THE CHAIRMAN OF THE
COUNCIL OF ECONOMIC ADVISERS
WASHINGTON

September 24, 1985

MEMORANDUM FOR DONALD T. REGAN

FROM: Beryl W. Sprinkel

SUBJECT: Consumer Costs of Textile Bill (H.R. 1562)

Attached is our analysis of the textile bill before Congress, based on the CEA model used to derive our earlier estimates of the consumer costs from current textile restrictions ($39 billion).

Attachment

Estimated Consumer Costs from Further Textile Restrictions

The CEA estimates that restrictions against textile and apparel imports proposed in H.R. 1562 and S. 680 would cost consumers $10 billion in the first year alone. The projected additional consumer cost per family household is $165. These figures, based on the initial year rollback of imports, would grow even larger in the future, due to more restrictive allowances for import growth. Because the proposed restrictions apply only to some of the countries which export to the U.S. market, the policy will encourage imports from uncovered sources, and reduce the consequent incentive for U.S. output to expand. Employment is estimated to be 161,000 workers more than in the absence of this additional protection, which implies a consumer cost per job saved of $62,000.

The CEA model assumes: (1) close, but imperfect substitutabiity between U.S. and imported products, (2) import supply is infinitely elastic, and (3) domestic supply is very elastic, but output cannot be expanded without any increase in price. The model accounts for the role of textile inputs in apparel production, both in the determination of textile demand and relevant costs of apparel supply. Elasticities in the model represent the midrange of those in the literature, or are derived from cross-equation demand restrictions or input-output relations.

The degree of restrictiveness of the proposed textile bill is based on calculations by USTR. The bill forces a rollback in exports by 12 major supplying countries, to what they would have sold in the U.S. had their sales grown 6 percent annually from 1980. As a consequence, the greatest decline is faced by countries whose sales have grown most rapidly in the past five years, especially Brazil, China and Indonesia. For the twelve major exporting countries as a group, the decline in apparel sales to the U.S. will be 32.4 percent and the decline in textile sales 45.8 percent. In subsequent years the growth of imports from these major suppliers would be limited to one percent annually. Imports from other countries would be allowed to grow at a six percent annual rate, while the EC and Canada would be exempt from any controls at all (similar to their treatment under the current Multi Fiber Agreement). Therefore, the change in total imports should be a weighted average based on the large reduction in sales by the major exporters and the potential diversion of sales to uncontrolled or less stringently controlled suppliers. USTR estimates the overall reduction in imports will be 27.7 percent in the case of apparel and 23.7 percent in the case of textiles.

The CEA model projects that the textile bill will raise the price of imported apparel by 16.7 percent and imported textiles by 15.2 percent. Additional consumer costs also arise because of increased domestic prices. However, because the expansion in domestic output is less than 10 percent in the case of apparel, and less than 7 percent in the case of textiles, the corresponding domestic price increases are only 2.8 percent and 1.2 percent, respectively.

Based on these estimated percentage changes in price and output, the estimated increase in consumer costs from these restrictions is $10 billion in the first year. Because the growth of imports from major suppliers is stringently limited in future years at a rate far below what they otherwise would be able to sell, this consumer cost will rise over time.

The projected increase in domestic output implies that 161,000 jobs in the textile-apparel sector can be attributed to the increase in protection, 117,000 in the apparel industry and 44,000 in the textile industry. This represents an average consumer cost of $62,000 per job. These figures do not incorporate the number of jobs lost in the retail sector due to a lower volume of sales, nor do they include costs which the economy would bear in the case of foreign retaliation against U.S. exports. Therefore, even under most favorable assumptions, the proposed textile retsrictons are an extremely expensive way of guaranteeing jobs in a particular sector of the economy.

TEXTILE MODEL

1. $a1(\ln(1 + qA)) + a2(\ln(PAD)) = \ln(MA) - a0 - a1(\ln(PAF)) - a1(\ln(1+tA))$
2. $- \ln(DA) + b2(\ln(1 + qA)) + b1(\ln(PAD)) = - b0 - b2(\ln(PAF*(1 + tA))$
3. $\ln(DA) - c1(\ln(PAD)) - c2(\ln(PID)) - c3(\ln(1+qT)) = c0 + c3(\ln(PTF)) + c3(\ln(1 + tT))$
4. $x1(\ln(1+qT)) + x2(\ln(PID)) + x3(\ln(DA)) = \ln(MT) - x0 - x1(\ln(PTF*(1+tT))$
5. $- \ln(DT) + y1(\ln(PID)) + y2(\ln(1 + qT)) + y3(\ln(DA)) = - y0 - y2(\ln(PTF*(1 + tT))$
6. $\ln(DT) - z1(\ln(PID)) = z0$

ELASTICITIES		BASELINE INTERCEPTS		IMPORT PERCENT CHANGE		INITIAL VALUES		RESULTS	PERCENT CHANGE
a1 =	-2.48	a0 =	2.66026	APPAREL =	-0.277	MA =	10.34		
a2 =	2.10	b0 =	4.03069	TEXTILES=	-0.237	DA =	56.30	61.6052	9.4%
b1 =	-1.20	c0 =	4.03069			tA =	0.25		
b2 =	0.80	x0 =	-0.22598			qA =	0.33	0.5572	68.8%
c1 =	5.00	y0 =	2.41307			PAM =	1.00	1.1670	16.7%
c2 =	-1.80	z0 =	4.02535			PAD =	1.00	1.0283	2.8%
c3 =	-0.20					PAF =	0.60		
x1 =	-2.24					MT =	3.05		
x2 =	0.90					DT =	56.00	59.3711	6.0%
x3 =	0.40					tT =	0.13		
y1 =	-0.50					qT =	0.33	0.5284	60.1%
y2 =	0.20					PTM =	1.00	1.1521	15.2%
y3 =	0.40					PTD =	1.00	1.0117	1.2%
z1 =	5.00					PTF =	0.67		

	ANNUAL CONSUMER COST * (BIL)	JOBS SAVED (THOUS)	COST PER JOB ($)
APPAREL	7.45	116.94	
TEXTILES	2.43	44.34	
TOTAL	9.88	161.28	$61,232

* COST IS BASED ON RETAIL SALES

							MODEL RESULTS		CONSTANTS USED		CHECK
	-2.48	0.00	2.10	0.00	0.00	0.00		0.44		-1.04	-1.04
	0.80	-1.00	-1.20	0.00	0.00	0.00		4.12		-3.80	-3.80
	0.00	1.00	-5.00	0.20	0.00	1.80	=	0.03	=	4.09	4.09
	0.00	0.40	0.00	-2.24	0.00	0.90		0.42		0.71	0.71
	0.00	0.40	0.00	0.20	-1.00	-0.50		4.08		-2.36	-2.36
	0.00	0.00	0.00	0.00	1.00	-5.00		0.01		4.03	4.03

a1	0.00	a2	0.00	0.00	0.00		ln(1+qA)		ln(MA)-a0-a1(ln(PAF))-a1(ln(1+tA))
b2	-1.00	b1	0.00	0.00	0.00		ln(DA)		-b0-b2(ln(PAF*(1+tA))
0.00	1.00	-c1	-c3	0.00	-c2	=	ln(PAD)	=	c0+C3(ln(PTF))+c3(ln(1+tT))
0.00	x3	0.00	x1	0.00	x2		ln(1+qT)		ln(MT)-x0-x1(ln(PTF*(1+tT))
0.00	y3	0.00	y2	-1.00	y1		ln(DT)		-y0-y2(ln(PTF*(1+tT))
0.00	0.00	0.00	0.00	1.00	-z1		ln(PID)		z0

Trade

THE WHITE HOUSE

WASHINGTON

July 5, 1985

MEMORANDUM FOR THE ECONOMIC POLICY COUNCIL

FROM: ROGER B. PORTER RBP

SUBJECT: Textile Correspondence

Secretary Baker has asked that I send you a copy of the letter he received from 175 members of the House of Representatives regarding the Textile and Apparel Trade Enforcement Act.

Attachment

85-13202

Congress of the United States
House of Representatives
Washington, DC 20515

June 28, 1985

Honorable James A. Baker, III
Chairman Pro Tempore
Economic Policy Council
Department of the Treasury
Washington, D.C.

Dear Jim:

We must take exception with your letter of June 19, 1985, in opposition to H.R. 1562, the Textile and Apparel Trade Enforcement Act of 1985. The jobs of a million U.S. workers are at stake.

The passage of this timely legislation is essential if the United States is to have a domestic fiber, textile and apparel industry in the next ten years. It is high-time the Administration faces reality with respect to the devastating effect imports are having on the American economy. Despite the measures which the Administration has taken, imports have doubled, 250 plants have closed their doors, and the employment in the textile industry is at its lowest point in several decades. Over 100,000 jobs have been lost in the last year alone.

You expressed your concern about the domestic consumer. If we persist in giving away our domestic production to plants overseas, it is domestic consumers who will pay the price. Historically, price increases of domestic textiles and apparel have been around 50% of the U.S. inflation rate due to the competition among U.S. textile and apparel producers. Before long we will not have a domestic industry and we will be depending on foreign sources for all our needs. H.R. 1562, as introduced, would allow foreign sources 38% of our market plus annual growth.

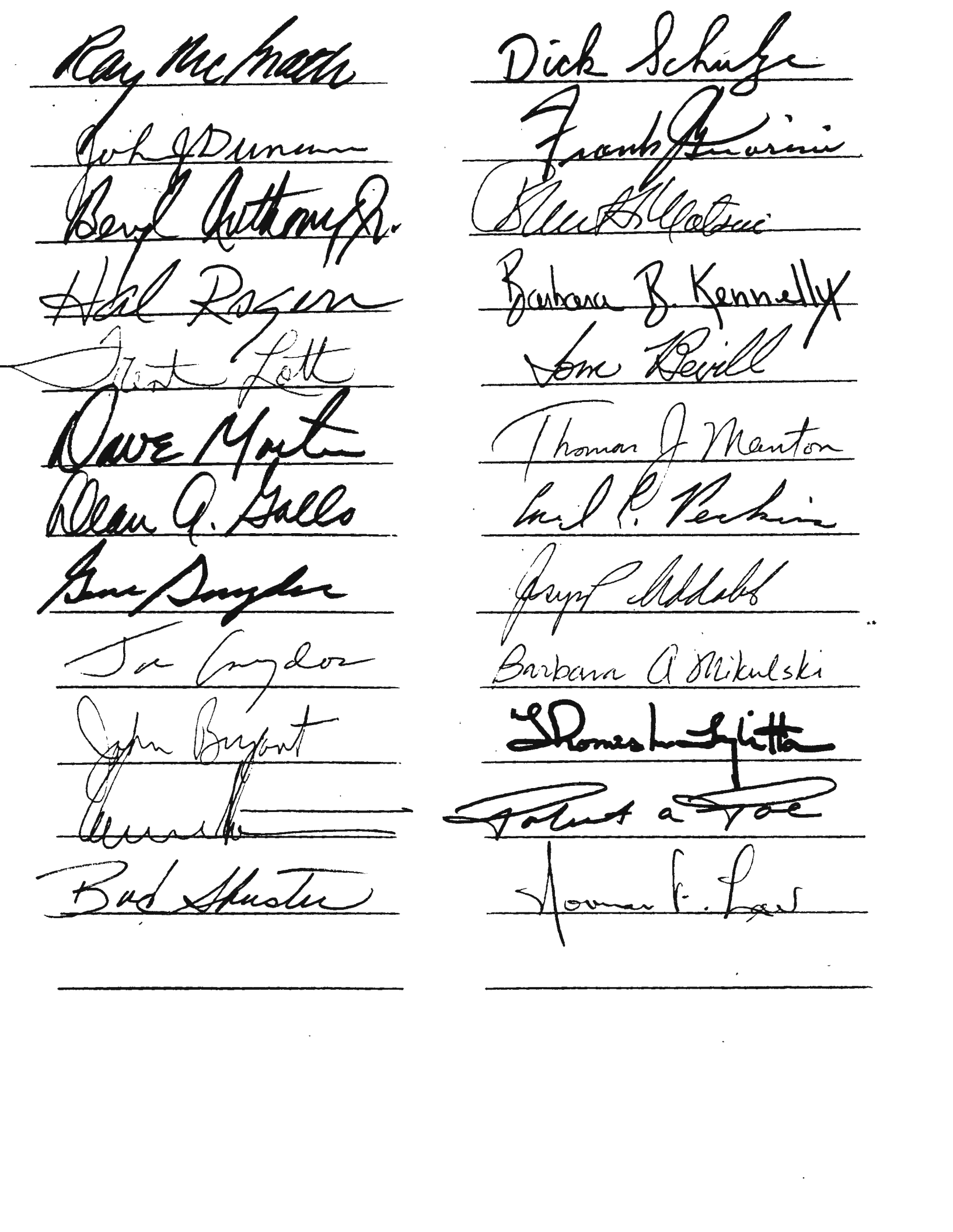
Should we continue to depend on strictly foreign sources, we will most likely see a repeat of the situation where the last U.S. velveteen producer was forced to close his door -- within hours the foreign producers raised their prices for the fabric by $1.00 per yard. Did the American consumer win? What will happen when we have to depend on overseas sources for all our goods?

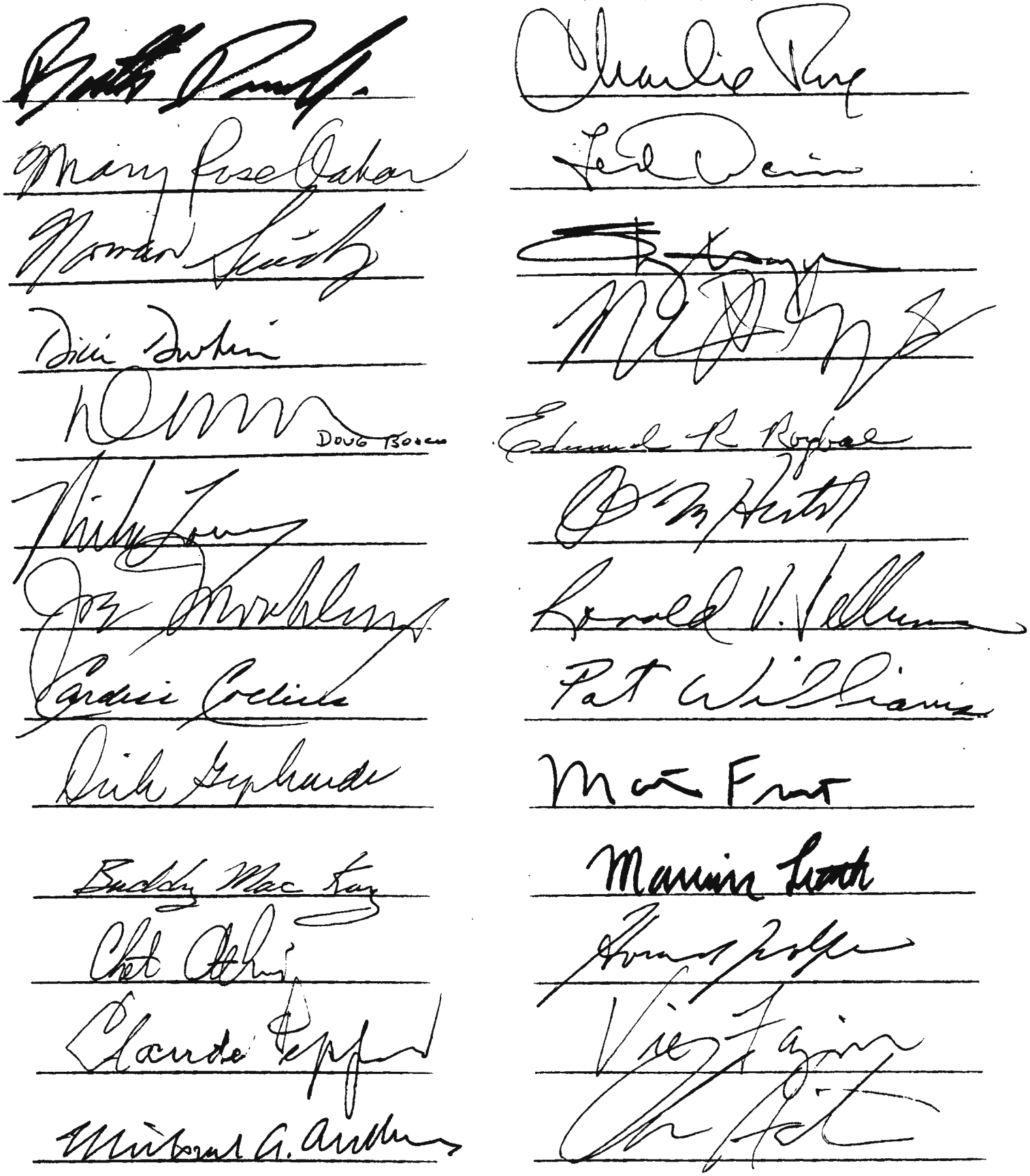
Data Resources, Inc., in a recent analysis, showed that limiting import growth to the growth of the domestic market would have a minimal effect on price levels and would avoid many adverse effects which will result if the current trend in imports continues. As you may recall, the President made a commitment to do just that.

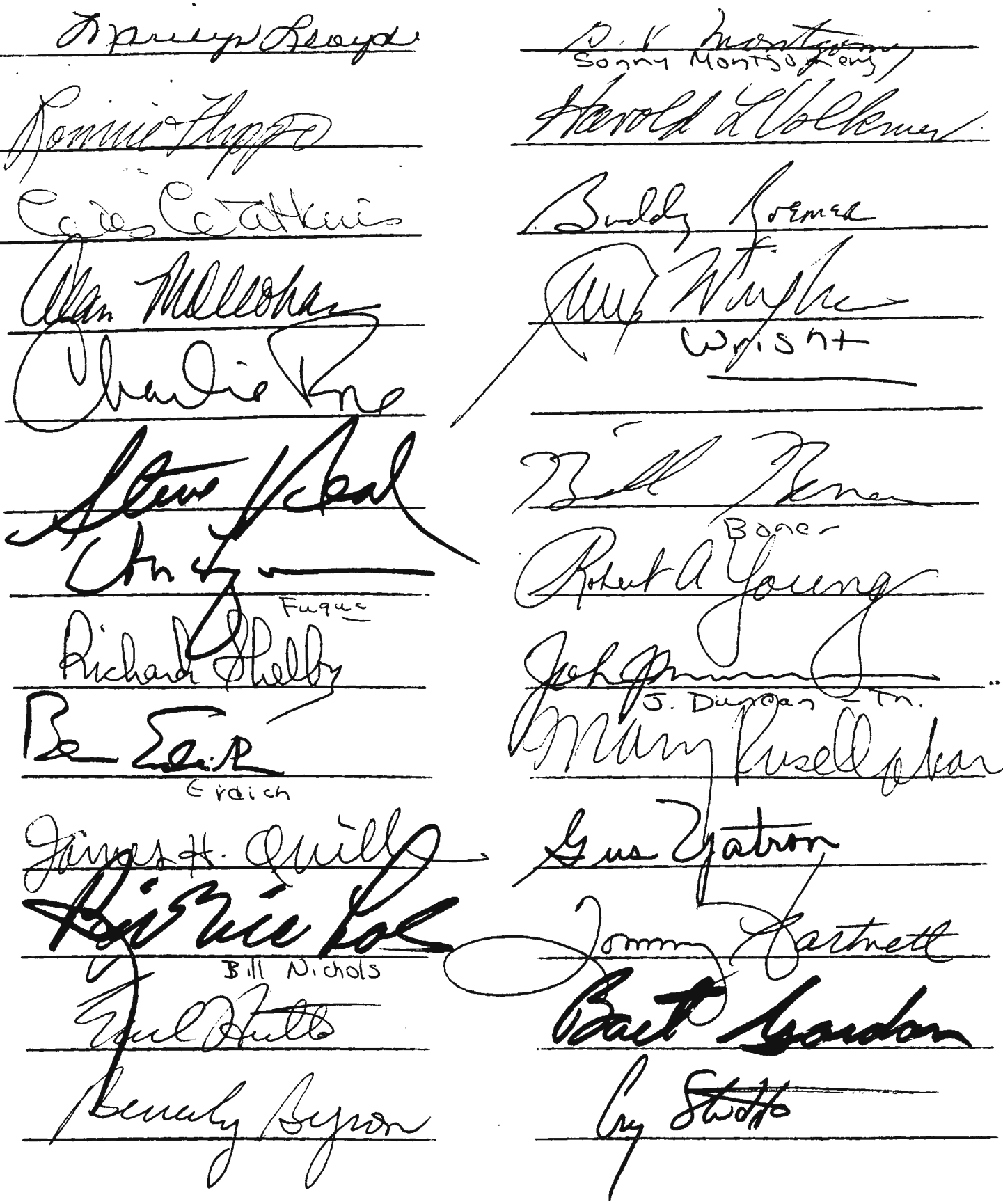
We maintain that the legislation is completely consistent with the objectives of the MFA and that it would mandate actions very similar to those taken unilaterally by the European Community several years ago. The EEC cut-back trade from major suppliers, set up low growth rates and a global approach on imports. Those actions were accepted and in fact, the MFA itself was modified through a protocol of understanding to specifically permit the kinds of actions taken by the EEC.

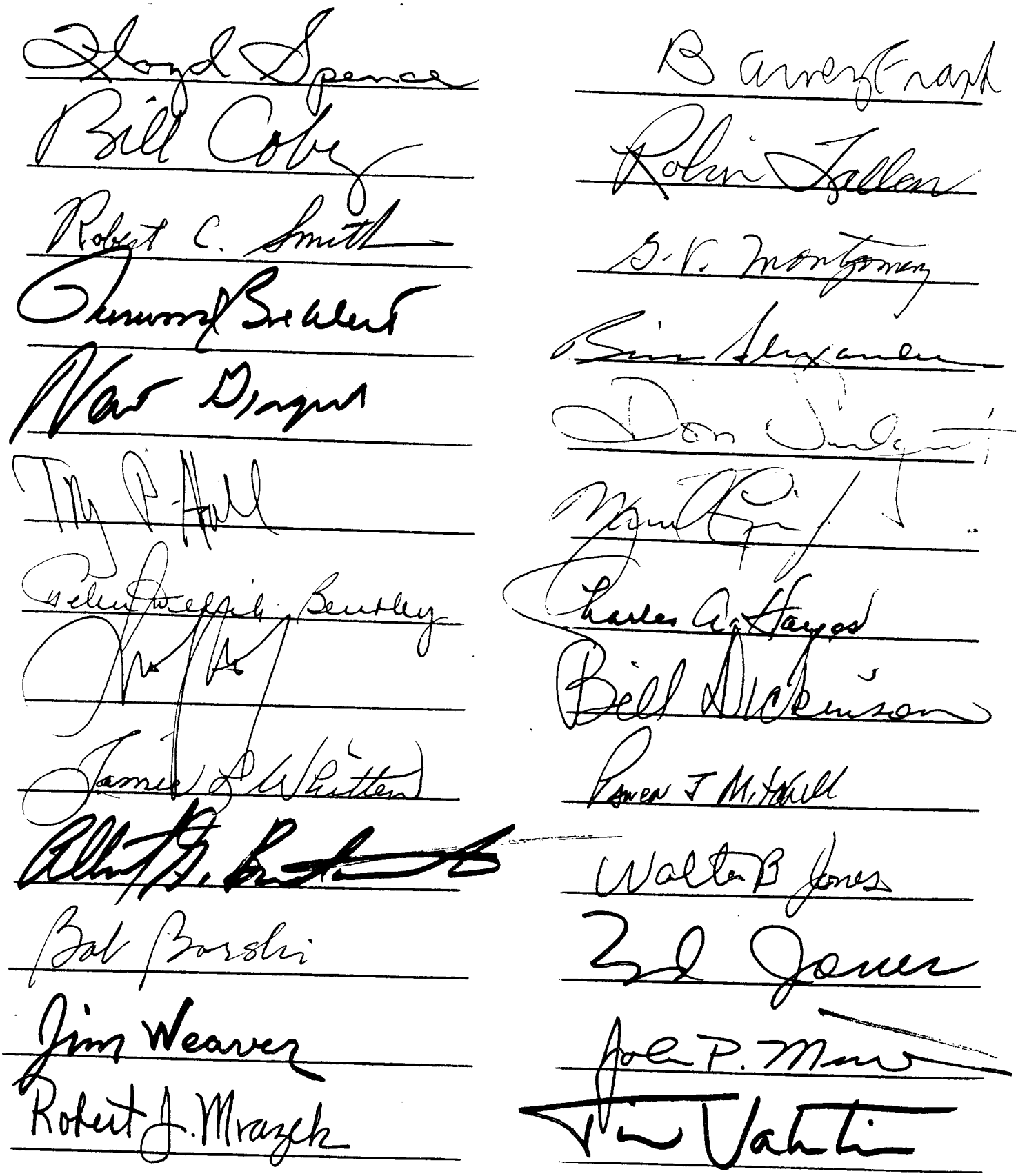
Reality dictates that strong action be taken. We are prepared to take that action.

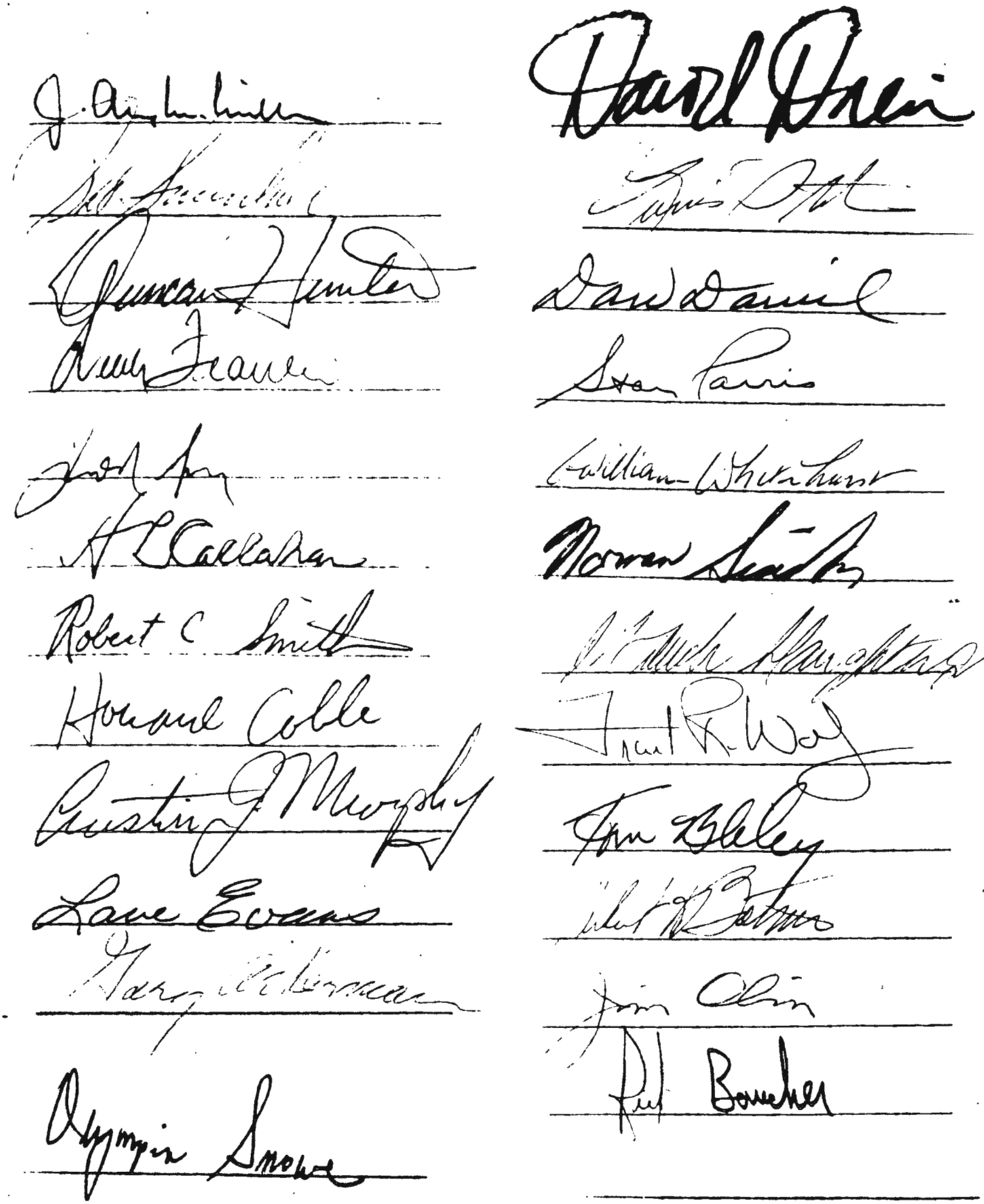
Sincerely,

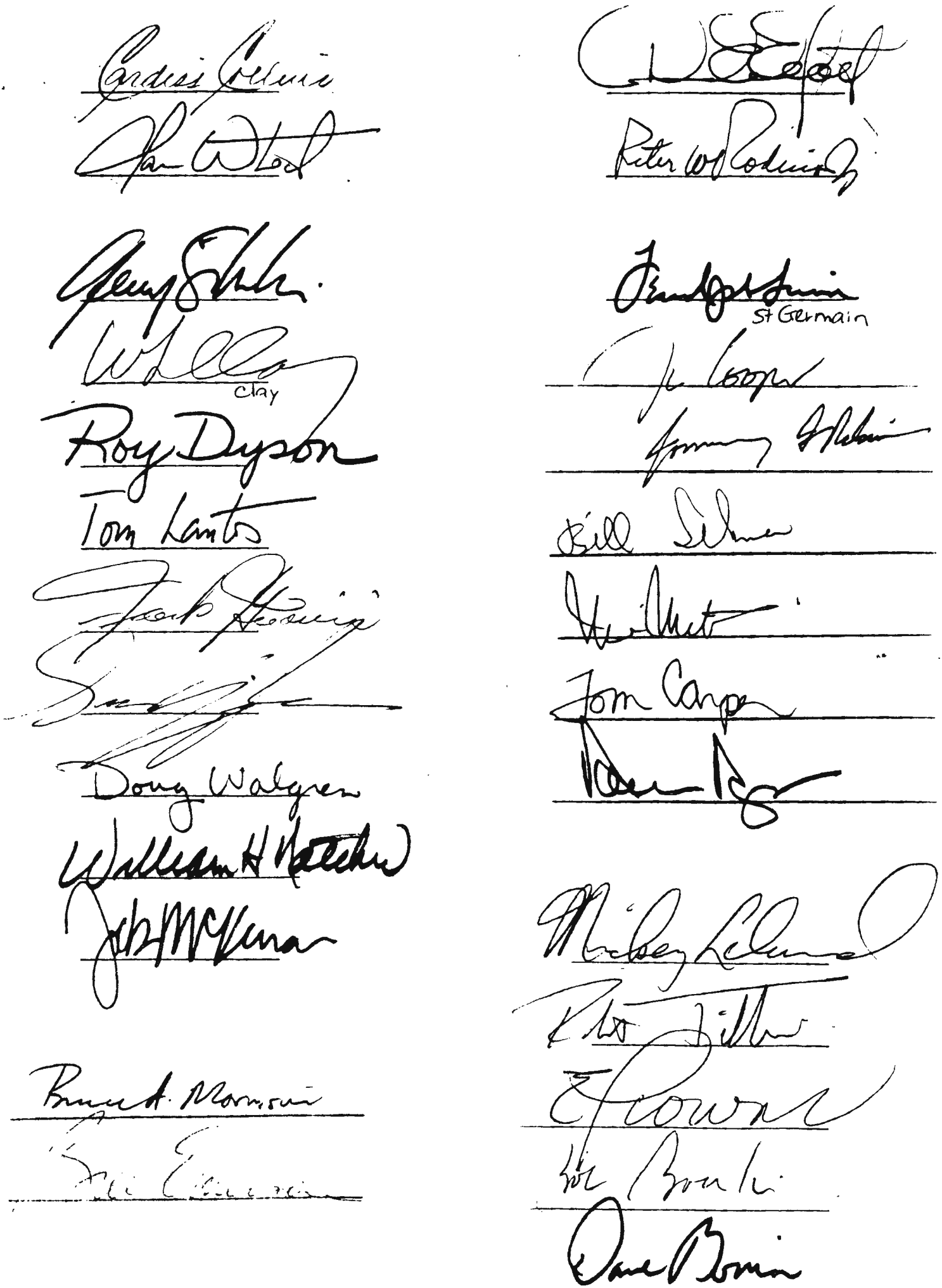



DOUG BOSCH
Edmund R. Ryan
Ronald V. Dellums
Pat Williams
Mac Fant
Marvin Leath
Clarence G. Anderson


Sonny Montgomery
Wright
Boner
Fuqua
J. Duncan Jr. Tn.
Erdich
Bill Nichols







Answers to the Administration's Fact Sheet on Implications of the Textile Quota Bill

In opposing H.R. 1562 and S.680, the Administration has made reference to a number of things it has done to help the U.S. fiber, textile and apparel complex.

These actions have been ineffective and clearly insufficient. Indeed, they are the reason this legislation has been introduced.

Administration's Actions to Help the U.S. Industry

0 The Administration claims that it has acted consistently and forcefully to protect firms and workers from disruptive imports. The facts show otherwise. The agreement negotiated in 1983 with China provided an annual growth in quotas of 10.1 percent. Agreements negotiated in 1982 with Hong Kong, Korea and Taiwan were supposed to control shipments to one to two percent annually, but since 1982 imports from these three countries increased 40 percent. Other major suppliers were permitted tremendous increases in their shipments to the U.S. For example, Indonesia has increased 213 percent just since 1983; India has increased 54 percent; the Philippines 32 percent; and Brazil 51 percent. The result has been over 300,000 U.S. jobs lost in the textile/apparel industry since 1980.

0 The Administration claims that in order to permit the industry to compete with foreign producers they have negotiated or imposed more than 300 quotas. It is correct that 300 new quotas have been imposed and should be helpful in curbing future import growth. However, there are two problems associated with these actions. First of all, the Administration has in many cases delayed for months putting on quotas until imports have risen to tremendously high levels, thus ensuring an import level which is very disruptive. Second, there are currently over 100 candidates for quotas which meet the market disruption criteria set out in the December 16, 1983 announcement on which the Administration has failed to act. These quota candidates represent about 500 million square yards of imports.

0 The Administration claims that the new textile rules of origin will have a major impact on the program. The Administration is correct in saying that these new rules of origin will make legal quota evasion more difficult, but this will have little or no impact on the overall import problem. These new rules will curb quota evasion where a country has manufacturing done in another country but uses its own quotas. The new rules will transfer production back to the original country with the impact on trade being minimal. The rules are basically designed to prevent practices aimed at circumventing quotas.

(over)

0 The Administration claims that it strengthened the Multi-fiber Arrangement (MFA) in 1981 and then tightened up bilateral agreements with Hong Kong, Korea and Taiwan in 1982. This is only a small part of the story. The MFA was tightened in 1981 only after very strong pressure was brought to bear on the White House by members of Congress and the domestic industry.

After renewal of the Multi-fiber Arrangement the United States did use some MFA provisions to negotiate tighter bilateral agreements with Hong Kong, Korea and Taiwan. However, in order to get tighter limits on certain products the Administration negotiated away the country limits with these countries. Failure to continue these country limits has led to an increase today of imports from Hong Kong, Korea and Taiwan of about 500 million square yards. The absence of country limits and slowness by the Administration to react to import growth in uncontrolled categories led to increases in imports from these three countries of 40 percent since 1981.

0 The Administration claims that 80 percent of all imports from developing country suppliers are now under quota. The Department of Commerce Major Shippers Report for April indicates that approximately 73 percent is under quota. This is down from 81 percent in 1982. It is important to realize that even with 81 percent under quota in 1982, imports since 1982 from the low cost countries increased by over 3 billion square yards, or 59 percent.

0 The Administration claims that additional tariff protection is provided by relatively high tariff levels on textiles and apparel. Textile and apparel tariffs are relatively higher than those on other products because of the import sensitivity which they have. These tariffs were not cut as much as others during multilateral negotiating rounds because, upon advice of the International Trade Commission, the industry was found to be severely import impacted. The current high rates reflect the judgment of the International Trade Commission (ITC) when imports were less than half of what they are today. After the increased import penetration of the last four years the ITC would today almost certainly recommend few or no tariff cuts. Finally, because of the overvalued dollar, these tariffs afford only a fraction of the protection they did when the ITC gave its advice.

Many other countries' trade barriers are far greater obstacles to trade than are U.S. tariffs. Import licensing requirements which prohibit all or most imports, value-added taxes and tariff rates of 100 percent or more are found in many of the major countries supplying textiles and apparel to the U.S.

U.S. Market Conditions

0 The Administration claims that imports are being reduced so far this year. The 4.4 percent decline cited must be compared with a major decline in domestic shipments and production. The real value of apparel industry shipments is down 7.6 percent from a year ago while textile shipments have fallen 10.9 percent. It is important to note that the textile and apparel trade deficit so far in 1985 has been 9.4 percent higher than last year. Last year's deficit was a record $16 billion and was 13 percent of the record U.S. trade deficit.

The current pattern of imports represents a continuing increase in market penetration and a continuation of market disruption in spite of the modest import decline. It is also of interest that the import decline was centered in yarn and fabric. Through April, apparel imports were up from last year. The decline in imports is related to high inventories in the pipeline and to a sluggish domestic market. Recent analyses indicate that in the first quarter 1985 consumer offtake of apparel, at retail, was slightly below last year's first quarter.

0 The Administration claims that real textile shipments rose 8.3 percent during the Administration's first four years. They did not. They rose a mere 1.9 percent, and apparel industry shipments rose only 2.7 percent in real terms, not the 6.4 percent claimed. Indeed, for the 12 months ended April, 1985, combined domestic textile and apparel shipments were virtually unchanged from 1980 levels in real terms, as shown on the attached graph. Over this same period, imports increased by 100 percent from 5 billion square yards to 10 billion.

Effect on Consumers

0 The Administration's claim that consumers would pay higher prices with passage of this legislation, costing them some $14 billion a year, is theoretical and completely at odds with the results of econometric analysis by Data Resources, Inc (DRI). It is not known how the $14 billion estimate was made, but it is known that the U.S. has lost one million job opportunities because of the current import level which equates to a $40 billion loss in gross national product.

The DRI analysis goes on to show that if the bill does not pass, the growth in imports, in wiping out most of the domestic apparel chain of production by 1990, will:

- 0 Create unemployment for 1,890,000 Americans, 947,000 in the textile and apparel industries and another 943,000 in other industries because of the ripple effect.
- 0 Increase the federal budget deficit by $24 billion.
- 0 Lower consumer disposable income by $19 billion.
- 0 Lower GNP by $40 billion.
- 0 Have a minimal effect on price levels.

In short, the cost to the consumer is in NOT passing the legislation rather than in enacting it.

0 The Administration claims that foreign textile suppliers would reap additional windfall profits of about $2 billion because of quotas. However, no explanation is given as to how this estimate is made.

0 It is not likely that prices of textiles and apparel will rise as predicted by the Administration if this bill is enacted. History shows the rate of price increases in domestic textiles and apparel has always been less than U.S. inflation generally - even when textile and apparel imports were at levels far lower than they are. This is because of the intense domestic competition that has always existed among U.S. textile and apparel producers. Apparel production capabilities can expand as easily inside the U.S. as they have outside the U.S. The U.S. textile industry is currently operating at 77 percent of capacity.

0 Low income families include many apparel and textile workers earning $5.00 to $6.00 per hour. 947,000 of these workers will lose their jobs by 1990 unless the legislation is enacted.

0 The assumption that apparel imports are lower priced derives from the fact that they are produced more cheaply overseas. Research shows that there is very little difference in retail prices of imported vs. domestic apparel. The huge markup placed on imports by retailers are the reason consumers are not now benefiting from imported apparel and textiles.

Marginal Effect on Production and Employment

0 The Administration's claim that passage of the bill will have a minimal impact on domestic production obviously relates to 1984 levels. What the legislation does is to increase domestic output by 100 percent from where it would otherwise be in 1990 if import growth continues on its present course. Without the bill, textile and apparel employment in the short space of five years will drop by more than half from current levels.

0 The gains in production and employment are not small and unemployment of 1.9 million Americans is a very high price to pay for failing to pass the bill.

Retaliation Against U.S. Exports

0 The Administration is concerned about retaliation against U.S. exports, specifically corn, wheat, aircraft, cigarettes and tobacco. In reality, the U.S. is already being shunted aside in world demand for agricultural products, particularly cotton and wheat as a result of growth in foreign production capability and the overvalued dollar.

The China Situation

There have been phenomenal increases in production of most major agricultural products over the last several years and this has greatly reduced China's need for imports including grain.

According to the USDA, "This drop in agricultural imports was largely the result of decreased demand due to several years of high domestic production and excess stocks." It is expected that China will continue to increase its internal production and should be self-sufficient in wheat by the end of the decade, as it is now in cotton.

China-Production and Imports of Key Agricultural Commodities
(MM Metric Tons - Except Cotton)

	'80/'81	'83/'84	% Change
Wheat			
Production	55.20	81.40	47%
Imports	13.80	10.00	-28%
Soybeans			
Production	7.94	9.30	17%
Imports	0.54	0.00	-100%
Coarse Grains			
Production	81.00	85.00	5%
Imports	0.99	0.50	-50%
Cotton (MM Bales)			
Production	12.40	21.30	72%
Imports	3.60	0.20	-94%

As countries become newly industrialized, they seek to move into higher technology production, primarily for export. Many other countries are producing goods using export or production subsidies. U.S. competition in agricultural products as well as in aircraft reflects these developments.

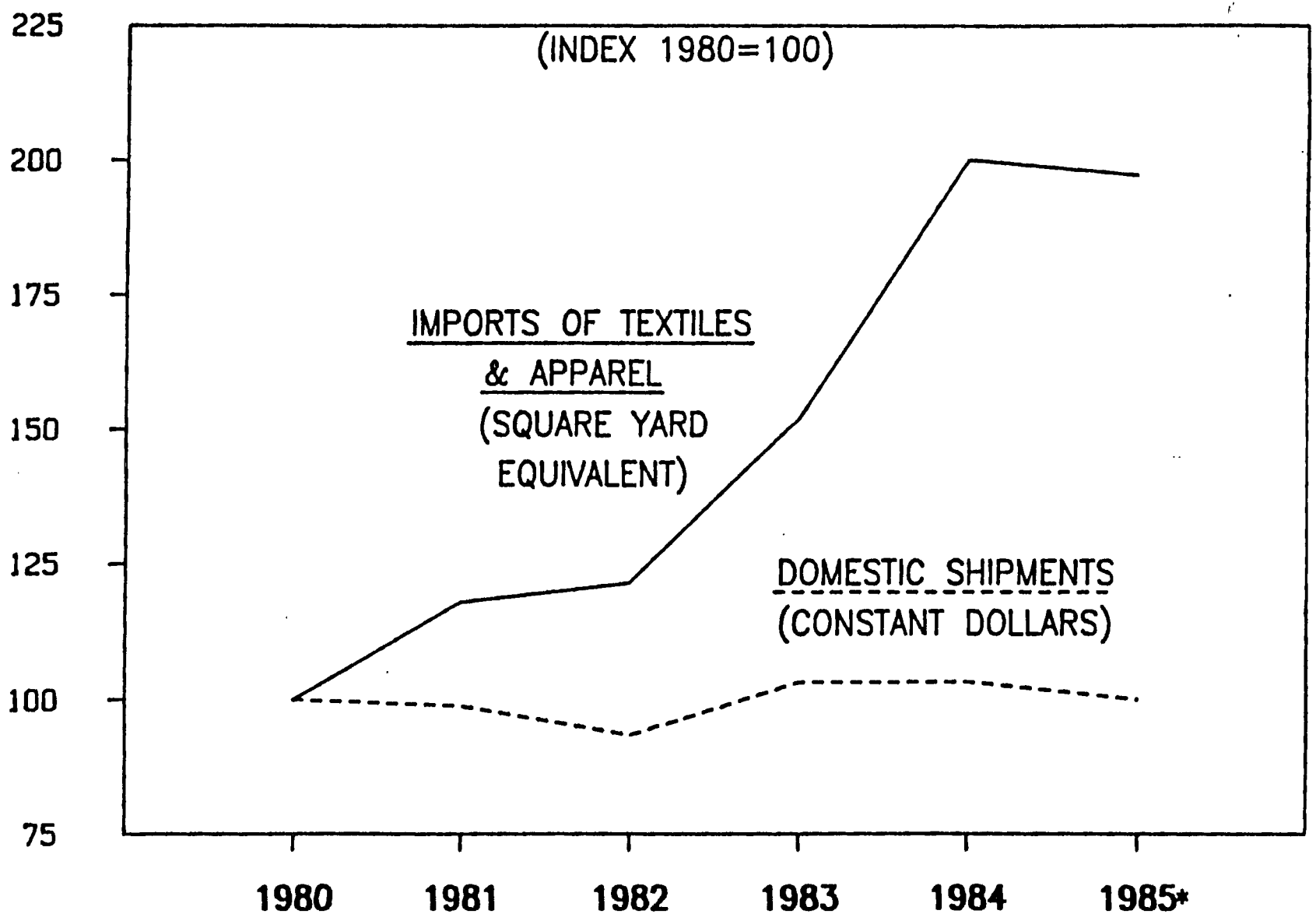
Violation of 34 U.S. Bilateral Agreements in the MFA and U.S. Obligation Under the Multi-fiber Arrangement (MFA)

0 The Textile and Apparel Trade Enforcement Act of 1985 is fully consistent with the objectives of the Multifiber Arrangement (MFA) which are to prevent market disruption and provide for growth of developing country exports. The act concludes that there is wide spread disruption in the U.S. market because of the failure to enforce adequately the provisions of the MFA.

This bill would mandate actions similar to those taken in 1977 by the European Community (EC). The EC cut back trade from major suppliers, imposed very low growth rates and established a global concept to control key imports. When the EC took those actions no one retaliated, nor were any claims made that the EC acted inconsistently with the Multifiber Arrangement. In fact, the Multifiber Arrangement's protocol of understanding was formulated to permit the actions taken by the EC. A similar approach could be taken by the Administration.

0 All of the bilateral agreements need not be abrogated. There are provisions in each for an orderly termination. The Administration could also consult with each country and explain the actions mandated in the bill. The MFA expires in July, 1986 and if the U.S. decides not to participate in a renewal, MFA issues will become moot. However, in 22 of the bilateral agreement countries, the bill provides for an increase in trade of 15 percent in 1985 and a 6 percent annual growth there after (except for certain sensitive categories). Also, there is a precedent for re-negotiating agreements before they expire, as in 1979 and 1980 with Hong Kong, Korea and Taiwan.

IMPORTS HAVE DOUBLED SINCE 1980 WHILE DOMESTIC SHIPMENTS LANGUISH



* 12 months ended April.

~~L.O.U. ATTACHMENTS~~ JN 12/1/2022

EXECUTIVE OFFICE OF THE PRESIDENT
COUNCIL OF ECONOMIC ADVISERS
WASHINGTON, D.C. 20500

May 12, 1986

MEMORANDUM FOR DISTRIBUTION

FROM: JACK H. MUTTI

SUBJECT: CEA Modeling of Textile and Apparel Trade Policy

Over the past year, several interagency analyses have been made of various trade policy proposals in the textile and apparel area. The purpose of the attached paper is to provide a thorough technical explanation of the basis for price, output and consumer cost projections reported by the Council of Economic Advisers. The work does not represent a response to measures under active debate at present. Instead, the paper is intended to identify important conceptual and empirical issues that must be addressed in any economic model of textile and apparel policy, and to demonstrate the extent to which different approaches alter the projected economic outcome.

Please direct questions or comments to Dean Furbush (395-3517), here at CEA.

Attachments

~~L.O.U. ATTACHMENTS~~

CEA MODELING OF TEXTILE AND APPAREL MARKETS

Executive Summary

Current U.S. tariffs and quotas on textile and apparel imports provide particularly high protection for the domestic industry. Further trade restrictions were proposed in two notable bills in 1985. CEA has used partial equilibrium simulation models of the textile and apparel industry to estimate the economic effects of current and proposed trade policy. The results of this analysis have been used as input for administration policy discussion and decisions. This paper provides a description of the methodology and a comparison of the various models from which the results come.

Results are presented from three models that simulate the single year effects of trade policy changes, and one model that examines the effect over five years. The restrictions and assumptions underlying two of the single year models are the focus of this paper: one treats domestic and import goods as perfect substitutes and another allows for imperfect substitutability. Primarily because the perfect substitute model assumes that protection raises domestic prices as much as import prices, its consumer cost results are higher than those reported in the other.

Two key conclusions follow from CEA analysis. First, the estimated cost of protecting the textile and apparel industries, though variable depending on the model used, is very high. Using

the most conservative model, the cost to American consumers, through foregoing the lower prices and more efficient allocation of resources brought about free trade, is more than $20 billion. Second, the estimated effect of protection on the domestic industry is robust across various models. Tariffs and quotas do effectively protect the industry, but liberalization of trade would not be disastrous -- removal of MFA quotas, for instance would lower domestic output by less than 20 percent.

--by S. Dean Furbush
Council of Economic Advisers

CEA MODELING OF TEXTILE AND APPAREL MARKETS

The current Multi-fibre Arrangement (MFA) expires in July 1986. Estimates of the consumer cost of the MFA are an important measure of the consequences of continuing current policy. The Economic Policy Council (EPC) has supported the renegotiation of a new MFA to replace the current arrangement but the actual strategy for reforming the agreement has not been established yet. The Council of Economic Advisers (CEA) has developed several analytical models to assess the likely consequences of alternative policies.

The combined effect of present tariffs and quotas make textiles and apparel the most protected industries in the United States. Nonetheless, legislative efforts to protect domestic textile and apparel markets have continued in various forms. In 1985, bills supported by Congressman Jenkins and Senator Thurmond received considerable attention. The Thurmond bill passed both Houses and was vetoed by the President.

Protection of textile and apparel industries from import competition leads to an expansion of U.S. production in those industries. This raises prices, benefiting domestic and foreign producers at a cost to consumers. But because protection leads to the inefficient use of productive resources, some of the cost to consumers is not gained by anyone. The harmful effects of

JN 12/1/22

trade barriers can be summarized by two measures: consumer cost, and deadweight or welfare loss. CEA models have been used to estimate the consumer cost of various policy choices and are capable of estimating deadweight losses. Consumer cost is the measure discussed in this paper.

Consumer costs are often weighed against the job displacements that are temporarily avoided in the textile and apparel manufacturing industries, giving a metric called the consumer cost per job saved. This metric measures the efficiency of trade protection as a tool for helping textile and apparel workers. But it ignores user industries and retailers, and the possibility of foreign retaliation. Sustained nationwide protection is not achievable. Jobs "saved" in the textile industry are jobs lost in industries that would have expanded in the absence of protection. Therefore the measure represents only the direct, industry-specific effects of trade protection.

A further policy issue not addressed directly in this study is the distinction between the effects of tariffs and quotas. Tariffs are, in general, preferable to quotas for three principal reasons. (1) Under tariffs, exports to the U.S. occur as the result of cost-minimizing decisions rather than the choice of government officials. (2) Tariff revenues go to U.S. government coffers. If U.S. retailers have little monopsony power then quota rents are collected by producers in foreign countries.

(3) In textile and apparel markets, foreign producers can avoid some of the effects of quotas by raising the quality of their products, often competing more directly with U.S. producers while remaining within the quantity constraints of the quota.

Over the past year, CEA has estimated the consumer cost and the jobs saved due to current and proposed protectionist textile and apparel legislation. The estimates are based on two different methods of modeling the textile and apparel markets. They assess the magnitude of the effects of protection, finding that, although estimates vary depending on the model used, protection of domestic textile and apparel industries is very costly to consumers. This paper explains the methodological basis for the cost estimates reported in CEA work, and indicates the policy judgments they support.

CEA SIMULATION MODELS

CEA models simulate the domestic market for textiles and apparel produced domestically and in foreign countries. The results depend on the model that is chosen, the initial import and domestic supply data, elasticity estimates, estimates of the effects of current and proposed legislation on imports, and the estimated tariff equivalent value of quotas. The models are shown in Appendix A.

An increase in the price of apparel leads to a decrease in the amount demanded and to an increase in the amount that would be supplied, other things equal. All protectionist legislation raises the price of the import good relative to its domestic competition thus helping domestic producers and hurting domestic consumers. The extent of the effects of price change on consumer costs depends on the supply and demand elasticities (the responsiveness of output changes to price changes) which are discussed in the sections on the particular models and in Appendix B.

CEA models of textile and apparel protection start from an equilibrium defined by current market conditions. The model is run by changing a variable that is exogenous to the system and then finding the new equilibrium. Increases in the level of protection, such as would have occurred under the Jenkins and Thurmond bills, are modeled by using the decrease in imports that result from the relevant legislation as the exogenous variables. The change in imports leads to a change in prices and hence in the quantity demanded. The first year reduction in imports that would have resulted from imposition of the Jenkins and Thurmond bills were taken from Department of Commerce estimates.

Movement from current levels of protection toward free trade, on the other hand, is modeled by decreasing the tariff or the tariff equivalent value of the quota which leads to a price

change and a consequent change in the level of imports and domestic output. In this case the change in the import level is endogenous to the model and therefore depends on the type of model and the parameters used.

Table 1 shows the difference in import levels between the current situation and four other levels of protection that have been examined by CEA. Imports are initially set at the 1984 levels of $18 billion of apparel imports and $4 billion of textile imports. The decrease in imports that would have occurred with the Jenkins and Thurmond bills are estimates from the Department of Commerce, exogenous to the CEA model. The increase in imports associated with free trade and a removal of MFA quotas are the mean of the results from the two CEA modeling methods, because import levels depend on the model in those cases.

TABLE 1

IMPORT LEVELS
(Percent Change from Current Protection)

	Apparel	Textiles
Free Trade	+122%	+174%
Remove MFA Quotas	+65	+104
Thurmond Bill	-4	-3
Jenkins Bill	-28	-24

Besides the framework of the model and the elasticities that are chosen, the results depend on current imports and domestic supply. CEA used 1984 data in nominal value terms. C.I.F. import values were raised by the estimated tariff because the tariff is not included in the value of imports plus customs, insurance, and freight.

The results of the CEA models also depend on the estimate of the tariff equivalent effect of quotas. CEA estimates are suggested in the work of Tarr and Morkre, which is based on the resale value of quota rights in the Hong Kong market in 1980.[1] Hong Kong is one of the most efficient producers of textiles and apparel. To the extent that, under free trade, Hong Kong could expand output at constant cost, the use of Hong Kong quota rents is an appropriate representation of the higher cost imposed on all textile and apparel imports as a result of the MFA. More recently, Hamilton has estimated tariff equivalents that show high variability from year to year.[2] The value of the tariff equivalent would be expected to be volatile. It depends on U.S. demand and foreign willingness to supply, and the difference between the quota and non-quota amount traded.

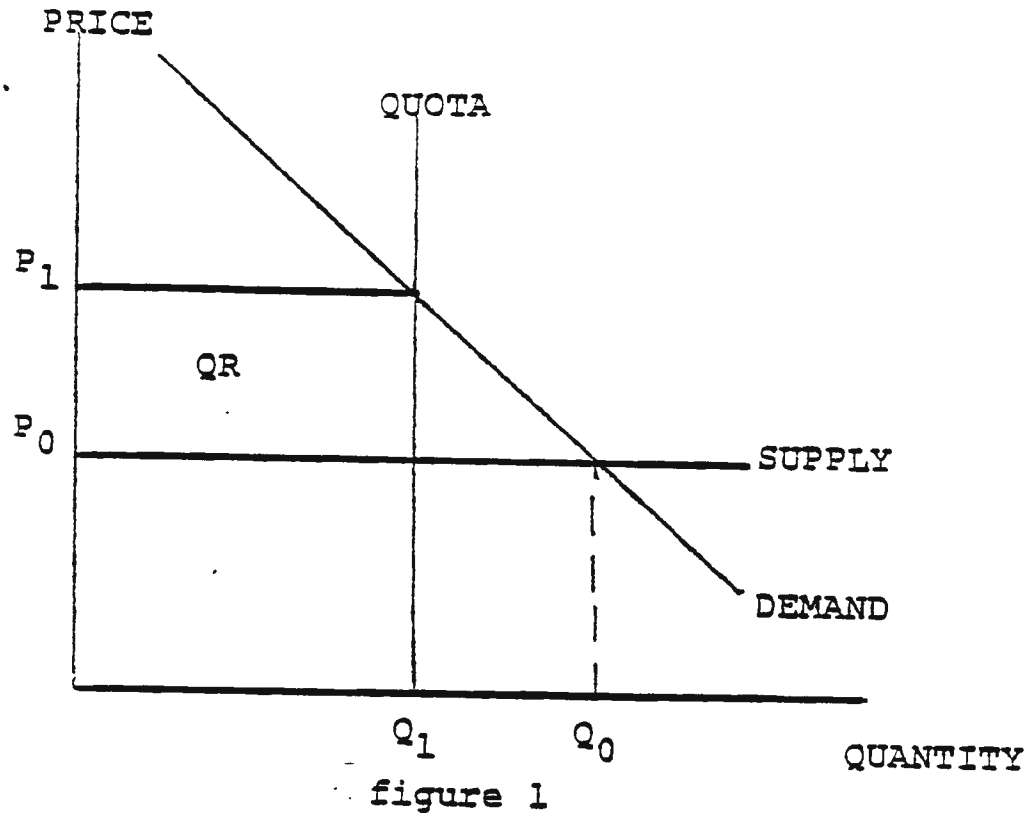


figure 1

As shown in Figure 1, a quota at Q_1 causes prices to rise from P_0 to P_1. The shaded area represents the quota rents. If demand were to fall in say, a recessionary year, or foreign supply were to become more costly, the rent associated with a given quota would fall.

Forty percent of the available supply textiles are used as inputs to apparel, while the remaining 60 percent are used for carpets, tires and other purposes. Two adjustments are made to the model to account for this fact. The U.S. demand for textiles

is modeled as being dependent on the domestic supply of apparel, with a coefficient of 0.4, as well as on textile prices. And the consumer cost result for textiles is multiplied by 0.6 to avoid the double counting if that figure were to be added to the consumer cost estimate in the apparel market.

In the past, CEA has reported consumer costs calculated at the wholesale level. But in the work of William Cline, cost estimates are reported at the retail level which is assumed to be twice the wholesale level. There is some justification for both approaches: wholesale cost estimates give a better picture of long-run costs, while retail estimates may provide a better short-run view.

The Cline approach can be justified as an approximation of short-run consumer costs if it is assumed that short-run rigidities in supply allow retailers to mark up wholesale merchandise by the same proportion as before the change in protection, even though merchandise costs are a higher proportion of total costs. If merchandise costs double due to import protection, but other business costs do not change, and retailers double retail prices, then super-normal profits can be maintained until prices are driven down by new entrants or firms attempting to increase their market share. This argument is not symmetric. If retailers maintain their doubling rule when less protection causes merchandise costs to fall, then profits fall because

merchandise costs are a smaller proportion of total costs. The decision to amend the doubling rule is then made internally by each firm which is now earning negative economic profits. Therefore the time frame in which the Cline approach is valid would seem to be much shorter in a move from the status quo to freer trade than one in the other direction.

With competitive market forces operating, the CEA wholesale result gives the consumer cost of import restrictions. Retail costs include both the cost of merchandise and other selling costs. A quota on imported merchandise has little effect on the other selling costs so most of the price increase will be due to the additional wholesale cost of merchandise. The cost of holding inventories may rise due to higher storage, interest, and insurance costs, and the possibility of slower turnover at higher retail prices. Because wholesale demand is derived from retail supply, the shift in demand in the wholesale market captures the effects of these cost changes. Consequently, the resultant consumer costs estimated at the wholesale level will be the same as properly estimated consumer costs at the retail level.

PERFECT SUBSTITUTE SIMULATION MODELS

An early model, CEA-1, which was the basis for the interagency memo of May 15, 1986, estimated consumer costs using perfect substitution methodology. Further work has maintained the same general approach, while making improvements to the

estimation procedure, so as to provide results that are compatible with earlier estimates. Improvements, incorporated in CEA-2, have included modeling the use of textiles as inputs to apparel production.

This model treats imported textiles and apparel as perfectly substitutable with those produced domestically. Consequently, any increase in the cost of imports as the result of trade restrictions applies equally to all competing domestic goods. As shown in Appendix B, a further result of this assumption is that imports are simply the difference between total market demand and domestic supply. Consequently, the total demand elasticity, the domestic supply elasticity, and the import demand elasticity are interrelated parameters and cannot be assigned values independently. Based on standard estimates of the two demand elasticities in the econometric literature, the residual domestic supply elasticity is small. A small supply elasticity, in turn, suggests that when textile and apparel prices are driven up by trade barriers, any increase in domestic output and employment will be small. This assumption leads to high consumer cost per job saved because the rise in prices affects all textile and apparel goods purchased, and has only a small effect on domestic production.

Total demand was constrained to be perfectly inelastic in the CEA-2 model, thus allowing the domestic supply elasticity to be as high as possible. This assumption of perfectly inelastic overall demand is intended to lower the consumer cost estimates,

offsetting the aspects of a perfect substitute model that tend to raise them. It implies rather unrealistically that any change in imports is exactly offset by a change in domestic production.

Figure 2 approximates the CEA perfect substitute model for either the textile or apparel market, but interaction between them is ignored. It shows supply and demand for the total and import markets. Domestic supply is shown in the total market and total demand is shown to be perfectly inelastic. In the import market, supply is assumed to be perfectly elastic over the relevant range, and demand is a residual of total demand.

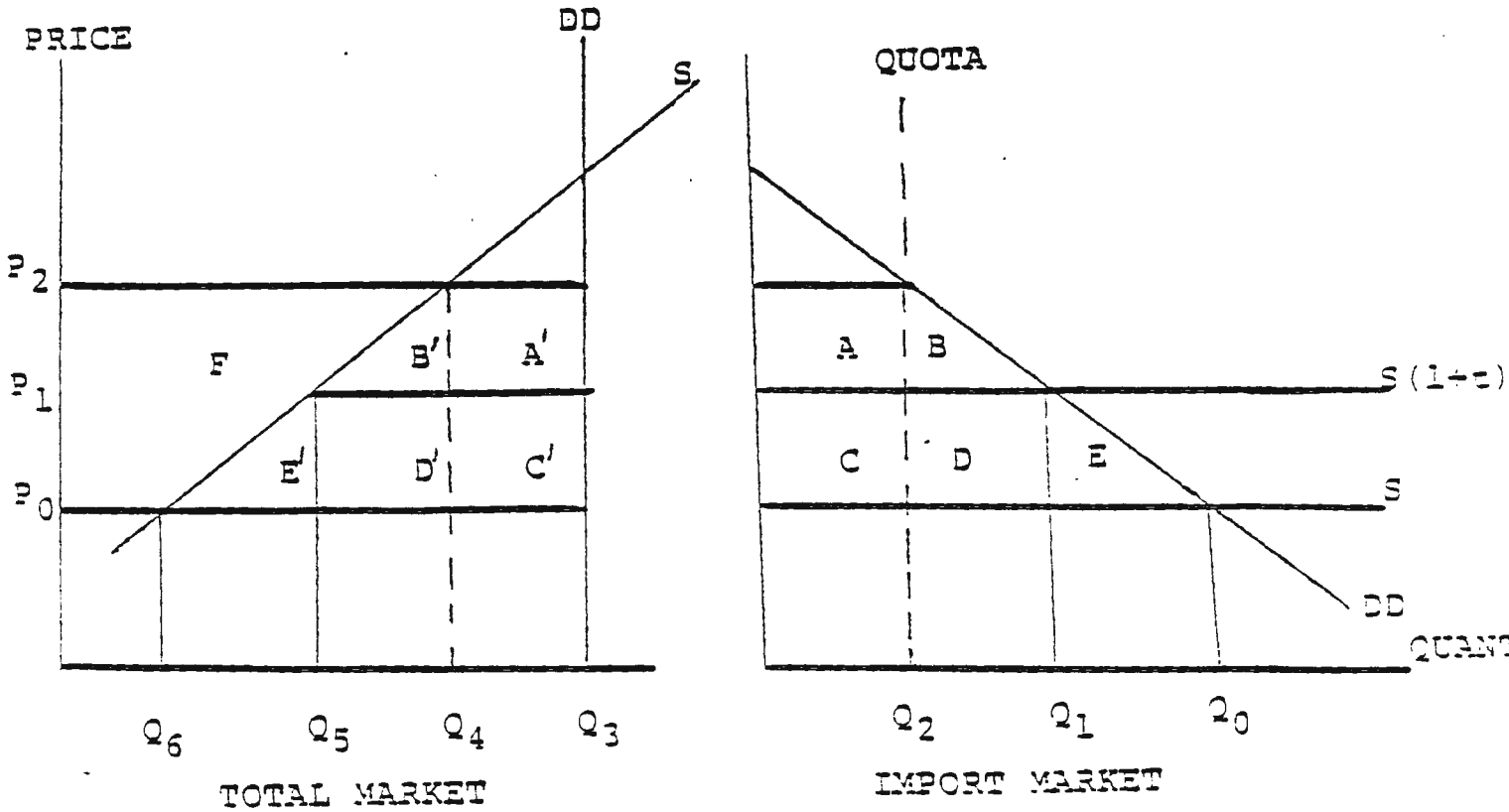


figure 2

Under free trade the U.S. produces the quantity Q_6 and imports Q_0 (equal to Q_3 minus Q_6) at price P_0. The tariff increases costs to foreign suppliers such that their supply curve becomes $S(_{1+t})$. The price rises to P_1, and the quantity imported falls to Q_1. The tariff allows domestic production to rise to Q_5.

An quota set at Q_2 causes a further price increase to P_2 and allows an expansion of domestic production to Q_4. The consumer cost of this protection in the import market is represented by the areas A+B+C+D+E, with area A going to foreign producers, C going to the U.S. government, and B+D+E being total deadweight losses. Areas B and D are lost due to the MFA over and above the tariff, with B being a deadweight loss and D being a loss in government tariff revenue.

Area E is a deadweight loss due to tariffs.

The area F in the total market diagram represents the transfer from consumers to domestic producers, and the areas A' through E' are identical to A through E in the import market diagram. Consequently these areas represent the total consumer cost.

IMPERFECT SUBSTITUTE SIMULATION MODEL

Domestically produced textiles and apparel may not be perfectly substitutable with those produced in foreign

countries. For example, domestic production may be of a higher quality than that produced abroad, and is consequently more expensive. So the higher import prices that are a consequence of protection do not necessarily cause a shift in domestic demand that is sufficient to drive domestic price up by as much as the price of imported goods is driven up. This is particularly important in the textile market where imports account for only about 7 percent of the total, and the price increase does not affect the vast majority of the market. Modeling imperfect substitutability between foreign and domestic textiles and apparel, as in CEA-3, has the effect of lowering consumer cost estimates.

Furthermore, the use of an imperfect substitute model allows all elasticities to be chosen independently. The method for doing so is discussed in Appendix B. CEA-3 treats domestic supply as being more responsive to changes in price than CEA-2, so that import protection has a more significant effect on domestic employment, thus lowering the estimates for the consumer cost per job. The higher domestic supply elasticity is a more realistic assumption particularly in the apparel industry.

Figure 3 is the imperfect substitute analog to Figure 2, except that the left hand panel shows the domestic market instead of the total market. This representation is more useful in the imperfect substitute case because price changes in the domestic and import markets are not identical. Figure 3 represents either the textile or apparel market as in Figure 2, and does not account for interaction between textiles and apparel.

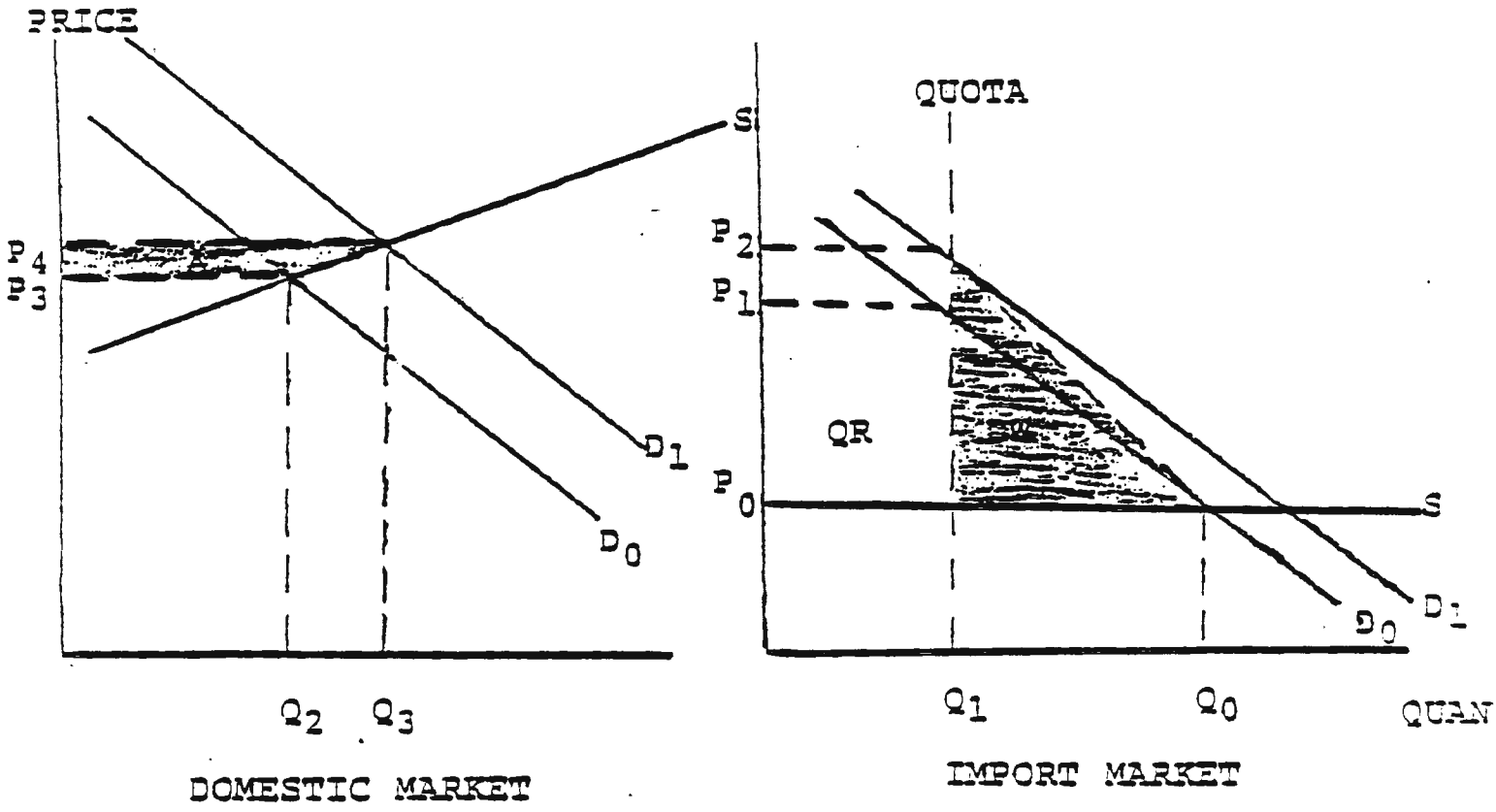


figure 3

With free trade, the United States produces the quantity Q_2 and Q_0 is imported. The initial effect of an import quota at Q_1 is to drive the import price from P_0 to P_1, causing an increase in

domestic demand. Because domestic and import goods are assumed to be imperfect substitutes, the change in domestic demand is not as large as in the perfect substitute case. Furthermore, relatively elastic domestic supply means that the domestic price increase is minimal, from P_3 to P_4, while domestic production rises from Q_2 to Q_3. The price increase for the domestic good causes an increase in demand in the import market. The increase cannot be accommodated because of the quota, so the price of imports rises further, to P_2.

In Figure 3, the consumer cost is the sum of areas A, QR, and DW. DW is a deadweight loss and QR, which is the rectangle bounded by P_2 and P_0, is a quota rent that goes to foreign producers. The area A is a transfer from consumers to domestic producers; the fact that the area A is much smaller than the area F in Figure 2 is attributable to the imperfect substitute approach.

OTHER MODELS

CEA is pursuing two further modeling methods: a model of the effects of policy changes over a number of years, and a model that includes the effects of restrictions on the output of countries, such as those in the European Community and Canada to whom restrictions do not currently apply.

Because protectionist legislation would draw down the base of imports to that of an earlier year and allow only slow foreign import growth from that point, the costs of such legislation continue over many years and are likely to become larger in the future than would be suggested by a single year snapshot analysis of the initial rollback even though higher long-term elasticities tend to lower consumer costs. CEA five-year cost estimates for the Thurmond bill, based on the CEA-2 perfect substitute model, compare the growth rate of imports that would be allowed under the Thurmond legislation with an assumed growth rate without legislation. Estimates of the consumer cost and consumer cost per job saved result from a discounted present value of the costs and jobs over the five years. The model also accounted for the annual changes in total demand that would be expected with income growth and for improved productivity in domestic supply. Using this method, CEA estimated the five-year cost of the Thurmond legislation to be $56 billion and the annual consumer cost per job saved to be $170,000.

Further work will expand the five-year growth capability to the imperfect substitute model.

To date, CEA models have not accounted separately for countries that are exempt from MFA quotas and are typically

exempted from proposed legislation. Production in the European Community and Canada is also protected by U.S. legislation, and the increase in U.S. imports from these countries offsets import protection against other countries.

INTERPRETATION OF CEA RESULTS

Regardless of which model is used in evaluating the four policy options, certain conclusions are clear.

The consumer cost of current protection is exceedingly high, both in terms of absolute dollars and also in terms of consumer cost per job protected in the industry. Average annual wages are $13,000 in the textile industry and $10,800 in the apparel industry, only a fraction of the consumer cost per job figures reported in Table 2.

TABLE 2

ESTIMATED CONSUMER COSTS AND BENEFITS RELATIVE TO THE STATUS QUO
(Apparel and Textile Costs are in Billions)

		CEA 1		CEA 2		CEA 3	
		Wholesale	Retail	Wholesale	Retail	Wholesale	Retail
Free Trade (Remove tariffs and quotas)	Apparel cost	($27.4)	($54.8)	($28.3)	($56.5)	($17.7)	($35.5
	Textile cost	($12.5)	($25.0)	($19.4)	($38.8)	($3.9)	($7.8
	Average cost per job	($66,931)	($133,862)	($89,014)	($178,028)	($37,723)	($75,446
MFA Quotas only (Remove tariffs)	Apparel cost	NOT MODELED	NOT MODELED	($18.6)	($37.2)	($9.3)	($18.7
	Textile cost			($14.4)	($28.7)	($2.2)	($4.4
	Average cost per job			($113,215)	($226,429)	($38,035)	($76,070
Thurmond Bill (More protection against 3 major exporters)	Apparel cost	NOT MODELED	NOT MODELED	$1.4	$2.8	$0.5	$1.0
	Textile cost			$0.7	$1.5	$0.1	$0.2
	Average cost per job			$119,800	$239,599	$37,260	$74,520
Jenkins Bill (More protection against 12 major exporters)	Apparel cost	$8.1	$16.2	$11.5	$22.9	$3.8	$7.6
	Textile cost	$5.6	$11.2	$6.3	$12.6	$0.8	$1.7
	Average cost per job	$209,200	$418,400	$143,096	$286,191	$39,345	$78,689

Table 2 compares the results of three CEA models for four policy options. The CEA-1 model is not discussed at length in this paper but is included for comparison. The top two policy options in Table 2 refer to a move toward free trade, so the figures represent benefits to consumers. The lower two policy options are bills that would increase protection and hence, costs to consumers.

The MFA currently being renegotiated accounts for roughly half of the current cost of protection. Its cost to the economy as a whole is particularly high, since foreign producers gain the rents from the quota.

The Jenkins and Thurmond bills would have lowered the amount of textiles and apparel imported in the first year following passage and allowed slow growth thereafter. Table 2 shows the results of modeling the first year effects only. The costs in later years are considerably higher as discussed in the previous section. In modeling the Jenkins and Thurmond bills, the results depend on the estimated effect of each bill on the level of overall imports. That estimate, which came from the Department of Commerce, was based on the assumption that foreign countries would be able to mitigate the effect of the quotas by moving to alternative textile and apparel production where quota limits would be less stringent. This assumption is a realistic approximation; over the last few years foreign countries have

shown the ability to respond quickly to quota restraints. Whereas foreign countries that fall under MFA quota restraints were assumed to respond to quota restraints quickly, Canada and the EC were not assumed to respond to the ensuing higher prices by increasing their output. Future CEA models will address that problem.

The interests of the textile and apparel industries in obtaining greater protection are not identical; textile protection is detrimental to the apparel industry because it raises apparel input costs. A bill that restricts textile imports raises the consumer cost per job saved because output in the more labor intensive apparel sector falls.

The consumer costs from the CEA-2 model are much higher than those given by the CEA-3 model. This is primarily due to the fact that, in the CEA-3 model, the increase in cost brought about by protection does not raise the prices of domestically produced goods by as much as the prices of imports. Since all prices do not go up by as much as in the CEA-2 model, the consumer cost of protection is lower.

Furthermore, in the CEA-2 model, any decrease in the purchase of imports due to higher prices was offset by an equivalent increase in domestic purchases, implying that total demand was perfectly inelastic. Thus an increase in prices, as modeled by CEA-2, leads to an increase in the total amount that consumers spend without any concomitant decrease in quantity,

whereas in the CEA-3 model consumers purchase less so their total expenditures and consumer cost is lower.

The primary difference between CEA-2 and CEA-3 with respect to consumer cost per job is due to the domestic supply elasticities used in the two models. The elasticity of domestic supply was assumed to be 5.00 in CEA-3 for textiles and apparel, whereas, in CEA-2, it averaged 1.08 for apparel and 0.27 for textiles over the four policy alternatives. The lower elasticity of supply in CEA-2 assumes that domestic output does not respond to price changes as much as in CEA-3. Consequently, a price increase brought about by protection does not add as many jobs in the CEA-2 model, the consumer cost is spread over fewer jobs, and the consumer cost per job is higher.

The consumer cost per job saved that is reported in all CEA models is based on a conservative measurement. Industry output is divided by the number of people employed in the industry to give an average labor per output figure, which is then used to evaluate the change in the number of jobs associated with a given change in output. The marginal effect of output changes on labor is likely to be lower than the average, particularly in the short run. Furthermore the appeal for protection is often made along with the claim that it will allow the industry to modernize. To the extent that modernization takes place, the average labor to output ratio would fall, raising the consumer cost per job saved.

Additionally, in the CEA-2 model, the consumer cost per job is higher when a move from the status quo to more protection is modeled and lower when a move to less protection is modeled, whereas it remains essentially the same for all four policy alternatives in the CEA-3 model. This difference can be traced to the strong assumption imposed in the CEA-2 model. In order to keep total demand perfectly inelastic, the domestic supply response to price changes must exactly offset the import demand response as shown in equation (1). Equation (1) is used to derive equation (3) for which Q is domestic supply, ε is the domestic supply elasticity, M is imports, and η is the import demand elasticity.

(1) $$-\frac{dQ}{dP} = \frac{dM}{dP}$$

(2) $$-\frac{Q}{P}\frac{PdQ}{QdP} = \frac{M}{P}\frac{PdM}{MdP}$$

(3) $$-Q\,\varepsilon_Q = M\,\eta_M$$

A move toward free trade increases imports and decreases domestic supply. Consequently, with η held constant at -3.0, ε must change. The necessary direction of change is clear: a move to free trade reduces the weight of domestic supply in equation (3) so the domestic supply elasticity must rise to accommodate. The higher domestic supply elasticity means that jobs are added more easily and the consumer cost per job, spread over more jobs, is

lower. The reverse holds in the case of a move toward more protection. This particular relationship is an artifact of the perfect substitute model and the assumption of perfectly inelastic overall demand, rather than an accurate representation of textile and apparel markets.

Whereas the consumer cost and consumer cost per job varied depending on the model used, the change in domestic output based on varying degrees of protection was similar for CEA-2 and CEA-3. As shown in Table 3, protection is effective in helping the domestic industry but a lack of protection is not devastating.

TABLE 3

DOMESTIC OUTPUT

(Percent Change From Current Protection)

Apparel	CEA-2	CEA-3
Free Trade	-34.4	-33.1
Remove MFA	-18.2	-17.3
Thurmond Bill	+1.3	+1.0
Jenkins Bill	+8.9	+6.7
Textiles		
Free Trade	-14.7	-22.2
Remove MFA	-8.9	-12.0
Thurmond Bill	+0.2	+0.6
Jenkins Bill	+1.8	+4.6

The effect of protection on domestic output depends on the elasticity of substitution in demand between domestic and imported goods and on the domestic supply elasticity. A high elasticity of substitution means that the increase in price in the import market has a significant effect on price in the domestic market. A higher domestic supply elasticity means that the domestic industry can react to the higher prices by increasing output significantly. Protection is effective, though still costly to consumers, when both the elasticity of substitution and the elasticity are high. The CEA-2 model assumed infinite substitutability but a low supply elasticity; the CEA-3 model assumed lower elasticities of substitution, -3.2 and -2.4 for apparel and textiles respectively, but a relatively high supply elasticity of 5.0.

APPENDIX A

THE CEA-2 AND CEA-3 MODELS

PERFECT SUBSTITUTE MODELS

Tables A-1 through A-4 show the CEA-2 perfect substitute models where DA is total demand for apparel, QA is domestic supply and MA is import demand. PA is the price of apparel, PAF if the foreign price, tA is the tariff, and qA is the tariff equivalent value of the quota. DT represents total demand for textiles and other notation follows accordingly. Because the models are log-linear, the coefficients are elasticities.

Models of the status quo compared to free trade and the removal of MFA quotas, shown in Tables A-1 and A-2, use estimates of quota and tariff levels in equations (2) and (6) to derive price changes. The price changes are exogenous to the main part of the model. All prices are initially normalized to one: changes can therefore be read directly as percent changes. Equations (3) and (7) represent domestic supply of apparel and textiles respectively, and equations (4) and (8) represent the domestic demand for imports. Equations (1) and (5) give total demand as the sum of domestic supply and import demand.

The Department of Commerce has estimated the effect of protectionist legislation on imports. CEA analysis of the

Jenkins and Thurmond bills used this projected in imports as exogenous variables. Consequently, the foreign supply functions, equations (2) and (6) of Tables A-1 and A-2, were not needed. Tables A-3 and A-4 are, in other respects, similar to Tables A-1 and A-2.

IMPERFECT SUBSTITUTE MODELS

Tables A-5 through A-8 show the imperfect substitute models for the same four cases analyzed with the perfect substitute model. The notation is similar but prices are differentiated between foreign and domestic.

In Tables A-5 and A-6, equations (1) and (5) show import demand for apparel and textiles respectively. Import supply prices are determined exogenously in equations (2) and (6). Equations (3) and (7) show domestic demand and equations (4) and (8) show domestic supply.

Tables A-7 and A-8 are like A-3 and A-4 in that changes in import levels, calculated by the Department of Commerce, are exogenous to the model. Equations (1) and (4) show import demand for apparel and textiles respectively; equations (2) and (5) show domestic demand; and equations (3) and (6) show domestic supply.

TABLE A-1

CEA-2
Perfect Substitute Model Analysis of Free Trade

* 1. DA = QA + MA
* 2. ln(PA) = ln(PAF) + ln(1 + tA) + ln(1 + qA)
3. ln(QA) = b0 + b1(ln(PA)) + b2(ln(PT))
4. ln(MA) = c0 + c1(ln(PA)) - c2(ln(PT))
* 5. DT = QT + MT
* 6. ln(PT) = ln(PTF) + ln(1 + tT) + ln(1 + qT)
7. ln(QT) = e0 + e1(ln(PT))
8. ln(MT) - d2(ln(QA)) = f0 + f1(ln(PT))

* Identities

$$\begin{bmatrix} 1.00 & 0.00 & 0.00 & 0.00 \\ 0.00 & 1.00 & 0.00 & 0.00 \\ 0.00 & 0.00 & 1.00 & 0.00 \\ -d2 & 0.00 & 0.00 & 1.00 \end{bmatrix} \begin{bmatrix} \ln(QA) \\ \ln(MA) \\ \ln(QT) \\ \ln(MT) \end{bmatrix} = \begin{bmatrix} b0 + b1(\ln(PA)) + b2(\ln(PT)) \\ c0 + c1(\ln(PA)) - c2(\ln(PT)) \\ e0 + e1(\ln(PT)) \\ f0 + f1(\ln(PT)) \end{bmatrix}$$

ELASTICITIES		BASELINE INTERCEPTS	
b1 =	1.36	b0 =	4.03
b2 =	-0.54	c0 =	2.90
c1 =	-3.00	e0 =	4.03
c2 =	-1.69	f0 =	-0.17
d2 =	0.40		
e1 =	0.38		
f1 =	-3.00		

INITIAL VALUES		RESULTS	PERCENT CHANGE
DA =	74.44	74.44	0.0%
QA =	56.30	36.93	-34.4%
MA =	18.14	37.51	106.8%
PA =	1.00	0.62	-37.9%
tA =	0.21	0.00	-100.0%
qA =	0.33	0.00	-100.0%
PAF =	0.62		
DT =	60.21	60.21	-0.0%
QT =	56.00	47.75	-14.7%
MT =	4.21	12.46	195.7%
PT =	1.00	0.66	-34.1%
tT =	0.14	0.00	-100.0%
qT =	0.33	0.00	-100.0%
PTF =	0.66		

	ANNUAL CONSUMER COST * (BIL)	JOBS SAVED (THOUS)	COST PER JOB ($)
APPAREL	-56.50	-427.00	
TEXTILES	-38.83	-108.48	
TOTAL	-95.33	-535.47	$178,028

* COST IS BASED ON RETAIL SALES

MODEL RESULTS

$$\begin{bmatrix} 1.00 & 0.00 & 0.00 & 0.00 \\ 0.00 & 1.00 & 0.00 & 0.00 \\ 0.00 & 0.00 & 1.00 & 0.00 \\ -0.40 & 0.00 & 0.00 & 1.00 \end{bmatrix} \begin{bmatrix} 3.61 \\ 3.62 \\ 3.87 \\ 2.52 \end{bmatrix} = \begin{bmatrix} 3.61 \\ 3.62 \\ 3.87 \\ 1.08 \end{bmatrix}$$

CONSTANTS USED

TABLE A-1

TABLE A-2

CEA-2

Perfect Substitute Model Analysis of the Removal of MFA Quotas

* 1. DA = QA + MA .
* 2. ln(PA) = ln(PAF) + ln(1 + tA) + ln(1 + qA)
3. ln(QA) = b0 + b1(ln(PA)) + b2(ln(PT))
4. ln(MA) = c0 + c1(ln(PA)) - c2(ln(PT))
* 5. DT = QT + MT
* 6. ln(PT) = ln(PTF) + ln(1 + tT) + ln(1 + qT)
7. ln(QT) = e0 + e1(ln(PT))
8. ln(MT) - d2(ln(QA) = f0 + f1(ln(PT))

* Identities

1.00	0.00	0.00	0.00		ln(QA)		b0 + b1(ln(PA)) + b2(ln(PT))
0.00	1.00	0.00	0.00		ln(MA)	=	c0 + c1(ln(PA)) - c2(ln(PT))
0.00	0.00	1.00	0.00		ln(QT)		e0 + e1(ln(PT))
-d2	0.00	0.00	1.00		ln(MT)		f0 + f1(ln(PT))

ELASTICITIES		BASELINE INTERCEPTS	
b1 =	1.16	b0 =	4.03
b2 =	-0.47	c0 =	2.90
c1 =	-3.00	e0 =	4.03
c2 =	-1.44	f0 =	-0.17
d2 =	0.40		
e1 =	0.33		
f1 =	-3.00		

	INITIAL VALUES	RESULTS	PERCENT CHANGE
DA =	74.44	74.44	0.0%
QA =	56.30	46.07	-18.2%
MA =	18.14	28.37	56.4%
PA =	1.00	0.75	-25.0%
tA =	0.21	0.21	0.0%
qA =	0.33	0.00	-100.0%
PAF =	0.62		
DT =	60.21	60.21	0.0%
QT =	56.00	51.00	-8.9%
MT =	4.21	9.21	118.6%
PT =	1.00	0.75	-25.0%
tT =	0.14	0.14	0.0%
qT =	0.33	0.00	-100.0%
PTF =	0.66		

	ANNUAL CONSUMER COST * (BIL)	JOBS SAVED (THOUS)	COST PER JOB ($)
APPAREL	-37.19	-225.45	
TEXTILES	-28.74	-65.74	
TOTAL	-65.93	-291.19	$226,429

* COST IS BASED ON RETAIL SALES

				MODEL RESULTS		CONSTANTS USED
1.00	0.00	0.00	0.00	3.83		3.83
0.00	1.00	0.00	0.00	3.35		3.35
0.00	0.00	1.00	0.00	3.93	=	3.93
-0.40	0.00	0.00	1.00	2.22		0.69

TABLE A-2

TABLE A-3

CEA-2
Perfect Substitute Model Analysis of the Thurmond Bill

1. DA = QA + MA (IDENTITY)
2. ln(QA) - b1(ln(PA)) - b2(ln(PT)) = b0
3. - c1(ln(PA)) + c2(ln(PT)) = -ln(MA) + c0
4. DT = QT + MT (IDENTITY)
5. ln(QT) - e1(ln(PT)) = e0
6. - f1(ln(PT)) - d2(ln(QA)) = f0 - ln(MT)

1.00	-b1	0.00	-b2		ln(QA)		b0
0.00	-c1	0.00	+c2		ln(PA)	=	c0 - ln(MA)
0.00	0.00	1.00	-e1		ln(QT)		e0
-d2	0.00	0.00	-f1		ln(PT)		f0 - ln(MT)

ELASTICITIES		BASELINE INTERCEPTS		INITIAL VALUES		RESULTS	PERCENT CHANGE
b1 =	0.95	b0 =	4.03	DA =	74.44	74.44	0.0%
b2 =	-0.38	c0 =	2.90	QA =	56.30	57.03	1.3%
c1 =	-3.00	e0 =	4.03	MA =	18.14	17.41	-4.0%
c2 =	-1.18	f0 =	-0.17	PA	1.00	1.02	1.9%
d2 =	0.40			DT =	60.21	60.21	0.0%
e1 =	0.19			QT =	56.00	56.14	0.2%
f1 =	-3.00			MT =	4.21	4.08	-3.2%
				PT =	1.00	1.01	1.3%

	ANNUAL CONSUMER COST * (BIL)	JOBS SAVED (THOUS)	COST PER JOB ($)
APPAREL	2.79	16.02	
TEXTILES	1.48	1.78	
TOTAL	4.26	17.80	$239,599

* COST IS BASED ON RETAIL SALES

				MODEL RESULTS		CONSTANTS USED
1.00	-0.95	0.00	0.38	4.04		4.03
0.00	3.00	0.00	-1.18	0.02		0.04
0.00	0.00	1.00	-0.19	4.03	=	4.03
-0.40	0.00	0.00	3.00	0.01		-1.58

TABLE A-4

CEA-2

Perfect Substitute Model Analysis of the Jenkins Bill

1. DA = QA + MA (IDENTITY)
2. ln(QA) - b1(ln(PA)) - b2(ln(PT)) = b0
3. - c1(ln(PA)) + c2(ln(PT)) = -ln(MA) + c0
4. DT = QT + MT (IDENTITY)
5. ln(QT) - e1(ln(PT)) = e0
6. - f1(ln(PT)) - d2(ln(QA)) = f0 - ln(MT)

1.00	-b1	0.00	-b2	ln(QA)	=	b0	
0.00	-c1	0.00	+c2	ln(PA)		c0 - ln(MA)	
0.00	0.00	1.00	-e1	ln(QT)		e0	
-d2	0.00	0.00	-f1	ln(PT)		f0 - ln(MT)	

ELASTICITIES		BASELINE INTERCEPTS	
b1 =	0.83	b0 =	4.03
b2 =	-0.33	c0 =	2.90
c1 =	-3.00	e0 =	4.03
c2 =	-1.04	f0 =	-0.17
d2 =	0.40		
e1 =	0.17		
f1 =	-3.00		

	INITIAL VALUES	RESULTS	PERCENT CHANGE
DA =	74.44	74.44	0.0%
QA =	56.30	61.33	8.9%
MA =	18.14	13.11	-27.7%
PA	1.00	1.15	15.4%
DT =	60.21	60.21	0.0%
QT =	56.00	57.00	1.8%
MT =	4.21	3.22	-23.7%
PT =	1.00	1.11	10.7%

	ANNUAL CONSUMER COST * (BIL)	JOBS SAVED (THOUS)	COST PER JOB ($)
APPAREL	22.92	110.81	
TEXTILES	12.56	13.14	
TOTAL	35.47	123.95	$286,191

* COST IS BASED ON RETAIL SALES

				MODEL RESULTS		CONSTANTS USED
1.00	-0.83	0.00	0.33	4.12		4.03
0.00	3.00	0.00	-1.04	0.14		0.32
0.00	0.00	1.00	-0.17	4.04	=	4.03
-0.40	0.00	0.00	3.00	0.10		-1.34

TABLE A-4

TABLE A-5

CEA-3
Imperfect Substitute Model Analysis of Free Trade

1. $\ln(MA) = a0 + a1(\ln(PAM)) + a2(\ln(PAD))$
* 2. $\ln(PAM) = \ln(PAF) + \ln(1 + tA) + \ln(1 + qA)$
3. $\ln(DA) = b0 + b1(\ln(PAD)) + b2(\ln(PAM))$
4. $\ln(DA) = c0 + c1(\ln(PAD)) + c2(\ln(PTD)) + c3(\ln(PTM))$
5. $\ln(MT) = x0 + x1(\ln(PTM)) + x2(\ln(PTD)) + x3(\ln(DA))$
* 6. $\ln(PTM) = \ln(PTF) + \ln(1 + tT) + \ln(1 + qT)$
7. $\ln(DT) = y0 + y1(\ln(PTD)) + y2(\ln(PTM)) + y3(\ln(DA))$
8. $\ln(DT) = z0 + z1(\ln(PTD))$

Identities

ELASTICITIES		BASELINE INTERCEPTS		INITIAL VALUES		RESULTS	PERCENT CHANGE
a1 =	-2.07	a0 =	2.93	MA =	18.74	44.61	138.1%
a2 =	1.67	b0 =	4.03	DA =	56.30	37.69	-33.1%
b1 =	-1.53	c0 =	4.03	tA =	0.25	0.00	-100.0%
b2 =	1.13	x0 =	3.23	qA =	0.33	0.00	-100.0%
c1 =	5.00	y0 =	2.41	PAM =	1.00	0.60	-40.0%
c2 =	-1.80	z0 =	4.03	PAD =	1.00	0.89	-10.8%
c3 =	-0.20			PAF =	0.60		
x1 =	-2.11			MT =	4.16	10.53	152.9%
x2 =	1.95			DT =	56.00	43.58	-22.2%
x3 =	0.40			tT =	0.13	0.00	-100.0%
y1 =	-0.45			qT =	0.33	0.00	-100.0%
y2 =	0.29			PTM =	1.00	0.67	-33.0%
y3 =	0.40			PTD =	1.00	0.95	-4.9%
z1 =	5.00			PTF =	0.67		

	ANNUAL CONSUMER COST (BIL)	JOBS SAVED (THOUS)	COST PER JOB ($)
APPAREL	-35.49	410.17	
TEXTILES	-7.78	163.36	
TOTAL	-43.27	573.53	$75,446

							RESULTS		CONSTANTS USED
-1.00	0.00	1.67	0.00	0.00	0.00		3.80		-3.99
0.00	-1.00	-1.53	0.00	0.00	0.00		3.63		-3.45
0.00	0.20	-1.00	0.00	0.00	0.36	=	-0.11	=	0.82
0.00	-0.45	0.00	-1.00	0.00	1.95		2.35		-4.08
0.00	0.40	0.00	0.00	-1.00	-0.50		3.77		-2.30
0.00	0.00	0.00	0.00	0.20	-1.00		-0.05		0.81

-1.00	0.00	a2	0.00	0.00	0.00		ln(MA)		-(a0+a1(ln(PAM)))
0.00	-1.00	b1	0.00	0.00	0.00		ln(DA)		-(b0+b2(ln(PAM)))
0.00	1/c1	-1.00	0.00	0.00	-c2/c1		ln(PAD)	=	(c0/c1)+(c3/c1)ln(PTM)
0.00	x3	0.00	-1.00	0.00	x2		ln(MT)		-(x0+x1(ln(PTM)))
0.00	y3	0.00	0.00	-1.00	y1		ln(DT)		-(y0+y2(ln(PTM)))
0.00	0.00	0.00	0.00	1/z1	-1.00		ln(PTD)		(z0/z1)

TABLE A-6

CEA-3
Imperfect Substitute Model Analysis of the Removal of MFA Quotas

1. $\ln(MA) = a0 + a1(\ln(PAM)) + a2(\ln(PAD))$
* 2. $\ln(PAM) = \ln(PAF) + \ln(1 + tA) + \ln(1 + qA)$
3. $\ln(DA) = b0 + b1(\ln(PAD)) + b2(\ln(PAM))$
4. $\ln(DA) = c0 + c1(\ln(PAD)) + c2(\ln(PTD)) + c3(\ln(PTM))$
5. $\ln(MT) = x0 + x1(\ln(PTM)) + x2(\ln(PTD)) + x3(\ln(DA))$
* 6. $\ln(PTM) = \ln(PTF) + \ln(1 + tT) + \ln(1 + qT)$
7. $\ln(DT) = y0 + y1(\ln(PTD)) + y2(\ln(PTM)) + y3(\ln(DA))$
8. $\ln(DT) = z0 + z1(\ln(PTD))$

Identities

ELASTICITIES		BASELINE INTERCEPTS		INITIAL VALUES		RESULTS	PERCENT CHANGE
a1 =	-2.27	a0 =	2.93	MA =	18.74	32.33	72.6%
a2 =	1.87	b0 =	4.03	DA =	56.30	46.55	-17.3%
b1 =	-1.33	c0 =	4.03	tA =	0.25	0.25	0.0%
b2 =	0.93	x0 =	3.00	qA =	0.33	0.00	-100.0%
c1 =	5.00	y0 =	2.41	PAM =	1.00	0.75	-25.1%
c2 =	-1.80	z0 =	4.03	PAD =	1.00	0.94	-5.7%
c3 =	-0.20			PAF =	0.60		
x1 =	-2.17			MT =	4.16	7.86	88.9%
x2 =	2.01			DT =	56.00	49.26	-12.0%
x3 =	0.40			tT =	0.13	0.13	0.0%
y1 =	-0.39			qT =	0.33	0.00	-100.0%
y2 =	0.23			PTM =	1.00	0.75	-24.6%
y3 =	0.40			PTD =	1.00	0.97	-2.5%
z1 =	5.00			PTF =	0.67		

	ANNUAL CONSUMER COST (BIL)	JOBS SAVED (THOUS)	COST PER JOB ($)
APPAREL	-18.65	214.90	
TEXTILES	-4.44	88.61	
TOTAL	-23.09	303.51	$76,070

							RESULTS		CONSTANTS USED
	-1.00	0.00	1.87	0.00	0.00	0.00	3.48		-3.59
	0.00	-1.00	-1.33	0.00	0.00	0.00	3.84		-3.76
	0.00	0.20	-1.00	0.00	0.00	0.36	-0.06	=	0.82
	0.00	-0.39	0.00	-1.00	0.00	2.01	2.06		-3.61
	0.00	0.40	0.00	0.00	-1.00	-0.50	3.90		-2.35
	0.00	0.00	0.00	0.00	0.20	-1.00	-0.03		0.81

	-1.00	0.00	a2	0.00	0.00	0.00	ln(MA)		-(a0+a1(ln(PAM)))
	0.00	-1.00	b1	0.00	0.00	0.00	ln(DA)		-(b0+b2(ln(PAM)))
	0.00	1/c1	-1.00	0.00	0.00	-c2/c1	ln(PAD)	=	(c0/c1)+(c3/c1)ln(PTM)
	0.00	x3	0.00	-1.00	0.00	x2	ln(MT)		-(x0+x1(ln(PTM)))
	0.00	y3	0.00	0.00	-1.00	y1	ln(DT)		-(y0+y2(ln(PTM)))
	0.00	0.00	0.00	0.00	1/z1	-1.00	ln(PTD)		(z0/z1)

TABLE A-7

~~LIMITED OFFICIAL USE~~

CEA-3

Imperfect Substitute Model Analysis of the Thurmond Bill

1. $a1(\ln(1+qA)) + a2(\ln(PAD)) = \ln(MA) - a0 - a1(\ln(PAF)) - a1(\ln(1+tA))$
2. $-\ln(DA) + b2(\ln(1+qA)) + b1(\ln(PAD)) = -b0 - b2(\ln(PAF*(1+tA))$
3. $\ln(DA) - c1(\ln(PAD)) - c2(\ln(PTD)) - c3(\ln(1+qT)) = c0 + c3(\ln(PTF)) + c3(\ln(1+tT))$
4. $x1(\ln(1+qT)) + x2(\ln(PTD)) + x3(\ln(DA)) = \ln(MT) - x0 - x1(\ln(PTF*(1+tT))$
5. $-\ln(DT) + y1(\ln(PTD)) + y2(\ln(1+qT)) + y3(\ln(DA)) = -y0 - y2(\ln(PTF*(1+tT))$
6. $\ln(DT) - z1(\ln(PTD)) = z0$

ELASTICITIES		BASELINE INTERCEPTS		INITIAL VALUES		RESULTS	PERCENT CHANGE
a1 =	-2.51	a0 =	2.93	MA =	18.74	17.99	-4.00%
a2 =	2.11	b0 =	4.03	DA =	56.30	56.85	0.97%
b1 =	-1.09	c0 =	4.03	tA =	0.25	0.25	0.00%
b2 =	0.69	x0 =	2.68	qA =	0.33	0.36	8.97%
c1 =	5.00	y0 =	2.41	PAM =	1.00	1.02	1.89%
c2 =	-1.80	z0 =	4.03	PAD =	1.00	1.00	0.30%
c3 =	-0.20			PAF =	0.60		
x1 =	-2.25			MT =	4.16	4.03	-3.20%
x2 =	2.09			DT =	56.00	56.35	0.62%
x3 =	0.40			tT =	0.13	0.13	0.00%
y1 =	-0.31			qT =	0.33	0.35	4.78%
y2 =	0.15			PTM =	1.00	1.01	1.44%
y3 =	0.40			PTD =	1.00	1.00	0.12%
z1 =	5.00			PTF =	0.67		

	ANNUAL CONSUMER COST * (BIL)	JOBS SAVED (THOUS)	COST PER JOB ($)
APPAREL	1.03	12.02	
TEXTILES	0.21	4.60	
TOTAL	1.24	16.62	$74,520

* COST IS BASED ON RETAIL SALES

						MODEL RESULTS		CONSTANTS USED
-2.51	0.00	2.11	0.00	0.00	0.00	0.31		-0.77
0.69	-1.00	-1.09	0.00	0.00	0.00	4.04		-3.83
0.00	1.00	-5.00	0.20	0.00	1.80	0.00	=	4.09
0.00	-0.31	0.00	-2.25	0.00	2.09	0.30		-1.93
0.00	0.40	0.00	0.15	-1.00	0.15	4.03		-2.37
0.00	0.00	0.00	0.00	1.00	-5.00	0.00		4.03

a1	0.00	a2	0.00	0.00	0.00	ln(1+qA)		ln(MA)-a0-a1(ln(PAF))-a1(ln(1+tA))
b2	-1.00	b1	0.00	0.00	0.00	ln(DA)		-b0-b2(ln(PAF*(1+tA))
0.00	1.00	-c1	-c3	0.00	-c2	ln(PAD)	=	c0+C3(ln(PTF))+c3(ln(1+tT))
0.00	x3	0.00	x1	0.00	x2	ln(1+qT)		ln(MT)-x0-x1(ln(PTF*(1+tT))
0.00	y3	0.00	y2	-1.00	y1	ln(DT)		-y0-y2(ln(PTF*(1+tT))
0.00	0.00	0.00	0.00	1.00	-z1	ln(PTD)		z0

TABLE A-7

~~LIMITED OFFICIAL USE~~

TABLE A-8

~~LIMITED OFFICIAL USE~~

CEA-3

Imperfect Substitute Model Analysis of the Jenkins Bill

1. $a1(\ln(1 + qA)) + a2(\ln(PAD)) = \ln(MA) - a0 - a1(\ln(PAF)) - a1(\ln(1+tA))$
2. $- \ln(DA) + b2(\ln(1 + qA)) + b1(\ln(PAD)) = - b0 - b2(\ln(PAF*(1 + tA))$
3. $\ln(DA) - c1(\ln(PAD)) - c2(\ln(PTD)) - c3(\ln(1+qT)) = c0 + c3(\ln(PTF)) + c3(\ln(1 + tT))$
4. $x1(\ln(1+qT)) + x2(\ln(PTD)) + x3(\ln(DA)) = \ln(MT) - x0 - x1(\ln(PTF*(1+tT))$
5. $- \ln(DT) + y1(\ln(PTD)) + y2(\ln(1 + qT)) + y3(\ln(DA)) = - y0 - y2(\ln(PTF*(1 + tT))$
6. $\ln(DT) - z1(\ln(PTD)) = z0$

ELASTICITIES		BASELINE INTERCEPTS		INITIAL VALUES		RESULTS	PERCENT CHANGE
a1 =	-2.59	a0 =	2.93	MA =	18.74	13.55	-27.7%
a2 =	2.19	b0 =	4.03	DA =	56.30	60.10	6.7%
b1 =	-1.01	c0 =	4.03	tA =	0.25	0.25	0.0%
b2 =	0.61	x0 =	-0.19	qA =	0.33	0.54	63.8%
c1 =	5.00	y0 =	2.41	PAM =	1.00	1.15	15.4%
c2 =	-1.80	z0 =	4.03	PAD =	1.00	1.02	2.2%
c3 =	-0.20			PAF =	0.60		
x1 =	-2.27			MT =	4.16	3.18	-23.7%
x2 =	2.11			DT =	56.00	58.57	4.6%
x3 =	0.40			tT =	0.13	0.13	0.0%
y1 =	-0.29			qT =	0.33	0.52	59.1%
y2 =	0.15			PTM =	1.00	1.15	14.9%
y3 =	0.40			PTD =	1.00	1.01	0.9%
z1 =	5.00			PTF =	0.67		

	ANNUAL CONSUMER COST * (BIL)	JOBS SAVED (THOUS)	COST PER JOB ($)
APPAREL	7.56	83.71	
TEXTILES	1.69	33.85	
TOTAL	9.25	117.55	$78,689

* COST IS BASED ON RETAIL SALES

							MODEL RESULTS		CONSTANTS USED
-2.59	0.00	2.19	0.00	0.00	0.00		0.43		-1.07
0.61	-1.00	-1.01	0.00	0.00	0.00		4.10		-3.86
0.00	1.00	-5.00	0.20	0.00	1.80	=	0.02	=	4.09
0.00	0.40	0.00	-2.27	0.00	2.11		0.42		0.70
0.00	0.40	0.00	0.15	-1.00	-0.29		4.07		-2.37
0.00	0.00	0.00	0.00	1.00	-5.00		0.01		4.03

a1	0.00	a2	0.00	0.00	0.00		ln(1+qA)		ln(MA)-a0-a1(ln(PAF))-a1(ln(1+tA))
b2	-1.00	b1	0.00	0.00	0.00		ln(DA)		-b0-b2(ln(PAF*(1+tA))
0.00	1.00	-c1	-c3	0.00	-c2	=	ln(PAD)	=	c0+C3(ln(PTF))+c3(ln(1+tT))
0.00	x3	0.00	x1	0.00	x2		ln(1+qT)		ln(MT)-x0-x1(ln(PTF*(1+tT))
0.00	y3	0.00	y2	-1.00	y1		ln(DT)		-y0-y2(ln(PTF*(1+tT))
0.00	0.00	0.00	0.00	1.00	-z1		ln(PTD)		z0

TABLE A-8

~~LIMITED OFFICIAL USE~~

APPENDIX B

(Elasticities Used in CEA Models)

The quantitative effect of price changes on demand and supply is determined by the respective elasticity. An own-price apparel demand elasticity of -3 means that a 1 percent increase in the price of apparel leads to a 3 percent decrease in the amount demanded. The elasticities used in CEA models are based on empirical research. Often these elasticities affect others through imperatives of the model or other economic relationships. The elasticities and their derivations differ depending on the model in which they are used. The elasticities used are shown in Tables A-1 through A-8.

PERFECT SUBSTITUTE MODEL

In this model, import demand (MA) and domestic supply (QA) for say, apparel equal total demand (DA).

(A-1) $$DA = QA + MA$$

This simple identity allows derivation of the following constraint on elasticities.

(A-2) $$\frac{P}{D}\frac{dD}{dP} = \frac{Q}{D}\frac{P}{Q}\frac{dQ}{dP} + \frac{M}{D}\frac{P}{M}\frac{dM}{dP}$$

or

(A-3) $$\varepsilon_D = {}^{Q}/_{D}\ \varepsilon_Q + {}^{M}/_{D}\ \eta_M$$

where the total demand elasticity is a weighted sum of the domestic supply elasticity and the import demand elasticity.

A typical estimate of the import demand elasticity for apparel is -1.24.[3] Such estimates might be biased downward due to the influence of quantitative restrictions over the estimate period, and the consequent price increases predicted as a result of import restrictions would be overstated. To avoid this possibility, the elasticity value in the CEA-2 simulations is taken to be -3, as the current procedure attempts to err on the side of underestimating the consumer costs of textile and apparel protection.

Nevertheless, using a demand elasticity of -3.0 yields on unrealistically low supply elasticity. To account for this problem total demand was assumed to be perfectly inelastic to changes in price, thus allowing the domestic supply elasticity to be as high as possible while remaining consistent with the price responsiveness of import demand.

IMPERFECT SUBSTITUTE MODEL

The problem in obtaining appropriate elasticities for the imperfect substitution model is not due to structural constraints but lack of information. Because prices of textiles and apparel

are differentiated between foreign and domestic, own- and cross-price elasticities of demand are needed for each market. Separate and consistent estimates of these parameters are not available, but using overall demand elasticities and elasticities of substitution between domestically produced and imported textiles and apparel, along with an approach developed by Armington, allows specification of these elasticities.[3,4]

The Armington approach uses the importance of one of the categories of goods in the total along with the overall demand elasticity to derive a scale effect, and a similar weighting along with the elasticity of substitution to derive the price effect. These effects together provide the relevant elasticity. The textile and apparel demand elasticities used were -.16 and -.4 respectively and the substitution elasticities were -2.4 and -3.2. Equations (1) through (4) show the equations used to derive the individual elasticities.

Because the elasticities are based on the initial levels of imports and domestic supply, and the levels change, the elasticities should be different at the new levels. This was accomplished by doing the Armington calculation on the average of the initial and final points and then iterating until the result showed no change.

$$(1) \quad \eta_{MM} = \left(1 - \frac{M}{TOT}\right) \sigma + \left(\frac{M}{TOT}\right) \eta_A$$

$$(2) \quad \eta_{DM} = -\left[\left(1 - \frac{M}{TOT}\right) \sigma - \left(\frac{D}{TOT}\right) \eta_A\right]$$

$$(3) \quad \eta_{DD} = \left(1 - \frac{D}{TOT}\right) \sigma + \left(\frac{D}{TOT}\right) \eta_A$$

$$(4) \quad \eta_{MD} = -\left[\left(1 - \frac{D}{TOT}\right) \sigma - \frac{M}{TOT} \eta_A\right]$$

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where η_{MM} is the own-price demand elasticity for imports, η_{DM} is the domestic price effect on imports and so on. The term associated with the elasticity of substitution (σ) captures the price effect the term associated with the overall demand elasticity for say, apparel (η_A) gives the income effect.

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Footnotes

1) Tarr, David G. and Morkre, Morris L. Aggregate Cost to the United States of Tariffs and Quotas on Imports, Bureau of Economics Staff Report.

2) Hamilton, Carl. An Assessment of Voluntary Restraints on Hong Kong Exports to Europe and the U.S.A. Institute for International Economic Studies, Stockholm University, Stockholm, Sweden.

3) Stone, Joe A. "Price Elasticities of Demand for Imports and Exports," The Review of Economics and Statistics, Volume LXI, No. 2, May 1979.

4) Houthakker, Hendrick and Taylor. Consumer Demand in the United States, Harvard University Press, Cambridge, MA, 1970.

5) Stern, Robert M; Deardorff, Alan V.; and Shiells, Clint R. "Estimates of the Elasticities of Substitution Between Imports and Home Goods for the United States," Office of Foreign Economic Research, Bureau of International Labor Affairs, Department of Labor, August 1982, pg. 43.