WORKING PAPER

Barriers to U.S. Trade

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From Free Trade to Fair Trade

> [T]he case for free trade is currently more in doubt than at any time since the 1817 publication of Ricardo's Principles of Political Economy....[The new models of international trade] call into doubt the extent to which actual trade can be explained by comparative advantage; they also open the possibility that government intervention in trade...may under some circumstances be in the national interest after all. (Krugman 1987)

> The "visions" of the future produced by STA, MITI, NIRA [the Japanese Science and Technology Agency, Ministry of International Trade and Industry, and National Institute for Research Advancement] and numerous other government and private sources do not pretend to be accurate predictions, nor do they commit companies to inflexible plans. They chart the broad direction of advance for the economy and for technology and give companies sufficient confidence to make their own long-term investments in research, development, software, equipment and training. (Freeman 1987, 89)

The unprecedentedly large volume of international trade in recent years has been governed not only by comparative cost advantages, but also by various government policies including mechanisms intended to directly protect and promote domestic production. The General Agreement on Tariffs and Trade (GATT) has operated for the several decades of its existence under the assumption that the international division of labor is, or rather should be, the result of free trade in competitive world markets and remains committed to the negotiation of international reductions in explicit trade barriers. The official U.S. position still advocates free trade which, in freely competitive markets, can be expected to promote international price competition favoring relatively low-cost producers, thus resulting in an optimal, self-adjusting international division of labor. There is increasing recognition of the inadequacy of the free trade model largely prompted in this country by attempts to explain the huge balance of payments deficit. Even economic theorists now acknowledge that because of increasing returns to scale and so-called externalities, free trade may lead to a demonstrably less than optimal allocation of resources which could be improved by certain interventions (Krugman 1987). While such abstract proofs do not always correspond with realities, skepticism about free trade is reinforced by recent empirical research which has shown that even in the absence of an explicit trade strategy, the unorchestrated action of assorted institutions in a modern economy assure that certain economic activities will be favored over others in ways that may powerfully influence their international competitiveness (Nelson 1984).

The initial GATT signatories were all market economies, but at the present time, even the USSR and China have requested admission and such centrally managed economies as Czechoslova-

kia, Hungary, Poland, Rumania, and Cuba are already members. Many other member countries rely on private initiative to fulfill more or less coordinated national industrial, technology, and trade strategies. Japan is surely the most striking example, but governments within the increasingly integrated European Community (all internal trade barriers are to be eliminated by 1992) and many of the developing countries also try to use their trade strategies to help promote a long-term economic vision. In implicit recognition of all of these facts, discussions of international trade both in the U.S. and within GATT now aim for "fair trade" rather than "free trade." Advocacy of fair trade appears to be compatible with various assumptions about market structure or public/private sector relationships and has the pragmatic objective of simply promoting bargaining among actual and pending GATT members (over 100 countries) to eliminate perceived bilateral imbalances in protection through tariff and non-tariff barriers.

There is an extensive international literature on bilateral protection, and the first objective of this paper is to assess the overall fairness of international trade from the point of view of the United States. The paper provides a systematic description of the nature and extent of the explicit barriers faced by our exports and those we impose on our imports. While previous descriptions of barriers to international trade have focused on individual commodities and/or regions in the case-study tradition, this paper brings together the many pieces of the picture affecting the 1987 U.S. merchandise trade bills of imports and exports while maintaining both sectoral and trading partner detail. This work is presented in the following two sections. Negotiating for protection reciprocity alone cannot be an adequate basis for American trade strategy, discussed in the final section, but the analysis of these barriers is the necessary first step to which we now turn.

Forms of Trade Protection

Since the late 1970s there has been a sharp increase in protectionist sentiment in the Western industrialized countries, mainly the U.S., Canada, and the EEC, as a reaction to increased penetration of their domestic markets by Japan and the NICs, tougher competition for their exports, and higher unemployment. Tariffs and other measures have been concentrated in similar sectors in all developed countries--agriculture, textiles and apparel, footwear, leather products, steel, machine tools, automobiles, and electronics--although the nature and degree of assistance provided to domestic producers varies considerably.

The centrally planned economies manage all aspects of production and trade with the stringency of control varying from Hungary at one extreme to the USSR at the other; while it proved sometimes problematic to isolate specific barriers, the volume of U.S. trade with these countries is relatively small. More important in terms of volume is U.S. trade with Japan whose industrial strategies and trade strategies are also highly interrelated. In this case we have tried to identify the instances of explicit trade barriers. Even in market-driven economies, monopolies, cartels, and other

market structures may also affect trade flows through the direct manipulation of production quantities and unit prices. These practices are included here as barriers to trade when the control is exercised by governments. Mineral fuels are subjected to perhaps the most extensive controls, mainly licensing and government monopoly (Nogues 1986, 19), but these controls had minimal effects on prices and quantities traded in 1987.

The increased reliance of all countries on non-tariff barriers (NTBs) has resulted in the proliferation of dozens of new forms; the nine major categories of trade barriers considered in this study are itemized in Table 1. A general description of the use of these barriers is given in this section, and the applicability to U.S. imports and exports is taken up in the following section.

It has been estimated that tariffs on raw materials and manufactured goods now average under 5 percent among industrialized countries—2.8 percent for Japan, about 4.5 percent for the U.S. and the EEC, and 7 percent for Canada. The fairly low average tariff rate obscures wide differences in sectoral protection which increases with the stage of processing from raw materials through manufactured goods. Tariffs for agriculture have not been reduced much in recent years and still average between 10 percent and 25 percent. While the U.S. General System of Preferences (GSP) in principle grants developing countries reduced duties on their exports, the volume covered by the GSP is, in fact, small because of the exclusion of important commodities--agricultural products, textiles and apparel, footwear, glass products, consumer electronics, and watches, among others--the exclusion of OPEC countries and the "graduation" of the Asian NICs, Singapore, Taiwan, Korea, and Hong Kong, from the GSP. Developing countries apply much higher tariffs to their imports than the industrialized countries, commonly in the range of 30 percent and sometimes as high as 100 percent. Hong Kong, Singapore, and some other countries are exceptions and impose practically no tariffs.

While tariffs remain in effect on most commodities throughout the world, non-tariff barriers characterize the "new protectionism." Among industrialized countries, only Japan, which started out with high NTB coverage, has reduced use of explicit non-tariff barriers in the eighties. It is estimated that over the period 1981 to 1986, the value of imports covered by the barriers which directly restrict trade flows--quantitative restraints (quotas, import prohibition, voluntary export restrictions), variable levies, and nonautomatic licensing--increased by 18 percent in the EEC, 21 percent in Canada, and 23 percent in the U.S. (World Bank 1987, 143). The use of NTBs by developing countries has always been high relative to the industrialized countries though here, too, Hong Kong and Singapore are notable exceptions.

All governments provide some direct or indirect assistance to domestic industries such as subsidized inputs, technical assistance, loans, research and development support, tax incentives, export credits, tied-aid assistance, and marketing assistance. U.S. government agencies also routinely provide sector-specific programs for agriculture, textiles and apparel, footwear, steel, and automobiles (Morici and Megna 1983). However, U.S. subsidies (as a percent of GDP) rank lowest

Table 1
Classification of Barriers to International Trade in Merchandise

1 Tariffs and other import charges	Tariffs, surtaxes, variable levies and other import duties
2 Quantitative restrictions	Bans, embargoes, quotas on production imports and exports; voluntary export restraint arrangements
3 Subsidies	Export subsidies, direct payments, tied-aid credit, dumping; production subsidies to import-competing sectors including subsidized inputs, taxes, loans, marketing and transportation subsidies; R&D support
4 Licensing	Restrictive or preferential export and import licensing practices
5 Standards, testing, and certification	Discriminatory standards, regional rather than international product standards, refusal of firm's self- certification of conformity to standards
6 Counter-trade and offsets	State trading, foreign government-mandated barter, counter-purchase or technology and production transfers as an export sale condition
7 Government procurement	Closed bidding and strong governmental "buy national" policies
8 Lack of intellectual property protection	Piracy of copyrighted work, inadequate patent protection, insufficient enforcement of laws
9 Other barriers	Controlled exchange rates, preshipment inspections, Custom barriers, discriminatory taxes, domestic content requirement

among the industrialized nations in these practices and Japan's, at least several years ago, second lowest (Hufbauer 1983). The amounts of subsidy are much higher in Europe, particularly the EEC: government ownership is more extensive, and subsidies are used to actively foster high technology sectors and protect traditional ones. Developing countries also use subsidies extensively, often through government ownership and monopoly sometimes justified as the temporary protection of infant industries. Agriculture is treated differently in industrialized and developing economies with very heavy subsidies in all industrialized countries and low or negative subsidies in most developing countries with the exception of the NICs.

Restriction of government procurement to domestically produced commodities is a widespread practice. The U.S. government procurement code for federal purchases is generally limited to military purchases, high technology products, transportation vehicles, textiles, and office equip-

ment. Government procurement is more extensive in other industrialized countries, in part because of the greater degree of public ownership. Government procurement policies are most extensive in developing countries, especially those countries with industrial development programs to foster the growth of particular industries.

Standards, labelling, or certification regulations can be uncommonly complex or frankly discriminatory. Particularly restrictive regulations of these types are imposed on agricultural imports by Japan and, to a lesser degree, by all European countries and by the U.S. They are also used by the industrialized countries to restrict trade among themselves in a broad range of manufactured goods such as pharmaceuticals and motor vehicles, but are not as important in their trade with developing countries.

Countertrade and offset requirements and the failure to protect "intellectual property rights" are most characteristic of the developing countries and the centrally planned economies. Such non-tariff barriers are disappearing among the few EEC nations that have used them. Most developing countries have controlled exchange rates and apply domestic content requirements to many manufactured products. Domestic content requirements are also imposed on certain goods by the industrialized countries.

Trade Barriers Facing U.S. Commodity Imports and Exports

U.S. trade flows in 1987 by commodity and by trading partner are given in Tables 2 and 3 (see also Tables D1-D4) which show that the majority of U.S. trade--79 percent of the value of U.S. imports and 76 percent of exports--is with Canada, Japan, the European Economic Community and the newly industrializing countries. Motor vehicles, processed materials, electronics, and the residual manufacturing category account for almost half the value of U.S. imports while the inflow of non-energy raw materials, transportation equipment other than automobiles, chemical products and agricultural products is relatively small. Electronics, machinery, processed materials, chemical products, and the residual manufacturing category account for most of the value of our exports.

The pertinent barriers to trade (numbered 1 through 9 as in Table 1) associated with these trade flows are shown in Tables 4 and 5 for U.S. imports and exports, respectively.[1] While it is not practical to individually document each figure appearing in these tables, all methods and sources are described in Appendices A-C. At the level of aggregation employed in this study, it turns out that every entry (of more than a billion dollars' worth) in both tables is subject to at least one and typically several barriers to trade.

Barriers placed by the U.S. on potential imports are intended to promote domestic production by either limiting the quantity of imports or raising the effective unit price. The success of these barriers, and of barriers to U.S. exports, should be assessed by computing what the trade flows would have been, based on comparative costs, in the absence of such obstacles, and comparing those

Table 2
Value of U.S. Commodity Imports in 1987 by Sector and by Region of Origin
(millions of dollars)

Imports (millions)	A Canada	B Japan	C EEC1	D EEC2	E Other Europe	F Other Dev	G Latin America	H NICs	I Asia	J Oil X	K ME-Af	L CPEs	M Total
1 Agricultural Products	1950	345	256	887	846	554	4507	3583	1815	46	875	316	16032
2 Energy Raw Materials	5432	38	2230	73	5375	339	4651	3693	1703	13359	973	404	33704
3 Other Raw Materials	1394	8	282	168	64	285	411	351	22	8	315	98	3376
4 Processed Materials	11021	4734	4711	9316	2166	3250	6939	8741	2265	3163	966	1704	58712
5 Textile And Apparel	595	1173	1126	4589	822	141	2022	20343	4671	208	344	3783	40056
6 Light Manufacturing	14061	1612	1996	3428	1433	160	323	5737	983	6	81	461	29966
7 Chemical Products	2384	2090	3896	3567	1105	604	508	1048	130	107	183	380	15780
8 Machinery	3940	11031	9499	5307	2578	159	118	6426	216	6	283	225	39592
9 Motor Vehicles	23232	32461	12932	2095	2417	63	28	6234	9	0	16	45	79405
10 Other Transportation	1833	1265	2043	2290	265	76	5	1173	9	0	151	14	9020
11 Electronic Products	2903	23651	2754	1805	537	49	161	20084	2835	3	300	313	56056
12 Other Manufacturing	2760	9661	4296	5321	2266	180	461	12815	1741	12	1500	1283	42377
13 Total	71510	88073	46025	38850	15042	5866	20139	90235	16406	16294	5973	9033	424082

Source: (U.S. Department of Commerce, 1988)

The numbers on this page were changed to fit the title, e.g., Imports (millions $), Exports: etc., except for the preceding page.

Table 3
Value of U.S. Commodity Exports in 1987 by Sector and by Region of Destination
(millions of dollars)

Imports (millions)	A Canada	B Japan	C EEC1	D EEC2	E Other Europe	F Other Dev	G Latin America	H NICs	I Asia	J Oil X	K ME-Af	L CPEs	M Total
1 Agricultural Products	1238	3852	1279	3086	454	132	1030	3528	696	1214	706	1440	18985
2 Energy Raw Materials	880	654	140	1178	135	6	45	655	4	60	32	51	3847
3 Other Raw Materials	492	309	105	342	73	40	54	230	49	7	60	8	1765
4 Processed Materials	5535	5654	1978	4564	924	594	2739	5778	737	1477	579	356	31093
5 Textile And Apparel	712	322	344	506	111	87	1071	825	96	216	89	77	4501
6 Light Manufacturing	3310	3094	1446	1642	232	507	1026	2214	321	288	158	446	14731
7 Chemical Products	3721	3410	2310	5146	948	1091	2729	5197	1079	474	266	1210	27867
8 Machinery	8542	1737	3303	3891	1220	1300	2904	5959	1063	1443	594	794	32710
9 Motor Vehicles	16457	257	523	432	370	191	721	1829	67	773	108	31	20747
10 Other Transportation	1985	2677	3698	3858	1497	1292	692	3107	963	1574	1781	537	23971
11 Electronic Products	5963	3390	6766	6079	1610	1352	1303	8474	2810	533	584	372	39490
12 Other Manufacturing	11051	2886	3963	3986	1497	996	2030	4368	770	816	725	399	33171
13 Total	59691	28248	25861	34716	9077	7594	16350	42169	6660	8881	5688	5726	252865

Source: (U.S. Department of Commerce, 1988)

Table 4
Barriers Imposed by the United States on Commodity Imports in 1987 by Sector and by Region

	A Canada	B Japan	C EEC1	D EEC2	E Other Europe	F Other DE	G Latin America	H NICs	I Other Asia	J ME-Af Oil X	K Other ME-Af	L CPEs
1 Agricultural Products	1 2 3 5						1 2 3 5	1 2 3 5	1 2 3 5			
2 Energy Raw Materials	4		4				4	4	4	4		
3 Other Raw Materials												
4 Processed Materials	1 2 3 7	1 2 3 7	1 2 3 7	1 2 3 7	1 2 3 7	1 2 3 7	1 2 3 7	1 2 3 7	1 2 3 7	1 2 3 7		1 2 3 4 6 7
5 Textile and Apparel		1 2 3 7	1 3 7	1 3 7			1 2 3 7	1 2 3 7	1 2 3 7			1 2 3 4 6 7
6 Light Manufacturing	1 2 9	1 2 9	1 2 9	1 2 9	1 2 9			1 2 9				
7 Chemical Products	1 5	1 5	1 5	1 5	1 5			1 5				
8 Machinery	2 3 7	2 3 7	2 3 7	3 7	2 3 7			2 3 7				
9 Motor Vehicles	3 5	1 2 3 5	1 3 5	1 3 5	1 3 5			1 3 5				

	7 9	7 9	7 9	7 9	7 9			7 9				
10 Other Transportation	1 3 5 7 9	1 2 3 5 7 9	1 3 5 7 9	1 3 5 7 9				1 3 5 7 9				
11 Electronic Products	1 3 7	1 2 3 7	1 3 7	1 3 7				1 2 3 7	1 3 7			
12 Other Manufacturing	1 3 7	1 3 7	1 3 7	1 3 7	1 3 7			1 3 7	1 3 7		1 3 7	1 2 3 4 6 7

Note: The numbers in each box correspond to the trade barriers (1-9) identified in Table 1. All empty boxes correspond to trade flows of less than a billion dollars' worth.

Table 5
Barriers Facing U.S. Commodity Exports in 1987 by Sector and by Region

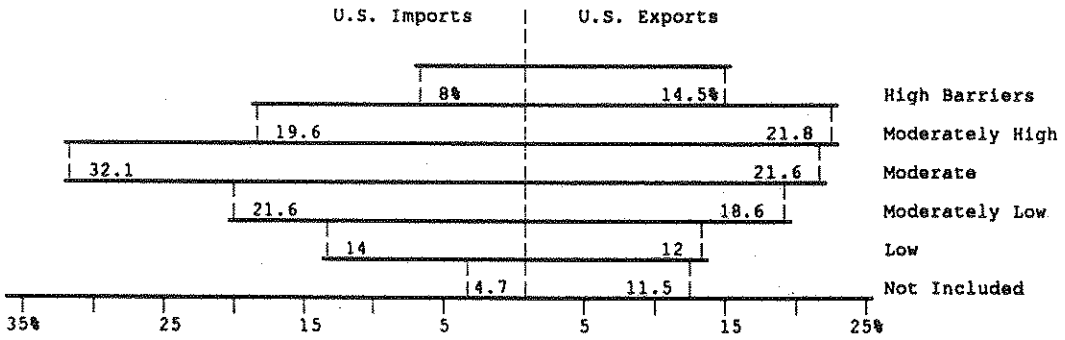
	A Canada	B Japan	C EEC1	D EEC2	E Other Europe	F Other Dev	G Latin America	H NICs	I Other Asia	J ME-Af Oil X	K Other ME-Af	L CPEs
1 Agricultural Products	1 2 3 4	1 2 3 5 7	1 2 3 5 9	1 2 3 5 6 9			1 4 9	1 2 4 6 9		2 3 4 9		1 2 3 4 6 7 9
2 Energy Raw Materials				6 9								
3 Other Raw Materials												
4 Processed Materials	1 6	1 3 7	1 3 7	1 2 3 7			1 4 6 8 9	1 2 3 4 6 8 9		2 4 5 8		
5 Textile and Apparel							1 2 4 9					
6 Light Manufacturing	1 5	1 8 7	1 3 7	1 3 7			1 4 7 8 9	1 3 6 7 8 9				
7 Chemical Products	1 3 8	1 5 8 9	1 3	1 3		1 8	1 4 8 9	1 3 4 8 9	1 4 5 8 9			1 2 6 7 8 9
8 Machinery	1 7	5 7	3 7	2 3 7 9	1 6 7 8	1 3 6 7 8	1 4 7 9	1 3 4 7 9	1 3 4 8 9	1 2 6 9		
9 Motor Vehicles	1 7							1 3 4 7 8 9				

10 Other Transportation	1 3 7	3 5 7 9	1 3 7	1 3 7	1 7	1 3 6 7		1 3 4 7 9		1 2 5 6 9	1 2 5 6 9	
11 Electronics Products	1 7 9	3 5 7 9	1 3 5 7	1 2 3 4 5 7	1 3 4 7 8 9	1 3 4 8	1 4 7 9	1 2 3 4 5 6 7 8 9	1 2 4 8 9			
12 Other Manufacturing	1 7	5 7	4 5 7	2 3 4 7 8	1 7 8 9		1 4 8 9	1 2 3 4 7 8 9				

Note: The numbers in each box correspond to the trade barriers (1-9) identified in Table 1. All empty boxes correspond to trade flows of less than a billion dollars' worth.

potential flows with their actual levels. There is, at the present time, no operational model of the world economy with which such a computation could credibly be carried out. Instead, the combined effect of these barriers in constraining the quantity of each trade flow was estimated, based on judgments given in the literature, as high, moderately high, moderate, moderately low, or low. These judgments were then weighted by the dollar amount of each actual flow and aggregated to estimate the distribution, from high to low, of constraints faced by the entire import and export bills of goods. The result is shown in Figure 1.

Figure 1
Severity of Trade Barriers Faced by U.S. Commodity Imports and Exports in 1987



Note: Each bar shows the percentage by value of the import (export) bill of goods subjected to high through low barriers. The portion "not included" is the aggregate value of the individual flows of under a billion dollars.

Based on these rough measures, U.S. exports appear to face more intensive trade barriers than the U.S. imposes on imports. About two-thirds of U.S. imports are faced with moderate to low barriers compared to about half the exports, and about 36 percent of U.S. exports face moderately high to high barriers compared to 28 percent of the imports. Some of the detail underlying Figure 1 is given in Tables D5-D8 of Appendix D. Inspection of these tables shows a fair amount of reciprocity in the nominal protectionism between the U.S. and Japan, the NICs, and Canada. Both regions comprising the European Economic Community (EEC1 and EEC2), however, restrict U.S. exports more than the U.S. protects against imports from these regions.

The NICs, the smaller Asian and EEC economies (other Asia and EEC2), and Japan impose the highest restrictions on U.S. exports. Imports from Japan and the NICs generally face more restrictions than those from other regions with about 45 percent of these imports subject to moderately high or high barriers, primarily voluntary export restraints on Japanese motor vehicles and quotas on textiles and machine tools from both regions. Imports from EEC2 face more restrictions than EEC1 (England and Germany) because a much larger volume of the exports to the U.S. from

EEC2 are of highly restricted processed materials (mainly steel). Canadian exports face relatively low protection in U.S. markets, and Canada in turn imposes the lowest restrictions on U.S. exports. Imports from and exports to the centrally planned economies are small, in part because they are heavily restricted.

The overall reciprocity that exists at the regional level naturally does not hold at the sectoral level. Production of agricultural goods and processed materials is protected throughout the world, but the U.S. is somewhat less restrictive of agricultural imports and more of processed materials, mainly steel, than other regions. U.S. agricultural and electronics exports face the heaviest trade barriers of all commodity classifications, followed by transportation equipment other than autos, machinery, and processed materials. Motor vehicles, textiles, and light manufacturing exports face low barriers in the relatively few countries to which we export these commodities, in contrast to the fairly high protection these sectors usually encounter in international trade. U.S. exports of chemical products face low barriers in all regions. Electronics accounts for 16 percent of the value of all U.S. exports, and U.S. electronics exports face moderately high or high trade barriers in most regions. By contrast, U.S. imports of these products, which amount to 13 percent of the value of imports, are subject to at most moderate barriers applied to our major suppliers, Japan and the NICs, and even lower barriers are applied to other regions.

Textiles and apparel are the most highly restricted of U.S. imports. Motor vehicles face two extremes--40 percent of motor vehicle imports are from Japan and are subjected to moderately high barriers while 30 percent are imported from Canada with very low restrictions. Raw materials are among the least protected sectors in the U.S.

From Fair Trade to Trade Strategy

It is clear that the U.S. contends with a wide range of barriers to international trade affecting exchanges of virtually all commodities with virtually all trading partners. While there appears to be rough bilateral reciprocity between us and our trading partners regarding the severity of trade barriers, American exports face more protection than is imposed on U.S. imports. This is especially true of exchanges between the U.S. and the EEC, and, to a lesser degree, the NICs. Within the context of GATT, the U.S. should no doubt press for removal of specific barriers to our exports, but reliance on this sort of reciprocity is likely to prove of limited long-term benefit as the case of Japan illustrates. The preceding analysis shows that our large trade deficit with Japan cannot be explained by their use of such barriers as impediments to free trade, nor is it likely to be reversed by this type of negotiation alone.

It is widely acknowledged that Japan has succeeded over the past few decades in shifting from traditional to extremely sophisticated sectors through coordinated industrial, technology and trade strategies. One of the important but often overlooked characteristics of Japanese economic

strategy is the importance accorded both to the logic of technological interdependence among sectors of the economy and to the internal logic of technological change over time horizons of several decades. Sectors are often targeted for support because of the anticipated future importance of their physical output for other sectors. Sectors whose output enters into current trade are protected for a variety of tactical reasons, as in other countries. The new element is the fostering of technological infrastructure in selected "infant industries" long before specific products enter into the world trade. By the time this infrastructure is in place, protection is generally no longer necessary as the specific products are already competitive. Because of the time lag, subsidies of such industries would not show up in a static analysis like the one reported in this paper.[2] This has been the general pattern in electronics, fiber optics, supercomputers, and telecommunication products. These technological achievements make it plausible to envisage an internationally competitive Japanese aircraft industry by the early 21st century. Such "spillovers" are too important to be considered economic "externalities"--that is, external to an economic analysis--which has been the standard practice of trade theorists.

The content of long-term technological strategies starts with the Japanese approach to technological forecasting. The Science and Technology Agency coordinates the projections of some 4000 academic, industrial, and government experts as to the most important science and technology objectives to be achieved over the next thirty years (Freeman 1987, 56). While no other country has been nearly as systematic in the formulation of scenarios about future technological systems, this approach is finally being acknowledged as an important element in Japanese commercial success and will be increasingly copied by the European Community, by developing countries, and hopefully by the United States. Americans are said to have little sense of history; a different challenge will be the imagination and pragmatism of our sense of the future.

This analysis leads to several conclusions. First, if GATT is to play an active role in promoting fairness in international trade in the future, its deliberations about the fairness of current trade barriers will need to be informed by scenarios about the likely future international division of labor. This view might lead to bargaining about subsidies to industries whose output is not yet entering world trade.

Second, we need to acknowledge that trade strategies cannot be formulated separately from industrial and technologies strategies. Scenarios describing such strategies need to be the subject of public debate. A subset of economists could be put to productive work analyzing the requirements and implications of each scenario as a basis for public and private decision-making. The analysis of engineering databases within a dynamic input-output model of the economy will make these assessments possible. We already have this capability, in the research stage, in the United States, but the Japanese are moving with determination toward its largescale implementation. This is an ideal project for international collaboration and in any case is not a research area in which we can afford to abstain.

Appendix A: Method of Analysis

Coverage of the entire bills of commodity imports and exports required the development of regional and commodity classification schemes as well as a taxonomy of the various barriers to trade.

Individual trade flows (U.S. Department of Commerce, 1988) were then tabulated simultaneously by region of origin or destination and by commodity and assigned one or more of the trade barriers.

Trade flows were described in terms of 12 major commodity groups shown in Appendix B. This classification was chosen because it was sufficiently aggregated to provide a useful overview while still exhibiting enough homogeneity within each category so that a distinctive set of trade regimes could be associated with each commodity flow.

The regional classification, also described in Appendix B, combines trading partners into twelve groups based on several criteria, notably geographic proximity, similarity of protection barriers, similarity of stage of economic development, and composition of trade with the U.S. Canada and Japan were each treated separately because of the large volume and unique characteristics of their trade with the U.S. Great Britain and West Germany, also major trade partners, were combined because of their similarities on these criteria. Middle East and African oil producing countries were likewise combined because of similar economic characteristics, notably the overwhelming importance of petroleum exports in their trade with the U.S. The newly industrializing countries (NICs) have been defined to include not only the Asian NICs, but also Mexico and Brazil since these two countries resemble the Asian NICs more than they resemble other Latin American countries in terms of economic structure, protection of their domestic markets, and their trade with the U.S.

Nine major categories of barriers to trade were identified and their applicability to U.S. imports and exports was assessed based on the sources give in Appendix C.

We have already attempted to quantify the impact of each instance of a trade barrier and also to add up the effects of barriers used in combination and weight the composite barrier by the relative importance of the associated trade flow in the overall bills of imports and exports. While the definition of such formal index numbers (here are elsewhere) is arbitrary, we report a rough ranking of the degree of overall protection applied to U.S. imports and exports, in terms of five categories ranging from low to high.

In addition to the effects on the commodity directly targeted by the nominal barrier, it is clear that economic effects of barriers spread both upstream and downstream throughout the economy.

For example, U.S. imports and exports of steel have both faced considerable direct protection. Subsidies to the domestic steel industry may also indirectly benefit the industry's suppliers

while tariffs on imported steel may indirectly penalize major users of steel such as the motor vehicles industry. One framework for computing "effective" rates of sectoral protection is described in the literature (Corden, 1966, 1985; Jones, 1971). We have not attempted to go beyond the description of nominal barriers in this paper.

Appendix B: Sectoral and Regional Classifications

Table B1
Classification of Commodities

IEA code	Description of Sector	BEA code
1.	AGRICULTURAL PRODUCTS	
	Livestock and livestock products	1
	Other agricultural products	2
	Forestry and fishery	3
2.	ENERGY RAW MATERIALS	
	Coal mining	7
	Crude petroleum and natural gas	8
3.	OTHER RAW MATERIALS	
	Iron and ferroalloy ores mining	5
	Nonferrous metal ores mining	6
	Stone and clay mining and quarrying	9
	Chemical and fertilizer mineral mining	10
4.	PROCESSED MATERIALS	
	Food and kindred products	14
	Tobacco manufactures	15
	Petroleum refining and allied industries	31
	Rubber and miscellaneous plastic products	32
	Primary iron and steel manufacturing	37
	Primary Nonferrous metals manufacturing	38
5.	TEXTILE, APPAREL AND LEATHER PRODUCTS	
	Broad and narrow fabrics, yarn and thread mills	16
	Miscellaneous textile goods and floor coverings	17
	Apparel	18
	Miscellaneous fabricated textile products	19
	Leather tanning and finishing	33
	Footwear and other leather products	34
6.	LIGHT MANUFACTURING	
	Lumber and wood products	20
	Wood containers	21
	Household furniture	22
	Other furniture and fixtures	23
	Paper and allied products except containers	24
	Paperboard containers and boxes	25
	Printing and publishing	26
	Glass and glass products	35
	Stone and clay products	36

Table B1 (cont.)
Classification of Commodities

IEA code	Description of Sector	BEA code
7.	CHEMICAL PRODUCTS	
	Chemicals and selected chemical products	27
	Plastic and synthetic products	28
	Drugs, cleaning and toilet preparations	29
	Paints and allied products	30
8.	MACHINERY	
	Engines and turbines	43
	Farm and garden machinery	44
	Construction and mining machinery	45
	Materials handling machinery and equipment	46
	Metalworking machinery and equipment	47
	Special industry machinery and equipment	48
	General industrial machinery and equipment	49
	Miscellaneous machinery, except electrical	50
	Service industry machines	52
	Electric industrial equipment and apparatus	53
	Electric lighting and wiring equipment	55
	Miscellaneous electrical machinery and supplies	58
9.	MOTOR VEHICLES	
	Motor vehicles, parts and equipment	59
10.	OTHER TRANSPORTATION	
	Aircraft and parts	60
	Other transportation equipment	61
11.	ELECTRONICS AND TELECOMMUNICATION PRODUCTS	
	Electronic computing and related equipment*	51
	Radio, T.V. and communications equipment	56
	Electronic components and accessories	57
12.	OTHER MANUFACTURING	
	Ordnance and accessories	13
	Metal containers	39
	Heating, plumbing and structural metal products	40
	Screw machine products and stampings	41
	Other fabricated metal products	42
	Household appliances	54
	Scientific and controlling instruments	62
	Optical, ophthalmical and photographic equipment	63
	Miscellaneous manufactured equipments	64

* Includes scales and balances and office machines not included elsewhere; n.e.c. their value does not exceed 6 percent of trade in this sector.

Table B2
Classification of Region by Country

A. CANADA
B. JAPAN
C. EUROPEAN ECONOMIC COMMUNITY 1
Germany (FRG)
United Kingdom
D. EUROPEAN ECONOMIC COMMUNITY 2
Belgium
Denmark
France
Greece
Ireland
Italy
Luxembourg
Netherland
Portugal
Spain
E. OTHER EUROPE
Austria
Finland
Gibraltar
Iceland
Malta & Gozo
Norway
Sweden
Switzerland
Turkey
Yugoslavia
F. OTHER DEVELOPED
Australia
New Zealand
South Africa
G. LATIN AMERICA
Argentina
Bahamas
Barbados
Belize
Bermuda
Bolivia
Cayman Islands
Chile
Colombia
Costa Rica
Dominican Republic
Ecuador
El Salvador
Falkland Islands
French Guinea
French West Indies
Guatemala
Guyana
Haiti
Honduras
Jamaica
Leeward & Windward Islands
Netherland Antilles
Panama
Paraguay
Peru
St. Pierre el Miquelon
Surinam
Trinidad & Caicos Islands
Turks & Caicos Islands
Uruguay
Venezuela
H. NEWLY INDUSTRIALIZING COUNTRIES
Brazil
Hong Kong
Korea (South)
Mexico
Singapore
Taiwan
I. OTHER ASIA
Afghanistan
Bangladesh
Brunei
Burma
India
Indonesia
Macao
Malaysia
Nepal
Pakistan
Philippines
Sri Lanka
Thailand
South Asia
French Pacific Islands
Marshall Islands
Micronesia (Fed. States of)
Palau
Papua New Guinea
Southern Pacific Islands
Western Samoa
Other Pacific Islands
J. MIDDLE EAST-AFRICA OIL EXPORTING
Algeria
Angola
Bahrain
Egypt
Gabon
Iran
Iraq
Kuwait
Libya
Nigeria
Quatar
Saudi Arabia
United Arab Emirates
Yemen (A.R.)
Oman
K. OTHER MIDDLE EAST AFRICA
Cyprus
Gaza Strip
Israel
Jordan
Lebanon
Syria
Yemen (P. D. R.)
Benin
Botswana
Burkina Faso
Burundi
Cameroon
Central Africa Republic
Chad
Comoros
Congo
Djibouti
Equatorial Guinea
Ethiopia
Gambia
Ghana
Ivory Coast
Kenya
Lesotho
Liberia
Malagasy Republic
Malawi
Mali
Mauritania
Mauritius
Morocco
Mozambique
Namibia
Niger
Rwanda
Senegal
Seychelles
Sierra Leone
Somalia
Sudan
Swaziland
Togo
Tunisia
Tanzania
Uganda
Zaire
Zambia
Zimbabwe
W. Sahara
St. Helena
British Indian Ocean Terrs.
French Indian Ocean Areas
W. Africa n.e.c.
L. CENTRALLY PLANNED ECONOMIES
Albania
Bulgaria
Cambodia
China
Cuba
Czechoslovakia
Germany (GDR)
Hungary
Korea (North)
Laos
Mongolia
Nicaragua
Poland
Rumania
USSR
Vietnam

Appendix C: Sources of Information About Trade Barriers

We relied upon the published literature to determine which barriers to trade are imposed on U.S. imports of specific commodity groupings from specific regions and which barriers face U.S. exports entering other countries. This information was gathered from approximately 75 books and articles (many of the latter contained in several edited collections) listed in this Appendix.

Of these, six references provide relatively broad coverage including the description of tariff and non-tariff barriers to a wide range of commodities in a large number of countries.

Most of the literature, however, concentrates on the trade policies of a few countries, mainly the U.S., Japan, and the European Economic Community (EEC). Over a third of the references describe the non-tariff barriers to various commodities entering or leaving one or more of these regions and at least another third focus on their trade policies in specific sectors, mainly agriculture, steel, motor vehicles, electronics, telecommunications and, to a lesser extent, other transportation equipment (such as aircraft) and heavy machinery.

The coverage of the developing countries is much less voluminous and more fragmentary, and the bulk of the information used in this study is deduced from articles providing rather general descriptions. Trade policies of Korea, Brazil, and Mexico have been better covered than those of other developing countries and are described in some detail in four of the references. Two references discuss the trade of the centrally planned economies, mainly in high-technology products. The literature contains only incidental coverage of the barriers to trade faced by the countries and commodities which have not been specifically mentioned above.

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Appendix D: Sectoral and Regional Distribution of U.S. Commodity Trade and Associated Barriers to Trade

Table D1
Regional Distribution of U.S. Commodity Imports in 1987

	A Canada	B Japan	C EEC1	D EEC2	E Other Europe	F Other DEV	G Latin America	H NICs	I Other Asia	J Me-Af Oil X	K Other ME-A	L CPEs	M Total
1 Agricultural Products	12%	2%	2%	6%	5%	3%	28%	22%	11%	0%	5%	2%	100%
2 Energy Raw Materials	16	0	7	0	2	1	24	11	5	40	3	1	100
3 Other Raw Materials	41	0	8	5	2	8	12	10	1	0	9	3	100
4 Processed Materials	19	8	8	16	4	6	12	15	4	5	2	3	100
5 Textile and Apparel	1	3	3	11	2	0	5	51	12	1	1	9	100
6 Light Manufacturing	47	5	7	11	5	1	1	19	3	0	0	2	100
7 Chemical Products	15	13	25	23	7	4	3	7	1	1	1	2	100
8 Machinery	10	28	24	13	7	0	0	16	1	0	1	1	100
9 Motor Vehicles	29	41	16	3	3	0	0	8	0	0	0	0	100
10 Other Transportation	20	14	23	25	3	1	0	13	0	0	2	0	100
11 Electronic Products	5	42	5	3	1	0	0	36	5	0	1	1	100
12 Other Manufacturing	7	23	10	13	5	0	1	30	4	0	4	3	100
13 Total	17	21	11	9	4	1	5	21	4	4	1	2	100

Source: Table 2.

Table D2
Sectoral Distribution of U.S. Commodity Imports in 1987
(percentages)

Imports (millions)	A Canada	B Japan	C EEC1	D EEC2	E Other Europe	F Other Dev	G Latin America	H NICs	I Asia	J Oil X	K ME-Af	L CPEs	M Total
1 Agricultural Products	3	0	1	2	6	9	22	4	11	0	15	4	4
2 Energy Raw Materials	8	0	5	0	4	6	23	4	10	79	16	4	8
3 Other Raw Materials	2	0	1	0	0	5	2	0	0	0	5	1	1
4 Processed Materials	15	5	10	24	14	55	34	10	14	19	16	19	14
5 Textile And Apparel	1	1	2	12	5	2	10	23	28	1	6	42	9
6 Light Manufacturing	20	2	4	9	10	3	2	6	6	0	1	5	7
7 Chemical Products	3	2	8	9	7	10	3	1	1	1	3	4	4
8 Machinery	6	13	21	14	17	3	1	7	1	0	5	3	9
9 Motor Vehicles	32	37	28	5	16	1	0	7	0	0	0	1	19
10 Other Transportation	3	1	4	6	2	1	0	1	0	0	3	0	2
11 Electronic Products	4	27	6	5	4	1	1	22	17	0	5	3	13
12 Other Manufacturing	4	11	9	14	15	3	2	14	11	0	25	14	10
13 Total	100	100	100	100	100	100	100	100	100	100	100	100	100

Source: Table 2

Note: Percentages do not total 100% because of rounding

Table D3
Regional Distribution of U.S. Commodity Exports in 1987
(percentages)

Imports (millions)	A Canada	B Japan	C EEC1	D EEC2	E Other Europe	F Other Dev	G Latin America	H NICs	I Asia	J Oil X	K ME-Af	L CPEs	M Total
1 Agricultural Products	7	20	7	16	2	1	5	19	4	6	4	8	100
2 Energy Raw Materials	23	17	4	31	4	0	1	17	0	2	1	1	100
3 Other Raw Materials	28	18	6	19	4	2	3	13	3	0	3	0	100
4 Processed Materials	18	18	6	15	3	2	9	19	2	5	2	1	100
5 Textile And Apparel	16	7	8	11	2	2	24	18	2	5	2	2	100
6 Light Manufacturing	22	21	10	11	2	3	7	15	2	2	1	3	100
7 Chemical Products	13	12	8	18	3	4	10	19	4	2	1	4	100
8 Machinery	26	5	10	12	4	4	9	18	3	4	2	2	100
9 Motor Vehicles	79	1	3	2	2	1	3	9	0	4	1	0	100
10 Other Transportation	8	11	15	16	6	5	3	13	4	7	7	2	100
11 Electronic Products	15	9	17	15	4	3	3	21	7	1	1	1	100
12 Other Manufacturing	33	9	12	12	5	3	6	13	2	2	2	1	100
13 Total	24	11	10	14	4	3	6	17	3	4	2	2	100

Source: Table 3

Note: Percentages do not total 100 percent because of rounding

Table D4
Sectoral Distribution of U.S. Commodity Exports in 1987
(percentages)

Imports (millions)	A Canada	B Japan	C EEC1	D EEC2	E Other Europe	F Other Dev	G Latin America	H NICs	I Asia	J Oil X	K ME-Af	L CPEs	M Total
1 Agricultural Products	2	14	5	9	5	2	6	8	8	14	12	25	8
2 Energy Raw Materials	1	2	1	3	1	0	0	2	0	1	1	1	2
3 Other Raw Materials	1	1	0	1	1	1	0	1	1	0	1	0	1
4 Processed Materials	9	20	8	13	10	8	17	14	9	17	10	6	12
5 Textile And Apparel	1	1	1	1	1	1	7	2	1	2	2	1	2
6 Light Manufacturing	6	11	6	5	3	7	6	5	4	3	3	8	6
7 Chemical Products	6	12	9	15	10	14	17	12	12	5	5	21	11
8 Machinery	14	6	13	11	13	17	18	14	12	16	10	14	13
9 Motor Vehicles	27	1	2	1	4	3	4	4	1	9	2	1	8
10 Other Transportation	3	9	14	11	16	17	4	7	11	18	31	9	9
11 Electronic Products	10	12	26	18	18	18	8	20	32	6	10	7	16
12 Other Manufacturing	18	10	15	11	16	13	12	10	9	9	13	7	13
13 Total	100	100	100	100	100	100	100	100	100	100	100	100	100

Source: Table 3

Note: Percentages do not total 100 percent because of rounding

Table D5
U.S. Commodity Imports in 1987 by Region and Severity of Trade Barriers

Severity of Barriers	A Canada	B Japan	C EEC1	D EEC2	E Other Europe	F Other Dev	G Latin America	H NICs	I Other Asia	J ME-Af	K Other ME-Af	L CPEs
High	0%	1%	0%	0%	0%	0%	10%	23%	0%	0%	0%	61%
Moderately High	3	43[a]	10	24	0	55[b]	22	20	11	0	0	14
Moderate	15	42	59	32	40	0	34	37	14	19	0	0
Moderately Low	34	13	23	42	39	0	0	15	0	0	41	0
Low	47	0	5	0	0	0	23	4	10	79	0	0
Unaccounted For	1	1	2	2	21	45	11	1	65	2	59	25
Total	100	100	100	100	100	100	100	100	100	100	100	100

[a] Predominantly motor vehicles
[b] Exclusively processed materials

Note: Each column shows the proportion of the value of U.S. commodity imports from the given region facing high through low trade barriers. The portion "unaccounted for" corresponds to the aggregate of individual trade flows which were not examined because of their small size (less than a billion dollars'worth) in terms of the commodity and region classification schemes utilized.

Table D6
U.S. Commodity Exports in 1987 by Region and Severity of Trade Barriers

Severity of Barriers	A Canada	B Japan	C EEC1	D EEC2	E Other Europe	F Other Dev	G Latin America	H NICs	I Other Asia	J ME-Af	K Other ME-Af	L CPEs
High	0%	14*	5%	38%	0%	0%	0%	28%	44%	0%	0%	46%
Moderately High	2	21	40	24	18	17	43	45	0	17	0	0
Moderate	22	26	21	16	29	35	25	21	12	16	0	0
Moderately Low	30	22	30	15	16	14	23	0	0	18	31	0
Low	41	11	0	3	0	0	0	0	0	14	0	0
Unaccounted For	5	6	4	4	35	34	9	6	44	35	69	54
Total	100	100	100	100	100	100	100	100	100	100	100	100

* Exclusively agriculture

Note: Each column shows the proportion of the value of U.S. commodity exports to the given region facing high through low trade barriers. The portion "unaccounted for" corresponds to the aggregate of individual trade flows which were not examined because of their small size (less than a billion dollars' worth) in terms of the commodity and region classification schemes utilized.

Table D7
U.S. Imports in 1987 by Commodity and by Severity of Trade Barriers

	Severity of Barriers						
	High	Mod. High	Mod.	Mod. Low	Low	Unac.	Total
1 Agricultural Products	0%	63%	0%	0%	0%	37%	100%
2 Energy Raw Materials	0	0	0	0	93	7	100
3 Other Raw Materials	0	0	0	0	41	59	100
4 Processed Materials	3	52	43	2	0	0	100
5 Textile and Apparel	80	0	14	0	0	6	100
6 Light Manufacturing	0	19	28	47	0	6	100
7 Chemical Products	0	0	0	83	0	17	100
8 Machinery	0	0	68	20	10	2	100
9 Motor Vehicles	0	41	30	0	29	0	100
10 Other Transportation	0	14	61	20	0	5	100
11 Electronic Products	0	0	78	18	0	4	100
12 Other Manufacturing	0	3	0	96	0	1	100

Note: Each row shows the proportion of the value of U.S. commodity imports from the given region facing high through low trade barriers. The portion "unaccounted for" corresponds to the aggregate individual trade flows which were not examined because of their small size (less than a billion dollars' worth) in terms of the commodity and region classification schemes utilized.

Table D8
U.S. Exports in 1987 by Commodity and by Severity of Trade Barriers

	Severity of Barriers						
	High	Mod. High	Mod.	Mod. Low	Low	Unac.	Total
1 Agricultural Products	70%	7%	0%	5%	6%	12%	100%
2 Energy Raw Materials	0	0	0	0	31	69	100
3 Other Raw Materials	0	0	0	0	0	100	100
4 Processed Materials	0	48	42	0	0	10	100
5 Textile and Apparel	0	0	24	0	0	76	100
6 Light Manufacturing	0	0	33	33	21	13	100
7 Chemical Products	4	0	23	65	0	8	100
8 Machinery	3	39	27	0	26	5	100
9 Motor Vehicles	0	0	9	0	79	12	100
10 Other Transportation	16	44	14	14	0	12	100
11 Electronic Products	43	33	18	0	0	6	100
12 Other Manufacturing	0	13	18	59	0	16	100

Note: Each row shows the proportion of the value of U.S. commodity exports to the given region facing high through low trade barriers. The portion "unaccounted for" corresponds to the aggregate of individual trade flows which were not examined because of their small size (less than a billion dollars' worth) in terms of the commodity and region classification schemes utilized.

Endnotes

1. The rest of this discussion is concerned only with those flows of more than a billion dollars.

2. Note that protection of infant industries in the developing economies would be captured in this analysis because they typically compete with sectors that are already well-established in other countries and are already widely traded.

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