	221	4,229
313	Cotton sheeting	35,572	5,433	22,879
314	Poplin and broadcloth	12,024	638	9,728
315	Cotton printcloth	20,794	1,790	13,069
317	Twills and sateens	28,033	4,277	35,789
318	Other yarn-dyed fabrics	6,286	2,781	3,692
319	Duck	11,097	283	4,862
320	Other cotton woven fabrics	23,170	13,230	86,978
330	Handkerchiefs	1,290	150	2,470
331	Cotton gloves and mittens	17,823	364	1,318
332	Cotton hosiery	2,983	869	8,146
333	MB suit-type coats	3,977	400	18,444
334	Other MB coats	42,947	2,310	108,396
335	WGI coats	32,370	3,886	15,064
336	Cotton dresses	24,108	5,522	62,454
337	Cotton playsuits, sunsuits	9,259	829	10,774
338	MB knit shirts	206,580	4,200	108,592
339	WGI knit shirts and blouses	228,025	39,628	77,952
340	MB shirts, not knit	316,722	14,997	403,911
341	WGI shirts, not knit	190,430	5,903	292,199
342	Cotton skirts	61,272	5,058	107,786
345	Cotton sweaters	125,934	14,575	204,947
347	MB trousers and shorts	181,602	9,136	288,273
348	WGI trousers and shorts	214,716	17,512	376,020
349	Brassieres, etc.	2,696	103	10,853
350	Dressing gowns, etc.	20,656	1,264	13,730
351	Cotton nightwear and pajamas	19,240	838	10,754
352	Cotton underwear	12,676	2,195	11,579
410	Woolens and worsteds	32,109	28,228	24,584
425	Wool knit fabrics	540	1,112	1,573
431	Wool gloves and mittens	863	107	(2)
432	Wool hosiery	1,341	770	856
433	MB suit-type coats	12,750	8,185	28,090
434	Other MB coats	20,222	12,145	39,356
435	WGI wool coats	30,747	15,304	34,378
436	Wool dresses	6,396	3,382	3,313
438	Knit shirts and blouses	55,029	849	3,496
440	Shirts, not knit	5,877	1,337	7,627
442	Wool skirts	12,014	8,395	16,022
443	MB wool suits	30,246	20,691	21,418
444	WGI wool suits	10,701	3,667	11,359
445	MB wool sweaters	30,313	14,463	15,903
446	WGI wool sweaters	70,032	11,352	5,849
447	MB trousers and shorts	11,602	8,667	11,193
448	WGI trousers and shorts	9,376	5,015	8,465
600	Textured MMF yarns	6,527	6,471	11,439
601	Continuous cellulosic	705	1,942	2,560
602	Continuous noncellulosic	8,161	4,900	14,496
603	Noncontinuous cellulosic	294	228	1,010
604	Noncontinuous noncellulosic	8,156	3,828	13,586
610	Woven of continous cellulosic	11,194	2,204	30,552
611	Woven of spun cullulosic	17,330	6,724	17,172
612	Woven of cont. noncellulosic	78,830	9,362	61,586
613	Woven of spun noncellulosic	16,360	3,263	60,851
614	Other woven MMF fabrics	20,048	28,278	31,929
625	Knit MMF fabrics	3,142	3,572	9,310
626	Pile and tufted fabrics	1,467	1,037	2,966
627	MMF specialty fabrics	48,396	21,774	32,586
630	Handkerchiefs	518	34	2,332
631	MMF gloves and mittens	17,549	117	196
632	MMF hosiery	12,469	3,355	81,926
633	MB suit-type coats	36,291	1,660	97,093
634	Other MB coats	116,923	2,168	449,418
635	WGI MMF coats	214,173	6,058	212,836
636	MMF dresses	121,612	3,288	257,434
637	MMF playsuits, sunsuits etc.	12,779	371	32,480
638	MB knit shirts	251,239	693	418,605
639	WGI knit shirts and blouses	497,662	3,618	523,979
640	MB shirts, not knit	321,060	1,674	573,487
641	WGI shirts, not knit	224,740	5,177	327,235

See footnote at end of table.

Table 4-5—*Continued*

Calculated changes in consumer welfare from MFA quota and tariff elimination for controlled, uncontrolled imports and domestic output, 1987 (domestic supply elasticity = 1)

(Thousands of dollars)

Category	*Description*[1]	*Controlled imports*	*Uncontrolled imports*	*Domestic output*[2]
642	MMF skirts	74,086	4,651	169,184
643	MB suits	24,233	214	90,953
644	WGI suits	39,267	5,436	47,438
645	MB sweaters	145,091	2,931	118,808
646	WGI sweaters	529,866	2,641	234,921
647	MB trousers and shorts	253,994	3,461	371,558
648	WGI trousers and shorts	295,348	7,052	569,254
649	Brassieres, etc	70,941	6,677	117,976
650	Dressing gowns	6,380	447	14,497
651	MMF nightwear and pajamas	30,118	311	41,920
652	MMF underwear	27,852	2,170	28,565
	Total	5,766,854	461,672	7,654,361

[1] "MB" denotes mens' and boys'. "WGI" denotes women's, girls' and infants'. "MMF" denotes manmade fiber.
[2] This value is also equal to the loss in producer's surplus.

Source: Estimated by the staff of the USITC.

Table 4-6

Calculated changes in consumer welfare from MFA quota and tariff elimination for controlled, uncontrolled imports and domestic output, 1987 (domestic supply elasticity = 10)

(Thousands of dollars)

Category	Description[1]	Controlled imports	Uncontrolled imports	Domestic output
300	Carded cotton yarn	19,566	1,180	2,697
301	Combed cotton yarn	8,471	236	2,999
312	Corduroy fabric	2,986	221	445
313	Cotton sheeting	37,177	5,415	5,371
314	Poplin and broadcloth	12,583	635	1,969
315	Cotton printcloth	21,642	1,785	2,928
317	Twills and sateens	28,837	4,267	5,433
318	Other yarn-dyed fabrics	6,633	2,771	877
319	Duck	11,583	282	1,922
320	Other cotton woven fabrics	23,649	13,209	11,067
330	Handkerchiefs	1,329	131	681
331	Cotton gloves and mittens	18,007	315	411
332	Cotton hosiery	2,983	869	815
333	MB suit-type coats	3,977	443	1,995
334	Other MB coats	42,947	2,310	11,008
335	WGI coats	34,114	3,945	6,915
336	Cotton dresses	24,108	5,522	6,245
337	Cotton playsuits, sunsuits	9,682	886	3,649
338	MB knit shirts	206,580	10,191	13,359
339	WGI knit shirts and blouses	228,025	39,628	14,943
340	MB shirts, not knit	316,722	14,997	57,180
341	WGI shirts, not knit	190,430	5,903	29,220
342	Cotton skirts	69,784	5,978	22,792
345	Cotton sweaters	125,934	14,575	20,495
347	MB trousers and shorts	196,362	11,311	52,430
348	WGI trousers and shorts	235,892	17,084	60,086
349	Brassieres, etc.	2,890	77	1,543
350	Dressing gowns, etc.	24,841	1,704	4,038
351	Cotton nightwear and pajamas	20,314	658	3,100
352	Cotton underwear	12,792	2,185	1,433
410	Woolens and worsteds	32,414	28,659	3,481
425	Wool knit fabrics	542	1,126	178
431	Wool gloves and mittens	861	106	(1)
432	Wool hosiery	1,341	770	86
433	MB suit-type coats	12,750	8,780	3,221
434	Other MB coats	20,222	12,145	3,936
435	WGI wool coats	35,705	15,961	6,662
436	Wool dresses	6,396	3,382	331
438	Knit shirts and blouses	55,029	849	1,743
440	Shirts, not knit	5,877	1,337	763
442	Wool skirts	12,995	9,240	2,719
443	MB wool suits	30,246	26,082	6,158
444	WGI wool suits	11,773	2,372	2,013
445	MB wool sweaters	30,313	14,463	1,590
446	WGI wool sweaters	70,032	11,352	1,387
447	MB trousers and shorts	13,030	11,108	2,198
448	WGI trousers and shorts	10,410	4,897	1,183
600	Textured MMF yarns	6,597	6,489	1,359
601	Continuous cellulosic	714	1,956	297
602	Continuous noncellulosic	8,199	4,905	1,521
603	Noncontinuous cellulosic	308	231	202
604	Noncontinous noncellulosic	8,294	3,844	1,591
610	Woven of continous cellulosic	11,346	2,255	3,310
611	Woven of spun cullulosic	18,173	7,254	3,335
612	Woven of cont. noncellulosic	79,719	9,516	7,201
613	Woven of spun noncellulosic	16,585	3,329	7,484
614	Other woven MMF fabrics	20,335	28,864	4,520
625	Knit MMF fabrics	3,154	3,591	988
626	Pile and tufted fabrics	1,472	1,042	313
627	MMF specialty fabrics	49,278	22,455	4,434
630	Handkerchiefs	535	29	372
631	MMF gloves and mittens	17,615	107	78
632	MMF hosiery	12,469	3,355	8,193
633	MB suit-type coats	36,291	1,868	10,105
634	Other MB coats	116,923	2,168	44,942
635	WGI MMF coats	268,241	6,491	48,489
636	MMF dresses	121,612	3,288	25,743
637	MMF playsuits, sunsuits etc	13,792	418	5,574
638	MB knit shirts	251,239	2,216	42,490
639	WGI knit shirts and blouses	497,662	3,618	52,398
640	MB shirts, not knit	321,060	1,674	67,028
641	WGI shirts, not knit	224,740	5,177	32,723

See footnote at end of table.

Table 4-6—*Continued*

Calculated changes in consumer welfare from MFA quota and tariff elimination for controlled, uncontrolled imports and domestic output, 1987 (domestic supply elasticity = 10)

(Thousands of dollars)

Category	*Description*[1]	*Controlled imports*	*Uncontrolled imports*	*Domestic output*
642	MMF skirts	84,587	5,591	27,302
643	MB suits	24,233	564	9,532
644	WGI suits	48,023	3,376	10,783
645	MB sweaters	145,091	2,931	24,040
646	WGI sweaters	529,866	2,641	53,827
647	MB trousers and shorts	284,142	4,704	60,789
648	WGI trousers and shorts	334,879	6,780	78,245
649	Brassieres, etc.	77,736	4,266	23,682
650	Dressing gowns	6,886	513	2,627
651	MMF nightwear	31,809	219	6,288
652	MMF underwear	28,608	2,141	3,904
	Total	5,992,991	481,204	1,061,406

[1] "MB" denotes mens' and boys'. "WGI" denotes women's, girls' and infants'. "MMF" denotes manmade fiber.

Source: Estimated by the staff of the USITC.

Table 4-7

Quota rent gains and tariff revenue losses from MFA quota and tariff elimination for 1987

(Thousands of dollars)

Category	Description[1]	Revenue		Quota Rent
		Tariff controlled	Tariff uncontrolled	
300	Carded cotton yarn	1,775	6,583	17,765
301	Combed cotton yarn	358	3,663	7,381
310	Gingham fabric	711	2,042	3,064
311	Velveteen fabric	20	533	736
312	Corduroy fabric	208	1,790	2,745
313	Cotton sheeting	5,292	20,645	36,550
314	Poplin and broadcloth	616	8,109	12,091
315	Cotton printcloth	1,740	14,602	20,917
316	Cotton shirting	99	695	879
317	Twills and sateens	4,169	16,663	27,995
318	Other yarn-dyed fabrics	2,673	5,542	6,243
319	Duck	276	5,602	11,742
320	Other cotton woven fabrics	12,794	17,215	22,259
330	Handkerchiefs	133	1,173	1,283
331	Cotton gloves and mittens	444	11,190	19,912
332	Cotton hosiery	919	1,237	2,548
333	MB suit-type coats	428	2,683	3,739
334	Other MB coats	1,990	23,538	36,130
335	WGI coats	3,775	32,112	0
336	Cotton dresses	6,492	21,763	0
337	Cotton playsuits, sunsuits	851	9,092	0
338	MB knit shirts	8,399	127,041	150,834
339	WGI knit shirts and blouses	27,024	126,185	198,293
340	MB shirts, not knit	15,292	154,830	249,647
341	WGI shirts, not knit	7,702	119,294	173,141
342	Cotton skirts	6,171	30,011	60,095
345	Cotton sweaters	17,716	39,183	83,454
347	MB trousers and shorts	8,266	128,765	174,453
348	WGI trousers and shorts	14,196	169,517	195,731
349	Brassieres, etc.	155	1,557	2,472
350	Dressing gowns, etc.	968	5,769	27,360
351	Cotton nightwear and pajamas	864	14,215	19,040
352	Cotton underwear	2,226	9,993	12,455
353	MB down-filled coats, etc.	6	983	2,878
354	WGI down-filled coats, etc.	12	1,072	3,954
359	Other cotton apparel	3,087	36,861	255,781
410	Woolens and worsteds	30,168	25,769	28,816
411	Tapestry and upholstery	3,185	176	0
425	Wool knit fabrics	1,048	358	513
429	Other wool fabrics	530	0	1
431	Wool gloves and mittens	109	858	0
432	Wool hosiery	728	301	1,321
433	MB suit-type coats	8,103	8,285	11,417
434	Other MB coats	8,877	7,604	15,305
435	WGI wool coats	14,198	21,404	29,155
436	Wool dresses	4,203	5,606	0
438	Knit shirts and blouses	1,698	15,431	40,780
440	Shirts, not knit	1,303	3,878	4,538
442	Wool skirts	8,925	9,215	10,246
443	MB wool suits	26,472	16,038	27,761
444	WGI wool suits	3,711	5,960	8,957
445	MB wool sweaters	15,926	16,346	23,010
446	WGI wool sweaters	18,574	37,577	55,994
447	MB trousers and shorts	7,590	8,091	11,445
448	WGI trousers and shorts	4,016	6,062	8,760
459	Other wool apparel	7,294	5,188	11,288
600	Textured MMF yarns	6,398	6,005	0
601	Continuous cellulosic	1,867	548	643
602	Continuous noncellulosic	4,974	3,427	7,505
603	Noncontinuous cellulosic	227	278	0
604	Noncontinuous noncellulosic	3,854	4,392	7,485
605	Other MMF yarns	4,170	3,741	4,279
610	Woven of continous cellulosic	2,151	2,786	14,862
611	Woven of spun cullulosic	7,047	7,337	19,352
612	Woven of cont. non-cell	9,074	67,144	73,953
613	Woven of spun non-cellul	3,186	15,340	0
614	Other woven MMF fabrics	27,645	18,816	0
625	Knit MMF fabrics	3,430	2,321	2,979
626	Pile and tufted fabrics	995	1,360	0
627	MMF specialty fabrics	21,538	11,757	63,635
630	Handkerchiefs	32	327	530

See footnote at end of table.

Table 4-7—*Continued*

Quota rent gains and tariff revenue losses from MFA quota and tariff elimination for 1987

(Thousands of dollars)

Category	Description[1]	Revenue		Quota Rent
		Tariff controlled	*Tariff uncontrolled*	
631	MMF gloves and mittens	129	14,054	18,370
632	MMF hosiery	3,358	8,890	9,802
633	MB suit-type coats	1,717	18,528	34,083
634	Other MB coats	1,688	80,783	83,422
635	WGI MMF coats	5,774	121,253	230,628
636	MMF dresses	5,926	66,455	109,654
637	MMF playsuits, sunsuits	363	8,912	12,162
638	MB knit shirts	1,386	161,355	164,418
639	WGI knit shirts	2,233	315,144	398,483
640	MB shirts, not knit	1,677	164,581	239,823
641	WGI shirts, not knit	7,145	162,698	190,121
642	MMF skirts	5,482	41,984	65,188
643	MB suits	790	16,954	20,700
644	WGI suits	4,154	30,775	35,023
645	MB sweaters	3,478	67,459	96,587
646	WGI sweaters	5,283	246,708	381,536
647	MB trousers and shorts	2,813	141,340	251,245
648	WGI trousers and shorts	5,002	156,596	271,463
649	Brassieres, etc.	7,054	59,589	62,852
650	Dressing gowns	311	5,875	0
651	MMF nightwear and pajamas	438	21,403	27,705
652	MMF underwear	2,240	18,771	28,047
653	MB down-filled coats	21	1,916	4,259
654	WGI down-filled coats	24	1,257	1,445
659	Other MMF apparel	12,467	71,828	95,699
	Total	502,046	3,516,584	5,160,813

[1] "MB" denotes mens' and boys'. "WGI" denotes women's, girls' and infants'. "MMF" denotes manmade fiber.

Source: Estimated by the staff of the USITC.

Estimates for the net welfare effects for each of the textile and apparel categories as calculated using the traditional method are presented in table 4-8. Overall, the removal of MFA quotas and tariffs will result in a net U.S. welfare gain in the range of $2.2 billion to $2.5 billion, depending on the domestic supply elasticity. Of the total net gain, 97 to 99 percent is attributable to quota and tariff elimination in the apparel industry. The net welfare gains from textile quota and tariff removal is rather trivial when compared to the gains in the apparel industry.

The traditional net welfare gains are presented for textiles, apparel, and the total of these two categories in table 4-9. This table also presents three other potential effects: worker income losses, domestic tax gains, and terms-of-trade losses. The net of these and the traditional net welfare is presented as "adjusted net welfare gain." Due to the fact that worker income losses, replacement tax gains, and the terms-of-trade losses are subject to considerable error, the adjusted net welfare gain is a very rough approximation. Lastly, table 4-9 presents the employment effects of import restraint removal for textiles, apparel, and the total of these two categories.

Upstream effects have not been calculated because data on the value of domestic shipments are not available. The 1977 input-output tables show a $.21 reduction in the value of textile shipments for every $1 of reduced shipments of apparel. The large reduction in apparel shipments would probably result in a large reduction in the market for domestic fabrics and yarns. To the extent that the U.S. textile industry is more internationally competitive than the apparel industry, exports of textiles to foreign apparel producers might soften this effect.

The downstream effects of removing quotas on the textile fabric producers are presented in tables 4-10 and 4-11. Table 4-10 outlines the changes in costs while table 4-11 presents the changes in fabric output. The comparable changes in apparel costs are presented in table 4-12 with the associated changes in apparel output in table 4-13. Since the bulk of the restrictions are in apparel, removing the textile restrictions has a marginal downstream effect on the apparel industry.

Table 4-8
Net welfare gains from quota and tariff elimination according to the traditional calculation

(Thousands of dollars)

Category	Description[1]	Domestic supply elasticity = 1	Domestic supply elasticity = 10
300	Carded cotton yarn	11,852	12,388
301	Combed cotton yarn	4,243	4,687
312	Corduroy fabric	1,183	1,209
313	Cotton sheeting	15,068	16,654
314	Poplin and broadcloth	3,937	4,493
315	Cotton printcloth	6,243	7,086
317	Twills and sateens	11,478	12,273
318	Other yarn-dyed fabrics	852	1,189
319	Duck	5,503	5,987
320	Other cotton woven fabrics	6,391	6,850
330	Handkerchiefs	135	155
331	Cotton gloves and mittens	6,553	6,687
332	Cotton hosiery	1,696	1,696
333	MB suit-type coats	1,266	1,309
334	Other MB coats	19,729	19,729
335	WGI coats	369	2,171
336	Cotton dresses	1,375	1,375
337	Cotton playsuits, sunsuits	145	625
338	MB knit shirts	75,339	81,331
339	WGI knit shirts and blouses	114,443	114,443
340	MB shirts, not knit	161,598	161,598
341	WGI shirts, not knit	69,337	69,337
342	Cotton skirts	30,148	39,579
345	Cotton sweaters	83,609	83,609
347	MB trousers and shorts	53,708	70,642
348	WGI trousers and shorts	48,517	69,264
349	Brassieres, etc.	1,088	1,256
350	Dressing gowns, etc.	15,183	19,808
351	Cotton nightwear and pajamas	4,998	5,893
352	Cotton underwear	2,652	2,759
410	Woolens and worsteds	4,400	5,137
425	Wool knit fabrics	245	262
431	Wool gloves and mittens	3	0
432	Wool hosiery	1,082	1,082
433	MB suit-type coats	4,548	5,143
434	Other MB coats	15,886	15,886
435	WGI wool coats	10,449	16,063
436	Wool dresses	(31)	(31)
438	Knit shirts and blouses	38,748	38,748
440	Shirts, not knit	2,033	2,033
442	Wool skirts	2,268	4,095
443	MB wool suits	8,425	13,816
444	WGI wool suits	4,696	4,473
445	MB wool sweaters	12,504	12,504
446	WGI wool sweaters	25,232	25,232
447	MB trousers and shorts	4,588	8,457
448	WGI trousers and shorts	4,313	5,229
600	Textured MMF yarns	594	682
601	Continuous cellulosic	231	255
602	Continuous noncellulosic	4,660	4,704
603	Noncontinuous cellulosic	16	33
604	Noncont noncellulosic	3,739	3,892
610	Woven of continous cellulosic	8,461	8,664
611	Woven of spun cullulosic	9,670	11,043
612	Woven of cont. noncellulosic	11,974	13,016
613	Woven of spun noncellulosic	1,097	1,388
614	Other woven MMF fabrics	1,865	2,738
625	Knit MMF fabrics	962	993
626	Pile and tufted fabrics	150	159
627	MMF specialty fabrics	36,876	38,440
630	Handkerchiefs	193	204
631	MMF gloves and mittens	3,483	3,538
632	MMF hosiery	3,575	3,575
633	MB suit-type coats	17,706	17,914
634	Other MB coats	36,621	36,621
635	WGI MMF coats	93,205	147,705
636	MMF dresses	52,519	52,519
637	MMF playsuits, sunsuits etc.	3,874	4,935
638	MB knit shirts	89,191	90,714
639	WGI knit shirts and blouses	183,902	183,902
640	MB shirts, not knit	156,477	156,477
641	WGI shirts, not knit	60,075	60,075

See footnote at end of table.

Table 4-8—*Continued*

Net welfare gains from quota and tariff elimination according to the traditional calculation

(Thousands of dollars)

Category	Description[1]	Domestic supply elasticity = 1	Domestic supply elasticity = 10
642	MMF skirts	31,272	42,712
643	MB suits	6,703	7,053
644	WGI suits	9,773	16,470
645	MB sweaters	77,084	77,084
646	WGI sweaters	280,516	280,516
647	MB trousers and shorts	113,303	144,694
648	WGI trousers and shorts	140,803	180,062
649	Brassieres, etc	10,976	15,360
650	Dressing gowns	641	1,213
651	MMF nightwear and pajamas	8,587	10,187
652	MMF underwear	9,011	9,738
	Total	2,367,813	2,613,482

[1] "MB" denotes mens' and boys'. "WGI" denotes women's, girls' and infants'. "MMF" denotes manmade fiber.

Source: Estimated by the staff of the USITC.

Table 4-9

Other potential effects

(Thousands of dollars except where indicated)

Item	Textiles	Apparel	Total
		Elasticity of supply = to 1	
Traditional net welfare gain	151,691	2,216,122	2,367,813
Worker income loss[1]	70,938	200,273	271,210
Domestic tax gain[2]	235,276	2,741,074	2,976,350
Terms-of-trade loss[3]	-18,601	772,072	753,472
Adjusted net welfare gain	334,630	3,984,851	4,319,481
Employment loss (no. employees)	5,158	227,707	232,865
		Elasticity of supply = to 10	
Traditional net welfare gain	164,221	2,449,260	2,613,482
Worker income loss[1]	102,622	248,414	351,036
Domestic tax gain[2]	235,276	2,741,074	2,976,350
Terms-of-trade loss[3]	15,586	1,172,213	1,187,798
Adjusted net welfare gain	281,289	3,769,707	4,050,998
Employment loss (no. employees)	7,525	283,634	291,159

[1] The worker income loss calculation assumes a rigid wage in the sector under consideration. If the wage is flexible, the worker income loss would be included in the producer loss of the traditional analysis.

[2] The domestic tax gain calculation assumes that tariff revenue is replaced with a proportional increase in all existing domestic taxes. If the replacement tax were a uniform sales tax, this adjustment would be insignificant in size. If the federal income tax were used to replace the tariff revenue, the adjustment could be 3 times as great.

[3] The terms-of-trade adjustment is relevant only for a unilateral restraint elimination. The estimate presented here tends to overstate the true terms-of-trade loss, because it does not account for the fact that increased U.S. imports might cause foreign demand for U.S. exports to increase.

Source: Estimated by the staff of the USITC.

Table 4-10

Proportional fall in the cost to fabric producers as a result of the removal of MFA quotas and tariffs in textile fibers

(Proportional change)

Category	Description[1]	Domestic supply elasticity = 1	Domestic supply elasticity = 10
310	Gingham fabric	-.026	-.026
311	Velveteen fabric	-.027	-.027
312	Corduroy fabric	-.001	-.001
313	Cotton sheeting	-.013	-.012
314	Poplin and broadcloth	-.010	-.010
315	Cotton printcloth	-.012	-.011
316	Cotton shirting	-.027	-.027
317	Twills and sateens	-.006	-.006
318	Other yarn-dyed fabrics	-.013	-.013
319	Duck	-.020	-.019
320	Other cotton woven fabrics	-.004	-.003
332	Cotton hosiery	-.002	-.001
352	Cotton underwear	-.007	-.006
353	MB down-filled coats, etc.	-.027	-.027
354	WGI down-filled coats, etc.	-.027	-.027
410	Woolens and worsteds	-.005	-.004
411	Tapestry and upholstery	-.017	-.017
425	Wool knit fabrics	-.002	-.001
429	Other wool fabrics	-.017	-.017
432	Wool hosiery	-.004	-.003
610	Woven of continuous cellulosic	-.002	-.001
611	Woven of spun cullulosic	-.009	-.008
612	Woven of cont. noncellulosic	-.003	-.002
613	Woven of spun noncellulosic	-.004	-.003
614	Other woven MMF fabrics	-.004	-.004
625	Knit MMF fabrics	-.002	-.001
626	Pile and tufted fabrics	-.002	-.001
627	MMF specialty fabrics	-.003	-.003
632	MMF hosiery	-.002	-.001
652	MMF underwear	-.009	-.008
653	MB down-filled coats	-.027	-.027
654	WGI down-filled coats	-.027	-.027

[1] MB" denotes mens' and boys'. "WGI" denotes women's, girls' and infants'. "MMF" denotes manmade fiber.

Source: Estimated by the staff of the USITC.

Table 4-11

Proportional increase in the supply of fabrics as a result of the decline in downstream costs due to the removal of MFA quotas and tariffs in textile fibers

(Proportional change)

Category	Description[1]	Domestic supply elasticity = 1	Domestic supply elasticity = 10
310	Gingham fabric	.039	.039
311	Velveteen fabric	.041	.041
312	Corduroy fabric	.002	.001
313	Cotton sheeting	.019	.018
314	Poplin and broadcloth	.015	.015
315	Cotton printcloth	.017	.017
316	Cotton shirting	.040	.040
317	Twills and sateens	.010	.009
318	Other yarn-dyed fabrics	.020	.019
319	Duck	.029	.029
320	Other cotton woven fabrics	.006	.005
332	Cotton hosiery	.002	.001
352	Cotton underwear	.010	.009
353	MB down-filled coats, etc.	.040	.040
354	WGI down-filled coats, etc.	.040	.040
410	Woolens and worsteds	.007	.006
411	Tapestry and upholstery	.026	.026
425	Wool knit fabrics	.003	.002
429	Other wool fabrics	.025	.025
432	Wool hosiery	.005	.004
610	Woven of continuous cellulosic	.003	.002
611	Woven of spun cullulosic	.013	.012
612	Woven of cont. noncellulosic	.004	.003
613	Woven of spun noncellulosic	.006	.004
614	Other woven MMF fabrics	.006	.005
625	Knit MMF fabrics	.003	.001
626	Pile and tufted fabrics	.003	.001
627	MMF specialty fabrics	.005	.004
632	MMF hosiery	.003	.002
652	MMF underwear	.014	.012
653	MB down-filled coats	.040	.040
654	WGI down-filled coats	.040	.040

[1] "MB" denotes mens' and boys'. "WGI" denotes women's, girls' and infants'. "MMF" denotes manmade fiber.

Source: Estimated by the staff of the USITC.

Table 4-12

Proportional fall in the cost to apparel producers as a result of the removal of MFA quotas and tariffs in textile fabrics

(Proportional change)

Category	Description[1]	Domestic supply elasticity = 1	Domestic supply elasticity = 10
330	Handkerchiefs	-.015	-.013
331	Cotton gloves and mittens	-.017	-.015
332	Cotton hosiery	-.004	-.001
333	MB suit-type coats	-.014	-.012
334	Other MB coats	-.020	-.019
335	WGI coats	-.022	-.021
336	Cotton dresses	-.011	-.009
337	Cotton playsuits, sunsuits	-.018	-.017
338	MB knit shirts	-.015	-.014
339	WGI knit shirts and blouses	-.022	-.021
340	MB shirts, not knit	-.019	-.018
341	WGI shirts, not knit	-.019	-.018
342	Cotton skirts	-.019	-.017
345	Cotton sweaters	-.013	-.011
347	MB trousers and shorts	-.011	-.009
348	WGI trousers and shorts	-.016	-.014
349	Brassieres, etc.	-.009	-.007
350	Dressing gowns	-.015	-.014
351	Cotton nightwear and pajamas	-.014	-.013
352	Cotton underwear	-.007	-.004
353	MB down-filled coats, etc	-.028	-.028
354	WGI down-filled coats, etc	-.028	-.028
359	Other cotton apparel	-.028	-.028
431	Wool gloves and mittens	-.026	-.026
432	Wool hosiery	-.006	-.003
433	MB suit-type coats	-.010	-.007
434	Other MB coats	-.012	-.010
435	WGI wool coats	-.012	-.009
436	Wool dresses	-.013	-.012
438	Knit shirts and blouses	-.023	-.023
440	Shirts, not knit	-.018	-.017
442	Wool skirts	-.012	-.011
443	MB wool suits	-.013	-.012
444	WGI wool suits	-.011	-.008
445	MB wool sweaters	-.019	-.019
446	WGI wool sweaters	-.024	-.024
447	MB trousers and shorts	-.011	-.009
448	WGI trousers and shorts	-.014	-.013
459	Other wool apparel	-.026	-.026
630	Handkerchiefs	-.008	-.006
631	MMF gloves and mittens	-.019	-.018
632	MMF hosiery	-.005	-.002
633	MB suit-type coats	-.010	-.008
634	Other MB coats	-.015	-.013
635	WGI MMF coats	-.016	-.015
636	MMF dresses	-.009	-.006
637	MMF playsuits, sunsuits	-.010	-.007
638	MB knit shirts	-.009	-.006
639	WGI knit shirts	-.017	-.015
640	MB shirts, not knit	-.017	-.016
641	WGI shirts, not knit	-.013	-.011
642	MMF skirts	-.013	-.011
643	MB suits	-.009	-.006
644	WGI suits	-.016	-.015
645	MB sweaters	-.019	-.017
646	WGI sweaters	-.020	-.019
647	MB trousers and shorts	-.011	-.008
648	WGI trousers and shorts	-.014	-.012
649	Brassieres, etc	-.015	-.013
650	Dressing gowns	-.008	-.006
651	MMF nightwear and pajamas	-.007	-.004
652	MMF underwear	-.009	-.006
653	MB down-filled coats	-.028	-.028
654	WGI down-filled coats	-.028	-.028
659	Other MMF apparel	-.028	-.028

[1] "MB" denotes mens' and boys'. "WGI" denotes women's, girls' and infants'. "MMF" denotes manmade fiber.

Source: Estimated by the staff of the USITC.

Table 4-13

Proportional increase in the supply of apparel as a result of the decline in downstream costs due to the removal of MFA quotas and tariffs in textile fabrics

(Proportional change)

Category	Description[1]	Domestic supply elasticity = 1	Domestic supply elasticity = 10
330	Handkerchiefs	.030	.027
331	Cotton gloves and mittens	.033	.030
332	Cotton hosiery	.008	.002
333	MB suit-type coats	.028	.024
334	Other MB coats	.040	.038
335	WGI coats	.043	.042
336	Cotton dresses	.022	.017
337	Cotton playsuits, sunsuits	.036	.033
338	MB knit shirts	.030	.027
339	WGI knit shirts and blouses	.044	.042
340	MB shirts, not knit	.039	.037
341	WGI shirts, not knit	.038	.036
342	Cotton skirts	.037	.035
345	Cotton sweaters	.025	.021
347	MB trousers and shorts	.023	.019
348	WGI trousers and shorts	.032	.029
349	Brassieres, etc	.018	.013
350	Dressing gowns	.030	.027
351	Cotton nightwear and pajamas	.029	.025
352	Cotton underwear	.014	.009
353	MB down-filled coats, etc	.056	.056
354	WGI down-filled coats, etc	.056	.056
359	Other cotton apparel	.056	.056
431	Wool gloves and mittens	.053	.052
432	Wool hosiery	.012	.006
433	MB suit-type coats	.019	.015
434	Other MB coats	.023	.019
435	WGI wool coats	.023	.019
436	Wool dresses	.027	.023
438	Knit shirts and blouses	.047	.045
440	Shirts, not knit	.037	.034
442	Wool skirts	.025	.021
443	MB wool suits	.027	.023
444	WGI wool suits	.021	.017
445	MB wool sweaters	.039	.037
446	WGI wool sweaters	.048	.047
447	MB trousers and shorts	.023	.019
448	WGI trousers and shorts	.029	.025
459	Other wool apparel	.051	.051
630	Handkerchiefs	.017	.012
631	MMF gloves and mittens	.039	.036
632	MMF hosiery	.009	.003
633	MB suit-type coats	.020	.016
634	Other MB coats	.030	.026
635	WGI MMF coats	.032	.029
636	MMF dresses	.017	.012
637	MMF playsuits, sunsuits	.019	.014
638	MB knit shirts	.018	.013
639	WGI knit shirts	.034	.031
640	MB shirts, not knit	.034	.032
641	WGI shirts, not knit	.025	.021
642	MMF skirts	.026	.022
643	MB suits	.018	.013
644	WGI suits	.033	.030
645	MB sweaters	.037	.035
646	WGI sweaters	.040	.038
647	MB trousers and shorts	.021	.017
648	WGI trousers and shorts	.028	.024
649	Brassieres, etc	.030	.026
650	Dressing gowns	.016	.011
651	MMF nightwear and pajamas	.014	.009
652	MMF underwear	.017	.012
653	MB down-filled coats	.056	.056
654	WGI down-filled coats	.056	.056
659	Other MMF apparel	.056	.056

[1] "MB" denotes mens' and boys'. "WGI" denotes women's, girls' and infants'. "MMF" denotes manmade fiber.

Source: Estimated by the staff of the USITC.

APPENDIX A
REQUEST LETTER

United States Senate

COMMITTEE ON FINANCE
WASHINGTON, DC 20510-6200

September 9, 1988

The Honorable
Anne Brunsdale
Vice Chairman
United States International
Trade Commission
500 "E" Street, S.W.
Washington, D.C. 20436

Dear Madam Vice Chairman:

On behalf of the Committee on Finance, I request that the Commission conduct a study pursuant to section 332 of the Tariff Act of 1930 on the economic effects of existing significant U.S. import restraints. The study should include an assessment of the effects on U.S. consumers, on the output and profits of U.S. firms, on the income and employment of U.S. workers, and on the net economic welfare of the United States. The study should assess the direct effect on U.S. industries that are protected by the import restraints and the indirect effects on "downstream" industries that are customers of the protected industries.

The study should consider the effects of significant restraints on U.S. imports, such as voluntary restraints on steel and autos, and the Multifiber Arrangement, whether they result from an Act of Congress, an action taken under the fair trade laws of the United States, such as section 201 investigations, or an international agreement. The study should not include those import restraints resulting from final antidumping or countervailing duty investigations by the ITC and the Department of Commerce or section 337 and 406 investigations by the ITC.

The results of the study should be reported in three phases. The first phase should address the effects of restraints on imports of manufactured products. The second phase should address the effects of restraints on imports of agricultural products and natural resources, and the third phase should address the effects of restraints on services industries. The Committee would appreciate receiving the report for the first phase within one year after receipt of this request, the report for the second phase within two years, and the report for the third phase within three years.

Sincerely,

A-2

Lloyd Bentsen

APPENDIX B
FEDERAL REGISTER NOTICE

UNITED STATES INTERNATIONAL TRADE COMMISSION
Washington, D.C. 20436

Investigation No. 332-262

The Economic Effects of Significant U.S. Import Restraints

AGENCY: United States International Trade Commission

ACTION: Institution of investigation, scheduling of hearing, and request for comments.

EFFECTIVE DATE: October 11, 1988

FOR FURTHER INFORMATION CONTACT: Walker Pollard (202) 252-1228, or Donald Rousslang (202) 252-1223, Research Division, Office of Economics, U.S. International Trade Commission, Washington, D.C. 20436.

BACKGROUND: The Commission instituted investigation No. 332-262 following receipt of a letter dated September 9, 1988, from the Senate Committee on Finance requesting the Commission to conduct an investigation under section 332(g) of the Tariff Act of 1930 (19 U.S.C. 1332(g)) of the economic effects of existing significant U.S. import restraints.

As requested by the Committee, the study will include an assessment of the effects on U.S. consumers, on the output and profits of U.S. firms, on the income and employment of U.S. workers, and on the net economic welfare of the United States. The study will assess the direct effect on U.S. industries that are protected by the import restraints and the indirect effects on "downstream" industries that are customers of the protected industries.

The study will consider the effects of significant restraints on U.S. imports, such as voluntary restraints on steel and autos, and the Multifiber Arrangement, whether they result from an Act of Congress, an action taken under the fair trade laws of the United States, such as 201 investigations, or an international agreement. The study will not include those import restraints resulting from final antidumping of countervailing duty investigations by the ITC and the Department of Commerce or section 337 and 406 investigations by the ITC.

The Committee has requested that the results of the study be reported in three phases. The first phase will address the effects of restraints on imports of manufactured products. The second phase will address the effects of restraints on imports of agricultural products and natural resources, and the third phase will address the effects of restraints on services industries. The Committee has requested that the report for the first phase be submitted within one year after receipt of this request, the report for the second phase within two years, and the report for the third phase within three years.

B-2

PUBLIC HEARING: A public hearing in connection with the first phase of this investigation will be held in the Commission Hearing Room, 500 E Street, SW, Washington, D.C. 20436, beginning at 9:30 a.m. on April 5, 1989. All persons shall have the right to appear by counsel or in person, to present information, and to be heard. Requests to appear at the public hearing should be filed with the Secretary, United States International Trade Commission, 500 E Street, SW, Washington, D.C. 20436, no later than noon, March 31, 1989. The deadline for filing prehearing briefs (original and 14 copies) is March 31, 1989. Dates for public hearings in connection with the second and third phases will be announced later.

WRITTEN SUBMISSIONS: Interested persons are invited to submit written statements concerning the matters to be addressed in the report. Commercial or financial information that a party desires the Commission to treat as confidential must be submitted on separate sheets of paper, each clearly marked "Confidential Business Information" at the top. All submissions requesting confidential treatment must conform with the requirements of section 201.6 of the Commission's Rules of Practice and Procedure (19 CFR 201.6). All written submissions, except for confidential business information, will be made available for inspection by interested persons in the Office of the Secretary to the Commission. To be assured of consideration by the Commission, written statements relating to the Commission's report and post-hearing briefs should be submitted at the earliest practical date and should be received no later than April 19, 1989. All submissions should be addressed to the Secretary to the Commission at the Commission's office in Washington, D.C.

Hearing-impaired persons are advised that information on this matter can be obtained by contacting the Commission's TDD terminal on (202) 252-1810.

By order of the Commission

Kenneth R. Mason
Secretary

Issued: October 13, 1988

APPENDIX C
CALENDAR OF PUBLIC HEARING

CALENDAR OF PUBLIC HEARING

Those listed below appeared as witnesses at the United States International Trade Commission's hearing:

Subject: The Economic Effects of Significant U.S. Import Restraints

Inv. No: 332-262

Date and Time: April 5, 1989 - 9:30 a.m.

Sessions were held in connection with the investigation in the Main Hearing Room 101 of the United States International Trade Commission, 500 E Street, S.W., in Washington, D.C.

WITNESS AND ORGANIZATION

Patton, Boggs & Blow
Washington, D.C.
on behalf of

American International Automobile
Dealers Association

Robert McElwaine, President

Citizens for a Sound Economy
Washington, D.C.

Jerome Ellig, Research Director

American Association of
Exporters and Importers
New York, New York

AAEI Textile and Apparel Group
(importers and retailers)

Professor Joel Dirlam

Gail Cummins, of Counsel

- more -

C-2

WITNESS AND ORGANIZATION

Consumers for World Trade
Washington, D.C.

Doreen L. Brown, President

National Knitwear & Sportswear Association
New York New York

Seth M. Bodner, Executive Director

Mudge Rose Guthrie Alexander & Ferdon
Washington, D.C.
on behalf of

U. S. Association of Importers of
Textiles and Apparel

Julia K. Hughes, Vice Chairman of USAI and
Director, Government Relations, Associated
Merchandising Corporation

Martin Lewin)—OF COUNSEL

- end -

APPENDIX D
TECHNICAL DESCRIPTION OF THE METHODOLOGY FOR ASSESSING THE EFFECTS OF TARIFF ELIMINATION

Technical Description of the Methodology for Assessing the Effects of Tariff Elimination

This appendix provides a technical description of the methodology for assessing the impacts of tariff elimination. It begins with the traditional analysis and then introduces the further complications of wage rigidity, domestic taxes, the terms-of-trade effects of exchange-rate changes, and upstream and downstream effects.

The Traditional Analysis

The traditional analysis is given in the partial-equilibrium diagrams presented in chapter 2. Denote the imported good as f and the competing, domestic good as d. Q_f and p_f are the initial imports and domestic price of the foreign good, and Q_d and p_d are the initial shipments and domestic price of the domestic good. Units are chosen such that, before tariff removal, $p_d = p_f = 1$. Thus, before tariff removal, $V_f = Q_f$ and $V_d = Q_d$, where V_f and V_d are the values of imports and domestic shipments. Denote the proportional change in a variable using a hat "^" so that, for example, $\hat{z} = dz/z$. The proportional changes in the dollar value of imports and domestic shipments due to the tariff elimination are then $\hat{V}_f = \hat{p}_f + \hat{Q}_f$ and $\hat{V}_d = \hat{p}_d + \hat{Q}_d$. Eliminating the tariff causes p_f to fall. The proportional change in pf caused by eliminating the tariff is calculated as:

$$\hat{p}_f = -(\text{duties collected})/(\text{customs value} + \text{import charges} + \text{duties collected}) \qquad \text{(D1)}$$

Following Baldwin and Lewis and Baldwin, Mutti, and Richardson it is assumed that imports in the protected sector are want-independent of all goods except the domestic good.[1] Thus, the compensated, cross-price elasticity of demand between d and all other goods except f is zero, and the post-tariff-elimination equilibrium values for the price and output of d and imports of f (p'_d, Q'_d, and Q'_f) depend on the values of five elasticities: the elasticity of demand for f, the two cross-price elasticities of demand between d and f, the own-price elasticity of demand for d, and the elasticity of supply for d.

The markets for d and f are described by the following three equations:

$$\hat{Q}_d = \epsilon_{dd}\hat{p}_d + \epsilon_{df}\hat{p}_f \qquad \text{(D2)}$$

$$\hat{Q}_f = \epsilon_{fd}\hat{p}_d + \epsilon_{ff}\hat{p}_f \qquad \text{(D3)}$$

$$\hat{Q}_d = e_d\hat{p}_d \qquad \text{(D4)}$$

where ϵ_{ij} is the uncompensated elasticity of demand for good i with respect to price j, and e_d is the elasticity of supply of d. In the system of equations given by (D2) through (D4), $\hat{Q}_d$, $\hat{Q}_f$, and $\hat{p}_d$ are endogenous variables. $\hat{p}_f$ is exogenous. Solving the system yields the following solutions:

$$\hat{p}_d = [\epsilon_{df}/(e_d - \epsilon_{dd})]\hat{p}_f \qquad \text{(D5)}$$

$$\hat{Q}_d = e_d[\epsilon_{df}/(e_d - \epsilon_{dd})]\hat{p}_f \qquad \text{(D6)}$$

$$\hat{Q}_f = \{\epsilon_{ff} + \epsilon_{fd}[\epsilon_{df}/(e_d - \epsilon_{dd})]\}\hat{p}_f \qquad \text{(D7)}$$

[1] R.E. Baldwin and W.E. Lewis, "U.S. Tariff Effects on Trade and Employment in Detailed SIC Industries," in W.G. Dewald (ed.), *The Impact of International Trade and Investment on Employment*, U.S. Department of Labor, Bureau of International Labor Affairs, 1978, pp. 241-259; and R.E. Baldwin, J.H. Mutti, and J.D. Richardson, "Welfare Effects on the United States of a Significant Multilateral Tariff Reduction," *Journal of International Economics*, August 1980, pp. 405-423.

D-2

The values of ϵ_{ff} are taken from the literature and are given in table D–1. In some cases, values of e_{dd} also are available from the literature, but in other cases they must be approximated. Table D–2 presents estimates of e_{dd} for those cases where they are available. In every case, the cross-price elasticities e_{df} and e_{fd} must be approximated. In cases where V_f is not very large relative to V_d, the cross-price elasticities are approximated using the formulas:[2]

$$\epsilon_{df} \approx -\epsilon_{ff}(V_f/V_d) \qquad \text{(D8a)}$$

$$\epsilon_{fd} \approx -\epsilon_{ff} \qquad \text{(D9a)}$$

In cases where V_f is much larger than V_d, the cross-price elasticities are approximated using the formulas:

$$\epsilon_{df} \approx -\epsilon_{dd} \qquad \text{(D8b)}$$

$$\epsilon_{fd} \approx -\epsilon_{dd}(V_d/V_f) \qquad \text{(D9b)}$$

In cases where there is no estimate of ϵ_{dd}, it is approximated using the following formula:

$$e_{dd} \approx (V_f/V_d)\epsilon_{ff} \qquad \text{(D10)}$$

V_f is c.i.f. duty-paid imports. The values for V_d are given in appendix E. Elasticity estimates are based on 1986 data for V_d and V_f.

Since reliable estimates of e_d generally are not available, the analysis is conducted first using a low estimate of unity and then using a high estimate of ten.

The impact of the tariff elimination on the dollar value of shipments in the protected sector is $(\hat{Q}_d + \hat{p}_d)Q_d$. Using an employment-shipment ratio for the protected sector (α), the impact of the tariff elimination on employment is measured as $\alpha(\hat{Q}_d + \hat{p}_d)Q_d$.

The impact of the tariff elimination on consumer welfare is estimated as follows. Referring to figure 2–1 in chapter 2, the tariff elimination increases consumer welfare in the market for good d by area $C_d = p_d dep'_d$ and increases consumer welfare in the market for good f by area $C_f = p_f abp'_f$. A straight line is used to approximate the actual path between equilibrium points a and b. As Burns notes, "for most practical purposes the variability of the ... (welfare measure) according to the path chosen is not going to be of any significant dimension." [3]

The area of the consumer-welfare trapezoid in market d is

$$C_d = (p_d - p'_d)(Q_d + Q'_d)/2$$

which can be written as

$$C_d = -Q_d \hat{p}_d(2 + \hat{Q}_d)/2 \qquad \text{(D11)}$$

The area of the consumer-welfare trapezoid in market f is

$$C_f = (p_f - p'_f)(Q_f + Q'_f)/2$$

which can be written as

$$C_f = -Q_f \hat{p}_f(2 + \hat{Q}_f)/2 \qquad \text{(D12)}$$

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[2] D.J. Rousslang and S. Parker, "Cross Price Elasticities of U.S. Import Demand, " *The Review of Economics and Statistics*, August 1984, pp. 518–523; and D.J. Rousslang and J.W. Suomela, *Calculating the Consumer and Net Welfare Costs of Import Relief*, USITC, Staff Research Study No. 15, 1985, p. 83.

[3] M.E. Burns, "A Note on the Concept and Measure of Consumer's Surplus, " *American Economic Review*, June 1973, pp. 335–344.

Adding equations (D11) and (D12) together gives the following estimate for the effect on U.S. consumers:

$$C = -[\hat{p}_d Q_d(2+\hat{Q}_d) + \hat{p}_f Q_f(2+\hat{Q}_f)]/2 \quad \text{(D13)}$$

The loss of producer surplus in the market for good d is exactly equal to the gain in consumer surplus in this market. This loss in producer surplus is used as an upper bound estimate of the loss in firms' profits (F), or

$$F = -Q_d \hat{p}_d(2 + \hat{Q}_d)/2 \quad \text{(D14)}$$

The traditional, net-welfare effect of the tariff elimination (TNW) is calculated as

$$TNW = C - F - R \quad \text{(D15)}$$

where R is the lost tariff revenue.

The Adjustment for Displaced Workers

If the industry wage is fixed and workers are involuntarily displaced by the tariff elimination, the producers' surplus, F, does not include losses to the displaced workers. The loss to these workers (W) is estimated as 15 percent of their predisplacement income, or[4]

$$W = -(\hat{Q}_d + \hat{p}_d)Q_d\gamma(0.15) \quad \text{(D16)}$$

where W is the change in workers' income and γ is the payroll-shipment ratio in the industry. Payroll-shipment ratios are given in appendix E.

Accounting for the Presence of Domestic Taxes

It is well known from public finance theory that the welfare cost of a tax per dollar of revenue tends to increase as the tax rate rises. For example, an income tax of 10 percent would impose a greater welfare cost per dollar of revenue than an income tax of 5 percent. It follows that, if a tax is levied on top of an existing tax, it will impose a greater welfare burden for each dollar of revenue it generates than if there had been no pre-existing tax.

Domestic income and excise taxes impose important welfare costs by lowering real after-tax wages and thereby distorting the choice of workers between activities that produce money income and those that do not. A tariff raises the cost of imports and so can add to the work-leisure distortion by reducing real wages.[5] In this sense, the tariff comes on top of existing domestic taxes. This fact has been ignored in virtually all of the previous studies of the welfare cost of tariffs.

The error from ignoring preexisting domestic taxes (which leads to understatement of the welfare cost of the tariff or of the gains from removing the tariff) is offset to some extent in the previous studies because these studies also ignore the cost of replacing the tariff revenue with an alternative tax. A tariff imposes an efficiency cost on the economy, but so does every other practical tax. Thus, in a world of second best, the true net gain from eliminating a tariff should be measured as the efficency cost of the tariff minus the efficiency cost of the tax used to replace the tariff revenue.

The net welfare implications of a tariff depend importantly on the form of the tax used to replace the tariff revenue. If the replacement tax is a flat sales tax on all final

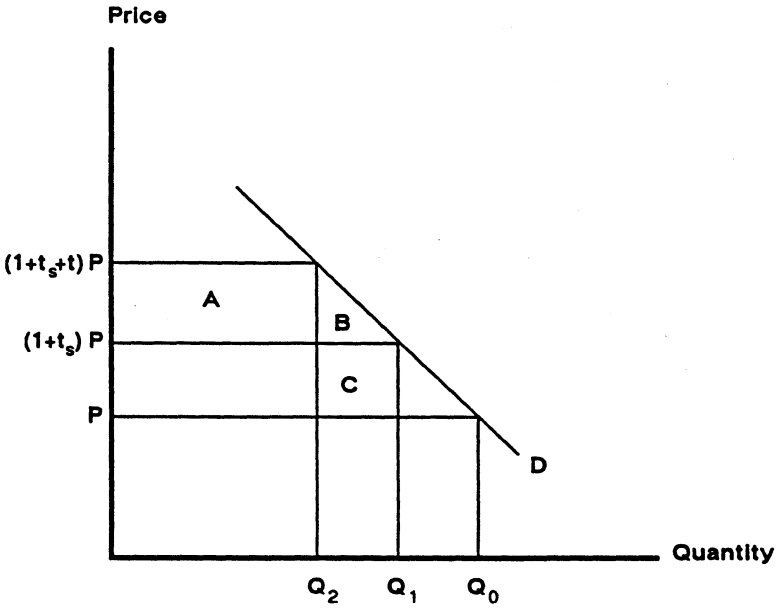
[4] This estimate is based on the work of L.L. Jacobsen, "Earnings Losses of Workers Displaced from Manufacturing Industries, " in W.G. Dewald (ed.), *The Impact of International Trade on Investment and Employment*, U.S. Department of Labor, 1978, pp. 87-98.

[5] The reduction in the real wage comes from the increase in consumer prices caused by the tariff. A tariff can also shift domestic factor demand toward or away from labor. The effects of such shifts are discussed later in this section.

output, the adjustment to the standard welfare triangles of a tariff is likely to be small. If the replacement tax increase is progressive, however, a substantial adjustment to the traditional calculations may be necessary. This is true because the progressive tax increase can impose a much greater welfare cost than the flat tax increase. Indeed, such a tax increase can easily impose a greater welfare cost than the tariff it replaces.

Figures D–1 and D–2 provide a highly stylized geometric analysis to support the conclusions given above.[6] Figure D–1 shows the domestic market for an import that is subject to a domestic sales tax (t_s) and an import tariff (t). (For simplicity of exposition, both taxes are assumed to be levied on the world price.) Q_0 is the initial quantity imported with no taxes. The domestic sales tax raises the domestic price from the world price (p) to $(1 + t_s)p$ and reduces the quantity imported to Q_1. The tariff raises the price further to $(1 + t_s + t)p$ and reduces the quantity to Q_2. The tariff yields revenue given by the area of rectangle A, but it reduces revenue from the domestic sales tax by the area of rectangle C. If there were no change in demand for other domestic products, the welfare cost of the tariff would be triangle B plus rectangle C. (This is the case in which the reduction in imports would be matched by an equal reduction in total purchases.) To the extent that demand for other goods is increased as domestic residents substitute them for the higher-priced import, some of the lost revenue from the domestic sales tax is restored and the welfare cost of the tariff is reduced accordingly.

Figure D–1
Domestic taxes



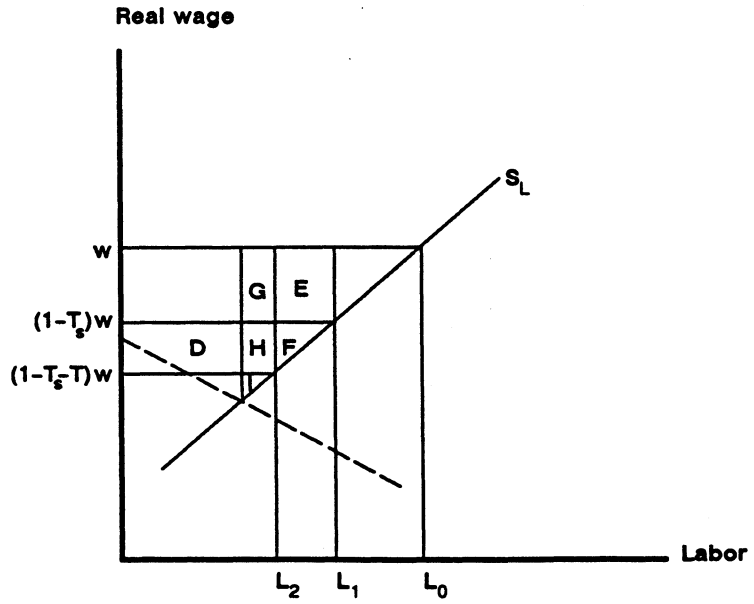
Key:

P = price t_s = sales tax
Q = quantity t = tariff
D = demand

For simplicity, assume that labor is the only factor of production and that the tariff-ridden import substitutes with leisure at the same rate as the average for all other goods. Thus, the net loss in the revenue from the domestic tax depends on the effect of the tariff on the suppy of labor, as shown in figure D–2. There, w is the pre-tax real wage, S_L is the supply of labor curve and L_0 is the level of income absent any tax. Ts and T are the percent reductions in the average real wage caused by the domestic sales tax and by the tariff-induced increase in the import price.

[6] The demand and supply curves in these diagrams are income compensated, as they must be for a proper welfare analysis.

Figure D-2
Domestic taxes



Key:

T_s = sales tax equivalent
T = tariff equivalent
L = labor
w = real wage
S_L = labor supply

Applying the domestic sales tax (or an equivalent income tax) reduces the real wage to (1 – Ts)w, and work effort declines to L_1. With the addition of the import tariff, the real wage declines to (1 – Ts – T)w and the level of income declines to L_2. Rectangle D plus rectangle H in figure D–2 is the tariff revenue and thus represents the same dollar amount as rectangle A in figure D–1. Rectangle E in figure D–2 corresponds to the net reduction in revenue from the domestic tax and has a smaller area than rectangle C in figure D–1 as long as the tariff shifts some domestic expenditure away from the import to other goods. The net revenue impact of the tariff is given in figure D–2 as rectangle D plus rectangle H minus rectangle E. The deadweight loss caused by the tariff is thus triangle B in figure D–1 plus rectangle E in figure D–2. This exceeds the traditional measure of this deadweight loss, which is merely triangle B.

To obtain the complete welfare consequences of the tariff, one must subtract the deadweight loss of the increase in the domestic taxes that would be needed to replace the tariff revenue. The deadweight loss of an increase in the sales tax rate that would supply the same amount of revenue as the tariff is rectangle E plus triangle F in Figure D–2. Since triangle F is small, if the tariff revenue is replaced with the domestic sales tax, its deadweight loss after accounting for the deadweight loss from the domestic tax increase is only slightly smaller than the traditional measure.

Suppose, however, that the tariff revenue were replaced with a progressive tax increase. In terms of our stylized example, the rate of domestic tax on each succeeding unit of wage income would be higher, so the effect on after-tax wages would be as indicated by the dashed line in figure D–2. The welfare cost of this tax increase is rectangle E plus rectangle G plus rectangle H plus triangle F plus triangle I in figure D–2. This welfare cost is substantially greater than that for the flat increase in the sales tax, and can exceed the welfare cost of the tariff. If the tariff revenue is replaced with this progressive tax increase, the deadweight loss of the tariff will fall short of the traditional measure by approximately the difference between the deadweight loss of the equal-revenue flat tax increase and that of the equal-revenue progressive tax increase. D-6

Since overall U.S. taxes are progressive, a tax increase that consists of a proportional increase in all existing domestic taxes would also be progressive. This is the form of tax increase that is chosen in the present study to represent the alternative to the tariff. Calculations have already been performed by Browning for this type of tax increase and for a flat, per-unit tax added to existing taxes.[7] His calculations indicate that the sum of the areas of rectangle G plus rectangle H plus triangle I is approximately 15 percent as great as rectangle D plus rectangle H.[8] This implies that the standard triangle for the welfare gain from eliminating a tariff must be adjusted by subtracting 15 percent of the lost tariff revenue to account for the presence of domestic taxes and the cost of replacing the tariff revenue. This is the adjustment used in the welfare estimates for each of the individual tariffs considered in this study.

In the above simple analysis, labor was the only factor of production and the tariff did not serve to increase the domestic demand for labor. The story becomes more complicated if other productive factors are considered. For example, in the standard trade model with two goods and two factors of production[9] (say, capital and labor), a tariff that protects the labor-intensive good (the good whose production requires more labor relative to capital) would increase the domestic demand for labor and cause the real wage rate to rise.[10] In this case, the tariff could increase work effort and generate a corresponding increase in domestic tax revenue from labor's income. However, in this case the tariff also would reduce the demand for capital, leading to a decline in the return to capital and in the amount of capital supplied. This reduction in returns to capital would generate a corresponding reduction in domestic tax revenue from capital's income. The direction of the net change in domestic tax revenue is unclear.

The Adjustment for Terms-of Trade Effects of Exchange-Rate Changes[11]

The phrase "terms of trade" refers to the prices a country receives for its exports compared to the prices it pays for its imports. It is measured as the weighted average of export prices divided by the weighted average of import prices. A reduction in the terms of trade is also called a worsening of the terms of trade, because it implies that the home country must give up a greater amount of its output to sustain a given level of imports. Eliminating a tariff increases the imports of the United States and tends to move the U.S. trade balance towards deficit. The move toward deficit, in turn, causes the U.S. dollar to depreciate against other currencies, raising the dollar prices of U.S. imports and exports.[12] Under normal conditions, the depreciation will worsen the terms of trade.[13]

Many studies ignore the exchange-rate effect on grounds that it is small. As Rousslang and Suomela point out, ignoring this effect is highly questionable.[14] Although the exchange rate change caused by a tariff on a single item generally will be quite small, it affects all traded goods, and the sum of these effects can be as important as any of the other welfare effects of the tariff.

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[7] E. K. Browning, "On the Marginal Welfare Cost of Taxation, " *American Economic Review*, March 1987, pp. 11-23

[8] We use Browning's results for the case where tax revenue is spent in such a way that taxpayers are compensated for their taxes by the benefits they receive from government spending. It is also assumed that the income compensated labor supply schedule has an elasticity of 0.3. Browning shows that changing the assumption as regards the value of government spending to taxpayers or the value of the labor supply elasticity changes the results substantially. Estimates of the labor supply elasticity are subject to wide margins of error.

[9] This model is often referred to as the Heckscher-Ohlin-Samuelson model.

[10] This result follows from the well known international trade theorem known as Stolper Samuelson (W. Stolper and P.A. Samuelson, "Protection and Real Wages, " *Review of Economic Studies*, 1941, pp. 58-73).

[11] This section is based on G. Basevi, "The Restrictive Effect of the U.S. Tariff and Its Welfare Value, " *American Economic Review*, September 1968, pp. 840-852 and D.J. Rousslang and J.W. Suomela, ibid.

[12] Our analysis of the dollar depreciation is based on an elasticities approach to the current account. An alternative, portfolio approach is presented in C.E. Smith, "Output Effects of a Tariff under Flexible Exchange Rates, " *Journal of International Economics*, May 1988, pp. 359-371.

[13] See G. Basevi, ibid.

[14] D.J. Rousslang and J.W. Suomela, ibid, p. 60.

Most studies that account for terms-of-trade effects of tariffs assume that the exchange rate changes to prevent the tariff from having any effect on the overall trade balance.[15] For instance, if removal of a tariff would increase imports of the formerly protected good, it is assumed that the home currency would depreciate to ensure that there was no net worsening of the overall trade balance. This procedure contains two important flaws: It ignores the effects that the tariff change might have on international capital flows and it ignores the effect that exchange rate changes would have on earnings from overseas investments.

Consider first the consequences of ignoring the effect of the tariff on international capital flows. Eliminating a tariff reduces tax revenue and might lead to increased credit needs of the government, which in turn might lead to higher domestic interest rates and an inflow of foreign capital. This capital inflow would reduce the tendency toward balance- of-payments deficit caused by the increased imports and, consequently, would reduce the amount of depreciation necessary to maintain balanced payments under a system of flexible rates. There is conflicting evidence about the response of domestic interest rates to changes in government debt.[16] There are also other avenues besides these fiscal changes in which a tariff might influence international capital flows.[17] Thus, it is not easy to gauge the response of capital flows to a tariff change. Fortunately, there is a good rationale for ignoring this response, at least for purposes of evaluating the welfare consequences of the tariff removal. Namely, to the extent that capital inflows (loans to U.S. residents) occur in response to the tariff removal, they merely postpone the terms-of-trade loss until the future time when these loans are repaid. Assuming the interest rate on the loans is equal to the social rate applied to future income, one can ignore the response of capital flows and the accuracy of the resulting estimates of the welfare consequences of the tariff removal will not suffer for it. It is true that we will not be able to provide a good picture of the actual time distribution of the costs and benefits, but this failing will not render less accurate the estimate for the present discounted value of these welfare effects.

The consequences of ignoring the effect of exchange-rate changes on factor payments from overseas investments are more serious. The nature of this effect can best be understood by considering the effect of a depreciation on the home country's stock of wealth. The depreciation can be viewed as reducing the value of the stock of wealth that is denominated in the currency of the home country as measured in terms of some "world currency." Any share of this stock held by foreign residents will, of course, also decline in value. The value of any foreign-denominated assets held by home country residents, however, will not decline in terms of this world currency. Thus, the adverse effects on residents of the home country from the depreciation will be ameliorated to the extent that they hold foreign-denominated assets. To account for these holdings, it is assumed that investment income outflows are fixed in terms of dollars, whereas investment income inflows are fixed in terms of the foreign currencies.[18] The dollar depreciation accompanying a tariff removal is then calculated as that which prevents the tariff removal from changing the balance on trade and factor income flows combined. This procedure yields a smaller dollar depreciation (and hence a smaller terms-of-trade effect) for any given tariff removal.

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[15] See, for example, Baldwin op. cit.; D.G. Tarr and M.E. Morkre, *Aggregate Costs to the United States of Tariff and Quotas on Imports*, Federal Trade Commission, December 1984; and J.H. Mutti, "Welfare Effects of Multilateral Tariff Reductions, " *Southern Economic Journal*, January 1979, pp. 760-772.

[16] For example, according to the "Ricardian equivalence" view, a reduction in government taxes that increases the immediate credit needs of the government will have no effect on domestic interest rates. The empirical evidence on the soundness of this view is inconclusive. For recent appraisals, see M. Feldstein, "The Effects of Fiscal Policies When Incomes are Uncertain: A Contradiction to Ricardian Equivalence, " *American Economic Review*, March 1988, pp. 14-23 and T. Holloway, "The Relationship Between Federal Deficits/Debt and Interest Rates, " *The American Economist*, Spring 1988, pp. 29-38.

[17] See, for example, the relationships between capital flows, trade flows and the exchange rate discussed in P. Krugman, "The J Curve, the Fire Sale and the Hard Landing," *American Economic Review*, May 1989, pp. 31-35.

[18] This procedure has been adopted in other studies of the effects of tax changes. See J. Gravelle, "International Tax Competition: Does it Make a Difference for Tax Policy?" *National Tax Journal*, September 1986, pp. 375-384 and D. Rousslang and P. Van Leeuwen, "Using a Vat to Reduce the Federal Deficit: The Consequences for U.S. Trade, " *Applied Economics*, forthcoming.

D-8

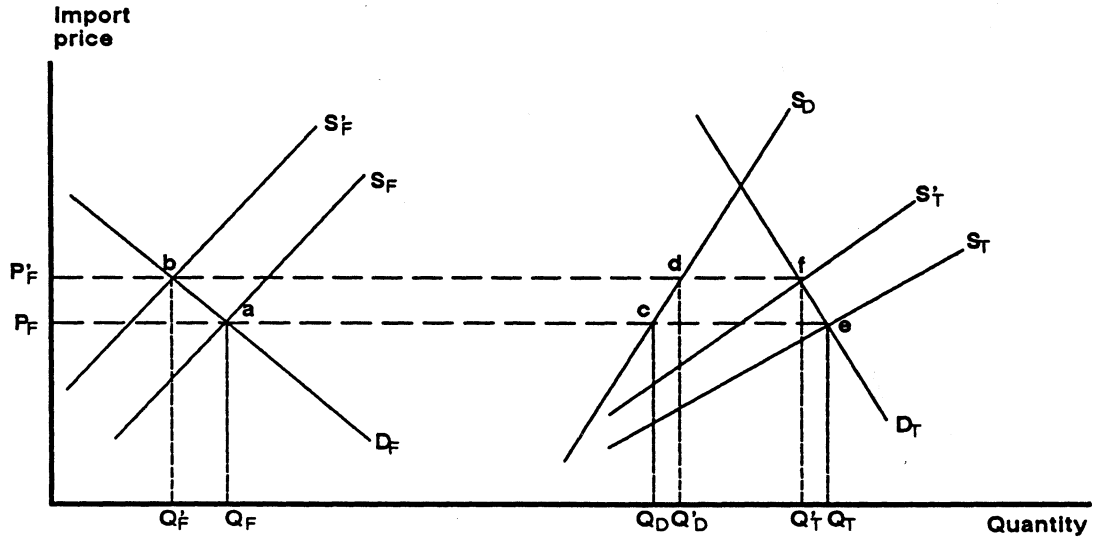
To estimate the terms-of-trade effects, the simple case where foreign goods and the competing, domestic goods are perfect substitutes is used. In the analysis that follows, the import market is considered first, then the export market.

The effects of exchange-rate changes in the import market are presented in figure D–3. Imports include merchandise and nonfactor services (such as transportation, insurance, and tourism). S_F and S_D are the supply curves for imports and competing, domestic goods, respectively. The total supply curve, obtained by adding S_F and S_D, is given by S_T. D_F represents domestic import demand, and D_T represents total domestic demand. In the initial equilibrium, total imports are Q_F, shipments of import-competing goods are Q_D, and demand for imported and import-competing goods is Q_T. The depreciation of the U.S. dollar shifts S_F and S_T upward to S'_F and S'_T, raising the domestic price of importable goods to P'_F. The increased price and reduced level of consumption reduces the welfare of U.S. consumers by trapezoid $P_F efP'_F$. The increases in price and sales increase the welfare of U.S. producers by trapezoid $P_F cdP'_F$. The net loss to U.S. residents in the import market is trapezoid cdfe, which can be measured as $T_F = P_F abP'_F$. This can be rewritten as:

$$T_F = V_F \hat{P}_F (2 + \hat{Q}_F)/2 \qquad \text{(D17)}$$

where V_F is the initial expenditure on imports.

Figure D–3
The terms-of-trade effects of exchange-rate depreciation in the import market



Key:

P = price	F = foreign, imported good
Q = quantity	D = competing, domestic goods
S = supply	T = total
D = demand	

Defining units such that $P_F = 1$ and $V_F = Q_F$, the import market can be modeled using the two equations

$$\hat{P}_F = (1/\eta_F)\hat{Q}_F + \hat{\beta} \qquad \text{(D18)}$$

$$\hat{Q}_F = \xi_F \hat{P}_F \quad \text{(D19)}$$

where η_F is the price elasticity of foreign supply, ξ_F is the price elasticity of domestic import demand, and $\hat{\beta}$ is the percentage depreciation. Solving for $\hat{P}_F$ and $\hat{Q}_F$, yields

$$\hat{P}_F = [\eta_F/(\eta_F - \xi_F)]\,\hat{\beta} \quad \text{(D20)}$$

$$\hat{Q}_F = [\xi_F\eta_F/(\eta_F - \xi_F)]\,\hat{\beta} \quad \text{(D21)}$$

Substituting equations (D20) and (D21) into equation (D17), yields

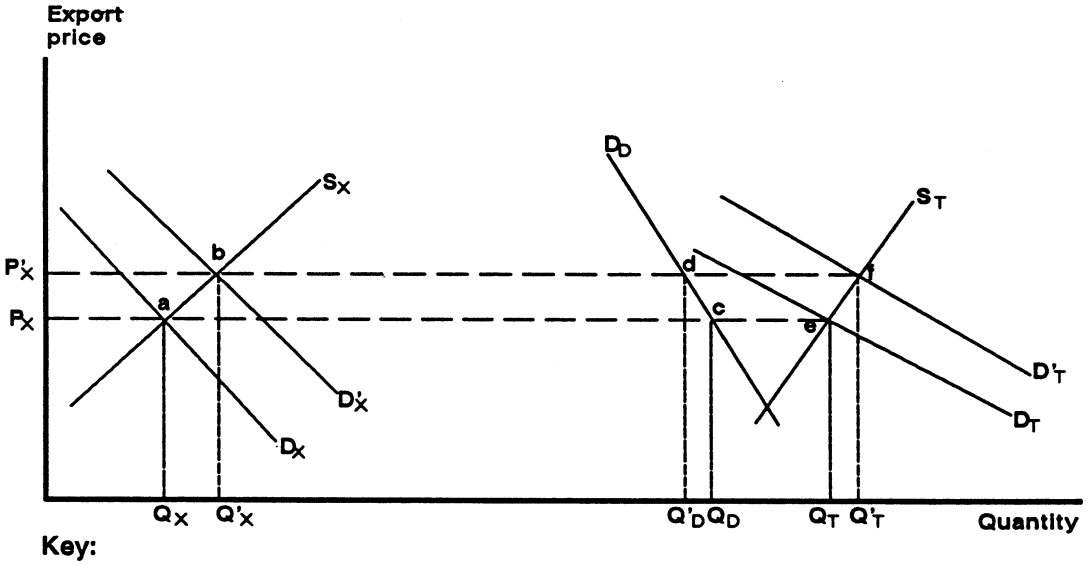
$$T_F = V_F[\eta_F/(\eta_F - \xi_F)]\,\hat{\beta}\,\{2 + [\xi_F\eta_F/(\eta_F - \xi_F)]\,\hat{\beta}\}/2 \quad \text{(D22)}$$

The effect of exchange-rate changes in the export market is presented in figure D-4. Exports include both merchandise and nonfactor services. S_T represents the total supply curve for U.S. exportable goods, and D_D represents domestic demand for these goods. The difference between these two curves is export supply, represented by curve S_X. D_X is the demand for U.S. exports, and the sum of this curve and D_D gives total demand for U.S. exportable goods, represented by curve D_T. In the initial equilibrium, aggregate exports are Q_X, aggregate domestic demand for U.S. exportable goods is Q_D, and total domestic sales of exportable goods is Q_T. The depreciation of the dollar shifts D_X and D_T upward to D'_X and D'_T. The increase in price and reduction in consumption reduces the welfare of U.S. consumers by trapezoid $PxcdP'_x$. The increases in price and sales increases the welfare of U.S. producers by trapezoid $PxefP'_x$. The net gain to U.S. residents in the export market is trapezoid cdfe, which can be measured as $T_X = PxabP'_x$. This can be rewritten as:

$$T_X = V_X \hat{P}_X(2 + \hat{Q}_X)/2 \quad \text{(D23)}$$

where V_X is the initial value of exports.

Figure D-4
The terms-of-trade effects of exchange-rate depreciation in the export market



Key:

P = price	X = export goods
Q = quantity	D = domestic
S = supply	T = total
D = demand	

D-10

Defining units such that Px = 1 and Vx = Qx, the export market can be modeled using the following two equations

$$\hat{Q}x = \eta x \hat{P}x \quad \text{(D24)}$$

$$\hat{P}x = (1/\xi x)\hat{Q}x + \hat{\beta} \quad \text{(D25)}$$

where ηx is the price elasticity of domestic export supply and ξx is the price elasticity of export demand. Solving for $\hat{P}x$ and $\hat{Q}x$, yields

$$\hat{P}x = [\xi x/(\xi x - \eta x)]\,\hat{\beta} \quad \text{(D26)}$$

$$\hat{Q}x = [\eta x \xi x/(\xi x - \eta x)]\,\hat{\beta} \quad \text{(D27)}$$

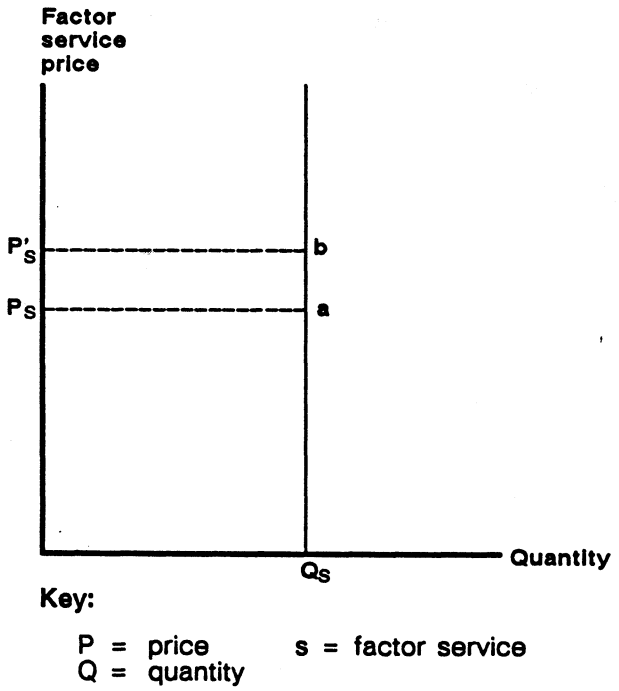
Substituting equations (D26) and (D27) into equation (D23), yields

$$Tx = Vx[\xi x/(\xi x - \eta x)]\,\hat{\beta}\,\{2 + [\eta x \xi x/(\xi x - \eta x)]\,\hat{\beta}\}/2 \quad \text{(D28)}$$

Finally, the imports and exports of factor services need to be addressed. U.S. imports of factor services generate a flow of profits from the United States to the countries whose capital is invested here. Since these profits are denominated in U.S. dollars, changes in the exchange rate do not directly affect the dollar value of this outflow. U.S. exports of factor services generate a flow of profits from foreign countries to the United States. These profits are, for the most part, denominated in foreign currencies, and a depreciation of the dollar increases the value of this inflow. This effect is presented in figure D-5. Before depreciation, the value of factor-service exports is PsQs. Defining units such that Ps = 1 and Vs = Qs, the dollar depreciation increases the price of these exports from Ps to P's and increases U.S. welfare in the factor services market (Ts) by PsabP's, or:

$$Ts = \hat{\beta}\,Vs \quad \text{(D29)}$$

Figure D-5
The effect of exchange-rate depreciation on export of fsctor services



The net-welfare cost of the terms-of-trade adjustment is $T_F - T_x - T_s$.

The incipient deficit caused by the tariff elimination is $(1+\hat{p}_t)\hat{Q}_t V_t$. This deficit is assumed to be fully offset as the exchange rate adjusts via an increase in total exports or a reduction in total imports. Algebraically,

$$(1 + \hat{p}_t)\hat{Q}_t V_t = (P'_x Q'_x - P_x Q_x) + (P'_s Q_s - P_s Q_s) - (P'_F Q'_F - P_F Q_F),$$

which can be written as

$$(1 + \hat{p}_t)\hat{Q}_t V_t = V_x[(1 + \hat{P}_x)(1 + \hat{Q}_x) - 1] + \hat{P}_s V_s - V_F[(1 + \hat{P}_F)(1 + \hat{Q}_F) - 1] \quad \text{(D30)}$$

Substituting Equations (D20), (D21), (D26), and (D27) into (30) yields

$$(1 + \hat{p}_t)\hat{Q}_t V_t = [V_x \xi_x (1 + \eta_x)/(\xi_x - \eta_x) + V_s - V_F \eta_F (1 + \xi_F)/(\eta_F - \xi_F)]\hat{\beta}$$

$$+ [V_x \eta_x \xi_x^2/(\xi_x - \eta_x)^2 - V_F \xi_F \eta_F^2/(\eta_F - \xi_F)^2]\hat{\beta}^2$$

which can be approximated as

$$(1 + \hat{p}_t)\hat{Q}_t V_t \approx [V_x \xi_x (1 + \eta_x)/(\xi_x - \eta_x) + V_s - V_F \eta_F (1 + \xi_F)/(\eta_F - \xi_F)]\hat{\beta} \quad \text{(D31)}$$

Solving (D31) for $\hat{\beta}$ yields

$$\hat{\beta} \approx (1 + \hat{p}_t)\hat{Q}_t V_t / [V_x \xi_x (1 + \eta_x)/(\xi_x - \eta_x) + V_s - V_F \eta_F (1 + \xi_F)/(\eta_F - \xi_F)] \quad \text{(D32)}$$

Equations (D22), (D28), (D29), and (D32) allow one to calculate the welfare impacts of the dollar devaluation from information on V_x, V_F, V_s, η_x, ξ_x, η_F, and ξ_F. V_x is merchandise and nonfactor-service exports. The 1988 values of these parameters are $322.1 billion and $86.3 billion, respectively. V_F is merchandise and nonfactor-service imports. The 1988 values of these parameters are $449.3 billion and $77.3 billion, respectively. V_s is factor-service exports, and its 1988 value is 87.9 billion.[19] Estimates of the required elasticities are taken from the literature. Since the study considers only annual impacts of tariff elimination, short-run elasticities are used. The estimate of Warner and Kreinin of −1.2 is used for the price elasticity of import demand.[20] This estimate is very much in line with other estimates of this parameter.[21] The price elasticity of import supply is taken from Haynes and Stone.[22] In their supply-price equation, the coefficient on contemporaneous imports is 0.13. The inverse of this coefficient implies a short-run elasticity of import supply of 7.7. The export demand and supply elasticities are derived from a study by Goldstein and Khan.[23] These authors estimated two models: an equilibrium model and a disequilibrium model. Each model generated slightly different elasticity estimates. Using the simple averages of these estimates yields a value of −2.3 for the elasticity of export demand and 6.6 for the elasticity of export supply.

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[19] Values for these three parameters are taken from U.S. Department of Commerce, *Survey of Current Business*, various issues.

[20] D. Warner and M.E. Kreinin, "Determinants of International Trade Flows," *Review of Economics and Statistics*, February 1983, pp. 96–104. We do not rely on these authors' estimate of the price elasticity of export demand, because it is not statistically significant.

[21] See, for example, H.S. Houthakker and S. Magee, "Income and Price Elasticities in World Trade," *Review of Economics and Statistics*, May 1969, pp. 111–125, and T. Murray and P. Ginman, "An Empirical Examination of the Traditional Import Demand Model," *Review of Economics and Statistics*, February 1976, pp. 75–80.

[22] S.E. Haynes and J.A. Stone, "Specification of Supply Behavior in International Trade," *Review of Economics and Statistics*, November 1983, pp. 626–632. We do not rely on these authors' estimate of the contemporaneous price elasticity of export supply because it is not statistically significant.

[23] M. Goldstein and M.S. Khan, "The Supply and Demand for Exports: A Simultaneous Approach," *Review of Economics and Statistics*, May 1978, pp. 275–286. We use the results of their disequilibrium model. The coefficients are statistically significant.

D-12

With the adjustments to the traditional, net welfare measure for displaced workers, terms-of-trade effects, and domestic taxes, we have the following net welfare calculation:

$$NW = C - F - (1.15)R - W - (T_F - Tx - Ts) \quad \text{(D33)}$$

Upstream and Downstream Effects

Let a_s be the (fixed) per-unit intermediate input from supplying industry s to production of the protected good. The proportional reduction in output of sector s caused by the tariff elimination is then given as

$$dQ_s = a_s dQ_d \quad \text{(D34)}$$

Values for a_s are taken from the 1977, 537-sector input-output table of the U.S. economy. The important upstream suppliers are given in table D–3. With one exception, each of these suppliers has a value for a_s of 0.05 or more. That is, 5 percent or more of the protected industry costs were spent on inputs from each of these supplying sectors.[24]

Downstream effects are estimated assuming input proportions remain fixed for the consuming industry. This assumption does not hurt the accuracy of estimates a great deal, because, as Jones points out, "the change in costs resulting from a small change in... [input] prices is the same whether or not... [input] proportions are altered. The savings in cost from such alterations is a second-order small."[25]

Let a_c be the per-unit, intermediate input of the protected good into production in consuming industry c, where a_c includes both inputs of domestically produced and imported inputs. Let a_c' be the domestically produced input requirement a_c'' be the imported input requirement. Since a_c' is not given in the U.S. input-output table, it is estimated as $a_c' = (Q_d)a_c/(Q_d+Q_f)$. a_c'' is estimated as $a_c - a_c'$.

Suppose the price of the foreign good has fallen by $\hat{p}_f$, and the price of the domestic good has fallen by $\hat{p}_d$. Then the fall in the cost to the downstream, consumer industry ($\hat{\rho}$) is given as

$$\hat{\rho} = a_c' \hat{p}_d + a_c'' \hat{p}_f \quad \text{(D35)}$$

Important downstream users are listed in table D–4. Each of these users has a value for a_c of 0.10 or more. That is, 10 percent or more of each sector's costs was for inputs from the subject industry.[26]

The response of industry c is calculated as if it has no monopoly power, so that $\hat{p}_c = \hat{\rho}$. The response in sector-c output to the fall in costs is then given as

$$\hat{Q}_c = \epsilon_{cc} \hat{p}_c \quad \text{(D36)}$$

where ϵ_{cc} is the elasticity of demand facing the consuming industry.

To compute equation (D36), estimates of the price elasticity of demand for each downstream industry, ϵ_{cc}, are taken from the literature (see table D–5). These estimates are for the 2-digit industry classifications from the input-output tables. These numbers are used for each downstream user falling under a particular 2-digit industry.

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[24] Owing to aggregation problems, the Office of Industries was asked to review these signficant suppliers. For Case 3 (ceramic tile), they suggested including "Clay, Ceramic, and Refractory Mineral Mining" as a significant supplier, even though the coefficient a s was only 0.044.

[25] R.W. Jones, "The Structure of Simple General Equilibrium Models, " in J.N. Bhagwati (ed.), *International Trade: Selected Readings*, Cambridge, MA: MIT Press, 1981, pp. 33–34.

[26] Owing to aggregation problems, the Office of Industries was asked to review the list of downstream users.

The proportional increase in the downstream users' output, $\hat{Q}_c$, is then calculated using these price elasticity of demand estimates and the no monopoly power assumption, i.e. $\hat{p}_c = \hat{\rho}$. To check whether or not the no monopoly power assumption for the downstream industries is valid, the four-firm concentration ratios, CR4, for each of these industries are obtained from the 1982 *Census of Manufactures*. The CR4 is a measure of monopoly power within an industry. An industry is highly concentrated if its CR4 is greater than 60, moderately concentrated if 45<CR4<60, and effectively competitive if CR4<45. Highly concentrated means that the industry is either a monopoly, a strong oligopoly, or has a dominant firm. Moderately concentrated means that the industry is a weak oligopoly, or the firms have some ability to set price. For the 15 downstream industries in this study, 5 fall into noncompetitive categories. Three industries are moderately concentrated: electron tubes, synthetic rubber, and radio and TV receiving sets. Two industries are highly concentrated: organic fibers, noncellulosic, and soap and other detergents. It is unlikely that these industries will pass on the total $\hat{\rho}$ to their consumers; therefore, the $\hat{Q}_c$ reported for these industries are an upper bound.

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Table D-1
Import demand elasticities

Case		Elasticity (eff)	Source
1	Rubber footwear	-2.00	(1)
2	Women's footwear	-2.00	(1)
3	Ceramic tile	-0.50	Hufbauer et al. (1986), Case M-6
4	Luggage	-1.82	USITC (1975), SIC 3161
5	Leather gloves	-4.06	USITC (1975), SIC 3151
6	China tableware	-1.03	USITC (1975), SIC 3262, 3263
7	Earthen tableware	-1.03	USITC (1975), SIC 3262, 3263
8	Handbags, purses	-2.01	Shiells, et al. (1986), SIC 323
9	Costume jewelry	-3.77	Almon et al. (1974), Sector 147
10	Glass	-2.86	Shiells et al. (1986), SIC 362
11	Cyclic crudes	-3.00	Hufbauer et al. (1986), Case M-2
12	Elect. capacitors	-3.08	Shiells et al. (1986), SIC 383
13	Methyl alcohol	-2.53	Stern et al. (1976), ISIC 351
14	Polyethylene resins	-5.09	Shiells et al. (1986), SIC 282
15	Non-stuffed dolls	-2.26	U.S.I.T.C. (1975), SIC 3942
16	Certain bicycles	-3.24	Shiells et al. (1986), SIC 375
17	Ball bearings	-0.25	Hufbauer et al. (1986), Case M-15
18	Optical instruments	-1.08	Stern et al. (1976), ISIC 385
19	Canned tuna	-3.30	Hufbauer et al. (1986), Case M-8
20	Shakes and shingles	-9.90	U.S.I.T.C. (1988)

[1] In the case of footwear, estimates range from -1.4 (Szenberg et al. 1977) to -4.00 (Almon et al. 1974) and up to -5.50 for rubber footwear alone (USITC 1975). Morkre and Tarr (1980) use a value of -1.5. Following Rousslang and Suomela (1988), we choose a value of -2.0 as representative.

Sources: C. Almon, Jr. et al., *1985: Interindustry Forecasts of the American Economy*, Lexington, KY: Lexington Books, 1974; G.C. Hufbauer, D.T. Berliner, and K.A. Elliott, *Trade Protection in the United States*, Washington, D.C.: Institute for International Economics, 1986; M.E. Morkre and D.G. Tarr, *Effects of Restrictions on United States Imports*, U.S. Federal Trade Commission, June 1980; D.J. Rousslang and J.W. Suomela, "Calculating the Welfare Cost of Import Restrictions in the Imperfect Substitutes Model," *Applied Economics*, May 1988, pp. 691-700; C.R. Shiells, R.M. Stern, and A.V. Deardorff, "Estimates of the Elasticities of Substitution between Imports and Home Goods for the United States," *Weltwirtschaftliches Archiv*, 1986, pp. 497-519; R.M. Stern, J. Francis, and B. Schumacher, *Price Elasticities in International Trade*, London: MacMillan, 1976; M. Szenberg, J.W. Lombardi, and E.Y. Lee, *Welfare Effects of Trade Restrictions*, New York: Academic Press, 1977; U.S. International Trade Commission, *Foreign Trade Elasticities for Twenty Industries*, Publication 738, August 1975; and U.S. International Trade Commission, *Western Red Cedar Shakes and Shingles*, USITC Publication 2131, October 1988.

Table D-2
Domestic own-price elasticities[1]

Case		Elasticity (edd)	Source
1	Rubber footwear	- 2.00	(2)
2	Women's footwear	- 2.00	(2)
3	Ceramic tile	- 1.20	Hufbauer et al. (1986), Case M-6
11	Cyclic crudes	- 0.20	Hufbauer et al. (1986), Case M-2
12	Elect. capacitors	- 1.00	(3)
13	Methyl alcohol	- 0.80	(4)
14	Polyethylene resins	- 0.90	(5)
17	Ball bearings	- 0.10	Hufbauer et al. (1986), Case M-15
18	Optical instruments	- 0.90	(6)
19	Tuna.	- 0.30	Hufbauer et al. (1986), Case M-8
20	Shakes and shingles	-10.00	USITC (1988)

[1] The domestic demand elasticity refers to the price elasticity of demand for the domestic competing good by U.S. residents.

[2] In the case of footwear, Szenberg et al. (1977) have found that the elasticity of demand for domestic footwear is similar in magnitude to the import demand. Following Rousslang and Suomela (1988), we therefore choose a value of -2.00.

[3] Richardson and Mutti (1975) estimate the elasticity of total demand for U.S. output of electrical components (domestic demand plus demand for U.S. exports) to be -1.20. Since we expect export demand to be more elastic than domestic demand, we choose a value of -1.00 for domestic demand alone.

[4] Richardson and Mutti (1975) estimate the domestic and export price elasticity of demand for chemicals to be -0.97. We choose a value of -0.80 for domestic demand alone (see note 3).

[5] Richardson and Mutti (1975) estimate the domestic and export price elasticity of demand for plastics to be -1.04. We choose a value of -0.90 for domestic demand alone (see note 3).

[6] Richardson and Mutti (1975) estimate the domestic and export price elasticity of demand for optical equipment to be -1.04. We choose a value of -0.90 for domestic demand alone (see note 3).

Sources: G.C. Hufbauer, D.T. Berliner, and K.A. Elliott, *Trade Protection in the United States*, Washington, D.C.: Institute for International Economics, 1986; A. Maki, "The Estimation of a Complete Demand System Using the Marginal Rates of Substitution: An Indifference Map Interpretation of the Houthakker-Taylor Model," *The Economic Studies Quarterly*, March 1988, pp. 64-76; J.D. Richardson and J.H. Mutti, "Industrial Displacement Through Environmental Controls: The International Competitive Aspects," in I. Walter (ed.), *Studies in International Environmental Economics*, New York: John Wiley, 1975, pp. 57-102; D.J. Rousslang and J.W. Suomela, "Calculating the Welfare Cost of Import Restrictions in the Imperfect Substitutes Model," *Applied Economics*, May 1988, pp. 691-700; M. Szenberg, J.W. Lombardi, and E.Y. Lee, *Welfare Effects of Trade Restrictions*, New York: Academic Press, 1977; and U.S. International Trade Commission, *Western Red Cedar Shakes and Shingles*, USITC Publication 2131, October 1988.

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Table D-3
Important upstream suppliers

Case		Upstream supplier[1]	as
1	Rubber footwear	(16.0100), Broadwoven fabric mills and fabric finishing plants	0.152
		(28.0200), Synthetic rubber	0.059
2	Women's footwear	(33.0001), Leather tanning and finishing	0.217
		(34.0100), Boot and shoe cut stock and findings	0.052
3	Ceramic tile	(27.0100), Industrial inorganic and organic chemicals	0.053
		(9.0003), Clay, ceramic, and refractory minerals mining	0.044
4	Luggage	(17.0600), Coated fabrics, not rubberized	0.096
		(42.0300), Hardware, NEC	0.056
5	Leather gloves	(33.0001), Leather tanning and finishing	0.398
8	Handbags, purses	(16.0100), Broadwoven fabric mills and fabric finishing plants	0.067
		(17.0600), Coated fabrics, not rubberized	0.061
		(28.0100), Plastics materials and resins	0.057
		(33.0001), Leather tanning and finishing	0.143
9	Costume jewelry	(38.0500), Primary nonferrous metals, NEC	0.051
		(64.0102), Jewelers' materials and lapidary work	0.070
		(69.0100), Wholesale trade	0.064
12	Elect. capacitors	(32.0400), Miscellaneous plastics products	0.065
		(69.0100), Wholesale trade	0.056
15	Nonstuffed dolls	(69.0100), Wholesale trade	0.064
16	Certain bicycles	(37.0101), Blast furnaces and steel mills	0.068
		(69.0100), Wholesale trade	0.100
17	Ball bearings	(37.0101), Blast furnaces and steel mills	0.168
18	Optical instruments	(32.0400), Miscellaneous plastics products	0.055
19	Canned tuna	(3.0002), Commercial fishing	0.385
		(39.0100), Metal cans	0.058
20	Shakes and shingles	(20.0100), Logging camps and logging equipment	0.335

[1] Numbers in parentheses are input-output sectors.

Source: Compiled by the staff of the USITC from official statistics of the U.S. Department of Commerce, Bureau of Economic Analysis.

Table D-4
Important downstream users

Case		Downstream user[1]	ac
10	Glass	(57.0100), Electron tubes	0.144
11	Cyclic crudes	(02.0702), Greenhouse and Nursery products	0.149
		(27.0402), Adhesives and sealants	0.159
		(27.0404), Printing ink	0.280
		(28.0100), Plastics materials and Resins	0.365
		(28.0200), Synthetic rubber	0.473
		(28.0400), Organic fibers, noncellulosic	0.303
		(29.0201), Soap and other detergents	0.212
		(29.0203), Surface active agents	0.137
12	Elect. capacitors	(56.0100), Radio and TV receiving sets	0.103
		(56.0400), Radio and TV communication equipment	0.115
13	Methyl alcohol	(27.0402), Adhesives and sealants	0.159
		(27.0406), Chemical preparations, NEC	0.172
		(28.0100), Plastics materials and resins	0.365
14	Polyethylene resins	(24.0702), Bags, except textile	0.147

[1] Numbers in parentheses are input-output sectors.

Source: Compiled by the staff of the USITC from official statistics of the U.S. Department of Commerce, Bureau of Economic Analysis.

Table D-5
Demand price elasticities for important downstream users

Industry number and title	Demand price elasticity
02. Other agricultural products	-0.92
24. Paper and allied products, except containers	-0.99
27. Chemicals and selected chemical products	-0.97
28. Plastics and synthetic materials	-1.04
29. Drugs, cleaning, and toilet preparations	-0.97
56. Radio, television, and communication equipment	-0.99
57. Electronic components and accessories	-1.20

Source: J.D. Richardson and J.H. Mutti, "Industrial Displacement Through Environmental Controls: The International Competitive Aspects" in I. Walter (ed.) *Studies in International Environmental Economics*, New York: John Wiley, 1975, 57-102.

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APPENDIX E
INDUSTRY DATA

Industry Data

This appendix describes the data on shipments, employment, and payroll/shipment ratios used to conduct the analysis described in chapter 2 and appendix D.

Shipments and Employment

Shipments and employment data for 8-digit Harmonized Tariff System (HTS) items and for shakes and shingles were estimated by the Office of Industries, U.S. International Trade Commission for 1986–1988. At the time of this report, data on shipments and employment by 4-digit SIC industries are available from the Office of Business Analysis, U.S. Department of Commerce only through 1986. For some of these 4-digit industries, 1987 and 1988 data are available from U.S. Department of Commerce (1989).[1] For other industries and for SIC 3675 and 36291 (case 12), it is necessary to forecast values or these variables for 1987 and 1988.[2]

The forecasts are made as follows. First, data for 1975–1986 are used in the following regression equation:

$$\log(X_{it}) = a + b * \log(Y_t) + c * T_t \qquad \text{(E-1)}$$

where X_{it} = nominal value of shipments of industry i in year t, Y_t = nominal value of GNP in year t, and T_t = time trend value in year t.

Then, shipment values for 1987 and 1988 are calculated using the equations:

$$X_{i_{1987}} = \exp[\log(X_{i_{1986}}) + b * (\log(Y_{1987}) - \log(Y_{1986})) + c] \qquad \text{(E-2)}$$

$$X_{i_{1988}} = \exp[\log(X_{i_{1986}}) + b * (\log(Y_{1988}) - \log(Y_{1986})) + 2 * c] \qquad \text{(E-3)}$$

The shipment estimates for 1986–1988 are presented in table E–1.

The employment forecasts are made as follows. First, data for 1975–1986 are used in the following regression equation:

$$\log(E_{it}) = a + b * \log(Y_t) + c * T_t \qquad \text{(E-4)}$$

where E_{it} = employment in industry i in year t. Then, employment values for 1987 and 1988 are calculated using the equations:

$$(E_{i_{1987}}) = \exp[\log(E_{i_{1986}}) + b * (\log(Y_{1987}) - \log(Y_{1986})) + c] \qquad \text{(E-5)}$$

$$(E_{i_{1988}}) = \exp[\log(E_{i_{1986}}) + b * (\log(Y_{1988}) - \log(Y_{1986})) + 2 * c] \qquad \text{(E-6)}$$

The employment estimates are presented in table E–2.

Payroll/Shipment Ratios

Payroll data by 4-digit SIC industries are available only through 1986 from the Office of Buisiness Analysis, U.S. Department of Commerce, so payroll/shipment ratios for 1987 and 1988 have to be forecasted. These forecasts are made as follows. First, data for 1975–1986 are used to estimate the following regression equation:

$$\log(R_{it}/X_{it}) = a + b * \log(Y_t) + c * T_t \qquad \text{(E-7)}$$

[1] U.S. Department of Commerce, 1989 *U.S. Industrial Outlook* , January 1989.
[2] U.S Department of Commerce import data for SIC No. 3675 incorrectly include both electronic and electrical capacitors. Shipment data for this category, on the other hand, include only electronic capacitors. Electrical capacitors are classified under SIC 36291. Data are not available at the 5-digit level on a year to year basis. Annual data for SIC 36291 were estimated using ratios to electronic capacitors for census of manufactures years 1977 and 1982.

E-2

where R_{it} = payroll in industry i in year t. Then, payroll/shipment values for 1987 and 1988 then are calculated using the equations:

$$(R_{i_{1987}}/X_{i_{1987}}) = \exp[\log(R_{i_{1986}}/X_{i_{1986}}) + b * (\log(Y_{1987}) - \log(Y_{1986})) + c] \quad \text{(E-8)}$$

$$(R_{i_{1988}}/X_{i_{1988}}) = \exp[\log(R_{i_{1986}}/X_{i_{1986}}) + b * (\log(Y_{1988}) - \log(Y_{1986})) + 2 * c] \quad \text{(E-9)}$$

For HTS items canned tuna, and shakes and shingles the payroll/shipment ratios were assumed to be the same as those for the corresponding 4-digit SIC industries. The estimates for payroll/shipment ratios are presented in table E-3.

Table E-1
Shipment values

(Millions of dollars)

Case		1986	1987	1988
1	Rubber footwear[1]	573.3	590.0	588.0
2	Women's footwear[1]	1,425.9	1,493.0	1,554.0
3	Ceramic tile[1]	665.9	729.0	805.0
4	Luggage[1]	665.8	708.0	746.0
5	Leather gloves[1]	202.9	214.0	221.0
6	China tableware[2]	268.3	259.5	271.5
7	Earthen tableware[2]	22.5	16.8	14.5
8	Handbags, purses[1]	438.4	474.0	507.0
9	Costume jewelry[1]	1,292.3	1,307.0	1,252.0
10	Glass[2]	3,241.9	3,155.4	3,274.3
11	Cyclic crudes[1]	7,013.4	7,570.0	8,730.0
12	Elect. capacitors[2]	1,480.4	1,469.7	1,560.9
13	Methyl alcohol[3]	150.1	162.0	162.0
14	Polyethylene resins[3]	2,840.2	3,313.8	4,678.8
15	Nonstuffed dolls[3]	98.0	92.6	102.2
16	Certain bicycles[3]	200.0	215.0	205.0
17	Ball bearings[3]	1,298.6	1,302.3	1,367.4
18	Optical instruments [3]	245.0	260.0	300.0
19	Canned tuna[4]	881.5	1,018.7	1.174.8
20	Shakes and shingles[3]	-	112.0	165.0

[1] 1987 and 1988 values are from U.S. Department of Commerce, *1989 U.S. Industrial Outlook*, January 1989.
[2] 1987 and 1988 values were forecast by USITC staff.
[3] Values estimated by USITC staff.
[4] U.S. Department of Commerce, *Fisheries of the United States*, various issues.

Source: U.S. Department of Commerce, Office of Business Analysis except where indicated.

Table E-2
Employment

(Thousands of employees)

Case		1986	1987	1988
1	Rubber footwear[2]	9.2	8.3	7.6
2	Women's footwear[2]	30.2	27.1	25.2
3	Ceramic tile[1]	9.6	9.7	9.5
4	Luggage[2]	11.4	9.9	9.2
5	Leather gloves[2]	3.5	3.1	2.8
6	China tableware[2]	5.6	5.1	5.0
7	Earthen tableware[2]	0.9	0.7	0.5
8	Handbags, purses[2]	9.2	7.6	6.8
9	Costume jewelry[1]	18.5	18.7	17.6
10	Glass[1]	35.0	32.4	31.2
11	Cyclic crudes[2]	22.0	19.7	18.7
12	Elect. capacitors[2]	25.0	23.2	22.7
13	Methyl alcohol[3]	5.4	5.6	5.6
14	Polyethylene resins[3]	24.0	24.0	24.0
15	Nonstuffed dolls[3]	5.0	4.0	3.5
16	Certain bicycles[3]	2.5	2.7	2.5
17	Ball bearings[3]	12.3	11.9	11.7
18	Optical instruments[3]	7.1	7.1	7.4
19	Canned tuna[4]	12.1	11.5	12.1
20	Shakes and shingles[3]	-	1.9	1.7

[1] 1987 and 1988 values are from U.S. Department of Commerce, *1989 U.S. Industrial Outlook*, January 1989.
[2] 1987 and 1988 values were forecast by USITC staff.
[3] Values estimated by USITC staff.
[4] U.S. Department of Commerce, *Fisheries of the United States*, various issues.

Source: U.S. Department of Commerce, Office of Business Analysis except where indicated.

E-4

Table E-3
Payroll/shipment ratios[1]

(Dollars payroll per dollar shipments)

Case		1986	1987	1988
1	Rubber footwear	0.24	0.23	0.23
2	Women's footwear	0.24	0.24	0.23
3	Ceramic tile	0.26	0.26	0.26
4	Luggage	0.25	0.25	0.25
5	Leather gloves	0.17	0.16	0.16
6	China tableware	0.38	0.38	0.38
7	Earthen tableware	0.47	0.47	0.46
8	Handbags, purses	0.23	0.22	0.21
9	Costume jewelry	0.23	0.23	0.22
10	Glass	0.26	0.26	0.26
11	Cyclic crudes	0.10	0.10	0.10
12	Elect. capacitors	0.26	0.26	0.25
13	Methyl alcohol	0.10	0.11	0.12
14	Polyethylene resins	0.09	0.09	0.09
15	Nonstuffed dolls	0.10	0.09	0.08
16	Certain bicycles	0.16	0.17	0.17
17	Ball bearings	0.27	0.27	0.26
18	Optical instruments	0.26	0.26	0.26
19	Canned tuna	0.13	0.14	0.15
20	Shakes and shingles	0.27	0.28	0.29

[1] 1987 and 1988 values were forecast by USITC staff.

Source: U.S. Department of Commerce, Office of Business Analysis except where indicated.

APPENDIX F
METHODOLOGY FOR ESTIMATING TARIFF EQUIVALENTS OF MFA QUOTAS

Methodology for Estimating Tariff Equivalents of MFA Quotas[1]

General Approach

The textile and apparel trade environment is so complex that its modeling requires the separation of the country-specific import market, at a minimum, into at least three markets. The first market, composed of less developed country (LDC) suppliers, constitutes those suppliers under bilateral restraint. The second market, composed predominately of developed country suppliers, constitutes those suppliers free of bilateral constraint.[2] The third market is the domestic producers who are affected by the activities of both constrained and unconstrained suppliers.

Figure F-1 shows the trade in a textiles or apparel product in these three markets. It is assumed that the domestic and foreign products are imperfect substitutes. Panels A and B present the equilibrium in the domestic market and in the import market when no constraints exist. Consumers purchase imports at the world price Pw, which is fixed by an infinitely elastic supply curve.

Under the Multifiber Agreement (MFA), the price facing importers is the world price plus the price margins created by both tariffs and quotas. Since quotas apply to a subgroup of the exporting population, panel B has to be subdivided into those imports constrained by MFA quotas and those constrained by tariffs alone. While tariffs are also charged on quota bound items, so long as the quota is binding the tariffs have no effect on the price.

Panel C presents the unconstrained market, where importers face only a tariff. In this market, equilibrium occurs at $Pw(1 + t)$ where t is the ad valorem tariff. Panel D presents the constrained market. Equilibrium in this market occurs at $Pw(1 + t)(1 + \delta)$ where δ is the ad valorem tariff equivalent of the quota. If the quota is ineffective, δ would be zero. Since these goods are imperfect substitutes for each other, each has its own price, and differentials between these prices can exist.

Panels E and F demonstrate the difficulty of estimating the ad valorem equivalent of the quotas. In panel E, the supply curve is truncated by the quota, along the vertical ray. In panel F, while exports do not lie on the vertical quota limit, the quota has in fact distorted the exporter's supply. Exports fall short of the quota, because exporters try to avoid having their actual shipments exceed their allowed quota allocation. This causes the quantity supplied to show a degree of randomness.

In order to determine the price effects attributable to these bilateral constraints, one needs to model both constrained and unconstrained markets, such that for every actual price-quantity combination observed in the presence of these quotas, a nonquota-bound price-quantity combination can be simulated. A likely scenario for the three markets would be as follows. A shortage generated in the quota-bound market, holding all other things equal, creates an increase in both nonquota-bound imports as well as domestic output. The supply response from the unconstrained suppliers is tempered, however, by the possibility that a too-enthusiastic response could make them subject to quota limits in the future. The domestic supply response also may be tempered by expectations of greater future competition from unconstrained suppliers.

Given the nature of this market, ordinary least squares regression of import demand on prices and other explanatory variables is inappropriate. Estimates of the demand and supply responses in the unconstrained market must account for changes in prices in the constrained market. In the constrained market, the supply curve is truncated, and the import quantities demanded (M^D) and quota upper bound (S^Q) are not necessarily equal to each other: they are related to actual observed imports (M^A) by the equation

$$M^A = \min (M^D, S^Q)$$

The price in this controlled market will affect the equilibrium in both the uncontrolled import market and the domestic market for the comparable domestic product. Adjustments in the quota-bound imports as these countries borrow across categories and time are already incorported in the quota upper bound S^Q.

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[1] This appendix is primarily the product of Professor Joseph Pelzman of George Washington University. All major decisions were made in close collaboration with, and cleared by, the Commission staff.
[2] The exception to this is Japan whose textile exports are constrained by the MFA.

F-2

A complete disequilibrium model applicable to the textile and apparel industry would consist of the following set of structural equations:

Import demand:[3]

$$M_t^D = \alpha_1 P_t + \alpha_2 X_t + \mu_{1t} . \quad \text{(F1)}$$

Import supply:

$$S_{M_t} = Q_{S_t}, \text{ or} \quad \text{(F2.1)}$$

$$M_t^S = \beta_1 P_t + \beta_2 Y_t + \mu_{2t} . \quad \text{(F2.2)}$$

A Walrasian price adjustment mechanism:[4]

$$P_t = P_{t-1} + \gamma_1 (M_t^D - S_t^Q) + \gamma_2 X_t + \mu_{3t} \quad \text{(F3)}$$

A market-clearing mechanism:

$$M_t^A = \min (M_t^D, S_t^Q), \quad \text{(F4)}$$

where:

M_t^A = Observed import transaction at time t,

M_t^D = Unobserved import demand at time t,

M_t^S = Quantity of imports supplied at time t,

S_t^Q = Quantity of imports constrained due to bilateral agreement,

P_t = Set of prices,

X_t and Y_t = Sets of exogenous explanatory variables,

α_i = demand elasticities,

β_i = supply elsasticities,

γ_i = adjustment coefficients, and

t = time.

In the controlled market, two outcomes are possible. If supply is equal to its maximum ceiling (equation F2.1), then an equilibrium will be observed on the vertical segment of the supply curve in panel E. On the other hand, an equilibrium could occur at some quantity less than the controlled supply as in panel F (equation F2.2). In both cases, while S^Q is observed, M_t^D and the true P_t are unobserved. Since P_t is not independent of μ_{1t}, it is not appropriate to estimate α by substituting M_t^D of (equation F1) and S^Q into (equation F3) and applying the Tobit method.[5] Furthermore, since the true M_t^D is not observed we can not estimate γ (of equation F3) directly.

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[3] Vectors are denoted with bold characters.

[4] In effect, this assumption claims that, ceteris paribus, prices change in proportion to the current excess demand.

[5] The econometric analysis receiving wide application in the case of disequilibrium models of markets is the Tobit analysis. For more details see G.S. Maddala, *Limited Dependent and Qualitative Variables in Econometrics*. Econometric Society Monographs No. 3. Cambridge University Press, London, 1983a and G.S. Maddala, "Methods of Estimation for Models of Markets with Bounded Price Variation," *International Economic Review*, June 1983b, pp. 361-378.

Equations F1, F2, F3 and condition 4 can be utilized to define the conditional joint density functions $g_1(.)$ of M_t^A and P_t, given that M_t^A is on the demand function and $g_2(.)$ when it is on the supply function. The unconditional joint density of the observed endogenous variables M_t^A and P_t is given by

$$f(M, P_t \mid X_t, Y_t) = \int_{M^A}^{\Theta} g(M_t^A, M_t^S, P_t \mid X_t, Y_t)\, dM_t^S +$$

$$\int_{M^A}^{\Theta} g(M_t^A, M_t^D, P_t \mid X_t, Y_t)\, dM_t^D$$

The maximum likelihood (ML) estimates of the parameters (α and β) and the variance-covariance matrix Σ are obtained by maximizing the log likelihood function corresponding to the above joint density function. This procedure is, however, a full information ML procedure which is inappropriate in the MFA case where M_t^D is not directly observed.

In order to measure the difference between the unobserved equilibrium price with no quotas and the observed transaction price with quotas, the reduced form of M_t^D must be substituted into equation (F4) where consistent estimators of the reduced form parameters can be obtained by Tobit analysis. Predictions of the unobserved variable M_t^D[6] can then be substituted into equation (F3) to directly estimate γ along with the predicted prices without the quota. It is this price differential which measures the value of the MFA quotas.

In what follows, the basic structure outlined in equations (F1) through (F4) is explored in more detail.

Import Demand

The import demand equation for the two markets (controlled and uncontrolled) is specified as a function of its specific market price, the price of a similar product from the alternative market, the domestic price of a competing good, and a real activity variable, or

$$M_{ij,t}^D = \alpha_0 + \alpha_1 P_{Cj,t} + \alpha_2 P_{Uj,t} + \alpha_3 P_{Dj,t} + \alpha_4 E_t + \mu, \qquad \text{(F5)}$$

where M_{ijt}^D = import demand for commodity j from i (controlled or uncontrolled suppliers) at time period t, $P_{Cj,t}$ = import price from controlled market at time period t, $P_{Uj,t}$ = import price from uncontrolled market at time period t, $P_{Dj,t}$ = domestic price of the competing product at time t, E_t = real activity variable at time t, and μ = random error term. Since there are two differentiated regions, there are two import demand equations that depend on all three prices over time.

This Armington specification of the import demand equations requires the following set of assumptions.[7] First, it is necessary for these import demand equations to be weakly separable between textile and apparel products and other products that enter the consumer's utility function. In effect, each of our products is treated as a distinct good with imperfect substitutes differentiated by country of origin. Second, Armington's two-step process assumes that the marginal rate of substitution for any two products (differentiated by source) is independent of the quantities demanded of third goods

[6] As M.J. Hartley points out ("The Estimation of Markets in Disequilibrium: The Fixed Supply Case," *International Economic Review*, October 1976), these predicted values are only for the cases where we are on the veritical segment of the supply curve. In all other cases we are already on the demand curve.

[7] P. Armington, "A Theory of Demand for Products Distinguished by Place of Production," *IMF Staff Papers*, March 1969, pp. 159-178.

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entering the consumer's utility function. This assumes a zero income-compensated cross-price effect between textile and apparel goods and third goods. It means that a change in the price of this third good will have an impact on the demand for textile and apparel imports, but only when it has an impact on real expenditures. The restrictive nature of this assumption, if violated, may result in a misspecification bias in our estimated import demand equations.[8]

While Armington's assumptions may be reasonable for textile and apparel end products, they may present a problem for some of the intermediate textile products. In the case of intermediate imports, such as yarn and fabric, the import demand equations noted by equation (F5) are, in fact, derived demand functions. The assumption of independence between the marginal rates of substitution of different classes of intermediate inputs, such as manmade fibers for cotton or vegetable fibers for both may represent a problem. In these latter cases the import demand equations will include the prices of all possible substitutes. Omission of these prices clearly will cause the import demand equations for the intermediate textile imports to be misspecified.

Import Supply

The specification for the textile and apparel import supply functions must take into account that there are two markets, one controlled and the other uncontrolled. These markets are related in that the price of the controlled product affects the equilibrium price in the uncontrolled market. This uncontrolled market would be characterized by a demand curve given by equation (F5) and by the following supply and equilibrium conditions:

$$M^{S}_{ij,t} = \beta_0 + \beta_1 P_{uj,t} + \epsilon' \text{ and} \qquad \text{(F6)}$$

$$M^{D}_{ij,t} = M^{S}_{ij,t} \qquad \text{(F7)}$$

where ϵ is normally distributed.

It is assumed that the supply equation for uncontrolled countries (equation F6) is a function of its product and time-specific export price. The solution of an equilibrium price and quantity, however, must take into account the price of substitutes from domestic and controlled suppliers.

The distortionary impact of the quota system is captured in equations (F2.1) and (F3). The reduced form estimating equations consist of import demand equation (F5) and supply equation (F6.1) or (F6.1'). The market clearing condition noted earlier as equation (F7) can be replaced by conditions (F7.1) or (F7.2). The added equations for the controlled country scenario are

$$M^{S}_{ij,t} = \lambda_0 + \lambda_1 P_{cj,t} + e' \qquad \text{(F6.1)}$$

$$M^{S}_{ij,t} = S^{Q}_{ij,t} \qquad \text{(F6.1')}$$

$$M^{A}_{ij,t} = M^{D}_{ij,t} = M^{S}_{ij,t} \quad \text{if} \quad M^{A}_{ij,t} < S^{Q}_{ij,t} \qquad \text{(F7.1)}$$

$$M^{A}_{ij,t} = S^{Q}_{ij,t} \quad \text{if otherwise} \qquad \text{(F7.2)}$$

where S^{Q}_{ijt} is the import quota limit.

[8] For a discussion of the theoretical implications of the weak separability assumption see A.L. Winters, "Separability and the Specification of Foreign Trade Functions," *Journal of International Economics,* 1984, pp. 239-263.

As noted above, the controlled market has two possible sets of price and quantity equilibria. The first case,

$$M^{A}_{ij,t} < S^{Q}_{ij,t},$$

yields a simultaneous equation model where both the quantity transacted and the price are observed endogenous variables. In this case the price and quantity of imports is determined by the intersection of import demand and supply.

The second case,

$$M^{A}_{ij,t} = S^{Q}_{ij,t},$$

yields an unobserved excess demand situation where the controlled quantity $S^{Q}_{ij,t}$ is an exogenous variable. In this case the price is an element of the supply constraint, not the demand curve.

The market effects of the MFA can be analyzed by treating the problem as a standard disequilibrium Tobit model.[9] The simplest disequilibrium model, noted above as equations (F7.1) and (F7.2), can be restated as equation (F4):

$$M^{A}_{t} = \min (M^{D}_{t}, S^{Q}_{t}), \qquad \text{(F4)}$$

implying that the actual quantity of imports sold is the minimum of supply and demand. This latter disequilibrium term can be substituted for equations (F7.1) and (F7.2) above. Furthermore, this disequilibrium caused by the MFA creates an inequality between the actual observed price and the ex-ante market equilibrium price. Thus, a Walrasian price adjustment equation suggested by Fair and Jaffee can be added.[10] The price adjustment equation can take the following simple form:

$$\delta P_{cj,t} = \delta_0 (D^{M}_{ij,t} - S^{M}_{ij,t}) + \delta_1 P_{uj,t} + \delta_2 P_{Dj,t} + \delta_3 E_t + \epsilon$$

where

$$\delta P_{cj,t} = P_{cj,t} - P_{cj,t-1}$$

The two-stage estimation procedure suggested by Maddala[11] and outlined above requires that equation (F5) be estimated in its constrained form, as

$$Z^{*}_{ij,t} = \alpha_0 S^{Q}_{ij,t} + \alpha_1 P_{cj,t} + \alpha_2 P_{uj,t} + \alpha_3 P_{Dj,t} + \alpha_4 E_t + \alpha \qquad \text{(F5.2)}$$

where

$$Z^{*}_{ij,t} = (M^{D}_{ij,t} - S^{Q}_{ij,t})$$

and

$$Z_{ij,t} = M^{D}_{ij,t} - S^{Q}_{ij,t} \; (= Z^{*}_{ij,t}) \quad \text{if} \quad Z^{*}_{ij,t} < 0$$

$$= 0 \quad \text{if otherwise.}[12]$$

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[9] See Maddala (1983a), Hartley ibid., and G.S. Maddala and F.D. Nelson, "Maximun Likelihood Methods for Models of Markets in Disequilibrium," *Econometrica*, 1974, pp. 1013-1030.
[10] R.C. Fair and D.M. Jaffee, "Methods of Estimation for Markets in Disequilibrium," *Econometrica*, 1972, pp. 497-514.
[11] Maddala (1983a).
[12] Note that Z is the truncated variable so that $Z_{ij,t} = Z^{*}_{ij,t}$ if $Z^{*}_{ij,t} < 0$ and = 0 otherwise.

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The estimated values of $P_{cj,t}$ are then substituted into the demand and supply equations in both controlled and uncontrolled markets in order to estimate the relative price and income elasticities absent the quota distortions. The results of this empirical model consist of a set of ad valorem tariff equivalents of the MFA quotas, along with a consistent set of unconstrained demand elasticities for both controlled and uncontrolled markets. All are estimated at the the textile category level used to monitor the U.S. textile program.

Data

Trade Data

The textile trade data on value and quantity are based on the three-digit textile category system. These data, which are available for the time period 1978–1987, are summed into two groups, one for countries without bilateral controls and the other for those with bilateral controls.

Prices

Domestic producer prices were matched to the textile category level when possible. In cases where a clear concordance was not possible, the more aggregate producer price index was used. *Import prices* both for controlled and uncontrolled country suppliers are unit values.

Tariffs

Ad valorem tariff equivalents were calculated at the three digit textile category level for the entire 1978–1987 period.

Activity variables

A number of activity variables were used. The choice of activity variable depended in part on whether the good is an end product or an intermediate input. The list of activity variables includes

1. Total personal consumption expenditures,
2. Personal consumption expenditure for textiles,
3. Personal consumption expenditure for clothing and shoes, and
4. Personal consumption expenditure for clothing.

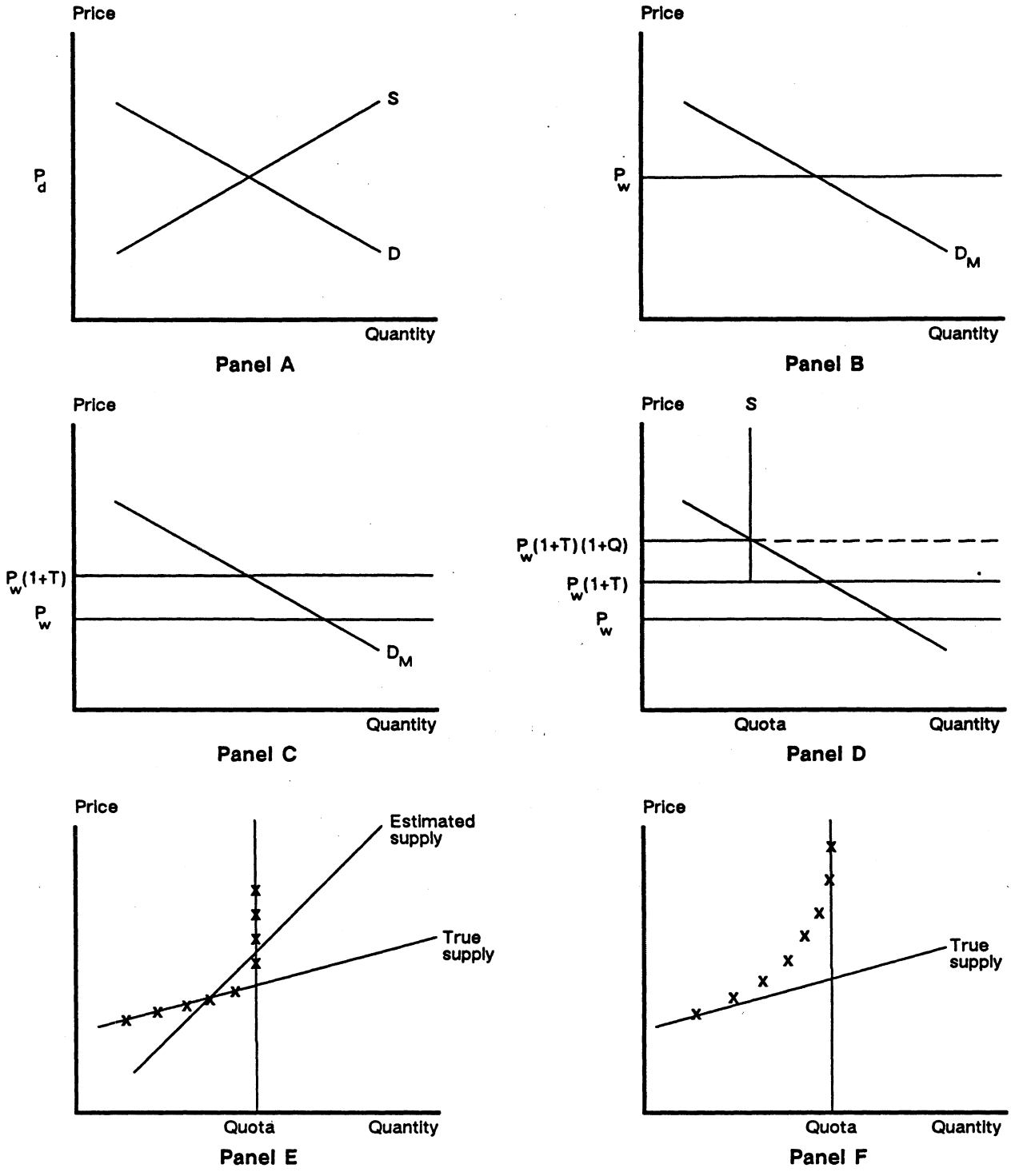
Output

Data on domestic output for the 3-digit textile categories were taken from the U.S. Department of Commerce.

Quota Levels

Quota levels by country and product were taken from the U.S. Department of Commerce. These limits have been corrected for the periodic borrowing and lending over categories and time. The restrictions used, therefore, present a true upper limit as exercised by the U.S. Government.

Figure F-1
Estimating tariff equivalents of MFA quotas



Key:

P = price	w = world
Q = quota	d = domestic
T = tariff	M = imports
E = demand	
S = supply	

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APPENDIX G
METHODOLOGY FOR ESTIMATING EFFECTS OF RESTRAINT REMOVAL IN TEXTILES AND APPAREL

Methodology for Estimating Effects of Restraint Removal in Textiles and Apparel[1]

This appendix provides a technical description of the methodology used to assess the impacts of tariff elimination in the textile and apparel industry. The methodology is an expanded version of the methodology outlined in appendix D.

In the textile and apparel industry there are two import markets, one controlled by the MFA quotas and the other subject only to tariffs. In what follows, the traditional analysis is modified for three markets: the market for controlled imports, the market for uncontrolled imports, and the market for the domestic substitute. The further complications of wage rigidity, domestic taxes, the terms-of-trade effects of exchange-rate changes, and upstream and downstream effects are identical to those presented in appendix D, and are not reproduced here.

The analysis of removing textile and apparel tariffs and tariff equivalents of MFA quotas is conducted with reference to the partial-equilibrium diagrams presented in chapter 4. The uncontrolled imported good is denoted as u, the controlled import as c, and the competing, domestic good as d. Q_u and p_u are the initial quantity of uncontrolled imports and domestic price of the uncontrolled foreign good, Q_c and p_c are the initial quantity of controlled imports and domestic price of the controlled foreign good, and Q_d and p_d are the initial shipments and domestic price of the domestic good.

As in appendix D, units of quantity are chosen such that, before removal of the tariff and the tariff equivalent of the MFA quota, $p_d = p_c = p_u = 1$. Then, if V_c, V_u and V_d are the dollar value of controlled imports, uncontrolled imports and domestic shipments, before tariff removal $V_u = Q_u$, $V_c = Q_c$ and $V_d = Q_d$. The proportional change in a variable is denoted by using a hat "^" so that, for example, $\hat{z} = dz/z$.

The markets for controlled imports, uncontrolled imports, and domestic output are described by the following equations:

$$\hat{Q}_c = \epsilon_{cc}\hat{p}_c + \epsilon_{cu}\hat{p}_u + \epsilon_{cd}\hat{p}_d \qquad \text{(G1)}$$

$$\hat{Q}_u = \epsilon_{uc}\hat{p}_c + \epsilon_{uu}\hat{p}_u + \epsilon_{ud}\hat{p}_d \qquad \text{(G2)}$$

$$\hat{Q}_d = \epsilon_d\hat{p}_d \qquad \text{(G3)}$$

$$\hat{Q}_d = -\gamma_c\hat{Q}_c - \gamma_u\hat{Q}_u \qquad \text{(G4)}$$

where ϵ_{ij} is the uncompensated elasticity of demand for good i with respect to price j, e_d is the elasticity of supply of good d, and γ_i equals (Q_i/Q_d). The exogenous variables are $\hat{p}_c$ and $\hat{p}_u$, and the endogenous variables are $\hat{Q}_c$, $\hat{Q}_u$, $\hat{Q}_d$, and $\hat{p}_d$.

The unit-for-unit substitution assumption implicit in equation G4 is necessary because data on expenditure for domestic textiles and apparel are not available for the 3-digit textile nomenclature. This assumption will tend to overstate the domestic impact of tariff and quota removal because the unit values of imported textile and apparel products are in most cases lower than their domestic counterparts.

[1] This appendix is primarily the product of Professor Joseph Pelzman of George Washington University. All major decisions were made in close collaboration with, and cleared by, the Commission staff. G-2

Solving the system yields the following:

$$\hat{p}_d = \frac{-[(\gamma_c \epsilon_{cc} + \gamma_u \epsilon_{uc})\hat{p}_c + (\gamma_c \epsilon_{cu} + \gamma_u \epsilon_{uu})\hat{p}_u]}{(e_d + \gamma_c \epsilon_{cd} + \gamma_u \epsilon_{ud})}, \quad \text{(G5)}$$

$$\hat{Q}_d = \frac{-e_d[(\gamma_c \epsilon_{cc} + \gamma_u \epsilon_{uc})\hat{p}_c + (\gamma_c \epsilon_{cu} + \gamma_u \epsilon_{uu})\hat{p}_u]}{(e_d + \gamma_c \epsilon_{cd} + \gamma_u \epsilon_{ud})}, \quad \text{(G6)}$$

$$\hat{Q}_c = \frac{[e_d \epsilon_{cc} + \gamma_u(\epsilon_{ud} \epsilon_{cc} - \epsilon_{cd} \epsilon_{uc})]\hat{p}_c + [\epsilon_d \epsilon_{cu} + \gamma_u(e_{ud} \epsilon_{cu} - \epsilon_{cd} \epsilon_{uu})]\hat{p}_u}{(\epsilon_d + \gamma_c \epsilon_{cd} + \gamma_u \epsilon_{ud})}, \quad \text{(G7)}$$

$$\hat{Q}_u = \frac{[e_d \epsilon_{uc} + \gamma_c(\epsilon_{cd} \epsilon_{uc} - \epsilon_{ud} \epsilon_{cc})]\hat{p}_c + [e_d \epsilon_{uu} + \gamma_c(\epsilon_{cd} \epsilon_{uu} - \epsilon_{ud} \epsilon_{cu})]\hat{p}_u}{(e_d + \gamma_c \epsilon_{cd} + \gamma_u \epsilon_{ud})}. \quad \text{(G8)}$$

The areas of the consumer-welfare trapazoids in the three markets are

$C_c = (p_c - p_c')(Q_c + Q_c')/2,$

$C_u = (p_u - P_u')(Q_u + Q_u')/2,$ and

$C_d = (p_d - P_d')(Q_d + Q_d')/2.$

These can be rewritten as

$$C_c = -\hat{p}_c p_c (2 + \hat{Q}_c) Q_c/2, \quad \text{(G9)}$$

$$C_u = -\hat{p}_u p_u (2 + \hat{Q}_u) Q_u/2, \text{ and} \quad \text{(G10)}$$

$$C_d = -\hat{p}_d p_d (2 + \hat{Q}_d) Q_d/2. \quad \text{(G11)}$$

The loss of producer welfare in the market for domestic output is exactly equal to the gain in consumer surplus in this market. This amount is an upper bound estimate of the loss in profits:

$$F = -\hat{p}_d p_d (2 + \hat{Q}_d) Q_d/2. \quad \text{(G12)}$$

Table G-1

Values of proportional changes of controlled ($\hat{p}_C$) and uncontrolled ($\hat{p}_u$) prices for 1987.

(proportional changes)

Category	*Description*[1]	$\hat{P}c$	$\hat{P}u$
300	Carded cotton yarn	-0.16	- 0.07
301	Combed cotton yarn	-0.17	- 0.09
310	Gingham fabric	-0.11	- 0.12
311	Velveteen fabric	-0.22	- 0.17
312	Corduroy fabric	-0.28	- 0.20
313	Cotton sheeting	-0.12	- 0.07
314	Poplin and broadcloth	-0.14	- 0.10
315	Cotton printcloth	-0.11	- 0.08
316	Cotton shirting	-0.15	- 0.13
317	Twills and sateens	-0.12	- 0.08
318	Other yarn-dyed fabrics	-0.13	- 0.12
319	Duck	-0.13	- 0.06
320	Other cotton woven fabrics	-0.13	- 0.11
330	Handkerchiefs	-0.12	- 0.11
331	Cotton gloves and mittens	-0.30	- 0.19
332	Cotton hosiery	-0.28	- 0.16
333	MB suit-type coats	-0.13	- 0.09
334	Other MB coats	-0.13	- 0.09
335	WGI coats	-0.09	- 0.09
336	Cotton dresses	-0.12	- 0.12
337	Cotton playsuits, sunsuits	-0.09	- 0.09
338	MB knit shirts	-0.20	- 0.17
339	WGI knit shirts and blouses	-0.25	- 0.17
340	MB shirts, not knit	-0.25	- 0.17
341	WGI shirts, not knit	-0.19	- 0.14
342	Cotton skirts	-0.15	- 0.08
345	Cotton sweaters	-0.31	- 0.17
347	MB trousers and shorts	-0.19	- 0.14
348	WGI trousers and shorts	-0.16	- 0.14
349	Brassieres, etc.	-0.26	- 0.18
350	Dressing gowns, etc.	-0.29	- 0.08
351	Cotton nightwear and pajamas	-0.12	- 0.10
352	Cotton underwear	-0.12	- 0.10
353	MB down-filled coats, etc.	-0.12	- 0.04
354	WGI down-filled coats, etc.	-0.15	- 0.04
359	Other cotton apparel	-0.39	- 0.08
410	Woolens and worsteds	-0.26	- 0.24
411	Tapestry and upholstery	-0.07	- 0.07
425	Wool knit fabrics	-0.22	- 0.17
429	Other wool fabrics	-0.16	- 0.09
431	Wool gloves and mittens	-0.09	- 0.09
432	Wool hosiery	-0.35	- 0.11
433	MB suit-type coats	-0.24	- 0.18
434	Other MB coats	-0.33	- 0.19
435	WGI wool coats	-0.24	- 0.19
436	Wool dresses	-0.16	- 0.16
438	Knit shirts and blouses	-0.33	- 0.16
440	Shirts, not knit	-0.21	- 0.19
442	Wool skirts	-0.16	- 0.15
443	MB wool suits	-0.28	- 0.19
444	WGI wool suits	-0.21	- 0.15
445	MB wool sweaters	-0.19	- 0.14
446	WGI wool sweaters	-0.20	- 0.15
447	MB trousers and shorts	-0.24	- 0.18
448	WGI trousers and shorts	-0.20	- 0.15
459	Other wool apparel	-0.21	- 0.11
600	Textured MMF yarns	-0.09	- 0.09
601	Continuous cellulosic	-0.11	- 0.10
602	Continuous noncellulosic	-0.19	- 0.10
603	Noncontinous cellulosic	-0.10	- 0.10
604	Noncontinous noncellulosic	-0.17	- 0.11
605	Other MMF yarns	-0.14	- 0.12
610	Woven of cont. cellulosic	-0.50	- 0.16

See footnote at end of table.

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Table G-1—*Continued*

Values of proportional changes of controlled ($\hat{p}_C$) and uncontrolled ($\hat{p}_u$) prices for 1987.

(proportional changes)

Category	*Description*[1]	$\hat{P}_C$	$\hat{P}_u$
611	Woven of spun cullulosic	-0.31	- 0.15
612	Woven of cont. noncellulosic	-0.17	- 0.16
613	Woven of spun noncellululosic	-0.15	- 0.15
614	Other woven MMF fabrics	-0.15	- 0.15
625	Knit MMF fabrics	-0.18	- 0.15
626	Pile and tufted fabrics	-0.15	- 0.15
627	MMF specialty fabrics	-0.48	- 0.15
630	Handkerchiefs	-0.19	- 0.13
631	MMF gloves and mittens	-0.20	- 0.16
632	MMF hosiery	-0.18	- 0.17
633	MB suit-type coats	-0.32	- 0.20
634	Other MB coats	-0.20	- 0.20
635	WGI MMF coats	-0.34	- 0.21
636	MMF Dresses	-0.26	- 0.18
637	MMF playsuits, sunsuits	-0.22	- 0.17
638	MB knit shirts	-0.26	- 0.26
639	WGI knit shirts	-0.30	- 0.26
640	MB shirts, not knit	-0.30	- 0.23
641	WGI shirts, not knit	-0.25	- 0.23
642	MMF skirts	-0.22	- 0.15
643	MB suits	-0.25	- 0.22
644	WGI suits	-0.24	- 0.22
645	MB sweaters	-0.33	- 0.25
646	WGI sweaters	-0.35	- 0.26
647	MB trousers and shorts	-0.34	- 0.23
648	WGI trousers and shorts	-0.34	- 0.23
649	Brassieres, etc.	-0.23	- 0.22
650	Dressing gowns	-0.17	- 0.17
651	MMF nightwear and pajamas	-0.21	- 0.17
652	MMF underwear	-0.25	- 0.18
653	MB down-filled coats	-0.09	- 0.04
654	WGI down-filled coats	-0.05	- 0.04
659	Other MMF apparel	-0.18	- 0.14

[1] "MB" denotes mens' and boys'. "WGI" denotes women's, girls' and infants'. "MMF" denotes manmade fiber.

Source: Estimated by the staff of the USITC.

Table G-2
Estimated Values of εcc, εcu, εcd for controlled imports

Category	Description[1]	εcc	εcu	εcd
300	Carded cotton yarn	-2.51	-1.11	5.67
301	Combed cotton yarn	-2.51	-1.11	5.67
310	Gingham fabric	-1.39	-0.12	2.55
311	Velveteen fabric	-1.39	-0.12	2.55
312	Corduroy fabric	-1.39	-0.12	2.55
313	Cotton sheeting	-1.39	-0.12	2.55
314	Poplin and broadcloth	-1.39	-0.12	2.55
315	Cotton printcloth	-1.39	-0.12	2.55
316	Cotton shirting	-1.39	-0.12	2.55
317	Twills and sateens	-1.39	-0.12	2.55
318	Other yarn-dyed fabrics	-1.39	-0.12	2.55
319	Duck	-1.39	-0.12	2.55
320	Other cotton woven fabrics	-1.39	-0.12	2.55
330	Handkerchiefs	-1.00	0.00	3.14
331	Cotton gloves and mittens	-1.13	1.29	2.89
332	Cotton hosiery	-1.74	-1.58	0.00
333	MB suit-type coats	-1.11	-0.69	0.00
334	Other MB coats	-2.82	-1.25	0.00
335	WGI coats	-3.54	0.69	3.51
336	Cotton dresses	-1.81	0.00	0.00
337	Cotton playsuits, sunsuits	-1.81	-0.29	2.91
338	MB knit shirts	-4.36	0.25	0.00
339	WGI knit shirts and blouses	-1.80	-0.47	0.00
340	MB shirts, not knit	-3.20	0.00	0.00
341	WGI shirts, not knit	-1.65	-0.16	0.00
342	Cotton skirts	-4.78	1.00	1.71
345	Cotton sweaters	-8.28	5.44	0.00
347	MB trousers and shorts	-1.59	-0.78	2.25
348	WGI trousers and shorts	-1.64	-1.70	1.04
349	Brassieres, etc.	-2.05	-0.48	1.96
350	Dressing gowns, etc.	-1.90	-0.37	4.78
351	Cotton nightwear and pajamas	-1.71	-0.43	3.74
352	Cotton underwear	-1.19	0.35	1.77
353	MB down-filled coats, etc.	-1.82	-0.39	1.38
354	WGI down-filled coats, etc.	-1.98	-0.89	0.00
359	Other cotton apparel	-1.78	-0.57	0.00
410	Woolens and worsteds	-1.20	0.00	1.31
411	Tapestry and upholstery	-1.20	0.00	1.31
425	Wool knit fabrics	-1.20	0.00	1.31
429	Other wool fabrics	-1.20	0.00	1.31
431	Wool gloves and mittens	-1.13	1.29	2.89
432	Wool hosiery	-1.74	-1.58	0.00
433	MB suit-type coats	-1.11	-0.69	0.00
434	Other MB coats	-2.82	-1.25	0.00
435	WGI wool coats	-3.54	0.69	3.51
436	Wool dresses	-1.81	0.00	0.00
438	Knit shirts and blouses	-4.36	0.25	0.00
440	Shirts, not knit	-3.20	0.00	0.00
442	Wool skirts	-4.78	1.00	1.71
443	MB wool suits	-1.27	-0.62	0.00
444	WGI wool suits	-3.29	-1.27	3.25
445	MB wool sweaters	-8.28	5.44	0.00
446	WGI wool sweaters	-3.53	0.24	0.00
447	MB trousers and shorts	-1.59	-0.78	2.25
448	WGI trousers and shorts	-1.64	-1.70	1.04
459	Other wool apparel	-1.78	-0.57	0.00
600	Textured MMF yarns	-2.31	0.03	5.22
601	Continuous cellulosic	-2.31	0.03	5.22
602	Continuous noncellulosic	-2.31	0.03	5.22
603	Noncontinuous cellulosic	-2.31	0.03	5.22
604	Noncontinuous noncellulosic	-2.31	0.03	5.22
605	Other MMF yarns	-2.31	0.03	5.22
610	Woven of cont. cellulosic	-1.15	0.00	2.14
611	Woven of spun cullulosic	-1.15	0.00	2.14
612	Woven of cont. noncellulosic	-1.15	0.00	2.14

See footnote at end of table.

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Table G-2—*Continued*
Estimated Values of ecc, ecu, ecd for controlled imports

Category	*Description*[1]	€cc	€cu	€cd
613	Woven of spun noncellulosic	-1.15	0.00	2.14
614	Other woven MMF fabrics	-1.15	0.00	2.14
625	Knit MMF fabrics	-1.15	0.00	2.14
626	Pile and tufted fabrics	-1.15	0.00	2.14
627	MMF specialty fabrics	-1.15	0.00	2.14
630	Handkerchiefs	-1.00	0.00	3.14
631	MMF gloves and mittens	-1.13	1.29	2.89
632	MMF hosiery	-1.74	-1.58	0.00
633	MB suit-type coats	-1.11	-0.69	0.00
634	Other MB coats	-2.82	-1.25	0.00
635	WGI MMF coats	-3.54	0.69	3.51
636	MMF Dresses	-1.81	0.00	0.00
637	MMF playsuits, sunsuits	-1.81	-0.29	2.91
638	MB knit shirts	-4.36	0.25	0.00
639	WGI knit shirts	-1.80	-0.47	0.00
640	MB shirts, not knit	-3.20	0.00	0.00
641	WGI shirts, not knit	-1.65	-0.16	0.00
642	MMF skirts	-4.78	1.00	1.71
643	MB suits	-1.27	-0.62	0.00
644	WGI suits	-3.29	-1.27	3.25
645	MB sweaters	-8.28	5.44	0.00
646	WGI sweaters	-3.53	0.24	0.00
647	MB trousers and shorts	-1.59	-0.78	2.25
648	WGI trousers and shorts	-1.64	-1.70	1.04
649	Brassieres, etc.	-2.05	-0.48	1.96
650	Dressing gowns	-1.90	-0.37	4.78
651	MMF nightwear and pajamas	-1.71	-0.43	3.74
652	MMF underwear	-1.19	0.35	1.77
653	MB down-filled coats	-1.82	-0.39	1.38
654	WGI down-filled coats	-1.98	-0.89	0.00
659	Other MMF apparel	-1.78	-0.57	0.00

[1] "MB" denotes mens' and boys'. "WGI" denotes women's, girls' and infants'. "MMF" denotes manmade fiber.

Source: Estimated by the staff of the USITC.

Table G-3
Estimated Values of euc, euu, eud for uncontrolled imports

Category	*Description*[1]	€uc	€uu	€ud
300	Carded cotton yarn	6.53	-4.28	3.94
301	Combed cotton yarn	6.53	-4.28	3.94
310	Gingham fabric	0.00	-0.61	0.00
311	Velveteen fabric	0.00	-0.61	0.00
312	Corduroy fabric	0.00	-0.61	0.00
313	Cotton sheeting	0.00	-0.61	0.00
314	Poplin and broadcloth	0.00	-0.61	0.00
315	Cotton printcloth	0.00	-0.61	0.00
316	Cotton shirting	0.00	-0.61	0.00
317	Twills and sateens	0.00	-0.61	0.00
318	Other yarn-dyed fabrics	0.00	-0.61	0.00
319	Duck	0.00	-0.61	0.00
320	Other cotton woven fabrics	0.00	-0.61	0.00
330	Handkerchiefs	2.09	-1.06	-7.71
331	Cotton gloves and mittens	2.84	-0.82	1.36
332	Cotton hosiery	1.00	-1.07	0.00
333	MB suit-type coats	0.00	-1.02	1.69
334	Other MB coats	-1.41	-1.42	0.00
335	WGI coats	-0.15	-1.27	0.00
336	Cotton dresses	5.30	-2.79	0.00
337	Cotton playsuits, sunsuits	-0.94	-0.88	3.31
338	MB knit shirts	-4.42	-1.18	9.06
339	WGI knit shirts and blouses	-2.23	-2.21	0.00
340	MB shirts, not knit	1.54	-2.02	0.00
341	WGI shirts, not knit	3.61	-1.63	0.00
342	Cotton skirts	0.00	-0.77	1.27
345	Cotton sweaters	1.67	-0.92	0.00
347	MB trousers and shorts	-3.67	-1.22	4.02
348	WGI trousers and shorts	-0.80	-1.82	0.00
349	Brassieres, etc.	5.92	-1.61	0.00
350	Dressing gowns, etc.	-6.37	-1.85	0.00
351	Cotton nightwear and pajamas	7.21	-2.47	2.10
352	Cotton underwear	0.76	-0.53	0.00
353	MB down-filled coats, etc.	3.89	-1.56	0.00
354	WGI down-filled coats, etc.	-2.55	-1.98	4.75
359	Other cotton apparel	0.00	-1.53	1.78
410	Woolens and worsteds	1.20	-0.92	3.45
411	Tapestry and upholstery	1.20	-0.92	3.45
425	Wool knit fabrics	0.00	-0.92	3.45
429	Other wool fabrics	0.00	-0.92	3.45
431	Wool gloves and mittens	2.84	-0.82	1.36
432	Wool hosiery	0.00	-1.07	0.00
433	MB suit-type coats	0.00	-1.02	1.69
434	Other MB coats	-1.41	-1.42	0.00
435	WGI wool coats	-0.15	-1.27	0.00
436	Wool dresses	5.30	-2.79	0.00
438	Knit shirts and blouses	-4.42	-1.18	9.06
440	Shirts, not knit	1.54	-2.02	0.00
442	Wool skirts	0.00	-0.77	1.27
443	MB wool suits	1.37	-2.92	9.15
444	WGI wool suits	6.66	-3.47	0.00
445	MB wool sweaters	1.67	-0.92	0.00
446	WGI wool sweaters	5.03	-1.64	0.00
447	MB trousers and shorts	-3.67	-1.22	4.02
448	WGI trousers and shorts	-0.80	-1.82	0.00
459	Other wool apparel	0.00	-1.53	1.78
600	Textured MMF yarns	0.64	-0.97	2.45
601	Continuous cellulosic	0.00	-0.97	2.45
602	Continuous noncellulosic	0.64	-0.97	2.45
603	Noncontinuous cellulosic	0.64	-0.97	2.45
604	Noncontinuous noncellulosic	0.64	-0.97	2.45
605	Other MMF yarns	0.64	-0.97	2.45
610	Woven of cont. cellulosic	0.00	-0.66	2.98
611	Woven of spun cullulosic	0.00	-0.66	2.98

See footnote at end of table.

Table G-3—*Continued*
Estimated Values of euc, euu, eud for uncontrolled imports

Category	*Description*[1]	€uc	€uu	€ud
612	Woven of cont. noncellulosic	0.00	-0.66	2.98
613	Woven of spun noncellulosic	0.00	-0.66	2.98
614	Other woven MMF fabrics	0.00	-0.66	2.98
625	Knit MMF fabrics	0.00	-0.66	2.98
626	Pile and tufted fabrics	0.00	-0.66	2.98
627	MMF specialty fabrics	0.00	-0.66	2.98
630	Handkerchiefs	2.09	-1.06	-7.71
631	MMF gloves and mittens	2.84	-0.82	1.36
632	MMF hosiery	1.00	-1.07	0.00
633	MB suit-type coats	0.00	-1.02	1.69
634	Other MB coats	-1.41	-1.42	0.00
635	WGI MMF coats	-0.15	-1.27	0.00
636	MMF Dresses	5.30	-2.79	0.00
637	MMF playsuits, sunsuits	-0.94	-0.88	3.31
638	MB knit shirts	-4.42	-1.18	9.06
639	WGI knit shirts	-2.23	-2.21	0.00
640	MB shirts, not knit	1.54	-2.02	0.00
641	WGI shirts, not knit	3.61	-1.63	0.00
642	MMF skirts	0.00	-0.77	1.27
643	MB suits	4.37	-2.92	9.15
644	WGI suits	6.66	-3.47	0.00
645	MB sweaters	1.67	-0.92	0.00
646	WGI sweaters	5.03	-1.64	0.00
647	MB trousers and shorts	-3.67	-1.22	4.02
648	WGI trousers and shorts	-0.80	-1.82	0.00
649	Brassieres, etc.	5.92	-1.61	0.00
650	Dressing gowns	-6.37	-1.85	0.00
651	MMF nightwear and pajamas	7.21	-2.47	2.10
652	MMF underwear	0.76	-0.53	0.00
653	MB down-filled coats	3.89	-1.56	0.00
654	WGI down-filled coats	-2.55	-1.98	4.75
659	Other MMF apparel	0.00	-1.53	1.78

[1] "MB" denotes mens' and boys'. "WGI" denotes women's, girls' and infants'. "MMF" denotes manmade fiber.
Source: Estimated by the staff of the USITC.

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