IMPORT QUOTAS ON TEXTILES: THE WELFARE EFFECTS OF UNITED STATES RESTRICTIONS ON HONG KONG

An Economic Policy Analysis

by

Morris E. Morkre

Bureau of Economics Staff Report
to the Federal Trade Commission
August 1984

FEDERAL TRADE COMMISSION

JAMES C. MILLER, III, Chairman
MICHAEL PERTSCHUK, Commissioner
PATRICIA P. BAILEY, Commissioner
GEORGE W. DOUGLAS, Commissioner
TERRY CALVANI, Commissioner

BUREAU OF ECONOMICS

WENDY L. GRAMM, Director
JOHN L. PETERMAN, Associate Director for Special Projects
RONALD S. BOND, Deputy Director for Operations and Research
RICHARD S. HIGGINS, Deputy Director for Consumer Protection and Regulatory Analysis
DAVID T. SCHEFFMAN, Deputy Director for Competition Analysis and Antitrust
KEITH B. ANDERSON, Assistant Director for Regulatory Analysis
ROBERT D. BROGAN, Assistant Director for Competition Analysis
JAMES M. FERGUSON, Assistant Director for Antitrust
PAULINE M. IPPOLITO, Assistant Director for Industry Analysis
WILLIAM F. LONG, Manager for Line of Business
PAUL H. RUBIN, Assistant Director for Consumer Protection

This report has been prepared by and represents the views of the Bureau of Economics of the Federal Trade Commission. It does not necessarily reflect the views of the Federal Trade Commission or any individual members. The Federal Trade Commission has, however, voted to authorize its release.

ACKNOWLEDGMENTS

This Report would not have been possible without the support of Bob Tollison, former Director of the Bureau of Economics, and without the basic data for quota prices and other information about Hong Kong's Textile Control System provided by the Trade Industry and Customs Department of the Hong Kong Government. Many people contributed to the preparation of this Report. Within the Commission, the assistance of Jon Ogur deserves special mention. His detailed comments had a significant influence on both the exposition and the substance of the final Report. Additionally, Keith Anderson, Richard Higgins, and David Tarr read one or more versions of early drafts and offered constructive comments.

Outside the Commission, valuable assistance was obtained from Jim Bennett of the Department of Commerce (Office of Textiles), Norman Bowers of the Bureau of Labor Statistics, Dr. Joseph Chai of the University of Hong Kong, and Don Keesing of the World Bank. Special thanks go to Professor James Riedel of Johns Hopkins University for a number of helpful discussions on methodology.

The brunt of the statistical assistance workload was efficiently performed by Kathleen McChesney; Barbara Battle, Dolores Munson, and Joseph Young also pitched in at critical moments. Several pairs of able hands typed the various drafts, including Eve Goodman, Angela Newsome, Annette Shanklin, Janice Wincher, and Betsy Zichterman. The artwork of Don Cox transformed my rough sketches into sharp and clear diagrams.

Finally, the usual disclaimer applies. None of the organizations or individuals cited above are responsible for the views, interpretations, or results presented in this Report.

TABLE OF CONTENTS

LIST OF FIGURES AND TABLES

LIST OF FIGURES and TABLES (Cont.)

CHAPTER I

Introduction

In one guise or another the United States has imposed quantitative restrictions (QRs) on imports of textile and clothing products for more than 25 years. The QRs are import quotas that have limited American consumers from obtaining "textiles" (including textile and clothing products) from the lowest cost sources and have artificially inflated prices in the U.S. The size of the consequent social cost to the United States has been difficult to assess because quotas usually mask the extent to which prices of imports would fall if they were eliminated. Unlike some other import restraint policies (particularly tariffs) relevant empirical data have not been available to estimate the price-increasing effects of the quotas. However, new data have recently become available which make it possible to estimate the social cost of the quotas imposed on one large foreign supplier, Hong Kong.

The results obtained in this Report are for the year 1980 and concentrate on nine clothing product categories from Hong Kong.[1] Import quotas for these products are estimated to cause an annual social cost on the U.S. economy of $308 million. The major component of the social cost is an economic rent created by the quotas that represents a transfer of real income from the United States to Hong Kong. Quota rents are found to exceed $218 million. It is also found that the effects of the quotas on U.S. employment in the domestic clothing and textile industries are comparatively small. If the quotas were removed we estimate that additional imports would reduce domestic employment in these industries by 8,900 workers and involve a cost of unemployment of $17 million. However, there is an important difference between the benefits and costs of removing the quotas. If the quotas were eliminated the benefits would continue year after year, indefinitely, while most of the unemployment costs would occur over a short period, less than a year, and would end once the workers displaced by the additional imports found new jobs. Therefore a comparison of the benefits and costs of removing the quotas must consider the differences between their time profiles. For example, during the first year the benefits are 18 times larger than the cost of unemployment. But after the first year the benefits continue while the costs decline so that the full benefit cost ratio is considerably larger than 18.

Several earlier studies have attempted to estimate the welfare costs resulting from all import quotas on textiles (for

---

[1] While the U.S. imposes import quotas on 22 countries it is important to single out Hong Kong because it is the largest foreign supplier of textile products to the U.S. Textile exports from this Far East supplier are restrained by a bilateral agreement concluded under the umbrella of the Multifiber Arrangement (MFA). The MFA dates from 1974 and is an international arrangement among major textile exporting and importing countries. Initially established for a 4 year term, the MFA has been twice renewed, most recently at the end of 1981, for a 4 year and 7 month term. Under the MFA the United States has concluded a succession of multi-year bilateral agreements with Hong Kong. The current six-year agreement was ratified in July, 1982 and expires on December 31, 1987.

all countries).[2] However these efforts were unable to obtain certain relevant data (or sufficient data) and the resulting estimates of social cost are best regarded as rough approximations. The essential problem is that an effective quota creates a difference or gap between foreign unit cost and price paid by importers and, hitherto, information about the size of the gap has been scanty.[3] The size of this price-cost gap provides the key element to estimate the social cost of a quota.

The central feature of the methodology adopted in this Report is that the price of rights to export textiles from Hong Kong measures the gap between import price and unit cost in Hong Kong. The rationale is that textile quotas are openly traded in Hong Kong so that the market price for transfers is expected to reflect the value of the price-cost difference.[4]

The plan for this Report is first to briefly review import and domestic production statistics to show the importance of Hong Kong as a source of textiles for U.S. consumers (in chapter II) and then turn to an examination of the specific textile products from Hong Kong that are restrained by U.S. import quotas (in chapter III). The principal results of the study are the estimates of the social costs and benefits of the import quotas, and they are given in chapter IV. A summary of the results and concluding remarks are contained in chapter V.

---

[2] Ilse Mintz (1973) U.S. Import Quotas, (American Enterprise Institute), chap. 5; U.S. General Accounting Office (1974), "Economic and Foreign Policy Effects of Voluntary Restraint Agreements on Textiles and Steel;" U.S. Council on Wage and Price Stability (1978), Textiles/Apparel: A Study of the Textile and Apparel Industries (U.S. Government Printing Office).

[3] The estimation of the social cost in the present study depends crucially on two recently released data sets for prices of quota rights in 1980, one by the Hong Kong Government and the other by a group of U.S. importers and retailers. As far as can be determined this is the first time a large number of observations for prices of quota rights for export of textiles to the U.S. has been available.

[4] The use of prices for quota rights as a measure of the import price-foreign unit cost gap is not new. Jenkins adopted this approach in his study of the welfare effects of Canada's import quotas on textiles, and the Consumers' Association in the United Kingdom used quota prices in their survey of the effects of the U.K.'s textile import quotas. The present Report therefore extends the use of quota-rights prices to assess the effects of U.S. quotas. Glen P. Jenkins (1980), "Costs and Consequences of the New Protectionism," (Harvard Institute for International Development, Harvard Univ.); Consumers' Association (1979), The Price of Protection, (London).

CHAPTER II

The Importance of Textile Imports from Hong Kong

Hong Kong is a significant source of supply of several textile products to U.S. consumers. In terms of total U.S. imports of all types of textiles, Hong Kong, despite its small size (1980 population of 5 million), is the leading foreign supplier. As shown in Table 1, 1980 U.S. imports of textiles from Hong Kong were $1.588 billion, more than from any other country, and 22 percent of total U.S. textile imports.

The broad class, textiles, consists of a number of products which can be divided into two groups: apparel and nonapparel products. While the former consists of manufactured clothing, the latter includes, for example, yarn and fabrics. As shown in Table 1, Hong Kong was the leading foreign source to the U.S. of both all textiles and apparel. Table 1 also reveals that virtually all, 93 percent, of its textile shipments consisted of apparel goods. Within the apparel group Hong Kong's relative strength is in cotton and wool articles. For cotton apparel Hong Kong's share of U.S. imports exceeded 41 percent; for wool apparel its share was 32 percent.

A closer look at the importance of Hong Kong's textiles to the U.S. is given by the share in apparent U.S. consumption for individual product categories.[1] Table 2 shows Hong Kong's share for a group of fifteen specific products. Also shown in the table are import/production ratios (total imports divided by domestic production) and Hong Kong's share in total U.S. imports.

The detailed product statistics are striking because they reveal that Hong Kong supplies nearly one-fifth (or more) of total U.S. consumption in five products--(1) woven cotton shirts for men and boys (category 340), (2) woven cotton blouses (341), (3) cotton sweaters (345), (4) cotton trousers for women, girls, and infants (348), and (5) wool sweaters for women, girls and infants (446).[2] Especially remarkable is the share figure for the wool sweater category: Hong Kong's share of total consumption is 43 percent.

In sum, Hong Kong, although a very small economy, is the largest source of foreign-made textiles for the U.S. This is in spite of the restrictions the U.S. has imposed on imports from the East Asian economy. The relative share of Hong Kong's textiles in total U.S. consumption varies across the broad spectrum of diverse textile products. In cotton and wool apparel, it is especially strong, and for five apparel product categories Hong Kong accounts for one-fifth or more of U.S. consumption. For these five apparel products and several others we will be able to estimate the magnitudes of the adverse welfare effects of the import quotas.

---

[1] Tables 1 and 2 use different measures for textiles. Table 2 is based on quantity data for imports and U.S. production as opposed to value of imports (reported in Table 1) and value of domestic production. No data are available for value of domestic production by product categories that correspond to import product categories. The quantity data are prepared by the U.S. Dept. of Commerce, Office of Textiles.

[2] The product categories are established by the U.S. Department of Commerce, Office of Textiles.

TABLE 1

Textile Imports in 1980
(Millions of Dollars)

Source of U.S. Imports	All Textiles	All Apparel	Cotton Apparel	Man-Made Fiber Apparel	Wool Apparel
World	$7,199	$5,517	$2,212	$2,710	$596
Hong Kong	1,588	1,479	917	336	196
Taiwan	1,146	1,091	179	893	19
South Korea	902	802	79	672	51
China (PRC)	344	232	143	46	42
Mexico	222	201	50	150	1
Philippines	197	189	75	110	3
Japan	504	176	107	53	17
Singapore	151	134	83	48	2
Italy	291	126	31	27	67
Macao	89	89	62	21	6

Source: Derived from worksheets prepared by the U.S. Dept. of Commerce, Office of Textiles.

TABLE 2

Total Import/Domestic Production Ratios, Percent Share of Hong Kong's Imports in Total U.S. Imports, and Hong Kong Imports as a Share of U.S. Consumption: Selected Apparel Categories, 1980

Category	(1) Total Imports as Percent of Domestic Production	(2) Imports from Hong Kong as Percent of all Imports	(3) Imports from Hong Kong as a Percent of Domestic Consumption
333: Suit-Type Coats, Cotton, Mens and Boys (MB)	92.5	12.5	6.0
334: Other Coats, Cotton, Mens and Boys (MB)	84.3	13.2	6.0
335: Coats, Cotton, Womens, Girls, Infants (WGI)	261.9	22.5	16.3
338: Knit-Shirts, Cotton, Mens and Boys (MB)	31.6	21.9	5.3
339: Knit Shirts & Blouses Cotton, Womens, Girls, Infants (WGI)	93.4	35.0	16.9
340: Shirts, Not Knit, Cotton, Mens and Boys (MB)	111.0	39.6	20.9
341: Blouses, Not Knit, Cotton, Womens, Girls, Infants (WGI)	174.4	31.2	19.8
345: Sweaters, Cotton	313.5	61.0	18.4
347: Trousers, Cotton, Mens and Boys (MB)	15.8	46.2	6.3
348: Trousers, Cotton, Womens, Girls, Infants (WGI)	70.6	47.5	19.7
445: Sweaters, Wool, Mens and Boys (MB)	59.9	47.1	17.6
446: Sweaters, Wool, Womens, Girls, Infants (WGI)	436.7	53.2	43.3
638: Knit Shirts, Man-Made Fiber, Mens and Boys (MB)	18.2	15.4	2.4
639: Knit Shirts & Blouses, Man-Made Fiber, Womens, Girls, Infants (WGI)	55.9	20.3	7.3

TABLE 2--Continued

Category	(1) Total Imports as Percent of Domestic Production	(2) Imports from Hong Kong as Percent of all Imports	(3) Imports from Hong Kong as a Percent of Domestic Consumption
641: Blouses, Not Knit Man-Made Fiber, Womens, Girls, Infants (WGI)	28.9	16.8	3.8

Note: Domestic consumption is approximated by the sum of domestic production and imports. U.S. exports are ignored because exports of apparel products are very small, less than .2 percent overall on a value basis in 1979. See International Trade Commission (1981), The Multifiber Arrangement 1973 to 1980 (USITC Pub. No. 1131), Vol. 1, p. 78.

Sources: Major Shippers Report, Category and Country, U.S. Cotton, Wool & Man-Made Fiber Textile and Apparel, General Imports, (selected Census data through November 1981), (1982); and U.S. Production, Imports and Import/ Production Ratios for Cotton, Wool and Man-Made Fiber Textiles and Apparel, (1982). Both documents were prepared by the U.S. Department of Commerce, Office of Textiles.

CHAPTER III

Quotas, Rents, and Prices of Textile Export Rights

After nearly twenty years of development and refinement, the United States system of textile import quotas has evolved into an elaborate mechanism to regulate textile imports. Textiles is made up of a large assortment of products, and the United States has established import limits for several product categories, in addition to setting quotas for broader groupings and for all textiles. Many (but not all) of the category-specific quotas are binding, so that actual imports are restricted to a lower level than would occur in the absence of quotas. When the import quotas are binding (or effective), they impose adverse effects on the U.S.

Figure 1 illustrates an effective quota. The demand curves reflect U.S. import demand for a specific textile product category (e.g., cotton sweaters) produced by Hong Kong. The supply curve, S, is assumed to be horizontal.[1] The amount of the quota limit is shown by Q_o. If the relevant demand curve is D_1, equilibrium is at point A, and price is P_o. Total payment for quantity Q_o is price times quantity and corresponds to area OP_oAQ_o. However, Hong Kong firms only require a payment shown by area OP_1BQ_o to supply quantity Q_o. The excess, area P_oABP_1, is economic rent. If demand is stronger, the total payment and economic rent increase. For example, if demand shifts to D_2 the economic rent increases to P_2CBP_1. Finally, if demand drops so that the quota is not effective, e.g., to level D_3 in Figure 1, then the rent disappears. In general, given the supply curve and the quota limit, economic rent varies directly with demand.

The economic rent created by the quota constitutes a payment by U.S. importers (and ultimately U.S. consumers) to firms in Hong Kong. While the import limits are set by the United States the Hong Kong Government has the responsibility for controlling its textile shipments to the U.S. This in effect grants the Hong Kong Government a monopoly over the use of the quota. The monopoly position together with a large number of U.S. importers enables Hong Kong to capture the economic rent created by the quota.[2]

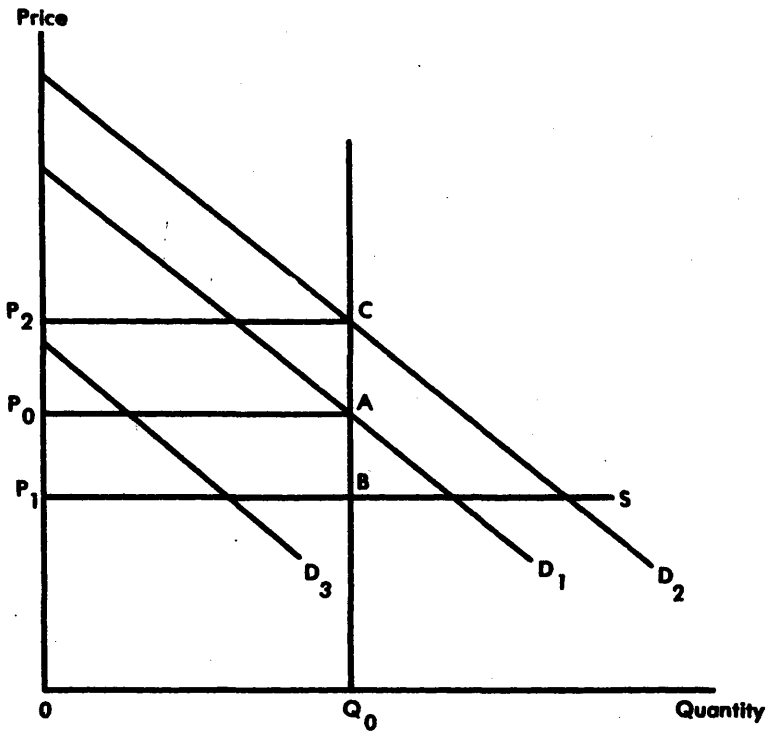
---

[1] The rationale for these assumptions is provided in chapter IV below. Note that the import demand curves shown in Figure 1 are net of U.S. tariffs and equal the net demand curves facing Hong Kong. This is also discussed in the next chapter.

[2] The importance of administrative control of imports for the capture of quota rents has been discussed by Bergsten, Meade, and Mintz. C. Fred Bergsten (1975) "On the Non-Equivalence of Import Quotas and 'Voluntary' Export Restraints," in Bergsten (ed.) Toward a New World Trade Policy (Heath), p. 247; James E. Meade (1952) The Balance of Payments Vol. I, (Oxford), p. 283; Ilse Mintz (1973) U.S. Import Quotas: Costs and Consequences (American Enterprise Institute), p. 17. Supplementing the theoretical position advanced by these economists, there is evidence that U.S. importers do pay for the quota premium. For example, a 1974 Report by the General Accounting Office noted that some Hong Kong quota holders "...sell their quotas to active manufacturers and exporters. Exporters then include in the cost to the importer the price paid for the right to export. (U.S. General Accounting Office (1974), Economic and Foreign Policy Effects of Voluntary Restraint Agreements on Textiles and Steel, p. 26.) Also, according to Textile Asia, (January 1978, p. 10), (footnote continues)

FIGURE 1

The Effects of Import Quotas



Source: Bureau of Economics, Federal Trade Commission

The textile product categories that had effective quota limits in 1980 are revealed by recently released data giving prices of quota rights in Hong Kong. An effective quota causes price paid by importers to exceed supply price or unit cost in Hong Kong. For example, with demand curve D_1 the quota limit Q_0 creates a difference between price and unit cost equal to $P_0 - P_1$. In Hong Kong the price minus unit cost at the quota limit is measured by the price of quota rights. The administrative system adopted by the Hong Kong Government to control textile shipments to the U.S.[3] allows firms to buy and sell export rights.[4] Profit making efforts by firms in Hong Kong push the price of quota rights to a level that equals the difference between the price paid for the textile product by U.S. importers and the unit cost to supply the product.[5]

Table 3 lists the textile product categories for Hong Kong that had effective import quotas in 1980 and gives, for each category, the average price of export rights,[6] the import price paid by U.S. importers, and the total value of imports for the year. The nine product categories listed cover thirteen quota categories and collectively represent $953 million of imports, which is approximately 60 percent of the value of all textile imports from Hong Kong, $1,588 million. Average prices for textile export rights, or quota prices, are derived from data furnished by the Hong Kong Government.[7] In addition to the products listed in Table 3, other product categories may have had effective quotas in 1980; the Hong Kong Government acknowledges that the quota prices it collects are not complete although the most important products that were subject to effective quota limits are presumably covered and given in the Table.

The quota limits have a substantial impact which is revealed by average quota price as a percent of import price, given in column 3 of Table 3. The import price is the amount U.S.

(footnote continued)

"Even if the exporter owns his own quota he naturally includes the current premium in his f.o.b. price..." Finally, at a recent Congressional hearing an official of the National Retail Merchants Association affirmed that U.S. importers pay for the quota premium: "These charges come on top of the actual cost of the goods involved. To add insult to injury, we pay duty on these quota charges." (Testimony of George E. Voyer, Senior Vice President, Import Merchandising, R.H. Macy & Co. in Hearings before the Subcommittee on Trade of the Committee on Ways and Means, House of Representatives (1982), U.S. Trade Policy-Phase II: Private Sector, Part A, Serial 97-46, 97th Cong., 1st Sess., p. 485.) In sum, these reports indicate that quota premia are routinely incorporated in the prices charged U.S. importers.

[3] Hong Kong's Textile Export System is discussed in Appendix A.

[4] See Appendix B which discusses the market for textile quotas in Hong Kong.

[5] Appendix B provides an economic analysis that supports the argument that the price of quotas equals the difference between the price paid by U.S. importers and the unit cost in Hong Kong. This analysis assumes that quota holding by firms in Hong Kong is not monopolized. Appendix C considers the possibililty of quota monopolization and concludes that it is unlikely.

[6] The method used to calculate average prices for quotas is explained in Appendix D.

[7] The basic data for quota prices are contained in Appendix B.

TABLE 3

Quota Price, Import Price and Total Value of Imports for Textile Import Products from Hong Kong that faced Effective Quotas in 1980

Quota Category	(1) Average Quota Price	(2) Import Price (unit value) of imports)	(3) Average Quota Price as Percent of Import Price	(4) Value of Imports
	(U.S. dollars per piece)			(millions)
333/334: Cotton Coats	$1.30	$10.68	12.2%	$18.2
335: Cotton Coats, MB	3.34	12.33	27.1	46.7
338/339: Cotton Knit Shirts and Blouses	0.26	2.80	9.3	124.0
340: Cotton Shirts, not Knit, MB	0.42	3.66	11.5	109.9
341: Cotton Blouses	0.06	3.44	1.7	77.5
345: Cotton Sweaters	1.67	6.11	27.3	22.6
347/348: Cotton Trousers	1.73	5.26	32.9	391.0
445/446: Wool Sweaters	3.34	7.22	46.3	115.1
641: MMF Blouses, not Knit, WGI	0.85	5.41	15.7	48.3
Total Value of Imports Subject to Effective Quotas				$953.3

Notes: MB = mens and boys
WGI = womens, girls and infants
MMF = man-made fiber

Sources: (1) Average quota prices are from Appendix D, Table D-2.
(2) Value of imports are from U.S. General Imports of Cotton Manufacturers, Agreement Category by Country of Origin and TSUSA Number of Country of Origin, and U.S. General Imports of Textile Manufacturers, Except Cotton, Agreement Category by Country of Origin and TSUSA Number by Country of Origin, U.S. Dept. of Commerce, Office of Textiles (Nov. 1981).
(3) Import price or unit value of imports derived from (2) and Major Shippers Report, Category and Country, U.S. Cotton, Wool and Man-made Fiber Textile and Apparel General Imports, U.S. Dept. of Commerce, Office of Textiles.

importers pay, per unit, to Hong Kong firms for a textile product such as cotton sweaters (category 345), and includes the quota price. U.S. importers paid an average price of $6.11 per unit for cotton sweaters in 1980 and of this amount the quota price was $1.67. Thus as a result of the import quota the cost to U.S. buyers of cotton sweaters from Hong Hong was increased by $1.67 per sweater. For cotton sweaters and six other product categories the ratio of quota price to import price exceeds 10 percent and for four product categories the percentage is greater than 20 percent. In general, the effect of the quotas is comparable to a significant ad valorem tax levied by Hong Kong and results in substantially higher prices to U.S. importers, and ultimately to U.S. consumers.[8]

---

[8] By comparison, the weighted average duty rate paid for the nine quota categories was 22 percent in 1980.

CHAPTER IV

The Welfare Effects of the Import Quotas Imposed by the United States on Hong Kong's Textiles

The welfare effects of an import quota consist of three components. First, a quota increases the price paid for the quantity that is imported. The excess of the import price with quota over the non-quota price is an economic rent which is paid by U.S. consumers to Hong Kong exporters. Second, a quota reduces the quantity that is imported compared to the level of imports that would occur without the quota. The social value of the decrease in imports is the consumption distortion effect. The sum of the first two components equals the gross social cost of a quota and represents the gross benefit to the United States of removing the quota. However, elimination of a quota will increase imports of foreign made textiles and reduce production of domestic made textiles. The third component in the analysis of the welfare effects of a quota considers the transitional increase in unemployment when additional imports displace domestic workers. The increase in unemployment causes a hardship for displaced workers and is usually regarded as imposing efficiency costs on the economy during the period the idled workers remain unemployed. These efficiency costs are reflected by the value of output the unemployed workers could produce and by the real resources involved in transfering idled workers to new jobs (e.g., moving expenses, retraining costs). Assuming the cost of displaced workers is an efficiency cost then the net welfare effect of a quota equals the gross social loss minus the cost of added unemployment.[1]

A. The General Model

The model used to estimate the gross social costs of the import quotas on Hong Kong's textiles is illustrated in Figure 2.[2] Before explaining the details of the model it should be mentioned that textile imports from Hong Kong are restricted by tariffs in addition to quotas. However, the focus in this study is on the incremental effects of quotas, and it is thus important to distinguish between the effects of tariffs and quotas.[3]

---

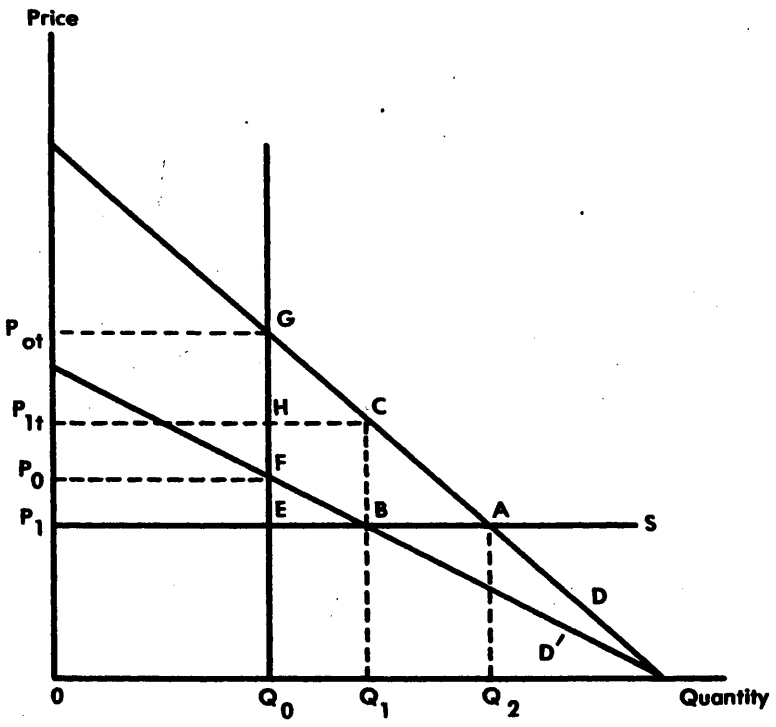
[1] The increased unemployment caused by liberalizing import restrictions does not necessarily imply a net cost to the economy. Recent work suggests that for this conclusion to hold there must be distortions or imperfections in factor markets, i.e., downward rigid wage rates. See R.E. Baldwin, J.H. Mutti and J.D. Richardson (1980), "Welfare Effects on the United States of a Significant Multilateral Tariff Reduction," Journal of International Economics, 10, pp. 405-423. Also see note 21 Section D., Infra.

[2] Figure 2 shows the separate effects of both quotas and tariffs and is therefore different from Figure 1, which only dealt with the effects of quotas.

[3] While this report is concerned with the effects of quotas it should be emphasized that tariffs on apparel are significant and have been found to impose substantial social costs. In an earlier Staff Report it was found that the average tariff on apparel is very high, 27 percent ad valorem, and the consumption deadweight losses that tariffs cause were estimated at $406 million in 1977. See Morris E. Morkre and David G. Tarr (1980) Effects of Restrictions on United States Imports, A Staff Report to the Federal Trade Commission, chapt. 8.

FIGURE 2

The Welfare Costs of Import Quotas



Source: Bureau of Economics, Federal Trade Commission

In Figure 2 the U.S. import demand curve (D) for a particular textile product is assumed to have an inverse relationship between price and quantity. Even though there may be a high degree of substitutability between a Hong Kong product and similar products produced by other countries, the demand curve D is not completely elastic. Moreover, the magnitude of the social cost caused by a quota is directly related to the elasticity of import demand. The greater the elasticity the larger is the increase in imports if the quota is removed.

The supply curve S is horizontal in the relevant range assuming that firms in Hong Kong can readily expand textile exports to the United States. Hong Kong firms can accomplish this by, for example, reducing shipments to other countries. While the U.S. is Hong Kong's largest customer for textiles, the U.S. share of Hong Kong's total textile exports is below 50 percent.[4] More importantly, entry into textiles, particularly clothing manufacturing, is relatively easy. The physical requirements--some sewing machines and factory space--are modest and further, since there are more than eleven thousand textile and apparel establishments, economies of scale appear not to be significant.[5] Given easy entry into an industry that does not appear to have any important specific factors, the industry's total supply curve would be virtually horizontal.[6]

Under conditions of free trade, equilibrium occurs at point A. Price paid by importers equals Hong Kong's supply price (ignoring transportation costs) and import quantity is Q_2.

It is convenient next to introduce a tariff. The initial effect of an ad valorem tariff can be depicted by rotating, counter-clockwise, the import demand from D to D'. At any quantity, the vertical distance between the two demand curves divided by price shown on demand curve D' equals the percent tariff rate. Curve D' is the net import demand (allowing for the tariff) facing Hong Kong. With the tariff, equilibrium on curve D shifts to point C. The tariff raises the cost to importers by amount BC and quantity of imports falls to Q_1. The reduction in imports and increase in price paid for imports (tariff inclusive) causes a social loss shown by triangle ABC. Finally, in addition to

---

[4] Hong Kong External Trade, January 1981 (H.K. Govt.). Even though the U.S. is the largest export market for Hong Kong's textiles, we do not consider the possibility of monopsony because there are many U.S. importers and retailers purchasing Hong Kong textiles and there do not appear to be significant obstacles facing U.S. firms that seek to import from Hong Kong. There are, for example, 76 U.S. companies that are members of the Textile and Apparel Group of the American Association of Exporters and Importers, and there are possibly many other smaller importing firms that do not belong to the Association.

[5] In 1977 there were 11,671 textile and clothing establishments. Hong Kong Monthly Digest of Statistics, May 1979.

[6] There is a further qualification about the supply curve with a quota. For the supply curve to be horizontal it is also necessary for quota to be transferable among firms. Otherwise, if quotas are assigned to a given number of Hong Kong firms and not transferable then when each of the firms has a "U-shaped" cost curve the market supply curve will be positively sloped. With transferability of quota, competitive forces will induce quotas to be reallocated among firms (including firms without quota) with the result that all firms produce at minimum average cost and giving a horizontal market supply curve. For an elaboration of this point see W.M. Corden (1971), The Theory of Protection, (Clarendon), p. 201f.

this deadweight loss, the tariff involves a distributional effect equal to the tariff revenue collected--rectangle $P_{1t}CBP_1$. Assuming the distribution effect is neutral--the decline in welfare of those who pay textile duties to the government equals the gain in welfare of the individuals who benefit from the government's additional revenue--then there is no net distributional effect.[7]

The imposition of a quota in the amount Q_0 shifts equilibrium to point G. Price increases further to P_{ot}. The quota causes two types of additional social losses. First, there is a further deadweight loss due to the cutback in quantity from Q_1 to Q_0. This loss is area BCGE. Second, because Hong Kong administers the quota, and a large number of U.S. importers compete to purchase Hong Kong textiles, Hong Kong is expected to obtain the scarcity rent of the quota. The loss due to the U.S. equals the rent which is shown by rectangle EFP_0P_1. Lastly, note that, per unit, the tariff rate is applied to the sum of supply price (P_1) and the rent obtained by Hong Kong $P_0 - P_1$. This is because from the standpoint of U.S. Customs the unit rent is treated as part of foreign cost.[8] Also note that an effective quota affects the tariff revenue collected by the Treasury. When the demand curve is elastic tariff revenue falls as the quantity of imports declines.[9]

---

[7] This ignores the administrative costs incurred by the government in collecting the tariff and redistributing the revenues. It also ignores resources used for rent seeking to capture the benefits of the added government revenue. These activities are efficiency losses caused by the tariff. The possible effects of rent seeking are analyzed in Jagdish N. Bhagwati and T.N. Srinivasan (1980), "Revenue Seeking: A Generalization of the Theory of Tariffs," Journal of Political Economy 88(6), pp. 1069-87. Also see Gordon Tullock (1967), "The Welfare Costs of Tariffs, Monopolies and Theft," Western Economic Journal (now Economic Inquiry) 5, pp. 224-232; reprinted in J.M. Buchanan, R.D. Tollison and G. Tullock (1980), Toward a Theory of the Rent-Seeking Society (Texas A&M Univ. Press), pp. 39-50.

[8] If the U.S. importer can document that he had to pay for a quota price that is built in to his invoice cost he can escape paying duty on the quota price. According to an official of U.S. Customs this is reported to be rare, apparently because of stringent information and documentation requirements.

[9] Another way of describing the cost to the economy of a textile import quota is in terms of the change in government revenue plus the cost to consumers. A quota that causes tariff receipts to fall creates a loss in real national income since the individuals who receive the benefits of the government revenue see their real incomes decline. (This argument ignores distributional effects, i.e., it assumes a dollar of benefits is worth the same amount to everyone, and does not consider the possible change in the cost of operating the government.)

Cost to consumers is measured by the reduction in consumers' surplus, which represents a loss in real income to consumers of a product whose price has increased. When price increases (e.g., caused by a quota), consumers of the product suffer a loss of real income because they must pay a higher price for the units they continue to purchase. In addition, consumers reduce their purchases and the value of the reduction in quantity is also a loss in their real income. The change in consumers' surplus caused by a price increase is the sum of both types of losses in real income.

(footnote continues)

The total gross social loss due to a quota thus has two elements, each of which corresponds to an area shown in Figure 2: (1) the loss due to the quota rent (area EFP_0P_1) and (2) the deadweight loss in consumption (area BCGE). These two losses will be estimated in the next two sections.

B. Quota Rents

The estimates for the quota rents created in 1980 by the import quotas on Hong Kong's textiles (area EFP_0P_1 in Figure 2) are reported in Table 4. The total rent for each product category is obtained by multiplying quantity of imports times the average quota price. Three sets of values for quota rents are provided based on three different methods used to calculate weighted average quota prices. More than one method is used to calculate average quota prices for 1980 because of missing observations for some monthly quota prices. The three methods use different assumptions for the missing observations. As explained in Appendix D, method II is expected to provide more accurate values for average quota prices than method I, which may be biased upward, while method III gives lower bound values. In the following discussion primary attention will be given to the method II estimates.

The total quota rent for all nine product categories is $218 million, according to the method II procedure. If the quota had been cancelled, quota rents would not have been paid by U.S. importers to Hong Kong firms and 1980 real national income in the U.S. would have increased by $218 million. The quota rents are neither small in absolute terms nor in relation to the value of imports. Total 1980 imports (customs value) of the nine products was $953 million (from Table 3). The quota rent therefore equals 23 percent of the expenditure by U.S. firms to acquire title to these products.[10]

The nine products do not contribute equally to the total quota rent. By product groups the quota rents range from $1.65 million for cotton blouses to over $119 million for cotton jeans (or trousers). Moreover, over three-fourths of the total rent, 77 percent, is accounted for by just two product categories, cotton jeans and wool sweaters. The quota rent for cotton jeans alone is more than half, 54 percent, of total quota rent.

Cotton jeans and wool sweaters have large quota rents because for both products the volume of imports was large and the average quota price was high. Imports of cotton jeans were 5.7 million dozen while the quantity for wool sweaters was 1.3

(footnote continued)

The total cost to the economy of a quota is the sum of the reduction in government revenue plus the cost to consumers. As noted in the text, the quota causes tariff revenue to fall. Therefore, the cost to consumers is smaller than the total cost to the economy.

The concept of consumer surplus is discussed in Hal R. Varian (1978), Microeconomic Analysis (Norton), pp. 207-215. See also the important article by Robert D. Willig (1976), "Consumer's Surplus without Apology," American Economic Review 66(4), pp. 589-597.

[10] This assumes that title to the goods passes to U.S. firms when the goods are ready at the dock (or airport) for shipment from Hong Kong. Duties, freight charges, and insurance costs are not included in the customs tabulation of imports.

TABLE 4

Quota Rents Created by U.S. Import Quotas on Hong Kong Made Textile Products

Quota Category		Quantity of Imports (dozens)	Weighted Average Quota Prices (U.S. dollars per dozen)			Quota Rent (millions of dollars)		
			Method I	Method II	Method III	Method I	Method II	Method III
333/334:	Cotton Coats, MB	123,657	19.19	15.63	6.04	2.37	1.93	0.75
335:	Cotton Coats, WGI	283,581	40.48	40.09	7.34	11.48	11.37	2.08
338/339:	Cotton Knit Shirts and Blouses	2,614,943	4.01	3.12	2.74	10.49	8.16	7.16
340:	Cotton Shirts, not knit, MB	2,405,058	5.49	5.06	3.76	13.20	12.17	9.04
341:	Cotton Blouses, not Knit, WGI	2,117,432	1.10	0.78	0.65	2.33	1.65	1.38
345:	Cotton Sweaters	297,130	20.00	20.00	1.95	5.94	5.94	0.58
347/348:	Cotton Trousers	5,736,827	24.45	20.81	18.29	140.27	119.38	104.93
445/446:	Wool Sweaters	1,256,781	45.93	40.03	37.57	57.72	50.31	47.22
641:	MMF Blouses, not Knit, WGI	723,713	14.58	10.21	8.02	10.55	7.39	5.80
Total Quota Rent for all Categories						254.35	218.30	178.94

Notes: MB = mens and boys
WGI = womens, girls and infants
MMF = man-made fiber

Source for Quantities: U.S. Dept. of Commerce, Office of Textiles "1980 Performance Report for Textile and Apparel, Bilateral Agreements and Unilateral Import Restraints: Hong Kong."

Source for average quota prices: Appendix D.

million dozen. The average quota prices (method II) were $20.81 per dozen for cotton jeans and $40.03 per dozen for wool sweaters.

Finally, the magnitude of the total quota rent is not very sensitive to the use of different methods to estimate average quota prices. Using average quota prices from method I the total rent is $254 million. Even if patently low estimates of average quota prices are used (given by method III) total quota rents are still large. As shown in Table 4, the lower bound estimate of total quota rents is $179 million, with the cotton jeans and wool sweater products contributing more than $152 million to this total. In sum, by any of these three methods, we obtain an estimate of the total rent transferred from U.S. consumers to Hong Kong textile suppliers that is of the order of magnitude of $200 million per year.

C. Consumption Distortion Effect

The consumption distortion effect (area BCGE in Figure 2) is estimated in two stages for each product. First, the tariff rate and the quota price for the product are needed to calculate the initial (with quota) and final (without quota) import price-cost margins--vertical segments GE and CB respectively, in Figure 2. Second, it is necessary to determine the amount by which the quantity of imports would increase if the quota were eliminated (quantity Q_0Q_1 in Figure 2). Information required for the first stage is readily available--average quota prices from section B above and tariff rates from Customs Bureau data. However, the estimation of the change in import quantity is more complex.

The problem is that we do not have information about the elasticity of the import demand curve for a particular clothing product (e.g., cotton jeans) made in Hong Kong. There do not appear to be any econometric studies that have estimated the price elasticities of import demand at this level of detail.[11] It is, however, possible to derive estimates of the these elasticities by adopting a variation of the international trade model developed by Paul Armington.[12]

The Armington model is used to generate estimates of the percent change in imports if quotas on Hong Kong are dropped. An important feature of this model is that it is possible to adjust for the effects of the binding textile import quotas the U.S. has imposed on other countries. In particular, the quotas on South Korea and Taiwan were probably effective in 1980.[13] The procedure employed here considers the case where all textile quotas are scrapped, not just those on Hong Kong's exports. Therefore the predicted increase in imports from Hong Kong is moderated by the elimination of the quantitative restraints on

---

[11] There is an extensive literature dealing with the estimation of price elasticities of imports and exports but none of these contributions appear to deal with specific clothing products from particular countries. An valuable bibliography of this literature (covering works to mid-1975) is given in Robert M. Stern, Jonathan Francis and Bruce Schumacher (1976), Price Elasticities in International Trade: An Annotated Bibliography, (Macmillan).

[12] Paul S. Armington (1969), "A Theory of Demand for Products Distinguished by Place of Production," IMF Staff Papers, 61(1), pp. 159-78.

[13] This is based on reported quota prices for several textile categories in South Korea and Taiwan. See Appendix F.

South Korea and Taiwan. However the consumption distortion effect is estimated only for Hong Kong. We lack sufficient information about South Korea and Taiwan to provide comparable estimates for those countries. The details of the Armington model and its application to the present case are explained in Appendix F.

The percent change in quantity of Hong Kong imports following removal of all textile import quotas and the consumption distortion effect of the quotas on Hong Kong are given in Table 5. The results in the table are based on the preferred method to calculate average quota prices (method II, see above, section B) and the more conservative of two cases (i.e., giving smaller estimates of the consumption distortion) that emerge from using the Armington model.[14]

For all nine product categories the total consumption effect of the import quotas on Hong Kong's clothing products was $90 million in 1980. As with the rent losses the total consumption distortion is dominated by two product categories: cotton jeans (347/348) and wool sweaters (445/446). These two products account for $74 million, or 82 percent of the total consumption distortion.

The consumption distortion effect measures the social value of the additional imports that would be consumed in the U.S. if the quotas were eliminated. As shown in Table 5 the lower prices that would result when quotas are dropped would lead to an import increase of 20 percent or more for five of the nine product categories. For cotton jeans and wool sweaters the percent increases would exceed 40 percent. The increase in U.S. consumption would be a substantial improvement in the well being of American consumers.

The consumption distortion of the quotas has a different impact on different groups of U.S. consumers. While we are not able to estimate the distributional effects of the textile quotas there are two ways in which groups of consumers can be affected by the quotas.

Since the quotas limit physical quantities but do not restrict quality, Hong Kong firms may upgrade their textile exports.[15] There are several reports that the quotas have caused

---

[14] These two cases involve two different values for a key parameter of the Armington model--the elasticity of substitution. The elasticity of substitution refers to the degree of substitutability in demand between the textile products of any two countries (e.g. Hong Kong jeans versus U.S. or Taiwanese jeans). The more conservative estimate of the consumption distortion follows from adopting the smaller value of the elasticity of substitution: the smaller the degree of substitutability between Hong Kong and U.S. (or another country's) textile products the smaller is the price elasticity of import demand for Hong Kong textiles.

[15] While several economists have analyzed the relationship between product quality and quantitative restrictions it appears that, a priori, the effect of a quota on quality is indeterminate. In particular, in a recent article Leffler finds that a quantitative restriction can either increase or decrease quality. The result depends on the relationship between quantity and quality in both consumption and production (specifically it depends on an interaction between the degree of substitutability in consumption and the extent of economies of joint production). However, since Leffler does not specify the precise form of the
(footnote continues)

TABLE 5

Consumption Distortion Effect of the Quotas on Hong Kong Textiles and Percent Change in Quantity of Imports if Quotas are Removed

Product Category		Percent Decrease in Price of Imports if Quotas are Removed	Percent Increase in Quantity of Imports if Quotas are Removed	Consumption Distortion Effect
				(Millions of Dollars per year)
333/334:	Cotton Coats, MB	12.2	16.2	0.39
335:	Cotton Coats, WGI	27.1	31.7	2.91
338/339:	Cotton Knit Shirts and Blouses	9.3	11.7	2.74
340:	Cotton Shirts, Not Knit, MB	11.5	12.7	3.44
341:	Cotton Blouses, Not Knit WGI	1.7	2.1	0.36
345:	Cotton Sweaters	27.3	31.6	2.25
347/348:	Cotton Trousers	32.9	41.6	54.35
445/446:	Wool Sweaters	46.3	43.8	19.78
641:	MMF Blouses, Not Knit,	15.7	20.0	3.46
Total Consumption Distortion for all Catagories				89.68

Notes: MB = mens and boys
WGI = womens, girls and infants
MMF = man-made fiber

The calculations are based on the average quota prices given in Table 4 (method II) and a parameter of the Armington model (the elasticity of substitution, equal to 1.41). Appendices F and G explain the calculation procedure. Appendix Table G-1 has the complete set of values for the consumption distortion effect for alternative methods to compute average quota prices and alternative values for the elasticity of substitution.

upgrading.[16] As a consequence, quotas are expected to be more severe for low-income consumers who discover that basic, low quality imports disappear after the quota is imposed.[17]

Another effect arises because a quota is expected to alter the mix of imports against low-priced articles and in favor of high-priced items. This result follows when each quota category encompasses a variety of substitute products that vary in price. For example, the quota category cotton jeans includes expensive as well as inexpensive cotton trousers and the two types of products are expected to be close substitutes in consumption. The application of a quota introduces a quota price that is the same for all items in the quota category. This raises the price of all items by the same absolute amount and means that the relative price of inexpensive items increases. As a result, consumers respond to the change in relative prices and substitute away from inexpensive items so that the mix of imports changes in

---

(footnote continued)

interaction and since we do not have information to resolve this problem, we cannot conclude that a quota on Hong Kong textiles causes their quality to improve. However, as we note in the text, the relevant empirical outcome appears to be that quality increases. See Keith B. Leffler (1982), "Ambiguous Changes in Product Quality," American Economic Review, 72(5), pp. 956-967. For two earlier works that argue that a quota leads to increases in quality, see Carlos Alfredo Rodrigues (1979), "The Quality of Imports and the Differential Welfare Effects of Tariffs, Quotas, and Quality Controls and Protective Devices," Canadian Journal of Economics, 12(3), pp. 439-449 and Gary J. Santoni and T. Norman Van Cott (1980), "Import Quotas: The Quality Adjustment Problem," Southern Economic Journal, 46(4), pp. 1206-1211.

16 Before the U.S. imposed quotas on Hong Kong, Hong Kong (in the 1950's) shipped primarily low-quality knitware to the U.S. After the first quotas were imposed, in 1961, there was a steady shift to higher quality garments. This was reported by James Riedel (1974), The Industralization of Hong Kong, (J.C.B. Mohr (Paul Siebeck) Tubingen), p. 28. Other reports suggesting that the quotas caused quality to improve include: Donald B. Keesing and Martin Wolf (1980), Textile Quotas Against Developing Countries, (Trade Policy Research Centre), p. 124; Helen Hughes and Anne O. Krueger (1983), "Effects of Protection in Developed Countries on Developing Countries' Exports of Manufactures," World Bank paper, (January), p. 34; Keyser Sung (1980), "Cotton-Lever for Industrialization," Textile Asia, (January), p. 130; Textile Asia, April 1980, p. 85 (statement by Fred W. Wenzel, Chairman of the U.S. company Kellwood which had acquired a major interest in the Hong Kong company Smart Shirts Ltd.); Peter Clark (1980), "The MFA and the Clothiers," Textile Asia, (August), p. 148; Textile Asia, October 1980, p. 32 (statement by Cecil Parkinson, Minister of Trade, The United Kingdom); Daily News Record, August 2, 1983, p. 24 (statement by officials from Werner Management Consultants); Daily News Record, December 19, 1983, p. 10 (statement by Alan Wong, Hong Kong Trade Development Council).

17 The adverse impacts of textile import quotas on low-income consumers have long been recognized. For example, the issue is discussed in C. Fred Bergsten (1972) The Cost of Import Restrictions to American Consumers, (American Importers Association), p. 1 and Ilse Mintz (1973), U.S. Import Quotas: Costs and Consequences (American Enterprise Institute), p. 65.

favor of the more expensive items.[18] Assuming that low-income consumers are the principal buyers of inexpensive products, the quota therefore imposes a relatively greater adverse effect on these consumers.[19]

Finally, the results given in Table 5 are one of six sets of estimates of the consumption distortion effect. The other five estimates use other methods to calculate average quota prices (i.e. methods I and III) or use a different version of the Armington model. The full range of outcomes for all six sets of estimates are given in Table G-1 (on page 75). As shown there the results provided in Table 5 are likely to be conservative estimates of the consumption distortion. Appendix Table G-1 indicates that the minimum and maximum values for the consumption distortion range from $72 million to $333 million whereas the estimate in Table 5 is $90 million.

D. Cost of Unemployment[20]

In the previous section, it was shown that removal of the import quotas on textiles will reduce prices of quota-restrained imports made in Hong Kong, South Korea, and Taiwan. This will encourage consumers to buy more of the now less expensive foreign clothing. As a result, other, non-restrained suppliers, domestic and foreign, will face a decline in demand for their products. The consequent contraction in U.S. clothing production will lower employment in the domestic industry and lead to temporary unemployment. Ultimately the unemployed workers will shift to their next best employment opportunities. During the period of transition, unemployed workers may incur several types of

---

[18] An import quota for a collection of articles can therefore produce a comparable effect on the composition of trade (i.e., a shift in the mix to higher-priced products) as does a common transportation charge for a number of articles (known as the Alchian and Allen proposition). A model analyzing the Alchian and Allen proposition for a quota on imports is given by Rodney E. Falvey (1979), "The Composition of Trade within Import-Restricted Product Categories," Journal of Political Economy, 87(5, pt. 1), pp. 1105-1114. See also, Thomas E. Borcherding and Eugene Silberberg (1978), "Shipping the Good Apples Out: The Alchian and Allen Theorem Reconsidered," Journal of Political Economy 86(1), pp. 131-138.

[19] An additional adverse effect of the quota is possible, which adversely affects consumers with large families. Quota categories include clothing articles for the young and old (e.g., women's, girl's, and infant's cotton coats) and the effect of the quota may be to change the composition of imports in favor of adult clothing and away from clothing for children and infants. Adult clothing is expected to be more expensive than clothing for children (e.g., because adult clothing requires more raw material) so that the effect of introducing a quota implies that the relative price of children's clothing increases. If import demand elasticities for adult and children's clothing products are comparable, then imports of children's clothing will decline relative to adult clothing. When the mix of imports shifts in favor of adult clothing, consumers with children would be discriminated against by the quota.

[20] In this section we estimate the social cost of labor unemployment if the quota is removed. We do not consider the adverse effect on owners of capital on the assumption that apparel and textile machinery and equipment are industry specific and have no alternative uses, except as scrap.

expenses to find new jobs, including retraining and moving expenses. The cost to the economy of transitional unemployment can be viewed as the value of the real output that is lost because of unemployment. To measure this cost we calculate the wages lost by import-displaced production workers during the period they are unemployed.[21]

The cost of unemployment is calculated in three steps. First, the fall in value of domestic shipments is determined. This fall is evaluated under the assumption that imports from all three of the major Asian suppliers--Hong Kong, South Korea, and Taiwan--will increase. In contrast therefore to the estimation of the quota rents and consumption distortion--which focussed only on Hong Kong--the determination of the unemployment effects of eliminating the quotas considers the impact of additional imports from all three countries. Second, the direct cost of unemployment is found by converting the fall in total domestic clothing shipments into the cost of unemployment for clothing industry workers. Third, the indirect cost of unemployment is the cost of unemployment in the domestic textile mill products industry. A decline in clothing production will curb shipments of textile mill products.[22] The total cost of unemployment is the sum of the direct and indirect costs.

---

[21] This assumes not only that displaced workers incur adjustment costs (e.g., foregone income, moving expenses, training costs) but also that wage rates are rigid (in part because of labor union contracts). If wage rates decline, part of the loss to the economy due to the cost of unemployment is offset by an increase in consumer surplus from the import-competing domestic product (because supply and product price decline). Therefore, to the extent that wage rates decline if the quota is eliminated our procedure overestimates the cost of unemployment. This point is discussed in Robert C. Baldwin, John H. Mutti, and J. David Richardson (1978), "Welfare Effects on The United States of a Significant Multilateral Tariff Reduction," (mimeo, April), pp. 11-16.

[22] The indirect unemployment effect is overstated to the extent that domestic textile mills obtain additional business to replace the decline in sales to domestic apparel factories. For example, if wage rates decline somewhat textile mills may be able to shift to make products that are not used by apparel factories, products such as textile floor covering, bedding, upholstery for home furniture and motor vehicles, and tapestries. Note that eliminating textile quotas is not likely to cause a significant increase in exports of textile mill products. That is, even though formerly restrained exporters such as Hong Kong, South Korea, and Taiwan increase apparel production, they will probably not purchase much additional textile mill products from the U.S. While the U.S. does achieve some success in exporting these products (approximately $4.4 billion in 1980 when total U.S. shipments to all buyers was $36.6 billion) most of the U.S. exports are to other developed countries (i.e., Canada, Japan, and the European Community countries) so the U.S. may lack a comparative advantage in relation to the less developed countries in the Far East. Furthermore, several of the exporters (particularly South Korea and Taiwan) impose significant tariff and nontariff barriers on textile mill products. U.S. Department of Commerce (1981), Foreign Regulations Affecting U.S. Textile/Apparel Exports.

Finally, we do not consider other possible indirect unemployment effects of other industries that supply intermediate products to apparel factories because, except for textile mills, no other domestic industry relies on apparel factories as a major purchasor of their output. About 38 percent of domestic yarn and

(footnote continues)

The fall in value of domestic shipments is calculated for each product category using a method based on the Armington model. An explanation of the procedure is given in Appendix F, section 5. The Armington model treats the output of domestic industry as a differentiated product so that a decline in prices of foreign substitutes causes the demand for domestic output to contract. It is also assumed that industry supply is perfectly elastic in the relevant range. Thus a decline in demand for domestic clothing leads to a fall in output but the price of domestic clothing is unchanged.

The estimated decline in domestic clothing shipments is given in Table 6. If import quotas had been relaxed in 1980, domestic products in all nine product categories would have suffered a drop in sales of $285 million.

The estimated direct cost of the resulting unemployment is $11.6 million which equals the product of the number of production workers that are displaced in the clothing industry times the wages they lose while they are unemployed. The estimated number of displaced workers is 7,052 which equals the decline in clothing industry shipments, $284.5 million (from Table 6) divided by the shipments per worker ratio for clothing, $40,344.[23] The wages lost per worker is $1,640 which equals the product of the annual wage per worker, $7,574,[24] times the fraction of the year that unemployed workers remain unemployed, .217.[25]

The indirect cost of unemployment is $5.2 million which reflects wages lost by workers displaced from the textile mill products industry when clothing industry shipments fall. The latest U.S. Department of Commerce input-output table gives

---

(footnote continued)

fabric output is purchased by apparel factories. Among all other industries, only the leather tanning and finishing industry depended on apparel for more than 10 percent of its sales. Apparel factories purchased 13 percent of all leather and tanning products. U.S. Department of Commerce (1979), Survey of Current Business (February), p. 47.

[23] From the Annual Survey of Manufacturers, 1980, pages 10 and 12. The definition of the clothing industry follows the convention of the U.S. Department of Commerce. The clothing industry consists of the following three-digit SIC industries: 225 (knitting mills), 231 (mens and boys suits and coats), 232 (mens and boys furnishings), 233 (womens and misses outwear), 234 (womens and childrens undergarments), 235 (hats, caps, and millinery), 236 (childrens outerwear), 238 (miscellaneous apparel and accessories) and 237 (fur goods).

Note we use the average product per worker to find the number of displaced workers. Since we assume constant cost conditions prevail the average product equals the marginal product for the industry.

[24] Ibid.

[25] The average duration of unemployment in 1980 for apparel workers was 11.3 weeks, or 21.7 percent of the year. Unpublished data from the U.S. Department of Labor, Bureau of Labor Statistics. The estimated unemployment due to quota relaxation (7,052) is small enough relative to total apparel industry unemployment in 1980 (approximately 150,000) so we assume that average duration is not unaffected by dropping the quota. The actual number of unemployed clothing workers was derived from information furnished by the Bureau of Labor Statistics.

TABLE 6

Decline in Domestic Shipments if
Import Quotas on Textiles are Eliminated

Quota Category		Decline in U.S. Shipments	
		Percent	Value (millions of dollars)
333/334:	Cotton Coats, MB	1.3	$ 4.72
335:	Cotton Coats, WGI	6.9	11.34
338/339:	Cotton Knit Shirts and Blouses	1.4	13.18
340:	Cotton Shirts, Not Knit, MB	3.6	15.69
341:	Cotton Blouses, Not Knit, WGI	0.5	1.38
345:	Cotton Sweaters	7.0	2.35
347/348:	Cotton Trousers	4.9	187.64
445/446:	Wool Sweaters	21.0	22.84
641:	MMF Blouses, Not Knit, WGI	2.2	25.36
	Total Decline in U.S. Shipments		$284.50

Notes: MB = mens and boys
WGI = womens, girls and infants
MMF = man-made fiber

Sources: See Appendix H and Table H-1.

.39978 as the total requirement coefficient for the clothing industry purchasing textile mill products.[26] In other words, each $1,000 in clothing industry shipments requires $399.78 in textile mill product materials. Therefore the fall in clothing industry shipments of $284.5 million (Table 6) times .39978 gives the decline in textile product shipments, $114 million. The number of displaced textile mill production workers is 1,839 which equals $114 million divided by the shipments per worker ratio for textiles, $61,842.[27] Each unemployed textile mill worker loses $2,800, which is equal to average annual wages, $10,664,[28] times the fraction of the year the displaced worker is unemployed, .263.[29] The product of number of displaced workers (1,839) times wages lost per worker ($2,800) equals $5.2 million.

The total estimated cost of unemployment in the textile industry caused by removing the quotas is $16.8 million, the sum of the direct ($11.6 million) and indirect ($5.2 million) costs. This cost is due to an increase of transitional unemployment of 8,891 production workers: 7,052 workers from clothing factories and 1,839 workers from textile mills. Note that the added unemployment expected from lifting the quotas is relatively small compared to the total number of unemployed workers in these industries. In 1980, approximately 150,000 clothing workers were out of work while the corresponding number of unemployed textile mill workers was 38,000.[30]

The sensitivity of the total unemployment costs is reported in Table H-3 in Appendix H (on page 80), which shows that the cost can vary considerably, and could be as large as $72 million. The wide range for unemployment costs is explained by different estimates for the increase in imports if the quotas are cancelled and this in turn depends on the ease with which imports can be substituted for domestic products.[31] Moreover, the unemployment costs need to be compared with the sizes of the quota rent and especially the consumption distortion effect for a given increase

---

[26] U.S. Department of Commerce, Bureau of Economic Analysis (1981), "Summary Input-Output Tables of the U.S. Economy: 1973, 1974, and 1975", Staff Paper, Oct. 1981, Table 5, p. 89. The textile mill products industry is defined to consist of the following three-digit SIC industries: 221 (cotton weaving mills), 222 (man-made fiber weaving mills), 223 (wool weaving mills, finishing mills), 224 (narrow fabric mills), 226 (textile finishing, except wool), and 228 (yarn and thread mills).

[27] Annual Survey of Manufactures, 1980, pages 10 and 12.

[28] Ibid.

[29] In 1980 the average duration of unemployment for textile workers was 13.7 weeks, or 26.3 percent of the year. Unpublished data from the U.S. Department of Labor, Bureau of Labor Statistics. The average duration of unemployment is not expected to be affected by removing the quota. We estimate that only 1,839 production workers would lose their jobs if the quota is dropped while in 1980 there were approximately 38,000 unemployed workers in textiles. Textile unemployment was derived from information supplied by the Bureau of Labor Statistics.

[30] Based on unpublished data furnished by the U.S. Department of Labor, Bureau of Labor Statistics.

[31] The degree of substitutability between foreign and domestic products is measured by the elasticity of substitution in the Armington model. See Appendix F which derives two values for this parameter.

in imports. The size of the consumption distortion effect is positively associated with the cost of unemployment since both depend on the increase in imports.

E. Summary of Costs and Benefits

The benefits and costs to the U.S. of eliminating the import quotas on textiles are summarized in Table 7. The benefits are the gain in social welfare and equal the sum of the quota rent and the consumption distortion effect. The cost is the total cost of the increase in unemployment. Estimated total benefits are $308 million[32] and substantially exceed the estimated total cost of unemployment, $16.8 million--the ratio of benefits to costs is 18. In other words, for each dollar of cost to unemployed clothing and textile workers the U.S. economy would gain $18 in real national income.

Our results indicate that the magnitude of the unemployment costs are small, only 5 percent, compared to size of the gains the economy can realize if the quotas are lifted. It may be argued, however, that our estimates of unemployment costs are too small because they are based on BLS information on the duration of unemployment for workers actually experiencing unemployment in 1980, which may primarily reflect mobility of workers between apparel and textile factories and frictional unemployment (e.g., seasonal adjustments in the workforce, normal mobility and turnover of workers). The duration of unemployment may be higher for a permanent reduction in the workforce as would occur if the quotas were dropped. However, even if the duration of unemployment for a permanent cut in workforce were two or three times higher than the BLS data we use, the resulting costs of unemployment would still be dominated by the benefits from removing the quotas. Moreover, even if the duration of unemployment were ten times higher than the BLS data (surely a gross overestimate), the benefits from removing the quotas would still be nearly double the costs.

Viewed as an employment-creation policy, textile import quotas are inefficient. Although these quotas increase employment by 8,891 workers--7,052 workers in the clothing industry and 1,839 workers in the textile mill products industry--they cost the U.S. economy $308 million. Thus the cost of quotas in terms of extra employment in clothing and textiles is $34,500 per worker. Other policies, such as retraining or subsidizing early retirement, would be able to lighten the burden on those who became unemployed as a result of liberalizing the import quotas, and these alternative policies are likely to cost much less than

---

[32] Note that this estimate may understate the true benefits because of the procedure used to calculate the consumption distortion in Appendix G. As indicated in Appendix G, formula (G-3), we use a linear (as opposed to a log linear) demand curve to solve for the new quantity of imports if the quota is removed. This implies that price elasticity of demand declines as quantity of imports increases. In contrast, if a constant elasticity demand curve is used, the estimated new quantity of imports absent the quota would be larger than our estimate, and the corresponding estimate for the annual consumption distortion would also be larger than the $90 million reported in Table 7. A consequence of the procedure we use in Appendix G is that the estimated tariff revenues decline by $10 million when the quota is removed. (This is in contrast to the discussion of the text, on page 16, which assumed a constant elastic import demand curve.) As a result, based on the discussion of footnote 9 on page 16, the cost to consumers exceeds the cost to the economy. The cost to consumers is $318 million per year.

TABLE 7

Estimated Benefits and Costs of Removing Import Quotas on Hong Kong Textiles

Benefits	
Quota Rent	$218.30 million
Consumption Distortion Effect	89.68 million
Total Benefit	$307.98 million
Costs	
Total Cost of Unemployment	$ 16.80 million
Benefit-Cost Ratio	18.33

Sources: Tables 4, 5 and section D of chapter IV.
See also Appendix Table I-1.

workers was only $7,600 while that of textile workers was $10,700. Thus the benefits to U.S. consumers from scrapping the quotas are more than three times a simple scheme that promises to continue paying import-displaced workers a wage equal to their former earnings levels.

As an alternative, the U.S. could provide each newly unemployed textile or clothing worker with special unemployment compensation equal to his lost wages and still have net benefits to U.S. consumers of over $290 million in the first year. In subsequent years, after the displaced textile workers have been reabsorbed into other jobs, the annual benefits to U.S. consumers would be the entire $308 million.

The principal thrust of these results is not altered by examining the sensitivity of our estimates of benefits and costs from eliminating the import quotas. Appendix Table I-1 (on page 81) shows the alternative values of the benefits and costs. In all cases the benefits dominate the costs of unemployment. Even in the most extreme case, the lowest benefit-cost ratio is 7.88.

It is important to note that our estimates of the benefits and costs of removing the import quotas are for only one year and reflect conditions in 1980. The relationship between benefits and costs would be even more one sided if we considered the effects of removing the quotas on future years. This is because the benefits would continue year after year while the bulk of the costs of unemployment occur in the year the quotas are dropped. For example, if 1980 conditions prevail in all subsequent years and if future benefits are discounted at a rate of 10 percent (to reflect a social rate of discount) then the present value of the benefits from eliminating the quotas is $3.08 billion. Thus the benefits to cost ratio would be substantially larger than the figures reported for 1980 if future benefits were taken into account.

Finally, textile quotas are one of several types of import restrictions, but they are distinctive because they are probably the most costly restriction to the U.S.[34] This results because the total annual social cost of the present quotas, $308 million, is dominated by the quota rent transferred abroad, $218 million. In contrast, if quotas were retained but the U.S. Government administered the quotas and auctioned them to the highest bidders, the annual social cost would be reduced to $90 million. With this policy the U.S. economy would retain the quota rent and U.S. Government would gain $218 million in additional revenue from the auction. Similarly, the annual social cost of an "equivalent" tariff (i.e., a tariff designed to allow the same level of imports that enter under the present policy) would also be $90 million. With an equivalent tariff the quota rent would become additional tariff revenue for the Treasury. Both of these alternative policies would not change domestic output or employment in apparel and textiles, but would reduce substantially the cost to the U.S. of restricting textile imports.

---

33 We were not able to obtain estimates of retraining costs for unemployed textile or clothing workers. However, according to an official at the Department of Labor, retraining costs in formal government sponsored programs range from $1,750 to $5,000 per person. The lower figure frequently involves counseling and job search training while the higher figure involves actual training, often for people who have never had a job.

34 The comparative costs of different types of import restrictions are discussed by several economists, for example the recent book by David Greenaway (1983), Trade Policy and the New Protectionism (St. Martin's). See also the submission by the FTC before the U.S. International Trade Commission, Carbon and Certain Alloy Steel Products, Investigation No. TA-201-51, Prehearing Brief on Remedy, June 1984.

CHAPTER V

Conclusion

The quotas installed by the U.S. to limit imports of textiles currently apply to nearly two dozen countries and are a protectionist device that imposes substantial costs on the U.S. in terms lost real national income. In addition to quotas, the U.S. also curbs textile imports by levying high tariff rates, which averaged 27 percent ad valorem for all foreign-made apparel products in 1980. The social cost to the U.S. of the tariffs has been estimated by several economists, but the consequences of the quotas have been harder to determine owing to deficiencies in the available empirical information. In this report we have been able to utilize a new set of data to evaluate the social costs in 1980 of the import quotas imposed on one foreign supplier, Hong Kong, which is the largest source of foreign-made textiles to U.S. consumers.

The new data that have recently become available are Hong Kong quota prices for nine clothing product categories exported to the U.S. Quota prices in Hong Kong emerge from transactions between firms that are granted quota allocations by the Hong Kong Government and firms that seek quota rights to export to the U.S. These transactions take place under competitive conditions in a quota market in Hong Kong and are facilitated by the efforts of specialist middlemen. Information about prices of quota rights is important in assessing the social costs to the U.S. of the quotas because they measure the difference between the price U.S. importers pay for Hong Kong clothing and the supply price for clothing from Hong Kong. This is a consequence of efforts by Hong Kong firms to adjust their use or holding of quotas in order to maximize profits, which implies that prices of quota rights equal the difference between price and average unit cost for all firms.

The prices of quota rights are found to account for a significant portion of the price paid by U.S.importers in 1980. For seven of the nine product categories studied, average annual quota prices exceed 10 percent of annual unit values or product prices. Moreover, for two large product categories, cotton jeans and wool sweaters, quota prices account for more than 30 percent of product prices.

The average prices of quota rights are derived from monthly data but since there are missing values for some months it was necessary to make alternative assumptions to calculate average annual quota prices. Three methods were used to calculate average annual quota prices. The method that gave mid values for average quota prices is regarded as the most accurate.

Using this method, the total value of quota rents for 1980 was $218 million, which was 23 percent of the total value paid by U.S. importers to purchase the nine Hong Kong clothing products. The quota rent is captured by Hong Kong because the Hong Kong Government administers the quota and many U.S. firms compete to import Hong Kong textiles. Consequently the quota rent represents a transfer of real income from the U.S. to Hong Kong: it is a social cost to the U.S. of the import quotas.

The import quotas not only create a rent cost for the U.S. economy they also distort the pattern of consumption, in two ways. First, the quotas restrict the total amount of imports to a lower level than would occur in the absence of quotas. To evaluate the social cost of this restriction in import quantity (i.e., the "deadweight loss triangle"), we adopted a model based on the work of Paul Armington to derive import demand

elasticities. We find that the total social cost in 1980 of the consumption distortion was $90 million.

Second, the quotas may also distort consumption by changing the quality of the clothing products that are imported. Quotas may create incentives for Hong Kong firms to increase the quality of their exports. In consequence, the burden of the quotas is expected to fall most heavily on low-income consumers as opposed to middle or high-income groups. Furthermore, the product categories subject to quotas cover a range of items with differing prices. Because a quota introduces a common price for quota rights for all items in the product category there is an increase in the relative price of less expensive clothing items. This is expected to change the composition of imports in favor of more expensive items. As a result of this mix shift, the quota may again discriminate against low-income consumers. We are not, however, able to estimate the distributional effects of the quotas.

The gross social cost to the U.S. of the import quotas consists of the sum of the rent and consumption distortion effects. In 1980 the gross social cost was $308 million, which represents the gross benefit to the U.S. of eliminating the quotas.

Against this gross benefit there is a cost of scrapping the quotas that stems from the cost of transitional unemployment caused by additional imports that will displace some workers in the domestic clothing and textile mill products industries. However, we estimate this cost is less than $17 million. Therefore the benefit cost ratio of cancelling the import quotas is 18. In other words, for each dollar of unemployment cost caused by dropping the quotas the U.S. economy would gain $18. Alternatively, the quotas are estimated to increase employment by 8,900 workers. Thus the gross social cost of quotas expressed in relation to the additional employment protected by the quotas is $34,500 per worker. The quotas are therefore an expensive method of increasing employment since the (1980) annual wage of clothing workers is $7,600 while that of textile mill workers is $10,700.

Finally, because of data limitations we have only been able to estimate the effects on U.S. welfare caused by the import quotas placed on Hong Kong. As noted, other countries also face U.S. import quotas and for some of them, particularly South Korea and Taiwan, the quotas are also expected to impose social costs on the U.S. economy. Therefore the total social cost of all import quotas on textiles is larger than the estimates provided here for Hong Kong.

APPENDIX A

Hong Kong's Textile Quota System

The purposes of Hong Kong's Textile Quota System are: (1) to ensure that Hong Kong complies with the provisions and quota limits set in its bilateral agreement with the United States (and other industrialized countries) and (2) to provide sufficient flexibility for firms in Hong Kong so that Hong Kong is able to achieve its potential in terms of utilizing the quotas. While the system has a number of specifications and regulations, there are two general features.[1]

First, each year the H.K. Government allocates without charge export rights (or quotas) on a past performance basis to individual firms in Hong Kong. Quotas do not have a tangible form (e.g., certificates); instead the quota position of each firm is simply maintained in the records of the H.K. Government. The quotas apply to a specific calendar year and may be used at any time during that year. Export rights are product specific, with the aggregate amount of annual quota issued for each product category governed by the quota limit established in the bilateral agreement. In order for a H.K. firm to ship a given quantity of textiles (say cotton jeans) to the U.S., it must apply for a license and indicate the source of quota for the transaction against which the quantity of textile exports will be deducted.

Second, and for present purposes the more important feature of the system, the regulations permit transfer of quota among firms. Thus a firm may accept a U.S. order even though it does not have quota (or sufficient quota). The decision to accept the order depends on whether the firm believes it can obtain sufficient quota through transfer from another firm (or firms) and on the price it expects to pay to obtain the quota.

The sources of supply for "transfer" quota are the firms that have been granted a quota allocation by the H.K. Government. These firms, called quota holders, are numerous, and individual holdings are typically relatively small. For example, in 1980 there were 3,541 quota holders, with most of these firms owning quota for more than one product category.[2]

Hong Kong's Textile Quota System requires that all transfers be registered. The type of transfer that is most important here is the temporary transfer, a quota transfer that only allows the acquiring firm to utilize quota within a given quota year. The quota holder who surrenders quota on a temporary transfer basis still qualifies to receive a quota allocation in the next calendar year. In contrast, under the second type of transfer, the permanent transfer, the acquiring firm becomes a quota holder (or adds to its quota holding) and qualifies to receive a corresponding quota allocation in the next calendar year. Temporary transfers are, therefore, entitlements or rights to export textiles within a specific calendar year and, as explained in Appendix B, the price of these rights is used to estimate the annual economic rent created by the quota limit for a particular textile product category.

---

[1] The details of the Hong Kong system are given in "The Textile Export Control System of Hong Kong," Trade Industry and Customs Department, Hong Kong (Ref: EIC 9200/20/9/1), March 7, 1980.

[2] Trade Industry and Customs Department, Hong Kong Government, "Export of Restrained Textiles to the USA: 1980 Quota Holder List."

The reported number and relative importance of temporary transfers varies across quota categories, as shown for 1979 in Table A-1.[3] The total number of temporary transfer transactions, for all categories combined, was 12,103, or an average of 46 transactions a day (on a five day a week basis). This suggests that, at the total textile level, temporary transfers cannot be viewed as rare or isolated transactions, but rather occur with a high degree of regularity. Furthermore, for several individual product categories that have effective quotas, there are frequent, relatively large transactions. For example, women's, girl's and infant's cotton jeans (category 348) reported 1,070 temporary transfers for the year--an average of 4 per day--and covered a volume equal to 39 percent of the year's quota limit. The number of 1979 transactions in men's and boy's cotton jeans (category 347) was 744--nearly 3 a day--which represented 36 percent of the quota limit. Similar results are found for most of the other quota categories that had effective quotas in 1980, as listed in Table 3 in the text (i.e. categories 333/334/335, 338/339, 340, 341, 638/639, 641, and 445/446). Therefore, for the majority of categories where quotas are binding, temporary transfers occur regularly and involve a significant reshuffling of quotas, i.e., a third or more of the relevant quota limits.

In summary, the key feature of Hong Kong's Textile Quota System is that it allows for the transfer of quota among firms. The large number of regular quota transfers suggests an active market for temporary transfers which should generate useful information about prices of quota rights.

---

[3] Comparable data for 1980 are not available.

TABLE A-1

Temporary Transfers of Textile Quotas in Hong Kong for Exports to the United States, 1979

Categories Subject to Specific Limits	Number of Temporary Transfers	Quantity of Quota Transferred on Temporary Basis	
		Quantity	As Percent of Restraint limit
Group I: Yarns and Fabrics of Cotton and Man-Made Fibers			
313: Sheeting, Cotton	21	770,389 Syd.	0.65
317: Twill and Sateen, Cotton	30	1,794,143 Syd.	3.80
319: Duck, Cotton	3	740,000 Syd.	1.21
Group II: Apparel of Cotton and Man-Made Fibers			
Section A: Cotton			
331: Gloves	50	228,290 Doz.	7.10
333/334: Coats, MB	296	78,598 Doz.	37.39
335: Coats, WGI	463	135,427 Doz.	51.39
338/339: Knit Shirts and Blouses*	987	1,091,621 Doz.	46.24
340: Shirts, Not knit, MB	473	736,050 Doz.	32.56
341: Blouses, Not Knit, WGI	696	456,391 Doz.	19.93
347: Trousers, MB	744	923,714 Doz.	36.79
348: Trousers, WGI	1,070	1,615,037 Doz.	39.44
Section B: Man-Made Fibers			
638/639: Knit Shirts	888	1,306,093 Doz.	33.56
640: Shirts, Not Knit, MB	153	140,805 Doz.	14.54
641: Blouses, Not Knit, WGI	536	331,916 Doz.	51.84
Group III: Made-ups and Miscellaneous Articles of Cotton and Man-Made Fibers			
(no specific category limits)			
Group IV: Wool Textiles and Apparel			
443: Suits, MB	1	1,000 Doz	1.00
445/446: Sweaters	505	387,778 Doz	33.93
Total for All Groups	12,103	224,792,400 Esy	22.14

TABLE A-1--Continued

Notes: MB = mens and boys.
WGI = womens, girls and infants.
Syd = square yard.
Esy = equivalent square yard.

* Category 338/339 excludes tank tops.

The product category 345 (cotton sweaters) is not included in this table because it was not subject to a specific limit in 1979.

Source: Trade Industry and Customs Department, Hong Kong Government.

APPENDIX B

The Market for Textile Quotas and Textile Quota Prices in Hong Kong

Because the regulations of Hong Kong's Textile Quota System allow firms in Hong Kong to buy and sell quotas, an open (and active) market in quota rights has developed. This market has been in existence for many years;[1] its participants include quota holders, firms that do not have but seek to use quota, and also individuals and enterprises that act as middlemen to arrange transactions. The workings of the quota market are reported in the local press, particularly the trade publication Textile Asia. For example, in late 1979 its editor wrote:

> "In Hong Kong more and more textile quotas are being traded in the market, and prices for quotas of some categories have risen unusually high, while the local newspapers, mostly Chinese, carry more advertisements for the purchase of quota in different categories and for different markets by temporary or permanent transfer--advertisements which usually indicate a surname and telephone number. ...Temporary quota transfer involves a cash payment from a transferee to the transferror according to market value."[2]

The economic function of the quota market and the role of quota prices (or quota premia) for transfers is essentially to reallocate export orders among firms so as to efficiently produce and supply textiles. The quota market and quota prices are a consequence of effective quota limits. If the quota limits were not binding the quota market would disappear and the price of quota rights would be zero.

With effective quota limits and a well-working quota market, the price for a unit of quota can be illustrated in Figure 1 of the text (on page 8). If demand is D_1 quota price equal $P_0 - P_1$, or the difference between demand price (the price paid by U.S. importers) and the supply price (the unit cost to supply textiles). Other things equal, the quota price thus depends on the strength of import demand. If demand were higher, at D_2, quota price would be greater, $P_2 - P_1$.

This analysis requires transferability of quota and optimizing behavior of firms. Firms that do not have quota will seek to purchase quota up to the quantity where the sum of quota price and marginal cost of production equals product price.[3] Firms that hold quota will sell quota if, at the quantity they are

---

[1] By one account the quota market was in operation as far back as the mid 1960's. David Bonavia, "A Question of Quotas," Far Eastern Economic Review, June 16, 1966, p. 578.

[2] Textile Asia, October 1979, p. 10. Also see the following issues: May 1980, p. 94, June 1980, pp. 77-8, August 1980, p. 120, September 1980, p. 50.

[3] It is assumed that the cost curves of firms are "U-shaped" and that entry into the industry is easy by firms that have identical cost curves. This implies that while the marginal cost curve of each firm in rising (in equilibrium) the industry supply curve is horizontal.

holding, marginal cost plus quota price exceeds product price. These firms will sell quota until the marginal cost of the output they produce with the quota they retain, plus quota price, equals product price. Thus the interest of firms to maximize profits will induce them to select output rates, and buy or sell quota, until marginal costs of production are equal for all firms. Transferability of quota allows quota to move from firms with high marginal costs (pre-transfer) to firms that have lower marginal costs. As a consequence the industry achieves efficient production; i.e., the total cost, for all firms, to produce the quota limit is minimized.[4]

Sporadic reports of quota prices have appeared in the trade press since the mid 1960's,[5] but until recently, (as far as can be determined) a wide collection of quota prices for many categories has not been collected and made available. In early 1982 two different and independent sets of quota prices became available. One set was assembled by the Hong Kong Government, and the second set was furnished by a group of U.S. importers and retailers.

The Hong Kong Government data for 1980 appear in Table B-1. Quota prices are provided on a monthly basis for nine product categories. The quota prices furnished by U.S. firms for 1980 are provided in Table B-2. These data show the 1980 range for quota prices for five of the same product categories covered by the Hong Kong Government series. Unfortunately, the basis of these high-low prices is not known (e.g. daily prices, individual transactions).

The two data sets do not coincide exactly although for a few categories the high-low range is very close, notably for categories 340 (cotton shirts) and 347/348 (cotton jeans). The Hong Kong Government data are expected to be more reliable because they present representative quota prices on a monthly basis and are obtained from Hong Kong firms and trade associations.[6] These sources are probably in the best position to know quota prices. In contrast, the data set from the American Association of Exporters and Importers only gives the high-low range for the year. In addition to not knowing the basis for these prices (e.g., daily) we do not know the number of U.S. firms that furnished quota price information and the time period covered (e.g., the entire year or a part of the year). Further, American importers may not always know the quota prices that apply to their orders, particularly when the supplier is a quota holder who does not need to buy quota rights.

Tables B-1 and B-2 show that quota prices had a wide range during 1980. For example, the high price/low price ratio for the large category 347/348 (cotton jeans) was five to one. In other

---

[4] The result in the text assumes there are no restrictions on temporary transfers. However the Hong Kong Government imposes penalties (quota is forfeited) for "excessive" transfers by quota holders. It is possible that restrictions of this type can cause inefficiency by encouraging quota holders to produce a larger output than they would choose in the absence of the restrictions. The discussion in the text is therefore subject to this qualification.

[5] Supra, note 1. Quota prices have been discussed on many occasions in Hong Kong newspapers (e.g., the Hong Kong Standard, March 4, 1976, Sec. 2, p. 1, the South China Morning Post, April 4, 1977, Sec. 2, p. 1, and the Asian Wall Street Journal, May 4, 1977, p. 1).

[6] According to a Hong Kong Government offical.

TABLE B-1

1980 Quota Prices in Hong Kong for Temporary Transfers of Textile Quotas: Export of Restrained Textiles to the United States (U.S. Dollars Per Dozen)

Quota Category		January	February	March	April	May	June	July	August	September	October	November	December
333/334:	Cotton Coats, MB	#	#	#	#	#	#	20.00	20.00	22.00	14.00	#	#
335:	Cotton Coats, WGI	#	#	#	#	#	#	41.00	40.00	#	#	#	#
338/339:	Cotton Knit Shirts and Blouses	#	#	6.20	6.20	3.90	4.30	#	6.50	1.40	1.20	3.70	#
340:	Cotton Shirts, Not Knit, MB	#	#	#	4.30	4.30	4.10	7.00	7.10	6.90	5.20	#	#
341:	Cotton Blouses,	#	#	2.00	#	5.10	.60	#	.40	0	0	0	#
345:	Cotton Sweaters	#	#	#	#	20.00	20.00	#	#	#	#	#	#
347/348:	Cotton Trousers	#	#	10.00	16.00	15.00	16.00	45.00	44.00	50.00	28.00	14.00	#
445/446:	Wool Sweaters	#	#	#	36.00	37.00	41.00	61.00	61.00	63.00	30.00	#	#
641:	MMF Blouses, Not Knit, WGI	#	#	#	#	#	20.00	20.00	16.00	12.00	7.60	#	#

Notes: The quota prices given are not official and are obtained essentially through casual inquiries by staff officers of the Trade Industry and Customs Department (HK Govt.) with trade associations and quota holders in Hong Kong.

TABLE B-1--Continued

\# = information not available
MB = mens and boys
WGI = womens, girls and infants
MMF = man-made fiber
Quota prices reported in the table are converted from Hong Kong dollars by the appropriate monthly free market exchange rate.

Sources: (1) For quota prices in Hong Kong dollars: Trade Industry and Customs Department, Hong Kong Government;

(2) For the Hong Kong exchange rate, Hong Kong Monthly Digest of Statistics, September 1981. The average exchange rate for 1980 was HK $4.976 = US $1.00.

TABLE B-2

Range for Prices of Hong Kong
Textile Quotas, 1980

Quota Category	High Price	Low Price
	(Dollars per dozen)	
340	$ 7.50	$ 4.00
341	5.00	2.00
347/348	50.00	9.00
445/446	49.00	15.00
640	4.00	3.00
641	44.00	12.00

Source: American Association of Exporters and Importers, in U.S. Congress, House of Representatives, Committee on Ways and Means, Subcommittee on Trade (1982), Hearings, U.S. Trade Policy, Phase II: Private Sector, 97th Cong., 1st Sess., Part A, Serial 97-46 (U.S. Government Printing Office), pp. 217-18.

words, between March and September, quota price in this category rose from $10 to $50 per dozen.

The wide range in quota prices is attributable to unforeseen variations in demand during the year and, more importantly, to the uncertainty of producers about the strength of demand for the year as a whole. The apparel business is sensitive to abrupt changes in fashion and fluctuations in quota prices are, in part, a reflection of these changes. Moreover, the demand facing Hong Kong is affected by changing supply conditions in competing countries. Both these factors explain the rapid rise in quota prices in the spring of 1980. According to Textile Asia

> "Foreign buyers who had hoped to place orders for clothing in China have returned to Hong Kong, causing a sharp rise in quota premia... At mid April exporters were complaining of very tight supply of quota, especially for wool sweaters, sweat shirts and knitted articles in general for the US and EEC.
>
> Demand for clothing from both these markets continues firm.... Demand is normally strong during the first half-year, but this year the rush has come earlier than usual, it seems. This is explained partly by the advent of a new fashion trend towards knits and away from wovens. Hence a demand for sweaters and knitted shirts, rather than the blouses that were last year's favorite."[7]

The new data on quota prices supplies an essential element needed to evaluate the welfare effects of the U.S. import quotas for Hong Kong. However, the fluctuation of quota prices during the year raises problems which are addressed in Appendix D.

---

[7] Textile Asia, May 1980, p. 95.

APPENDIX C

The Market for Textile Quotas in Hong Kong: Competition versus Monopoly

Prices of quota rights in Hong Kong appear to be determined by competitive demand and supply forces in Hong Kong's quota market. Accordingly, for a particular quota category the price of quota rights is equal to the difference between import demand and supply price for the textile product at the quota limit. The assessment that prices of quota rights are determined under competitive conditions is supported by evidence that suggests the concentration of quota rights among quota holders is relatively low, which implies insignificant monopoly power by quota holders. More importantly, a competitive quota market is supported by evidence that indicates quotas are fully used, which means quota holders do not possess sufficient market power to curb exports to the U.S. below the levels set by the quota limits.

In contrast, the price of quota rights would be higher if the quota was monopolized (in particular, if quota holders had significant monopoly power). Figure C-1 illustrates the case where quota rights are monopolized.[1] Figure C-1 is based on Figure 1 of the text (on page 12); that is, D and S are import demand and Hong Kong supply for a textile product, while Q_0 is the quota limit set by the United States. To show monopolization of quota a marginal revenue curve (MR) is drawn for the demand curve D. Under monopoly the quantity of imports is Q_M, where MR equals S, since this level of imports maximizes the value of quota rights. The price of quota rights is $P_M - P_1$ and is made up of two parts: (1) $P_0 - P_1$ which is the result of the import quota alone (and would prevail under competitive conditions for quota rights) and (2) $P_M - P_0$ which is attributable to the monopolization of quota. Quota monopoly also results in "short shipping" or not fully utilizing the total quota Q_0. The difference $Q_0 - Q_M$ is the extent of short shipping: the quota limit allows imports of Q_0 but only Q_M is shipped.

There are two pieces of evidence that suggest that quota monopolization does not apply for textile export rights in Hong Kong. The first concerns the concentration of quota rights among quota holders. If only one or a few firms control a large share of the aggregate quota in a product category it is conceivable that the leading quota holder(s) will act as a monopoly and maximize profits by deliberately not using all their quota.

Information about quota holdings in Hong Kong consists of a roster maintained by the Hong Kong Government of quota positions by registered companies, a roster that identifies 3,541 different companies.[2] It was not possible to determine the relationships among these companies, but it is reported that in at least some

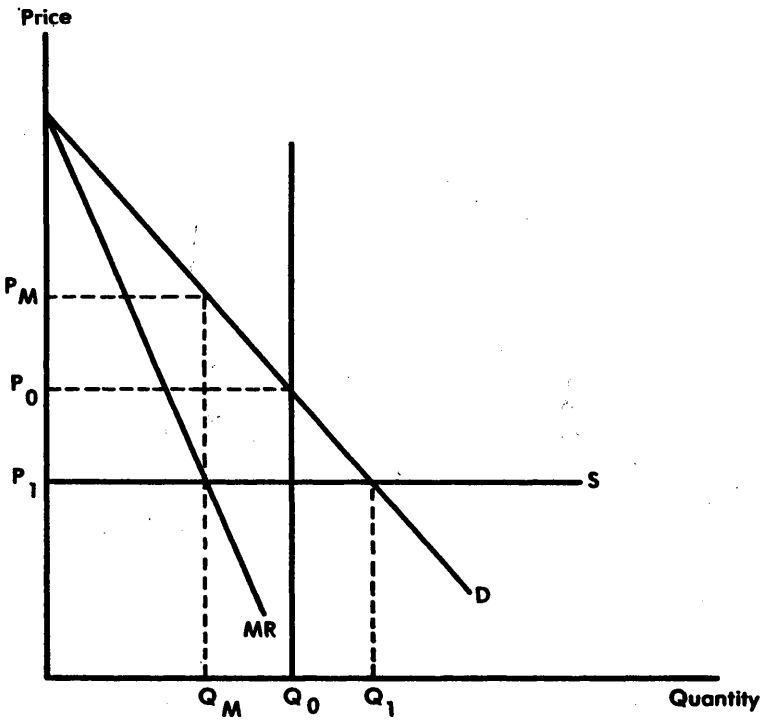
---

[1] Monopolization of quota holding is analyzed by Jagdish Bhagwati (1965), "On the Equivalence of Tariffs and Quotas," in Robert Baldwin, et al. (1965), Trade, Growth, and the Balance of Payments (Rand McNally), pp. 53-67.

[2] Trade Industry and Customs Department, Hong Kong Government, "Export of Restrained Textiles to the USA: 1980 Quota Holder List."

FIGURE C-1

Monopolization of Textile Quotas by Firms
in Hong Kong



Source: Bureau of Economics, Federal Trade Commission

cases there are ownership ties that link two or more companies.[3] Therefore a review of quota holdings of registered companies is subject to qualification.

In Hong Kong it appears that quota holdings are highly fragmented. This is based on a detailed examination of ten important product categories. Table C-1 lists the percentage shares of total quota held by the leading firms. The combined share of the top four firms (C4) never exceeds 50 percent, and there are only two product categories where C4 exceeds 40 percent--woven cotton shirts (340) and woven man-made fiber shirts for men and boys (640). The implication of these figures is that it is unlikely that a small group of leading quota holders could exert a significant influence on the supply of transfer quota. However this evidence is not definitive because of the qualification noted above that we lack knowledge about the links (e.g. direct or partial ownership links) between different quota holders.

The second piece of available evidence about quota monopolization is annual quota utilization and the possibility of short shipping. Conceptually there is some uncertainty as to when the annual quota for a particular category is fully utilized. Actual imports of textiles from Hong Kong, although less than the quota limit, can nevertheless reflect full utilization of quota. For example, import demand conditions for a given quota category (which includes a variety of specific clothing articles, e.g., sizes, styles, colors) can easily change during the year and it may not be possible for firms to adjust quickly enough to respond fully and achieve 100 percent quota utilization. Moreover, the terms of the bilateral agreement between the United States and Hong Kong permit the quota limits for individual categories to be revised somewhat during the year.[4] Thus the Hong Kong Government may increase the quota limit for a quota category late in the calendar year and after the main buying season so that the final year end quota utilization ratio may fall short of 100 percent.

The actual utilization rates for quota categories that had effective quotas in 1980 (because quota prices were reported) are given in Table C-2. Two sets of utilization rates are provided. As explained above the more important measure of utilization rate for present purposes is shown in column (1) which indicates the quantity licensed as a percent of the original restraint limit. Column (2) gives the utilization rate based on the revised year-end restraint limit.

The quota utilization rates in column (1) exceed 100 percent for all but one quota category, 341. (Note that the relatively low utilization rate for category 333/334 (71.9 percent) actually represents full utilization because categories 333/334 and 335 had individual limits as well as a combined limit for the sum of

---

[3] For example, the recent financial difficulties of one Hong Kong quota holder, Lai Sun Garment Manufacturing Co., Ltd., revealed that Lai Sun had a large quota holding for cotton jeans under its own name (684 thousand dozen) and also considerable additional quota held by its subsidiaries (more than 300 thousand dozen). Daily News Record, May 10, 1983, p. 2.

[4] The quota limit for a particular category can be adjusted in three ways: (1) by carryover (using part of the unutilized quota of the previous year), (2) by carryforward (borrowing a portion of next year's quota) and (3) by swing (shifting a part of a year's quota in one category to another category). The maximum allowable carryover and carryforward in 1980 was 11 percent and the maximum swing was 5 percent. See International Trade Commission (1981), The Multifiber Arrangement, 1973 to 1980, Vol. I (pub. no. 1131), p. 15.

TABLE C-1

Percent Share of Total Quota Held By Leading Firms, By Selected Quota Categories

Quota Category	-------Percent of Total Quota in Each Category Held By-------						
	No. 1 Firm	No. 2 Firm	No. 3 Firm	No. 4 Firm	Top 4 Firms	Top 8 Firms	Top 20 Firms
333/334: Cotton Coats, MB	4.32	4.31	4.04	3.44	16.11	28.27	50.04
335: Cotton Coats, WGI	8.26	5.10	4.31	3.95	21.62	32.98	51.56
338/339: Cotton Knit Shirts and Blouses	11.58	6.71	6.58	5.31	30.18	46.40	67.31
338/339(1): Cotton Knit Tank Tops	6.93	6.66	4.89	4.65	23.13	36.35	53.33
340: Cotton Shirts, not knit,	20.84	14.52	7.16	5.98	48.50	65.91	85.35
341: Cotton Blouses, not Knit,	13.83	9.07	2.42	2.32	27.64	34.87	47.67
345: Cotton Sweaters	11.86	6.02	4.11	3.05	25.04	30.60	38.83
347: Cotton Trousers, Slacks, Shorts, MB	9.02	8.21	4.37	4.23	25.83	39.49	55.71
348: Cotton Trousers, Slacks, Shorts, WGI	11.25	7.79	6.33	5.57	30.94	42.22	53.33
445/446: Wool Sweaters	5.26	4.04	3.62	3.61	16.53	26.46	46.57
638/639: MMF Knit Shirts and Blouses	7.67	6.45	2.37	2.63	19.48	27.15	39.58
641: MMF Blouses, not Knit, WGI	9.39	6.81	5.59	4.92	26.71	40.25	59.70

Notes: MB = mens and boys
WGI = womens, girls and infants
MMF = man-made fiber

Source: Based on data given in "Export of Restrained Textiles to USA: 1980 Quota Holder List," Trade Industry and Customs Department, Hong Kong Government.

TABLE C-2

Textile Quota Utilization Rates for Selected Quota Categories for Hong Kong in 1980

Quota Category		---Quota Utilization Rate--- Quantity Licensed as Percent of Original Restraints Limit (1)	Quantity Licensed as Percent of Adjusted Restraints Limit (2)
333/334/335:	Cotton Coats	101.9	97.1
(333/334):	Cotton Coats, MB	(71.9)	(68.5)
(335):	Cotton Coats, WGI	(102.9)	(97.5)
338/339:	Cotton Knit Shirts and Blouses	102.9	98.0
340:	Cotton Shirts, not Knit, MB	104.2	99.2
341:	Cotton Blouses	93.4	88.9
345:	Cotton Sweaters	102.2	95.5
347/348:	Cotton Trousers	104.7	99.7
445/446:	Wool Sweaters	105.3	100.3
641:	MMF Blouses, not Knit, WGI	104.7	99.7

Notes: The parentheses for categories 333/334 and 335 indicate that they had specific limits as well as had a combined limit for all cotton coats grouped in 333/334/335. Furthermore, the sum of the specific limits for 333/334 and 335 exceed the combined limit for 333/334 and 335.

MB = mens and boys
WGI = womens, girls and infants
MMF = man-made fiber

Source: Trade Industry and Commerce Department, Hong Kong, "Notice To Exporters: Series 1A (USA) No. 15/80, Export of Restrained Textiles to the USA, Quantity Licensed Against Quota Limits from 1.1.80-31.12.80," (May 5, 1981).

333/334 plus 335 and the sum of the individual limits was greater than the combined limit.) For category 341 the rate is still high, 93.4 percent, and may indicate full quota utilization owing to unforeseen changes in demand late in the year. Therefore this evidence suggests that textile quotas for the categories listed in Table C-2 were fully utilized in 1980. Consequently, monopolization of quotas is not supported because its manifestation, short shipping, did not occur.

In summary, quota monopolization in Hong Kong for the quota categories we study is not supported by available evidence on the concentration of quota holdings among firms nor by the evidence on actual utilization rates. The concentration of quota holdings appears too low to suggest significant monopoly power. More importantly, the very high quota utilization rates, exceeding 100 percent for all but one quota category, are inconsistent with the short shipping that is predicted by quota monopolization.

APPENDIX D

The Calculation of Average Quota Prices for 1980

The magnitude of the annual economic rent caused by the import quotas cannot be obtained directly from available data; neither the official tabulations of imports, nor the underlying invoices for import transactions give the value of economic rents. To solve this problem, an estimation procedure was developed to obtain rents by multiplying the quantity of annual shipments times the annual average quota price. The procedure is based on the fact that the economic rent for every unit of imports equals the price of the quota rights for that unit.

To estimate total economic rent for 1980, we calculated for each month the product of quantity of exports licensed times quota price and then added over the months. The quantity of exports licensed in a month equals the quantity of quota rights that are used during the month because to obtain an export license a Hong Kong firm must supply quota rights. Missing values for several monthly quota prices made it necessary to construct estimates for inclusion in annual average prices. Three sets of estimates were made under alternative assumptions that will be discussed further below.

The estimation procedure for economic rent had to confront the apparent existence of two types of import orders or contracts--short-term contracts and long-term contracts.[1] Short-term contracts call for orders to be filled quickly, e.g., within a few days or weeks. In this case product price incorporates the current price for quota rights. Exporters that do not have quota must pay the current quota price to obtain quota; for exporters that have quota, the current quota price is the opportunity cost of using quota to fill the order. If all import transactions were short-term orders, the product of quantity and quota price for each month would equal the economic rent for the month.[2]

---

[1] This is based primarily on reports in the trade press, (Textile Asia and Daily News Record and interviews with U.S. importers. See also notes 3, 4, and 5 Infra. It does not appear that many economists have studied and compared prices in short-term and longer-term contracts. An exception is a recent article by Dennis Carlton. In Carlton's article a market is characterized by uncertainty and transactions costs that create incentives to have both short-term and long-term fixed-price contracts. One of Carlton's objectives is to explain why short-term contract prices can move by different magnitudes (and even directions) from long-term contract prices. Our concern is to explain why short-term (monthly) quota prices can differ from longer-term quota prices. Dennis Carlton (1979), "Contracts, Price Rigidity, and Market Equilibrium," Journal of Political Economy 87(5), 1034-62.

[2] The text assumes that the exporter in effect sells both the textile good and the textile quota. This is not always the case. In some transactions U.S. importers place orders for the goods alone and then arrange with other parties to obtain quotas. However, in this case the value of the economic rent will still equal the product of quantity and quota price for the month. The experience of one textile quota broker who sells quotas mainly to U.S. buyers is given in Daily News Record, March 30, 1983, p. 10.

Hong Kong has a reputation of being highly flexible and able to respond quickly to changing opportunities.[3] This suggests that short-term orders may be relatively important.[4] On the other hand there are reports that some importers, for example large U.S. retailers, arrange longer-term contracts.[5]

Longer-term contracts are orders placed several months in advance of shipment, and they can also call for a stream of shipments stretched out over many months. Clothing products are commonly made to order and price is agreed at time of order. This is related to the usual arrangement where the importer obtains a letter of credit (LC) in favor of the exporter and the manufacturer does not begin production until he has received the LC.[6] As a result the exporter will need to estimate future quota prices before he accepts the order. However, exporters do not have to estimate quota prices for each month they plan to make

---

[3] For example, Donald Keesing of the World Bank has reviewed the results of 83 field interviews conducted in 1978 with businessmen and officials of government departments and trade organizations in five East Asian economies. Keesing concludes from this evidence that a major factor in the export success of these economies (including Hong Kong) is flexibility and quick reaction time. Donald Keesing (1982), "Exporting Manufactured Consumer Goods from Developing to Developed Countries." (Provisional Draft, World Bank), Chap. I, p. 17.

[4] Short-term orders are expected to be more important for fashion apparel as opposed to standard or basic grades. A number of firms in Hong Kong specialize in making fashion apparel. Donald Keesing cites an interview with a Hong Kong businessman who estimated that there were approximately 1,000 fashion factories in Hong Kong, out of a total of some 11,000 textile and clothing factories. Furthermore, fashion apparel is likely to be shipped air freight vs. sea freight, to reduce the time lag between date of order and date of receipt by the U.S. retailer. Glen Jenkins, in his study of Canadian imports of Hong Kong apparel, found that basic apparel items were almost always shipped by sea (taking 2 to 3 months). In contrast, Jenkins reported that high fashion apparel was shipped by air freight. Based on Census Bureau data Keesing found that 28 percent of Hong Kong's wearing apparel exports to the U.S. were sent by air freight in 1979. Donald Keesing, Supra, note 3, Chap. II, p. 40, Chap. III, p. 24; Glen P. Jenkins (1980), "Costs and Consequences of the New Protectionism," (Harvard Institute for International Development, Harvard Univ.), fn. 15.

[5] Reports by both U.S. buyers and Hong Kong sellers indicate that longer-term orders are used. For example, there is evidence that U.S. retailers plan their import purchasing programs up to one year in advance of retail sale and this suggests that long-term contracts are employed. See the submissions by the National Retail Merchants Association on two occasions to Hearings before the Subcommittee on Trade of the Committee on Way and Means: (1) Exemption of Certain Products from Tariff Reductions Negotiated in the Multilateral Trade Negotiations (MTN), 95th Cong., 2nd Sess., July 10, 1978, Serial 95-102 (U.S. Government Printing Office), p. 341; and (2) U.S. Trade Policy, Phase II: Private Sector, 97th Cong., 1st Sess., Sec. 15, 1981, Serial 97-46 (U.S. Government Printing Office), p. 492. Finally, according to a textile businessman in Hong Kong, "...orders for most textile products are placed during the second half or the year, with shipments to be effected from January on." Textile Asia, June 1980, p. 77.

[6] Keesing, note 3 Supra; Daily News Record, February 13, 1984, p. 24.

shipments. Both quota holders and non-quota holders need only estimate an average quota price to incorporate into the product price that is agreed when the contract is written.[7]

If expectations are realized, the expected annual cost of quota rights equals the actual cost. The actual cost is found by taking the sum of products of monthly quantity times quota price. This is equivalent to forming the product of annual quantity and a weighted average quota price. To obtain the weighted average quota price, each month's quota price is multiplied by the ratio of the month's quantity to total annual quantity. The realization of expections can also be characterized by the equality of the expected average quota price and the realized weighted average quota price. Quota prices for individual months will fluctuate around the average but will not influence the terms of longer-term contracts.

It is assumed that expectations of average prices are realized for most product categories. This assumption appeals to the rational expectations hypothesis that argues firms use information efficiently to forecast future prices.[8] The rational expectations hypothesis does not, however, maintain that predictions are always accurate. But to get better predictions more information is needed. When expectations are not realized then unanticipated windfalls accrue to either exporters (when actual quota prices are lower than expected) or to importers (when actual quota prices are higher than expected).[9]

The relative importance of short-term and longer-term contracts is not known but evidence suggests both types exist. Table D-1 provides a comparison of 1980 monthly quota prices with the monthly export unit values for two product categories, cotton jeans (347/348) and wool sweaters (445/446). (The export unit value of a product includes the charge for quota rights.) There are two export unit value series for cotton jeans, one for each of the two major (and more narrowly defined) products that are contained in the cotton jeans quota category. Similarly, the one

---

[7] As discussed in note 2 Supra, American buyers may also obtain quota rights separately from their order for a textile product. The thrust of the argument in the text is not affected in this case since it would be the buyers that would need to estimate average quota prices over the period for which they have made arrangements to ship products.

[8] The Rational Expectations Hypothesis (REH) was developed by John Muth. For a more recent discussion of the hypothesis see Newbery and Stiglitz. Part of the attraction of invoking the REH is that the observations are assumed to characterize a rational expectations equilibrium (an extension of the textbook market equilibrium) and that in the absence of assuming REH some other, ad hoc, assumption about expectations is required. John F. Muth (1961), "Rational Expectations and the Theory of Price Movements," Econometrica (29), 315-35; David M. G. Newbery and Joseph Stiglitz (1981), The Theory of Commodity Price Stabilization (Oxford), Chap. 10.

[9] Note that there is another possible way of justifying our use of a weighted average of monthly quota prices to measure the annual average quota price for the year that does not invoke the rational expectations hypothesis. This involves searching for an unbiased estimator of the true annual average quota price where the weighted average measure is one estimator. We cannot be assured that the weighted average measure is an unbiased estimator but, on the other hand, we are unaware of any systematic biases with the use of this measure. I am grateful to David Tarr for suggesting this alternative point of view.

TABLE D-1

Export Product Prices and Prices of Quota Rights for Cotton Jeans and Wool Sweaters in 1980

Month	Export Unit Value: Mens Cotton Jeans	Export Unit Value: Womens Cotton Jeans	Price of Quota Rights For Cotton Jeans	Export Unit Value for Womens Knit Wool Jackets and Pullovers	Price of Quota Rights for Wool Sweaters
	(Hong Kong Dollars per Dozen)				
Jan.	300	275	n.a.	334	n.a.
Feb.	304	287	n.a.	331	n.a.
Mar.	317	286	50	343	n.a.
Apr.	333	302	80	353	180
May	351	316	76	383	180
June	353	328	80	424	200
July	356	330	220	455	300
Aug.	380	341	220	476	300
Sept.	408	363	250	503	310
Oct.	402	383	140	542	150
Nov.	426	386	70	589	n.a.
Dec.	395	372	n.a.	513	n.a.

n.a. = Not available

Sources: Hong Kong Trade Statistics, 1980, and Trade Industry and Customs Department, Hong Kong Government.

export unit value series for wool sweaters refers to the major product within the wool sweater quota category.[10] Quota prices for both quota categories are markedly higher in the third quarter of the year. However, this is not fully reflected in the changes in product prices, particularly for cotton jeans. Product prices do increase, but at a smoother rate than quota prices. This can be explained by the incorporation of a constant average quota price in longer-term contracts, which operates to steady product prices, while short-term contracts fully incorporate current quota prices in product prices.

The calculation of weighted average quota prices for 1980 is based on the monthly quota price data given in Table B-1. However, this data set is not complete; no quota prices are available for several months. Three methods are used to cope with this missing value problem. (1) Method I calculates weighted average prices using only the months that have reported prices. This assumes that the resulting weighted averages are representative for the year. (2) Method II replaces the missing values by the lowest reported monthly price.[11] This approach will provide an underestimate of the true average if the missing quota prices are (on average) larger than the lowest reported price. (3) Method III replaces all missing values with zero. This method yields a lower bound for average quota prices. It understates the true weighted average prices because the quotas are effective for all categories, which implies that the missing quota prices are positive. The results of the calculations are given in Table D-2.

It is interesting to note that the differences in average quota prices between methods I and II are generally small, less than $1.00 per dozen in five of nine categories. The largest percentage difference between the two average quota prices for these five categories is 22 percent, for cotton knit shirts and blouses (338/339). Furthermore, in two categories where the difference exceeds $3 per dozen, for cotton jeans (347/348) and wool sweaters (445/446), the method II average price is still large, over $20 for cotton jeans and over $40 for wool sweaters. For these two categories the average prices remain high even under method III, $18 for cotton jeans and $37 for wool sweaters. This is a consequence of the relatively high quota prices reported for these products plus the comparatively large number of monthly observations available, 9 for cotton jeans and 7 for wool sweaters.

In the text the magnitudes of the economic rents and consumption distortions will emphasize one method of deriving average quota prices, the method regarded as the most likely to provide correct average prices. The preferred method involves a choice between methods I and II since method III gives patently low average prices. This issue is discussed in Appendix E.

---

[10] See Appendix E which considers the correspondance between quota categories and export items.

[11] With the exception of category 341 where zero is the lowest reported quota price. In this case the lowest nonzero price is used.

TABLE D-2

Weighted Average Quota Prices
for Hong Kong Textile Exports
to the United States in 1980

Quota Category		Method I	Method II	Method III
		(US Dollars Per Dozen)		
333/334:	Cotton Coats, MB	19.19	15.63	6.04
335:	Cotton Coats, WGI	40.48	40.09	7.34
338/339:	Cotton Knit Shirts and Blouses	4.01	3.12	2.74
340:	Cotton Shirts, Not Knit, MB	5.49	5.06	3.76
341:	Cotton Blouses, Not Knit, WGI	1.10	0.78	0.65
345:	Cotton Sweaters	20.00	20.00	1.95
347/348:	Cotton Trousers	24.45	20.81	18.29
445/446:	Wool Sweaters	45.93	40.03	37.57
641:	MMF Blouses, Not Knit, WGI	14.58	10.21	8.02

Notes: MB = mens and boys
WGI = womens, girls and infants
MMF = man-made fiber

Weighted average quota prices (WAP) are:

Method I: $WAP_I = \Sigma_i P_i q_i / \Sigma_i q_i$

where i denotes months for which quota prices are available;

Method II: $WAP_{II} = (\Sigma_i P_i q_i + \Sigma_j p^{min}_i q_j)/(\Sigma_i q_i + \Sigma_j q_j)$

where p^{min}_i is the minimum reported monthly quota price and j denotes months for which quota prices are not available;

Method III: $WAP_{III} = \Sigma_i P_i q_i / (\Sigma_i q_i + \Sigma_j q_j)$

Sources: (1) for monthly quota prices, Table B-1;

(2) For monthly quantities, quantities licensed for export as reported in "Notice to Exporters: Series 1A (USA)," Trade Industry and Customs Department, Hong Kong Government. (monthly, mimeo).

APPENDIX E

Comparing Two Methods of Calculating Average Quota Prices

This Appendix discusses the steps and presents the data used to compare two methods to measure average quota prices. The two methods, I and II, were defined in Appendix D. Method I calculates weighted average quota prices using only the months that have reported prices. Method II calculates a weighted average price by assuming that the quota prices for the months with missing values are equal to the lowest reported monthly price. Since method I average quota prices generally exceed those for method II, we attempt to discover whether Method I is biased upward. To test for possible bias, Hong Kong export unit values are studied based on the assumption that monthly quota prices and monthly export unit values (which include quota prices) are positively correlated. That is, we expect that changes in quota prices are a major factor in explaining movements in export unit values. (The other major factor is changes in production costs, about which we lack specific information for product categories.) The specific criterion that is adopted is to compare (a) the export unit value for 1980 with (b) the export unit value covering the months for which quota prices are reported. If (a) equals or exceeds (b) then it is not expected that the months for which quota prices are available are months that tend to have above average (for the year) quota prices; accordingly method I is not likely to be biased upward and method I is the preferred method to find average quota prices. On the other hand if (b) exceeds (a) then method II is the preferred method.

The first step was to find six-digit export trade items in the Hong Kong export/import classification system that correspond to the U.S. textile quota categories. This was done by comparing descriptions given in official Hong Kong and United States trade materials.[1] Only approximate correspondences are possible because the descriptions available are very broad and because the assortment of individual clothing articles is so diverse. Table E-1 gives the six-digit Hong Kong trade items that appear to be contained in each U.S. textile quota category. As a check for completeness the 1980 quantity licensed for each quota category is compared with the quantity of exports for all trade items matched to the quota category. In all but one quota category the two sums are in close agreement, differing by at most 13 percent. The exception is quota category 345; it was not possible to find corresponding export trade items for this quota category.

For each quota category only a few six-digit trade items are found to dominate exports, accounting for at least 96 percent of total exports. These items are marked with an asterisk and used to find export unit values.

Table E-2 shows the average export unit values (per dozen) for the entire year, 1980, and for the months with quota prices. For eight categories the 1980 unit value is less than the unit value for months that report quota prices. For these categories (all except 340) we expect that reported quota prices exceed the quota prices for the months in which we have no quota price

---

[1] For Hong Kong, the source was Hong Kong Trade Statistics, Exports and Reexports, Census and Statistics Department, Hong Kong Government, December 1980. For the United States the source was U.S. Department of Commerce, Office of Textiles (1980), "Correlation: Textile and Apparel Categories with Tariff Schedules of the United States Annotated."

TABLE E-1

Correspondence Between U.S. Textile Quota Categories and Hong Kong Six-Digit Trade Items in 1980

U.S. Quota Category	Description	Quantity Licensed in 1980	Hong Kong Trade Item	Description	Quantity Exported to U.S. in 1980
333/334	Cotton Coats - Mens and Boys includes suit-type coats and others, raincoats, jogging etc.--knit and not knit.		842421*	Jackets, uniforms, mens--not knit, cotton	1,439,987
			842422*	Jackets, uniforms, boys--not knit, cotton	168,342
			842932	Raincoats, mens, cotton--not rubberized	63,073
			842933	Raincoats, boys, cotton--not rubberized	1,608
			845922	Coats, uniforms, mens--knit, cotton	460
	Quota in Dozens	160,185		Total (number) Exports in Dozens	1,673,470 139,456
335	Cotton Coats - Womens, Girls, and Infants--includes ready-wear, raincoats, jogging, etc.--Knit and not Knit		843121*	Coats, uniforms, womens--not knit, cotton	2,738,790
			843122	Coats, uniforms, girls--not knit, cotton	34,271
			843943*	Raincoats, womens, cotton-not rubberized	450,073
			843944	Raincoats, girls, cotton-not rubberized	1,824
			845226	Coats, uniforms, womens--knit, cotton	33,814
			845228	Dresses, coats, infants--knit, cotton	58,452
	Quota in Dozens	277,807		Total (number) Exports in Dozens	3,317,224 276,435

TABLE E-1 (continued)

U.S. Quota Category	Description	Quantity Licensed in 1980	Hong Kong Trade Item	Description	Quantity Exported to U.S. in 1980
338/339	Cotton Knit shirts and blouses--mens and boys, womens, girls and infants--includes T-shirts, sweat-shirts, others.		845930*	Blouses--knit, cotton	12,686,944
			846211*	Shirts NES--Knit, cotton	16,515,425
			846212	Dress shirts--knit, cotton	393,572
				Total (number)	29,595,991
	Quota in Dozens	2,502,681		Exports in Dozens	2,466,333
340	Cotton shirts - not knit--mens and boys--includes dress shirts, work shirts, sport shirts, and others.		844111*	Shirts NES--not knit cotton	19,644,127
			844112*	Dress shirts--not knit cotton	9,339,269
				Total (number)	28,983,396
	Quota in Dozens	2,425,873		Export in Dozens	2,415,283
341	Cotton blouses - not knit--womens, girls and infants--includes ornamental and non ornamental, broadcloth, and silk and vegetable fibers.		843511*	Blouses--not Knit, cotton--not embroidered	23,780,618
			843512*	Blouses--not knit, cotton--embroidered	437,258
				Total (number)	24,217,876
	Quota in Dozens	2,202,333		Exports in Dozens	2,018,156
347/348	Cotton trousers - mens and boys, womens, girls, and infants--includes knit and not knit, shorts, ornamented and not ornamented, and denim.		842321*	Slacks, jeans, mens--not knit, cotton	22,443,364
			842322*	Slacks, jeans, boys--not knit, cotton	3,826,597
			843947*	Slacks, jeans, womens--not knit, cotton	33,448,131
			843948*	Slacks, jeans, girls--not knit, cotton	3,645,611
			845926	Slacks, jeans, mens--knit, cotton	77,477
			845927	Slacks, jeans, boys--knit, cotton	47,042
			845933	Slacks, jeans, womens--knit, cotton	404,064
			845934	Slacks, jeans, girls--knit, cotton	5,765
				Total (number)	63,898,051
	Quota in Dozens	5,763,923		Exports in Dozens	5,324,837

TABLE E-1 (continued)

U.S. Quota Category	Description	Quantity Licensed in 1980	Hong Kong Trade Item	Description	Quantity Exported to U.S. in 1980
445/446	Wool sweaters - mens and boys--womens, girls, and infants--knit and not knit, ornamented and not ornamented, and cashmere.		845111*	Jackets, pullovers - Mens--knit wool	2,321,312
			845112*	Jackets, pullovers - Boys--knit wool	372,404
			845113*	Jackets, pullovers - Womens--knit wool	12,812,670
			845114*	Jackets, pullovers - Girls--knit wool	155,150
				Total (number)	15,661,536
	Quota in Dozens	1,215,093		Exports in Dozens	1,305,128
641	Blouses, not knit, man-made fibers--womens, girls, and infants, includes vegetable fibers and silk, ornamented and not ornamented.		843521*	Blouses, not knit, man-made fibers, not embroidered	9,009,934
			843522	Blouses, not knit, man-made fibers, embroidered	110,057
				Total (number)	9,119,991
	Quota in Dozens	710,736		Exports in Dozens	759,999

Sources for descriptions of U.S. quota categories

(1) U.S. General Imports of Textile Manufacturers, Except Cotton, U.S. Department of Commerce - International Economic Policy, Office of Textiles; November 1981--Issued January 1982 (TQ 2750);

(2) U.S. General Imports of Cotton Manufactures, U.S. Department of Commerce - International Economic Policy, Office of Textiles; November 1981--Issued January 1982 (TQ 2709)

Source of Hong Kong export information: Hong Kong Trade Statistics Exports and Re-exports, Census & Statistics Department, Hong Kong, December 1980.

Source of Hong Kong quantities licensed by quota categories:

"Notice to Exporters: Series 1A (USA), No. 15/80," Trade Industry and Customs Department, Hong Kong, May 1981.

Note: * Indicates six-digit trade items selected to represent quota category for calculation of export unit values.

TABLE E-2

Hong Kong Export Unit Values
by Quota Categories, 1980

Quota Category		Number of Months that Report Quota Price	Export Unit Value for 1980	Export Unit Value for months that have reported Quota Price
			(U.S. Dollars Per Dozen)	
333/334:	Cotton Coats, MB	4	120	140
335:	Cotton Coats, WGI	2	156	162
338/339:	Cotton Knit Shirts and Blouses	8	44.9	46.6
340:	Cotton Shirts, Not Knit, MB	7	43.5	43.2
341:	Cotton Blouses, Not Knit, WGI	7	40.5	41.6
347/348:	Cotton Trousers	9	64.1	65.9
445/446:	Wool Sweaters	7	87.1	88.3
641:	MMF Blouses, Not Knit, WGI	5	62.8	66.8

Notes: MB = mens and boys
WGI = womens, girls and infants
MMF = man-made fiber

For export unit values, the trade items covered are shown by (*) in Table E-1. The sources for the monthly and annual Hong Kong export data are also listed in Table E-1. The value of exports is given in Hong Kong dollars. The annual exchange rate is applied to convert to U.S. dollars, from Hong Kong Monthly Digest of Statistics, September 1981.

information. This suggests that method II is the preferred method to calculate annual average quota prices since this method assigns the lowest reported monthly quota price to the months that do not have quota prices. The exception is category 340 where average export unit value for the full year exceeds the average export unit value for the months that have reported quota prices ($43.5 vs $43.2). Given this small difference and the convenience of working with one preferred method for all quota categories, method II was adopted as the preferred method for all categories.

APPENDIX F

A Derivation of Price Elasticities of Import Demand for Hong Kong Textile Products

This appendix presents an analytical framework to derive price elasticities of import demand for nine Hong Kong textile products. Given these elasticities it is possible to estimate the increase in the quantity of Hong Kong imports for each of the nine products if the import quotas are removed. These results are used to calculate the consumption distortion effect, in chapter IV, section C of the text. As a byproduct of deriving the Hong Kong elasticities, the analytical framework provides values for the cross elasticities of demand for U.S. produced textiles and these elasticities are used to estimate the cost of domestic unemployment in chapter IV, section D.

1. General Equation for the Increase in Imports from Hong Kong

Import demand for a Hong Kong textile product depends on Hong Kong price as well as prices for rival textile goods produced by other countries, including domestic textiles.[1] That is:

$$(F\text{-}1) \quad X_{ij} = f(P_{ij}, P_{ik})$$

where:

X_{ij} is the quantity demanded of textile product i made in Hong Kong (j = Hong Kong)

P_{ij} is the price for textile product i made in Hong Kong,

P_{ik} represents prices for rival textile products made in other countries.

Thus, if import quotas are removed the effect on imports from Hong Kong will depend on how Hong Kong prices and prices of other countries change. Taking the total differential of (F-1) and making simple algebraic transformations, the percent change in U.S. imports from Hong Kong in response to price changes in Hong Kong and other countries can be expressed as follows:

$$(F\text{-}2) \quad dX_{ij}/X_{ij} = -\eta_{ij}(dP_{ij}/P_{ij}) + \sum_{k \neq j} \delta_{ijk}(dP_{ik}/P_{ik})$$

where:

dX_{ij}/X_{ij} is the percent change in the quantity of imports of textile product i from Hong Kong,

dP_{ik}/P_{ik} is the percent change in the price of textile product i from country k (including Hong Kong),

η_{ij} = the (absolute value of the) own price elasticity of import demand for Hong Kong textile product i,

δ_{ijk} = the cross elasticity of demand between Hong Kong and country k.

---

[1] Import demand also depends on U.S. total income and the prices of other, non textile products. However, the effects on these variables of a change in U.S. textile import policy are assumed to comparatively small and are ignored.

simplifying procedures [illegible] loped by Armington is used to obtain values for η_{ij} and δ_{ijk} from available aggregate data.[2] Second, information on structural features of the industry and knowledge about the effectiveness of U.S. textile quotas on foreign suppliers are introduced to limit the number of countries that need to be considered (i.e., reduce the number of δ_{ijk} terms that we need to obtain). These procedures are necessary because econometric estimates of own and cross price elasticities by country are not available. The approach taken here will enable us to work from information about demand parameters for total U.S. consumption and for total imports (which are available) to derive demand parameters for individual countries.

2. The Armington Approach

Armington's analysis of import demand builds on earlier studies of aggregation, which defined aggregate goods consisting of closely related individual products and measured the quantity and price of each aggregate or group good.[3] In Armington's view, aggregate goods are different in kind, while individual products are distinguished by place of production. For example, aggregate good food is different in kind from aggregate good clothing. Within aggregate good clothing, U.S. clothing and Hong Kong clothing are imperfect substitutes.

Assumptions. With this hierarchial view of products and starting from the traditional neoclassical utility theory, Armington makes three simplifying assumptions.

First, it is assumed that the optimal spending decision of a consumer can be characterized by a two step procedure. At the outset, consumers decide how to allocate their spending among aggregate goods, e.g., 10 percent to food and 5 percent to clothing. Next, within each group good, consumers decide how much to buy of specific products e.g., U.S. clothing vs. Hong Kong clothing. The initial decision is based on average prices for aggregate goods, while the second level decision is guided by prices of individual products within the aggregate and is independent of prices of individual products in other group goods.

The necessary and sufficient condition for the two step spending decision is that the total quantity of each aggregate good is a linear homogeneous function of the specific country-sourced products that belong to the group.[4] That is

$$(F\text{-}3) \quad X_i = \phi_i(X_{i1}, X_{i2}, \ldots, X_{im})$$

where ϕ_i is linear homogeneous and X_i, the total quantity for aggregate good i, depends only on the individual products in good i from all m countries. The linear homogeneous assumption ensures that the average price of each aggregate good depends only on the prices of the specific products in the aggregate and

---

[2] Paul S. Armington (1969), "A Theory of Demand for Products Distinguished by Place of Production," IMF Staff Papers, 61(1), pp. 159-78. Note that the notation in this appendix follows Armington.

[3] This literature is reviewed in H.A. John Green (1964), Aggregation In Economic Analysis (Princeton Univ. Press), Chapts. 2-4.

[4] Green, Supra, chapt. 4. This condition is known as homogeneous functional separability.

is independent of the total amount (or scale) of group purchases.

Second, it is assumed that the elasticity of substitution between each pair of individual products in an aggregate good is constant and the same for all pairs. This symmetry condition means that the ease of substitution is the same between e.g., U.S. vs. Hong Kong clothing as it is between Hong Kong and Taiwanese clothing. This assumption holds if the aggregate quantity is a constant elasticity of substitution (CES) function of the quantities of the specific products purchased from each country. A CES function is also linear homogeneous as required by the first assumption. Expressing equation (F-3) as a CES function,

$$(F\text{-}4) \quad X_i = \phi_i(\ ) = [b_{i1}X_{i1}^{-\rho_i} + b_{i2}X_{i2}^{-\rho_i} + \ldots + b_{im}X_{im}^{-\rho_i}]^{-1/\rho_i}$$

where the b_i's are constant coefficients and ρ_i is a parameter for group i related to the elasticity of substitution. Specifically, the elasticity of substitution for group i is $\sigma_i = 1/(1+\rho_i)$.[5]

An important property of CES functions is that several specific products in equation (F-4) can be combined and the combination can be also expressed as a CES function. In particular, equation (F-4) can be expressed as a function of all imports, X_{iN}. Specifically, let X_{i1} be the quantity of the U.S. product while foreign-made products are X_{i2} through X_{im}. Then

$$(F\text{-}5) \quad X_i = [b_{i1}X_{i1}^{-\rho_i} + (1-b_{i1})X_{iN}^{-\rho_i}]^{-1/\rho_i}$$

where

$$(F\text{-}6) \quad X_{iN} = [c_{i2}X_{i2}^{-\rho_i} + \ldots + c_{im}X_{im}^{-\rho_i}]^{-1/\rho_i}$$

and where the sum of the c_{ij}'s is one and the parameter ρ_i is the same as in equation (F-4). As explained below, this property of CES functions plays a crucial role in our estimation of demand elasticies.

Demand for Aggregate Goods and Individual Products. Under these assumptions the demand functions for a utility maximizing consumer with a given money income (D) are as follows: First, the demand function for each product group is

$$(F\text{-}7) \quad X_i = X_i(D, P_1, P_2, \ldots, P_n)$$

where $P_1, P_2, \ldots, P_n$ are average prices for aggregate goods. Second, it can be shown that the demand function for the product of a specific country takes the form[6]

---

[5] The elasticity of substitution between any two specific products, X_{ij} and X_{ik} (from countries i and k), is defined as the negative of the percent change in X_{ij}/X_{ik} divided by the percent change in P_{ij}/P_{ik}.

[6] Armington, Supra, note 2, pp. 172-3.

$$(F\text{-}8)\quad X_{ij} = b_{ij}^{\sigma_i} X_i \left(\frac{P_{ij}}{P_i}\right)^{-\sigma_i}$$

where P_{ij} is the price of product i from country j.

A central feature of this demand model is that equation (F-8) can be interpreted as either the demand for product i from country j or as the total import demand (X_{iN}) for good i (with P_{ij} modified to be the average price for imports).[7] This result is a consequence of the CES specification assumed for X_i in equation (F-4) since, as shown above, X_i can be expressed as a function for all the individual X_{ij}'s (F-4) or, alternatively, X_i can be expressed as a function of the U.S. product and all imports (F-5).

Percent Change in Quantity Demanded. We next present expressions for the percent changes in X_{ij}, X_i and X_{iN}, which are derived from (F-7) and (F-8). These derivations identify the components that make up the own and cross price elasticity terms in (F-2). To obtain the percent change for X_{ij} take the total differential of the natural logarithm of equation (F-8), which yields

$$(F\text{-}9)\quad \frac{dX_{ij}}{X_{ij}} = \frac{dX_i}{X_i} - \sigma_i\left[\frac{dP_{ij}}{P_{ij}} - \frac{dP_i}{P_i}\right].$$

The percent change in X_i is found by taking the total derivative of equation (F-7) and making some simple arithmetic transformations, giving

$$(F\text{-}10)\quad \frac{dX_i}{X_i} = \varepsilon_i\left(\frac{dD}{D}\right) - \eta_i\left(\frac{dP_i}{P_i}\right) + \sum_{k\neq i} \eta_{i/k}\left(\frac{dP_k}{P_k}\right)$$

where: ε_i = the income elasticity of demand for aggregate good i,

η_i = own price elasticity of demand for aggregate good i,

$\eta_{i/k}$ = the cross elasticity of demand for aggregate good i with respect to a change in the price for aggregate good k.

Substituting (F-10) into (F-9) we have

$$(F\text{-}11)\quad \frac{dX_{ij}}{X_{ij}} = \varepsilon_i\left(\frac{dD}{D}\right) - \eta_i\left(\frac{dP_i}{P_i}\right) + \sum_{k\neq i} \eta_{i/k}\left(\frac{dP_k}{P_k}\right) - \sigma_i\left[\frac{dP_{ij}}{P_{ij}} - \frac{dP_i}{P_i}\right]$$

Lastly, the prices for the individual products in group i are introduced explicitly. The P_{ij}'s are contained in P_i. Because X_i is linear homogeneous in the X_{ij}'s [see equation (F-3)] it can be shown that P_i is also linear homogeneous and can be expressed as a weighted average of individual country prices where the weights are market shares for each country.[8] This implies

$$(F\text{-}12)\quad \frac{dP_i}{P_i} = \sum_{j=1}^{m} S_{ij}\left(\frac{dP_{ij}}{P_{ij}}\right)$$

---

[7] Armington, Supra, note 2, pp. 167-8.

[8] Armington, Supra, note 2, p. 174.

country j in total expenditure on aggregate good i. Substituting (F-12) into (F-11) and rearranging gives

$$(F\text{-}13)\quad \frac{dX_{ij}}{X_{ij}} = \varepsilon_i\left(\frac{dD}{D}\right) - \left[(1-S_{ij})\sigma_i + S_{ij}\eta_i\right]\left(\frac{dP_{ij}}{P_{ij}}\right) + \sum_{k\neq j} S_{ik}(\sigma_i-\eta_i)\left(\frac{dP_{ik}}{P_{ik}}\right) + \sum_{k\neq i} \eta_{i/k}\left(\frac{dP_k}{P_k}\right).$$

The similarity between equation (F-13) and equation (F-2) can be seen by letting the percent changes in income $\left(\frac{dD}{D}\right)$ and average prices of other aggregate goods $\left(\frac{dP_k}{P_k}\right)$ be zero, which gives

$$(F\text{-}14)\quad \frac{dX_{ij}}{X_{ij}} = -\left[(1-S_{ij})\sigma_i + S_{ij}\eta_i\right]\left(\frac{dP_{ij}}{P_{ij}}\right) + \sum_{k\neq j} S_{ik}(\sigma_i-\eta_i)\left(\frac{dP_{ik}}{P_{ik}}\right).$$

In other words, equation (F-14) is a special case of equation (F-2) under the assumptions we have made.

Finally, equation (F-14) can be interpreted as the percent change in total import demand for product i, where all terms that involve country j are replaced by total imports. This follows from the alternative interpretation of equation (F-8), discussed above. Specifically, the percent change in total imports is

$$(F\text{-}15)\quad \frac{dX_{iN}}{X_{iN}} = -\left[(1-S_{iN})\sigma_i + S_{iN}\eta_i\right]\left(\frac{dP_{iN}}{P_{iN}}\right) + S_{iN}(\sigma_i-\eta_i)\left(\frac{dP_{il}}{P_{il}}\right)$$

where S_{iN} is the share of imports, P_{iN} is the price of imports, and P_{il} is the price of the U.S. product.

Elasticity Equations. For present purposes the key results of the analysis are three equations for demand elasticities which follow from equations (F-14) and (F-15). Equation (F-16) below is the own price elasticity of U.S. demand for a particular product from country j, equation (F-17) is the cross elasticity of demand between the particular product of country j and corresponding product of country k, equation (F-18) is the own price elasticity of U.S. import demand for all imports of a particular product.

$$(F\text{-}16)\quad \eta_{ij} = (1 - S_{ij})\sigma_i + (S_{ij})\eta_i$$

$$(F\text{-}17)\quad \delta_{ijk} = S_{ik}(\sigma_i - \eta_i)$$

$$(F\text{-}18)\quad \eta_{iN} = (1 - S_{iN})\sigma_i + (S_{iN})\eta_i$$

where:

η_{ij} is the own price elasticity of demand for country j's product,

δ_{ijk} is the cross elasticity of demand between the products of countries j and k,

η_{iN} is the own price elasticity of demand for all imports in aggregate good i,

and σ_i and η_i are absolute values with σ_i assumed to be greater than η_i.[9]

The equations express each elasticity in terms of two components. The two components derive from the fact that a change in the price of one country's product alters the average price level for the group and also changes relative prices within the group. With the price level effect the average price for the aggregated good changes compared to average prices for other groups and each country participates in the increase or decrease in demand for the group. With the relative price effect there is a substitution within the aggregate good increasing (or decreasing) the demand for the product of a country whose price has decreased (increased).

In equation (F-16) the own import elasticity for a product of country j is a weighted average of the demand elasticity for the group (η_i) and the elasticity of substitution between any two countries (σ_i). The weights for the two components involve country j's share of group purchases (S_{ij}). Country j's share is the weight for group elasticity because group price will decline in proportion to this share. The weight for the elasticity of substitution is one minus country j's share since this indicates the fraction of aggregate good sales that are initially held by other countries, which can shift to country j.

Intuitively, equation (F-16) states that a country's price elasticity varies inversely with its share. As its share increases a country's elasticity will fall and approach the group elasticity: the potential to draw customers away from other countries diminishes as the combined shares of rival countries decreases.

Equation (F-17) expresses the cross elasticity of demand in terms of the difference between σ_i and η_i times country k's share of the market. For example, when country k's price rises (other prices constant) there are two opposing effects on the sales by country j. First, there is a positive effect due to within group substitution against country k's product. This is measured by $(S_{ik})(\sigma_i)$, which is positively related to country k's share because the higher its initial share the more country k can lose. Second, the negative effect arises because group price rises and reduces consumption of the group (or from all countries).

Equation (F-18) gives the total import elasticity and has a similar form to equation (F-16). The difference is that the weights for σ_i and η_i involve the share of all imports in total consumption (S_{iN}). This is a consequence of the aggregation property of our assumptions and refers to equation (F-15).

Application of the Armington Model. The application of Armington model to textile imports is based on the following assumptions:

(1) Each textile product category (e.g., cotton jeans) is a product group consisting of specific products made in different countries. Domestically-made cotton jeans are thus a specific differentiated product, as are jeans made in Hong Kong, South

---

[9] This assumption appeals to the notion that the specific products of any two countries in the same product class are closer substitutes than any two product classes.

U.S. market.

(2) The elasticity of substitution between the specific textile products produced by any two countries is constant. Furthermore, this parameter is the same for all pairs of countries.

(3) It is possible to aggregate the specific textile product demands for a group of countries. In particular, the shipments for all exporter countries can be combined and the group can be treated as a single source where the elasticity of substitution parameter between individual countries also applies to the group in relation to domestic supply.

With these specifications equations (F-16) through (F-18) can be applied to textiles where subscript "j" designates Hong Kong (and is replaced by HK in the equations below). For example, equation (F-16) is the own price elasticity for the textile product from Hong Kong, equation (F-17) is the cross price elasticity between Hong Kong and another country (e.g, the U.S. or Taiwan) and equation (F-18) is the total import demand elasticity for a textile product.

Equations (F-16) through (F-18) depend on two parameters, σ_i and η_i. Their values are based on econometric studies of all clothing imports and all clothing consumption, which assume that σ_i and η_i are the same for all clothing product classes. Because of this assumption we will henceforth suppress the subscript i and let η and σ denote the U.S. demand elasticity for each clothing product class and the cross elasticity between any two countries for each clothing product class respectively. The value used for η is .282.[10] Two values are used for σ, 1.41 and 4.39, based on two different estimates of total import price elasticity of demand. For reasons explained in the note below we regard σ = 1.41 as the better estimate; however, we will also use the value σ = 4.39 to test the sensitivity of the deadweight loss estimates to the magnitude of σ.[11]

---

[10] This value is obtained from H.S. Houthakker (1965), "New Evidence on Demand Elasticities," Econometrica 33(2), p. 280.

[11] The value of σ is found by applying equation (F-18) to total imports of clothing. Solving this equation for σ gives $\sigma = [1/(1-S_N)][\eta_N - S_N\eta]$. There are two values for η_N, from Joe A. Stone (1979), "Price Elasticities of Demand for Imports and Exports," Review of Economics and Statistics 61(2), p. 308, and from Margret Buckler and Clopper Almon (1972), "Imports and Exports in an Input-Output Model," American Statistical Association, 1972, Proceedings of the Business and Statistics Section, p. 180. Stone's elasticity estimate is -1.24 while the Buckler-Almon estimate is -3.77. Stone's estimate is more appropriate for present purposes because the form of the estimated regression equation (linear in the logs of the variables, including separate variables for import price and domestic price) is the form called for by the Armington model. In the Buckler-Almon model, the ratio of import price to domestic price enters the regression equation. This constrains the elasticity estimate for imports to equal (the negative of) the elasticity estimate for the domestic product. Finally, the value share of imports to domestic consumption is based on an average of import shares over the period 1963 and 1972 (the observation period for Stone's regression) calculated from Research Department, International Ladies' Garment Workers' Union (1982), "Estimation of Apparel (Knit and Woven) Imports: A Methodological Note", (mimeo., Revised Aug. 1982).

3. Industry Supply Conditions and Effective Quotas

The second set of assumptions adopted to apply equation (F-2) refers to industry supply conditions and effective quotas. If textile quotas are removed, only prices of textile products from countries that face effective quotas are expected to change. For non-quota restrained countries--including the domestic industry--prices do not change because of the assumption that industry supply curves are perfectly elastic in the relevant range. This assumption is supported by a survey of econometric studies of industry cost conditions that suggest the apparel industry operates under conditions of constant costs.[12] Thus the cross elasticity terms in equation (F-2) (i.e., the δ_{jk}'s) apply to countries that face effective textile import quotas.

Additionally, we will only consider South Korea and Taiwan because both face effective quotas and both are significant exporters to the U.S. (See Table 1). We also assume that the percent price changes for South Korea and Taiwan equal the percent price changes for Hong Kong.[13] Finally, even though South Korea and Taiwan face effective import quotas the estimation of the consumption distortion will focus solely on Hong Kong because we lack sufficient data for South Korea and Taiwan.[14]

---

12 An extensive survey of econometric results suggests that constant cost conditions are appropriate for a variety of manufacturing industries, but unfortunately the apparel industry was not covered by the survey. See Alan A. Walters (1963) "Production and Cost Functions," Econometrica, 31, pp. 1-66. However, a recent study found that economies of scale and barriers to entry were not significant for apparel. This is consistent with the proposition that the industry supply curve is horizontal. Council on Wage and Price Stability, COWPS (1978), Textiles/Apparel: A Study of the Textile and Apparel Industries (Govt. Printing Office)

13 This assumption may lead to an underestimate of the increase in imports from Hong Kong. That is, elimination of quotas may lead to larger percentage cuts for prices of Hong Kong textiles than for the prices of South Korean and Taiwanese textiles. This view is based on limited evidence which indicates that quota prices in South Korea and Taiwan are generally smaller than in Hong Kong. This is suggested by a comparison of quota prices (for the same quota categories) for the three textile exporters. In four of the six quota categories where comparisons of quota prices are possible, quota prices in Hong Kong exceed those in South Korea and/or Taiwan. See the following footnote.

14 Thus the social losses arising from the quotas on South Korea and Taiwan are ignored. The key data that are needed to evaluate the effects of the quotas on South Korea and Taiwan are quota prices or measures of the sizes of the price-cost margins produced by the quotas. Some information about quota prices in South Korea and Taiwan exists, but it is not adequate to estimate deadweight losses. For example, at the request of Congressman Gibbons, an official of the American Association of Exporters and Importers submitted the following data on quota prices to the Subcommittee on Trade in December 1981.

(footnote continues)

(footnote continued)

Quota Premiums For Selected Products

Country	Category	Description	Quota Premiums 1980 High	1980 Low	Fall 1981
			(U.S. dollars per dozen)		
Hong Kong	347/348	Cotton Trousers	$50	$9	$17.00
	340	Cotton Shirts	7	4	5.00
	341	Cotton blouses	5	2	7.50
	436	Wool dresses	NA	NA	17.00
	445/446	Wool sweaters	49	15	27.00
	640	MMF shirts	4	3	2.00
	641	MMF blouses	44	12	19.00
Taiwan	333/334/335	Cotton coats			50.00
	338/339	Cotton knits shirts	15	10	7.00
	340	Cotton shirts	5	2	4.00
	341	Cotton blouses	7	3	18.00
	445/446	Wool sweaters	12	3	12.00
	663/634/635	MMF coats			40.00
	640	MMF shirts	2	0	0
	641	MMF blouses	15	3	15.00
	645/646	MMF sweaters	15	3	5.00
South Korea	335	Cotton jackets	18	12	
	340	Cotton shirts	5	3	3.00
	341	Cotton blouses	5	3	3.00
	347/348	Cotton trousers	7	3	
	445/446	Wool sweaters	15	10	
	640	MMF shirts	2	0	2.00
	641	MMF blouses	2	0	2.00
	645/646	MMF sweaters	6	2	

These data suggest that the import quotas on several South Korean and Taiwanese textile products generate deadweight social losses to the U.S. But the data only show the ranges for quota prices in 1980 (and quite wide ranges). We do not know the quantities of shipments that applied to different quota prices, nor do we have weighted average quota prices for the textile products. U.S. Congress, House of Representatives, Committee on Ways and Means, Subcommittee on Trade (1982), Hearings, U.S. Trade Policy, Phase II: Private Sector, 97th Cong., 1st Sess., Part A, Serial 97-46, (U.S. Government Printing Office), pp. 217-18.

4. Price Elasticities for Hong Kong

Equation (F-2) can now be simplified based on the assumptions of the previous sections. The percent change in imports from Hong Kong can be written in (F-19):

$$(F\text{-}19) \quad dX_{HK}/X_{HK} = [-\eta_{HK} + (\delta_{HK,SK} + \delta_{HK,T})](dP_{HK}/P_{HK})$$

where $\delta_{HK,SK}$ and $\delta_{HK,T}$ are the cross elasticities for South Korea and Taiwan. From equations (F-16) and (F-17) the bracketed term on the right hand side of (F-19) can be expressed in terms of the parameters σ and η in (F-20):

$$(F\text{-}20) \quad dX_{HK}/X_{HK} = \{-[(1-S_{HK})\sigma+S_{HK}\eta] + (S_{SK}+S_T)(\sigma-\eta)\}(dP_{HK}/P_{HK})$$

where S_{SK} and S_T are the shares of South Korean and Taiwanese imports in U.S. consumption.

The derived price elasticities for Hong Kong are calculated in Table F-1. For the case where the elasticity of substitution (σ) equals 1.41, the own price elasticities range from 1.02 to 1.37. Because the cross elasticities are much smaller, less than 0.1, the total elasticities (or combination of own and cross elasticities) range from .96 to 1.30. For the less plausible case where the elasticity of substitution equals 4.39, the own, cross, and total price elasticities are substantially larger. For instance, the range for the total price elasticities is 2.74 to 3.99.

The total import demand elasticities for Hong Kong are needed to calculate the consumption deadweight losses arising from the import quotas. The full array of these losses is given in Appendix G for all combinations of parameter values for σ and values for dP_{HK}/P_{HK}.

5. General Equation for the Decrease in Value of Domestic Production

Analogous to the discussion in section 1 above, the demand for a domestic textile product can be expressed as a function of domestic price and prices of substitute products made abroad. When prices change the percent change of U.S. shipments is:

$$(F\text{-}21) \quad dX_{US}/X_{US} = -\eta_{US}(dP_{US}/P_{US}) + \sum_{j \neq US} \delta_{US,j}(dP_j/P_j),$$

where:

dX_{US}/X_{US} is the percent change in the quantity of a domestic textile product,

dP_j/P_j is the percent change in the price of the textile product from country j (including the U.S.)

η_{US} is the (absolute value of the) own price elasticity of demand for the U.S. textile product,

$\delta_{US,j}$ is the cross elasticity of demand between the U.S. and country j.

Equation (F-21) takes a simplified form when determining the domestic response to the elimination of import quotas. As explained in the previous section, only prices for the textile

TABLE F-1

Derived Price Elasticities for Imports of Hong Kong Textile Products

Product Category	(1) η	(2) σ	(3) S_{HK} (percent)	(4) $(1-S_{HK})\sigma$	(5) $(S_{HK})\eta$	(6) Direct Price Elasticity $(1-S_{HK})\sigma + (S_{HK})\eta$	(7) S_{SK} (percent)	(8) S_T (percent)	(9) $S_{SK}+S_T$ (percent)	(10) $(\sigma-\eta)$	(11) Cross Price Elasticity $(S_{SK}+S_T)$ x$(\sigma-\eta)$	(12) Total Price Elasticity (Col.6 -Col.11)
333/334	.282	1.41	6.02	1.325	.017	1.342	1.78	1.87	3.65	1.13	.041	1.301
335	"	"	16.32	1.180	.046	1.226	2.58	3.72	6.30	1.13	.071	1.155
338/339	"	"	9.89	1.271	.028	1.299	1.43	1.70	3.13	1.13	.035	1.264
340	"	"	20.86	1.116	.059	1.175	1.54	5.42	6.96	1.13	.079	1.096
341	"	"	19.85	1.130	.056	1.186	1.04	4.34	5.38	1.13	.061	1.125
345	"	"	18.40	1.151	.052	1.203	1.97	2.32	4.29	1.13	.048	1.155
347/348	"	"	11.07	1.254	.031	1.285	0.42	1.75	2.17	1.13	.025	1.260
445/446	"	"	34.31	0.926	.097	1.023	1.84	4.11	5.95	1.13	.099	.956
641	"	"	3.77	1.357	.011	1.368	5.00	3.77	8.77	1.13	.099	1.269
333/334	.282	4.39	6.02	4.126	.017	4.143	1.78	1.87	3.65	4.11	.150	3.993
335	"	"	16.32	3.674	.046	3.720	2.58	3.72	6.30	4.11	.259	3.461
338/339	"	"	9.89	3.956	.028	3.984	1.43	1.70	3.13	4.11	.129	3.855
340	"	"	20.86	3.474	.059	3.533	1.54	5.42	6.96	4.11	.286	3.247
341	"	"	19.85	3.519	.056	3.575	1.04	4.34	5.38	4.11	.221	3.354
345	"	"	18.40	3.582	.052	3.634	1.97	2.32	4.29	4.11	.176	3.458
347/348	"	"	11.07	3.904	.031	3.935	0.42	1.75	2.17	4.11	.089	3.846
445/446	"	"	34.31	2.884	.097	2.981	1.84	4.11	5.95	4.11	.245	2.736
641	"	"	3.77	4.224	.011	4.235	5.00	3.77	8.77	4.11	.360	3.875

Notes: The expressions for direct, cross and total elasticities are in equations (F-16), (F-17), and (F-20) in the text. The values for η (the price elasticity of demand for total US clothing consumption) and σ (the elasticity of substitution) are from page 110.

Sources: The market shares for Hong Kong (S_{HK}), South Korea (S_{SK}) and Taiwan (S_T) are derived from two reports by the U.S. Department of Commerce, Office of Textiles: (1) U.S. Production, Imports and Import/Production Ratios for Cotton, Wool, and Man-made Fiber Textiles and Apparel, June 1982 and (2) Major Shippers Report, U.S. Cotton, Wool and Manmade Fiber Textile and Apparel, General Imports, 1982.

products in Hong Kong, South Korea, and Taiwan are expected to change in this situation. Domestic prices remain steady because U.S. production appears to involve constant cost conditions, so that the domestic supply curve is horizontal. Prices for textile products produced in countries other than Hong Kong, South Korea, and Taiwan will also remain unchanged for two reasons: (1) these countries do not face effective import quotas and (2) their supply curves are assumed to be horizontal. Under these conditions and substituting for the $\delta_{US,j}$ from equation (F-17), the consequence for domestic production of removing import quotas may be written as:

$$(F\text{-}22) \quad dX_{US}/X_{US} = (S_{HK} + S_{SK} + S_T)(\sigma - \eta)(dP_{HK}/P_{HK}),$$

where, following the treatment in the previous section, the percent change in Hong Kong price is assumed to apply to the price changes of South Korea and Taiwan. As explained in footnote 13, this assumption may overestimate the price declines of South Korea and Taiwan and, accordingly, overestimate the adverse effect on domestic production.

According to equation (F-22) and recalling that σ is assumed to exceed η, there is a positive correlation between the percentage change in U.S. production and the combined share of the three East Asian textile suppliers. For example, the percentage contraction in U.S. production will be relatively small when the sum of the shares of Hong Kong, South Korea, and Taiwan are low.

Equation (F-22) is the basis for calculating the percentage decline in value of domestic textile production if quotas are dropped. The percentage fall in value equals the percentage fall in quantity because domestic prices are taken to be unaffected by the change in import policy. The results are presented in Appendix H.

APPENDIX G

The Calculation of the Consumption Distortion Effect

The consumption distortion effect of an import quota imposed on a good that is also subject to an ad valorem tariff equals area BCGE in Figure G-1. (Figure G-1 is the same as Figure 2 in the text.) This effect is a deadweight welfare loss to the United States denoted DWL_C.

To calculate DWL_C area BCGE is divided into two parts. Part one, DWL'_C, is the box area BCHE. Part two, DWL''_C, is the triangle area CGH. The base of the box and the base of the triangle are the same and equal the change in quantity of imports, $Q_1 - Q_0$, if the quota is eliminated. Quantity Q_0 is known, the actual amount of imports. The first step is to solve for the quantity that would be imported, Q_1 if the quota were removed.

Quantity Q_1 is found using the formula for the elasticity of demand. This is:

$$(G\text{-}1) \quad e_d = \frac{\text{percent change in Q}}{\text{percent change in P}}$$

where e_d = price elasticity of demand,
P = price,
Q = quantity.

Equation (1) can be expressed as:

$$(G\text{-}2) \quad e_d = \frac{(Q_1 - Q_0)/Q_0}{(P_1 - P_0)/P_0}$$

where Q_0 = initial quantity of imports under the quota,

Q_1 = the new quantity of imports after the quota is removed,

P_0 = initial price paid by importers (exclusive of duties),

P_1 = the new import price (before duties).

Finally, equation (G-2) is solved for $Q_1 - Q_0$ in (G-3),

$$(G\text{-}3) \quad Q_1 - Q_0 = (Q_0)\ (e_d)\ (P_1 - P_0)/P_0$$

Next, three additional price variables are defined, R, P_{0t}, and P_{1t}.

$$(G\text{-}4) \quad P_0 = P_1 + R \text{ or } P_1 = P_0 - R$$

$$(G\text{-}5) \quad P_{0t} = P_0(1+t)$$

$$(G\text{-}6) \quad P_{1t} = P_1(1+t)$$

where R = quota price,

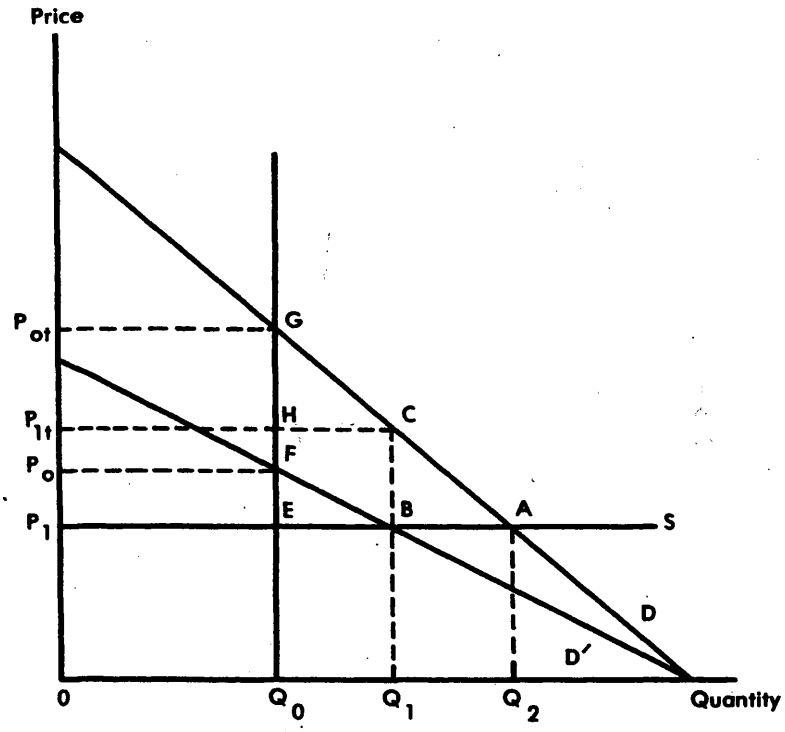
P_{0t} = initial tariff-inclusive import price when the quota is in effect,

P_{1t} = new tariff-inclusive price after the quota is dropped,

t = the ad valorem tariff rate.

FIGURE G-1

The Consumption Distortion of Import Quotas
(same as Figure 2)



Source: Bureau of Economics, Federal Trade Commission

The first part of the consumption distortion, DWL'_c, is:

$$DWL'_c = (P_{1t} - P_1)(Q_1 - Q_0).$$

Substituting from equations (G-4) and (G-6),

(G-7) $$DWL'_c = (P_0 - R)(t)(Q_1 - Q_0).$$

The second part of the consumption distortion, $DWL"_c$, is:

$$DWL"_c = (1/2)(P_{0t} - P_{1t})(Q_1 - Q_0).$$

Substituting from equations (G-4), (G-5), and (G-6),

(G-8) $$DWL"_c = (1/2)[R(1+t)](Q_1 - Q_0).$$

The total consumption distortion is the sum of (G-7) and (G-8):

$$DWL_c = (P_0-R)(t)(Q_1-Q_0) + (1/2)[R(1+t)](Q_1-Q_0).$$

Combining terms and rearranging,

(G-9) $$DWL_c = (Q_1 - Q_0)[P_0t + (1/2)(R)(1-t)].$$

Substituting for $Q_1 - Q_0$ from (G-3) into (G-9) gives:

$$= [(Q_0)(e_d)(P_1-P_0)/P_0][P_0t + (1/2)(R)(1-t)].$$

From equation (G-4), $P_1 - P_0 = -R$ so that:

(G-10) $$DWL_c = (Q_0)(e_d)(-R/P_0)[P_0t + (1/2)(R)(1-t)].$$

Equation (G-10) expresses DWL_c in terms of the initial values of the following variables: quantity of imports, import price, and quota price (Q_0, P_0, and R), and of the following parameters: the elasticity of demand and the tariff rate (e_d and t). This equation is applied to each of the nine clothing products produced in Hong Kong that are subject to U.S. import quotas. The results are contained in Table G-1 on the next page.

The data sources used to calculate DWL_c are as follows:

R, quota prices; see Table D-2,

Q_0, initial quantity; from U.S. Department of Commerce, Office of Textiles, "1980 Performance Report, Textile and Apparel Bilateral Agreements and Unilateral Import Restraints, Hong Kong",

P_0, initial price; derived from value of imports (customs valuation basis) divided by import quantity. The sources of value data are two reports prepared by the U.S. Department of Commerce, Office of Textiles, U.S. General Imports of Cotton Manufactures and U.S. General Imports of Textile Manufactures, Except Cotton (monthly). Import quantities are from U.S. Department of Commerce, Office of Textiles, Major Shippers Report, Category and Country, U.S. Cotton, Wool & Man-Made Fiber Textile & Apparel General Imports (monthly),

e_d, the total price elasticity of import demand; from Table F-1,

t, the ad valorem tariff rate; weighted average tariff rates were calculated from U.S. Bureau of the Census, U.S. Imports for Consumption 1980, IM146. The weights used are value weights for all of the individual import items that make up each quota categroy.

TABLE G-1

Consumption Distortion Effect of the Import Quotas on Hong Kong Textiles

Quota Category		σ = 1.41			σ = 4.39		
		Average Quota Price			Average Quota Price		
		Method I	Method II	Method III	Method I	Method II	Method III
		(Consumption Distortion Effect in Millions of Dollars) (Percent Increase in Imports Shown in Parentheses)					
333/334:	Cotton Coats, MB	$ 0.50 (19.41)	$ 0.39 (16.17)	$ 0.12 (6.47)	$ 1.55 (59.84)	$ 1.16 (48.52)	$ 0.34 (18.60)
335:	Cotton Coats, WGI	2.93 (31.74)	2.91 (31.74)	0.28 (5.64)	8.71 (94.51)	8.60 (93.80)	0.86 (17.28)
338/339:	Cotton Knit Shirts	3.66 (15.03)	2.74 (11.66)	2.37 (10.25)	11.20 (45.97)	8.41 (35.79)	7.26 (31.43)
340:	Cotton Shirts, not knit, MB	3.79 (13.76)	3.44 (12.68)	2.45 (9.44)	11.21 (40.66)	10.17 (37.46)	7.21 (27.82)
341:	Cotton Blouses, not Knit, WGI	0.52 (2.98)	0.36 (2.13)	0.30 (1.75)	1.55 (8.93)	1.10 (6.33)	0.90 (5.29)
345:	Cotton Sweaters	2.25 (31.64)	2.25 (31.64)	0.16 (3.03)	6.63 (93.90)	6.63 (93.90)	0.46 (9.09)
347/348:	Cotton Trousers	67.78 (48.84)	54.35 (41.57)	45.74 (36.54)	207.12 (149.24)	166.09 (127.04)	139.76 (111.65)
445/446:	Wool Sweaters	24.11 (50.61)	19.78 (43.76)	18.07 (41.46)	69.15 (145.13)	56.67 (126.51)	51.76 (118.72)
641:	Blouses, not Knit, MMF, WGI	5.23 (28.46)	3.46 (20.04)	2.64 (15.75)	16.01 (87.19)	10.55 (61.07)	8.02 (47.95)
Total Consumption Distortion for all Categories		$110.77	$ 89.68	$ 72.13	$333.13	$269.38	$216.57

Notes: MB = mens and boys
WGI = womens, girls, infants
MMF = man-made fiber

The formulas and data sources are given in Appendix G. The Consumption Distortion is calculated using equation (G-10). The percent increase in imports uses equation (G-3).

APPENDIX H

The Calculation of the Decline in Value of Domestic Shipments

The calculation of the decline in value of domestic shipments of clothing products if the import quotas are eliminated is based on the results of Appendix F. Equation (F-22) in Appendix F is used for that calculation. Recall that this equation embodies the following assumptions: (1) the U.S. price does not change because the U.S. industry's supply curve is horizontal in the relevant region, and (2) elimination of import quotas causes textile prices to decline by the same percentage in Hong Kong, South Korea, and Taiwan. Rewriting this equation to apply to a percent change in value of domestic shipments gives:

$$dV_{US}/V_{US} = (S_{HK} + S_{SK} + S_T)(\sigma - \eta)(dP_{HK}/P_{HK}),$$

where:

dV_{US}/V_{US} is the percent change in the value of domestic shipments of a textile product,

S_{HK}, S_{SK}, and S_T are the percent shares of U.S. consumption for a textile product accounted for by Hong Kong, South Korea, and Taiwan,

σ is the elasticity of substitution between any two countries in the supply of the textile product,

η is the U.S. price elasticity of demand for the aggregate product (or for the supply of all countries combined),

dP_{HK}/P_{HK} is the percent fall in import price of the textile product made in Hong Kong.

The results of applying this equation are in Table H-1 which follows.

Because the value of domestic shipments for each quota category's products is not compiled by official sources, it was derived by multiplying the quantity of domestic production times an estimate of domestic unit value. Domestic production for quota categories is constructed by the Office of Textiles and appears in their report U.S. Production, Imports and Import/Production Ratios for Cotton, Wool and Man-Made Fiber Textiles and Apparel, (June 1982).

Domestic unit values by quota categories are not available primarily because the basic data sources for value of U.S. shipments do not distinguish between types of fibers (i.e., cotton, wool, and man-made fibers). The basic sources are two publications by the Bureau of the Census: (1) Current Industrial Reports and (2) Annual Survey of Manufactures. Domestic unit values by quota categories were approximated by unit values derived from Current Industrial Reports. The constructed unit values are reported in Table H-2.

Another proxy for domestic unit value is the unit value of exports. The advantage of this measure is that export data do break out clothing by type of fiber. However exports may not be representative of a domestic output and export unit values may understate domestic unit values. One possible reason for this is that exports may be strongly influenced by shipments of semi-finished articles to low wage countries where the garments are finished and then sent back to the United States. Such articles

TABLE H-1

Estimated Absolute and Percent Decline in Value of Annual Domestic Shipments if Import Quotas on Textiles are Eliminated

Category	σ = 1.41 Average Quota Price Methods I	II	III	σ = 4.39 Average Quota Price Methods I	II	III
	(millions of dollars; percent decline in parenthesis)					
333/334	$ 5.78 (1.6)	$ 4.72 (1.3)	$ 1.81 (0.5)	$21.11 (5.9)	$17.21 (4.8)	$ 6.67 (1.9)
335	11.46 (7.0)	11.34 (6.9)	2.08 (1.3)	41.71 (25.4)	41.31 25.2)	7.57 (4.6)
338/339	16.96 (1.7)	13.18 (1.4)	11.63 (1.2)	61.73 (6.4)	48.06 (5.0)	42.15 (4.3)
340	17.03 (3.9)	15.69 (3.6)	11.66 (2.7)	61.96 (14.3)	57.11 (13.2)	42.42 (9.8)
341	1.94 (0.8)	1.38 (0.5)	1.15 (0.4)	7.05 (2.8)	5.01 (2.0)	4.16 (1.6)
345	2.35 (7.0)	2.35 (7.0)	0.23 (0.7)	8.55 (25.4)	8.55 (25.4)	0.83 (2.5)
347/348	220.37 (5.8)	187.64 (4.9)	164.80 (4.3)	802.69 (21.1)	683.18 (17.9)	600.21 (15.8)
445/446	26.20 (24.1)	22.84 (21.0)	21.34 (19.7)	95.43 (87.6)	83.16 (76.4)	78.04 (71.7)
641	36.16 (3.2)	25.36 (2.2)	19.90 (1.7)	131.55 (11.6)	92.10 (8.1)	72.31 (6.4)
Total Decline in Shipments	$338.25	284.50	234.69	1,231.78	1,035.69	854.36

Sources: For combined market shares of Hong Kong, South Korea, and Taiwan--Table F-1; for average quota prices--Table D-2; for initial import prices for Hong Kong--see Appendix G; for initial quantity and unit value for value of domestic shipments--see text of Appendix H and Table H-2.

TABLE H-2

Constructed Unit Values for
1980 Domestic Shipments by Import
Quota Categories

Quota Category	Domestic Unit Value Proxy from Current Industrial Reports	Domestic Unit Value Proxy from U.S. Exports to OECD Countries
	(----------dollars per dozen----------)	
333/334	$279.18	67.10
335	306.78	43.26
338/339	39.21	24.39
340	76.13	25.75
341	74.15	46.16
345	82.84	64.96
347/348	88.92	46.96
445/446	82.84	88.92
641	74.15	19.75

Sources: Bureau of the Census, Current Industrial Reports, Men's and Boy's Outerwear, 1980 (MA23E(80)-1) and Current Industrial Reports, Women's and Children's Outerwear, 1980 (MA-23F(80)-1); Bureau of the Census, U.S. Exports, Schedule B, Commodity by Country FT446/Annual 1980.

receive favorable tariff treatment under section 807 of the tariff schedule. Apparently developing countries are the main parties to the trade in section 807 goods, as opposed to high wage developed countries. Accordingly, to avoid this type of bias, exports to OECD countries, the major developed countries, are used. The export unit values for shipments to OECD countries appear in Table H-2.

For all but one quota category, the unit values based on Current Industrial Reports exceed, by a wide margin, the unit values for U.S. exports. For four categories the difference is greater than threefold. We expect that the major reason for the differences is that wool garments have a higher unit value than cotton or man-made fiber garments. With the Current Industrial Reports unit values, wool garments cannot be isolated to that they appear in the data used to derive unit values for quota categories that exclude wool. The exception is wool sweaters (445/446) where the two proxies vary by less than 10 percent ($82.84 vs. $88.92). For wool sweaters, the export unit value is based entirely on higher value wool products whereas the unit value proxy from the Current Industrial Reports also includes some non-wool articles.

In this report we rely on the Current Industrial Reports proxy for domestic unit value. In part this is because U.S. exports for some quota categories are very small and may be strongly influenced by special transactions (e.g., promotional sales, shipments to U.S. military PX's). Moreover, if it is true that the Current Industrial Reports unit values overstate the true unit values, then the values of domestic shipments will be overestimated. This will result in an upward bias in the estimates for the cost of unemployment.

TABLE H-3

Estimated Total Cost of Unemployment if Import Quotas on Textiles are Eliminated

	σ = 1.41			σ = 4.3		
	Average Quota Price Method			Average Quota Price Method		
	I	II	III	I	II	III
	(----------Millions of dollars----------)					
Direct Cost of Unemployment	13.70	11.60	9.50	50.10	42.10	34.70
Indirect Cost of Unemployment	6.10	5.20	4.20	22.30	18.80	15.50
Total Cost of Unemployment	19.80	16.80	13.70	72.40	60.90	50.20

Note and sources: The procedure to obtain costs of unemployment is explained in the text, chapter IV.D. The sources are also given in the text, and Table H-1.

TABLE I-1

Summary of Benefits and Costs of Removing Import Quotas on Textiles from Hong Kong

	σ = 1.41			σ = 4.39		
	Average Quota Price Method			Average Quota Price Method		
	I	II	III	I	II	III
	(Millions of dollars)					
Benefits (millions)						
Quota Rent	254.35	218.30	178.94	254.65	218.30	178.94
Consumption Distortion Effect	110.77	89.68	72.13	333.13	269.38	216.57
Total Benefit	365.12	307.98	251.07	587.78	487.68	395.51
Costs (millions)						
Total Cost of Unemployment	19.80	16.80	13.70	72.40	60.90	50.20
Benefit-Cost Ratio	18.44	18.33	18.33	8.12	8.01	7.88

Notes: the parameter σ is the elasticity of substitution between the specific textile products produced by any pair of countries; see Appendix F for a discussion of this parameter. The three methods to calculate annual average quota prices for each product category is discussed in Appendices D and E.

Sources: Tables 4, G-1, and H-3.

REFERENCES

Armington, Paul S. (1969). "A Theory of Demand for Products Distinguished by Place of Production," International Monetary Fund Staff Papers 61(1), 159-78.

Baldwin, Robert E., John H. Mutti and J. D. Richardson (1980). "Welfare Effects on the United States of a Significant Multilateral Tariff Reduction," Journal of International Economics 10, 405-423.

Bergsten, C. Fred (1975). "On the Non-Equivalence of Import Quotas and 'Voluntary' Export Restraints." In C.F. Bergsten (ed.), Toward a New World Trade Policy: The Maidenhead Papers (Heath) pp. 239-75.

Bergsten, C. Fred (1972). The Cost of Import Restrictions to American Consumers (American Importers Association).

Bhagwati, Jagdish N. and T.N. Srinivasan (1980). "Revenue Seeking: A Generalization of the Theory of Tariffs," Journal of Political Economy 88(6), 1069-87.

Bhagwati, Jagdish (1965). "On the Equivalence of Tariffs and Quotas." In R.E. Baldwin, et al., Trade, Growth and the Balance of Payments (Rand McNally), 53-67.

Bonavia, David (1966). "A Question of Quotas," Far Eastern Economic Review (June 16), 577-79.

Borcherding, Thomas E. and Eugene Silberberg (1978). "Shipping the Good Apples Out: The Alchian and Allen Theorem Reconsidered," Journal of Political Economy, 86(1), 131-138.

Buchanan, James M., Robert D. Tollison, and Gordon Tullock, eds. (1980). Toward a Theory of the Rent-Seeking Society (Texas A&M University Press).

Buckler, Margaret and Almon (1972). "Imports and Exports in an Input-Output Model," American Statistical Association, Proceedings of the Business and Economic Statistics Section, 175-184.

Carlton, Dennis (1979). "Contracts, Price Rigidity, and Market Equilibrium," Journal of Political Economy 87(5), 1034-62.

Consumers' Association (1979). The Price of Protection (London).

Corden, W.M. (1971). The Theory of Protection (Clarendon Press, Oxford).

Council on Wage and Price Stability, COWPS (1978). Textiles/Apparel: A Study of the Textile and Apparel Industries (Government Printing Office).

Falvey, Rodney E. (1979). "The Composition of Trade within Import-Restricted Product Categories," Journal of Political Economy 87(5, pt. 1), 1105-1114.

Green, H.A. John (1964). Aggregation In Economic Analysis (Princeton University Press).

Greenaway, David (1983). Trade Policy and the New Protectionism (St. Martin's Press.)

Hong Kong Government, Census and Statistics Department (1980). Hong Kong Trade Statistics, Exports and Reexports (Hong Kong).

_____. Hong Kong Monthly Digest of Statistics (monthly), September 1981 and May 1979 (Hong Kong).

_____ (1981). Hong Kong External Trade (Hong Kong).

Hong Kong Government, Trade Industry and Customs Department (1980). Hong Kong Trade Statistics (Hong Kong).

_____. "The Textile Export Control System of Hong Kong," (REF:EIC 9200/20/9/1/).

_____ (1981). "Notice to Exporters: Series 1A (USA) No. 15/80, Export of Restrained Textiles to the USA, Quantity Licensed Against Quota Limits from 1.1.80-31.12.80," (May 5, 1981).

Houthakker, H.S. (1965). "New Evidence on Demand Elasticities," Econometrica 33(2), 277-88.

International Ladies' Garment Workers' Union, Research Department (1982). "Estimation of Apparel (Knit and Woven) Imports: A Methodological Note" (August 1982, Revised)(mimeo).

Jenkins, Glen P. (1980). "Costs and Consequences of the New Protectionism" (Harvard Institute for International Development, Harvard University).

Keesing, Donald B. (1982). "Exporting Manufactured Consumer Goods from Developing to Developed Countries" (Provisional Draft, World Bank).

Kessing, Donald B. and Martin Wolf (1980). Textile Quotas Against Developing Countries (Trade Policy Research Centre).

Leffler, Keith (1982). "Ambiguous Changes in Product Quality," American Economic Review 72(5), 956-967.

Meade, James E. (1952). The Balance of Payments Vol. I (Oxford University Press).

Mintz, Ilse (1973). U.S. Import Quotas: Costs and Consequences (American Enterprise Institute).

Morkre, Morris E. and David G. Tarr (1980). Effects of Restrictions on United States Imports. A Staff Report to the Federal Trade Commission (Government Printing Office).

Muth, John F. (1961). "Rational Expectations and the Theory of Price Movements," Econometrica (29), 315-35.

Newbery, David M.G., and Joseph Stiglitz (1981). The Theory of Commodity Price Stabilization (Oxford University Press).

Riedel, James (1974). The Industrialization of Hong Kong (J.C.B. Mohr (Paul Siebeck) Tubingen).

Rodrigues, Carlos A. (1979). "The Quality of Imports and the Differential Welfare Effects of Tariffs, Quotas and Quality Controls and Protective Devices," Canadian Journal of Economics XII(3), 439-449.

Santoni, Garry J. and T. Norman Van Cott (1980). "Import Quotas: The Quality Adjustment Problem," Southern Economic Journal 46(4), 1206-1211.

Stern, Robert M., Jonathan Francis and Bruce Schumacher (1976). Price Elasticities in International Trade: An Annotated Bibliography (Macmillan).

Stone, Joe A. (1979). "Price Elasticities of Demand for Imports and Exports," Review of Economics and Statistics 61(2), 306-312.

Tullock, Gordon (1967). "The Welfare Costs of Tariffs, Monopolies, and Theft," Western Economic Journal 5, 224-234 (now Economic Inquiry).

U.S. Bureau of the Census (1980). FT-446, U.S. Exports, Schedule By Commodity by Country (Government Printing Office).

_____. IM-146, U.S. Imports for Consumption (Government Printing Office).

U.S. Bureau of the Census. Annual Survey of Manufacturers, various issues (Government Printing Office).

U.S. Bureau of the Census (1980). Current Industrial Reports, Women's and Children's Outerwear (MA23F(80)-1) (Government Printing Office).

_____. Current Industrial Reports Men's and Boy's Outerwear (MA23E(80)-1) (Government Printing Office).

U.S. Congress, House of Representatives, Committee on Ways and Means, Subcommittee on Trade (1982). Hearings, U.S. Trade Policy, Phase II: Private Sector. 97th Congress, 1st Session, Part A. Serial 97-46 (Government Printing Office).

_____ (1978). Exemption of Certain Products from Tariff Reductions Negotiated in the Multilateral Trades Negotiations (MTN), Hearing. 95th Congress, 2nd Session, H.R. 10853, Serial 95.102 (Government Printing Office).

U.S. Department of Commerce, Bureau of Economic Analysis (1981). "Summary Input-Output Tables of the U.S. Economy: 1973, 1974, and 1975" (A Staff Paper, Oct. 1981).

U.S. Department of Commerce, Office of Textiles (1982). Major Shippers Report, Category and Country, U.S. Cotton, Wool and Man-Made Fiber Textile and Apparel, General Imports.

_____. U.S. Production, Imports and Import Production Ratios for Cotton, Wool and Man-Made Fiber Textiles and Apparel.

_____ (Nov. 1981). U.S. General Imports of Cotton Manufacturers (TQ2709).

_____. U.S. General Imports of Textile Manufacturers, Except Cotton (TQ2750).

_____ (1980). "Correlation: Textile and Apparel Categories with Tariff Schedules of the United States Annotated."

_____ (1982). "1980 Performance Report for Textile and Apparel, Bilateral Agreements and Unilateral Import Restraints."

U.S. General Accounting Office (1974). Economic and Foreign Policy Effects of Voluntary Restraint Agreements on Textiles and Steel (Government Printing Office).

U.S. International Trade Commission (1981). The Multifiber Arrangement 1973 to 1980 (USITC Publication Number 1131).

Varian, Hal R. (1978). Microeconomic Analysis (Norton).

Walters, Alan A. (1963). "Production and Cost Functions: An Econometric Survey," Econometrica 31, 1-66.

Willig, Robert D. (1976). "Consumer's Surplus without Apology," American Economic Review 66(4), 589-597.

☆ U.S. GOVERNMENT PRINTING OFFICE: 1984-456-587/20231