THE TRADE PARTNERSHIP

Costs to American Consuming Industries of Steel Quotas and Taxes

By

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and

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Executive Summary

Once again, policy makers are debating the wisdom of imposing quotas to protect the U.S. steel industry from imports and to help it maintain production capacity and employment domestically. A related initiative targets financial support for steelworkers through new taxes on steel-consuming industries. Legislation -- the "Steel Revitalization Act of 2001" (SRA) -- has been introduced in the Congress. In addition the Bush Administration is considering whether to self-initiate an investigation under Section 201 of the Trade Act of 1974, which likely would result in the imposition of quotas on steel imports.

While much attention is being paid to the need for assistance to protect employment in the steel industry, only passing attention is being paid to the broader effects such protection would have on the rest of the American economy. In part this is because hard estimates of these impacts are not readily available. At the request of the Consuming Industries Trade Action Coalition Foundation, The Trade Partnership has estimated the impacts on the economy generally, and on steel-consuming industries specifically, of pending proposals to protect the steel industry: (1) the SRA (quotas on imports of steel raw materials and finished steel products, and a 1.5 percent steel sales tax), and (2) quotas on finished steel imports. The findings are as follows:

- The SRA would cost more jobs than it would preserve. The SRA would protect no more than 3,700 steel jobs, compared to losses in steel-consuming sectors of the American economy ranging from 19,000 to 32,000 jobs. The job losses in steel-consuming industries would be five to almost nine times as great as the job gains in the steel industry.

- The SRA comes with a heavy price tag for consumers and the economy generally. The SRA's quotas would essentially tax consumers $1.35 billion to $2.89 billion a year, and cost as much as $732,000 per job protected in the steel industry. This amounts to roughly 10 times the average employment cost (wages and benefits) of a steelworker in 2000. Over the five-year term of the SRA, consumers generally would be socked with an effective tax bill totaling $6.75 billion to $14.5 billion.

- The impact of quotas on finished steel products alone remains significantly negative for steel-consuming industries. Roughly two to three times as many workers in steel-consuming industries would lose their jobs as would be protected upstream in the steel industry.

- The costs to consumers generally of quotas on imports of finished steel products are significant. Total consumer costs would range from $1.33

billion to $2.34 billion a year, or as high as $565,000 per steel job protected, for the cutbacks suggested by the SRA. More severe import reductions (say, of 50 percent) would preserve almost 13,000 steel jobs, but at an *annual* cost to consumers of $5.8 billion. In just five years, the cost of such a jobs program would amount to $22 billion. Put another way, *this type of jobs program would require steel-using industries (and ultimately consumers as a whole) to pay $2.2 million per job over a five-year period*.

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About the Authors

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I. Introduction

Much has been made recently about the current crisis in the steel industry. Steel company and union leaders have been fanning out across Washington, meeting with senior Bush administration officials, Congressional Representatives and Senators. The press covers their pleas for relief almost daily, describing an industry "on its knees" suffering job losses of 15,000 since 1998.[1]

Steel industry claims are at the same time both simple and complex. Virtually all industry and labor groups point to "dumped or subsidized" imports as the primary culprit.[2] But they also acknowledge other causes of the perceived crisis.[3] These include the sheer volume of imports,[4] excess global steel capacity, closed foreign steel markets, a slowing U.S. economy, unproductive capacity in the United States, heavy non-steel-related debt for some U.S. producers, health insurance obligations to 75,000 steelworker retirees, high energy prices, a strong U.S. dollar, and even bad management decisions.[5]

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[1] See, for example, "US Lawmakers to Unveil Bill to Protect, Revamp Steel Industry," Bloomberg, February 28; "U.S. Lawmakers Prod Bush on Steel Import Curbs," Reuters, March 12, 2001.

[2] Producers and unions who believe they have been hurt by "unfair" ("dumped" or illegally subsidized) specific imported products from specific countries can ask the U.S. Government to conduct "antidumping" (AD) or "countervailing duty" (CVD), respectively, investigations. If the U.S. government determines that dumping or subsidies exist and have injured U.S. producers, penalty duties are imposed on future U.S. imports of those products from the offending countries. Steel companies have been filing AD and CVD petitions for years, and continue to do so. The most current Commerce Department data available indicate that through 1999, 95 steel-product related AD or CVD orders were in effect, 42 percent of all AD and CVD orders outstanding. Another 38 steel product cases are pending.

[3] "Steel Associations to Join Ranks in Call for 201 Investigations," *Inside U.S. Trade*, Vol. 19, No. 10, March 9, 2001.

[4] A different U.S. trade law is available to address injury alleged to be caused by large volumes of imports: the safeguard law, or Section 201 of the Trade Act of 1974 (as amended). A Section 201 investigation does not require that imports be sold in the United States at less-than-fair value, or that they be subsidized. Instead, if producers can show the U.S. International Trade Commission that imports are a substantial cause of serious injury to them, the U.S. Government may impose quotas, tariffs, or some combination of quotas and tariffs on imports for a set period of time. Producers must put together an adjustment plan which specifies the actions they will take during the period of protection to regain their competitiveness with imports. In 1999, extra duties were imposed on imports of steel wire rod as a result of a Section 201 investigation; similarly, duties were imposed on imports of line pipe also as a result of a 1999 Section 201 investigation.

[5] American Iron and Steel Institute, "AISI Urges Import Restraints, Section 201 To Escape Steel Crisis," Press Release, February 16, 2001; AFL-CIO, "Current American Steel Crisis,"

Actually, the current "crisis" is better understood as a manifestation of long-term trends. The steel industry has undergone tremendous change over the last 15 years. Steel employment has fallen dramatically. Yet, the growth in output has been almost as dramatic. In 1987, the steel industry produced 77 million short tons. According to the American Iron and Steel Institute, by 2000 output had grown to 110 million short tons.[6] How can steel employment be falling so rapidly, even as output has grown so dramatically? According to the U.S. Department of Labor, the explanation lies in productivity growth, not pressure from unfair imports: "This decline [in overall steel employment] can be attributed mostly to increased use of labor-saving technologies and machinery… Computers allow one worker to perform duties that previously took the efforts of several workers." [7] Even the United Steelworkers of America concedes that worker productivity has improved 174 percent since 1980.[8] This employment pressure will continue as the efficiency gains spearheaded by mini-mills work their way through the industry, transforming it into one characterized by rapid overall productivity growth and a growing demand for skilled labor to operate sophisticated technology. In this new steel industry, the old steel jobs are rightly vanishing. Any economic downturn will only increase the pressure for cost-savings, with bankruptcy looming over older operations and accelerating the loss of union employment (and exacerbating pressure on existing health insurance obligations for retired workers), irrespective of the level or price of imports.

While technology is driving long-term change in the industry, the steel ranks have themselves been blaming other factors. They point to a wide range of potential causes, with little agreement even among steel producers and their workers' union about what to do about "the crisis."[9] While several U.S. producers

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February 14, 2001; Robert Manor, "Flood of Problems Threatens U.S. Steel Industry," *Chicago Tribune*, February 25, 2001; Chris Bonura, "Conditions Make It Tough to Draw a Bead on Bayou Steel," *New Orleans CityBusiness*, February 5, 2001; Brink Lindsey, Daniel T. Griswold, and Aaron Lukas, "The Steel 'Crisis' and the Costs of Protectionism," Cato Institute Trade Briefing Paper, April 16, 1999.

6 Based on data from the American Iron and Steel Institute and from the Institute for International Economics (Gary Clyde Hufbauer and Erika Wada, "Steel Quotas: A Rigged Lottery," IIE Policy Brief 99-5, June 1999.)

7 "Steel Manufacturing – SIC331," *Occupational Outlook Handbook 2000-2001*, U.S. Bureau of Labor Statistics, p. 83.

8 United Steelworkers of America, "The Crisis in American Steel," Rapid Response Conference, April 5, 2001, p. 15. These trends are not unique to steel. Across the U.S. economy, new technologies have placed a growing premium on educated and highly trained labor. Resulting productivity improvements have fueled over eight years of economic expansion. Elsewhere, this is viewed as a good thing.

9 "Steel Associations to Join Ranks in Call for 201 Investigations," *Inside U.S. Trade*, Vol. 19, No. 10, March 9, 2001.

have indeed filed for bankruptcy, whether imports are the cause of those bankruptcies is open to debate. Producers and unions loudly blame imports. Steel-using industries (supported by evidence on productivity trends) offer a strong case that the blame lies elsewhere. What is to be done? As a solution to their membership crisis, union representatives advocate quotas on all steel imports, including raw materials. U.S. producers support quotas for different reasons. They are interested more in their financial health than the health of union membership roles. While steel producers support quotas, they insist that quotas cover only finished steel products and exempt producer imports of raw materials.[10] Producers saddled with heavy "legacy costs" (e.g., health insurance for retirees) also want help from the government for those expenses. More competitive steel producers, having spearheaded the productivity revolution in steel, do not want uncompetitive U.S. producers artificially supported in this way.[11] Few if any of the stakeholders want to do a "restructuring" or "adjustment" plan, which would be required by one U.S. trade law that could deliver quotas to the industry.[12] In all this confusion, it is perhaps telling that the industry would turn to God, organizing a "Kneel Down and Pray, Stand Up for Steel" interfaith service on March 27: "…perhaps a little divine intervention was in order," said one steel company official.[13]

Most recently, many members of Congress have lined up in support of imposing quotas on imports, among other "solutions." Some would impose quotas legislatively. Others suggest use of a safeguard investigation under Section 201 of the Trade Act of 1974. Responding to industry and union pleas for "a period of stability through effective, comprehensive temporary quantitative restrictions on steel imports…,"[14] a bipartisan group of Congressmen introduced on March 1 a bill to impose quotas for five years. The next day, 14 Senators sent President Bush a letter asking the Administration to self-initiate a Section 201

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[10] In 2000, the steel industry imported more than 8 million tons of steel slabs, billets and blooms. See also "Steel Industry to File New Trade Cases as 201 Process Looms," *Inside U.S. Trade*, Vol. 19, No. 13, March 30, 2001; "Steel Groups Wrestle with Details of Demands for U.S. Action," *Inside U.S. Trade*, Vol. 19, No. 7, February 16, 2001, "Cleveland-Cliffs Seeks Limits on Imports to Protect Iron Ore Demand," Associated Press Newswires, April 13, 2001.

[11] "Steel Industry to File New Trade Cases as 201 Process Looms," *Inside U.S. Trade*, Vol. 19, No. 13, March 30, 2001; "Steel Groups Wrestle with Details of Demands for U.S. Action," *Inside U.S. Trade*, Vol. 19, No. 7, February 16, 2001.

[12] "Steel 201 Backers Balk at Zoellick Call for Restructuring Plans," *Inside U.S. Trade*, Vol. 19, No. 11, March 16, 2001.

[13] "Kneel Down and Pray, Stand Up for Steel' Interfaith Service Set," PR Newswire, March 20, 2001.

[14] American Iron and Steel Institute, "AISI Urges Import Restraints, Section 201 To Escape Steel Crisis," Press release, February 16, 2001. While the United Steelworkers of America supports quotas on steel products and raw materials used to make steel, most steel producers only support quotas on finished steel products because they import some raw materials.

that could well result in import quotas. The Administration is seriously considering this request.[15] In February 2001, the Bush administration, at the behest of steel producers, began a Section 232 investigation regarding whether imports of iron ore and semifinished steel threaten the U.S. national security. If the Administration concludes that they do, import restraints may be imposed.

Are import restraints the correct solution for a short-term "crisis" actually driven by long-term gains in productivity and efficiency? Whatever the answer, *this much is certain: U.S. steel import restraints, if imposed, will hurt steel-consuming industries in the United States far more than they will help steel.* Steel-using industries in the United States include manufacturers of farm machinery and equipment, construction machinery, machine tools, refrigeration equipment, and many other types of industrial machinery, as well as motor vehicles, aircraft and parts, ships, and railroad equipment. Steel represents a significant part of the total cost of making these products. Steel-using industries also include sectors that rely on steel such as construction. More than 50 times as many workers are employed in steel-consuming industries as in the steel industry itself.[16]

The purpose of new import protection for steel would be to drive up prices and demand for domestic steel. In a nutshell, this boils down to transferring money from downstream industries to the steel industry. These downstream companies and their workers face the same tough and highly competitive economic forces as U.S. steel producers. Table 1 shows that the current unemployment rates in many steel-using industries rival that facing the steel industry. Moreover, many steel-using manufacturers face tough competition in export markets as well. Boosting their input costs through import restraints will not make that situation any easier.

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[15] "U.S. Lawmakers Prod Bush on Steel Import Curbs," Reuters, March 12, 2001; "White House to Consider Regulation of Steel Imports," Associated Press Newswires, March 30, 2001.

[16] According to the Bureau of Labor Statistics, in 2000, the steel industry (defined as blast furnaces and manufacturers of basic steel products, SIC 331) employed 175,600 production workers. Steel-consuming industries in that year employed about 9,430,000 production workers, or 54 production workers for every steel worker. Employment considered steel-consuming includes workers in the following sectors: fabricated metal products (SIC 34); industrial machinery and equipment (SIC 35); electric distribution equipment (SIC 361); electrical industrial apparatus (SIC 362); household appliances (SIC 363); electric lighting and wiring equipment (SIC 364); transportation equipment (SIC 37); chemicals and related products (SIC 28); tires (SIC 301); petroleum refining (SIC 291), and nonresidential construction (SIC 15 –17 minus SIC 152).

Table 1
Unemployment Rates in Steel, Steel-Using Industries,
March 2000 and March 2001
(Percent)

	March 2000	March 2001
Primary metal industries (such as steel)	2.6%	4.6%
Steel-users:		
Fabricated metal products	3.1	4.7
Machinery and computing equipment	2.3	4.2
Transportation equipment	2.8	4.7
Automobiles	2.1	5.3
Construction	9.2	8.7

Source: Bureau of Labor Statistics.

Unfortunately, little attention has been paid so far to the potential impact of steel import relief on these downstream steel users. These effects include reduced supplies of imported steel and increased prices of the steel, both domestic and foreign that would remain available. Prices would rise for two reasons: (1) less competition from foreign steel, and (2) reduced net supply of steel as well. U.S.-produced steel is not perfectly substitutable for imported steel – i.e., significant differences often exist in quality and/or price. If a quota reduces imported steel, not all of the reduced supply will be made up for by more U.S.-produced steel. Quotas would therefore result in a net reduction in the supply of steel to the American market, which would force up prices. If protection were imposed on the raw materials used to produce steel – iron ore, pig iron, coke and coke products, and semifinished steel -- even steel producers would be negatively impacted by reduced supply and higher raw material prices.

The Consuming Industries Trade Action Coalition Foundation asked The Trade Partnership to evaluate the downstream effects of the most tangible new relief proposal now on the table, a steel quota bill ("The Steel Revitalization Act of 2001," or SRA, H.R. 808) introduced by Representatives Peter Visclosky (D-IN), Jack Quinn (R-NY), Dennis Kucinich (D-OH), and Phil English (R-PA) on March 1.[17] This report describes the requirements of the SRA (Section II) and its likely impact on downstream industries and workers as well as the economy generally (Section III). Appendix A details the model used to calculate these effects.

[17] One month later, the SRA had 156 co-sponsors.

II. The Steel Revitalization Act of 2001 (SRA)

The SRA consists of four parts. The first establishes quotas on steel imports for five years and sets up a steel import notification and monitoring program. The second part establishes an excise tax on steel to fund health-care related boards and trust funds. The third part makes certain modifications to the steel loan guarantee program. The fourth part establishes a grant program for merged companies.

Import Quotas. The SRA limits finished steel product imports, for five-years, to their average shares of the U.S. market from June 1994 through July 1997 (Section 101). Table 2 shows that this would effectively reduce imports of finished steel products from 23.0 percent of the market to 19.2 percent, or by roughly 16.5 percent from 2000 levels. The quotas apply to stainless steel, plates, sheets and strip, rods, wire and wire products, rail type products, bars, structural shapes and units, and pipe and tube. The SRA also reduces the volume of raw materials used to produce steel (iron ore, pig iron and coke and coke products) and of semifinished steel to the average level of imports from June 1994 to July 1997. Waivers from quota limits for periods of not more than three months each are possible if products are in short supply from U.S. producers.

Table 2
Imports of Finished Steel Mill Products
(Millions of Net Tons and Share of U.S. Consumption)

	Millions of Net Tons	Share of U.S. Consumption
1994	22.1	19.9%
1995	19.2	17.9
1996	21.6	18.7
1997	24.8	20.3
Average, 1994-1997	**21.9**	**19.9**
1998	34.7	26.8
1999	27.2	21.4
2000	**29.4**	**23.0**

Source: American Iron & Steel Institute

The SRA also establishes an import licensing/monitoring program (Section 102). To enter an imported steel product for U.S. consumption, importers must present a Commerce Department-issued certificate.[18] The SRA authorizes Commerce to charge fees for issuing the certificates.

Steel Tax. The SRA imposes a 1.5 percent tax on the value of steel sold by manufacturers, producers or importers (Section 204). The proceeds of the tax fund a "Steelworker Retiree Health Care Trust Fund" established by the SRA to make payments to designated steelworker group health plans to fund qualified retiree health benefits under those plans. Steel products subject to the tax are iron ore, pig iron, coke and coke products, semifinished steel, stainless steel, plates, sheets and strip, rods, wire and wire products, rail type products, bars, structural shapes and units, and pipe and tube.

Loan Guarantee Program. The SRA expands to $10 billion and extends to 2015 the current steel loan guarantee program (Section 301).

Consolidation Grants. Anyone who acquires a steel producer may apply for a Commerce Department grant of up to $100 million to defray the costs of bringing that company into ongoing compliance with environmental protection laws (Section 401). Acquiring companies must maintain prescribed levels of employment to the acquired steel company.

III. The Likely Impact of The Steel Revitalization Act of 2001 on Downstream Industries

The Trade Partnership employed a state-of-the art computable general equilibrium model to estimate the potential impacts of the quota and tax features of the SRA. The model reflects the interactions of the entire U.S. economy, rather than of just the protected industry.[19] The model contains 15 specific sectors: food; other primary goods; mining; steel; non-ferrous metals; fabricated metals; chemicals, rubber and plastics; refineries; automobiles and parts; other transport equipment; electrical equipment; non-electrical equipment; other

[18] Information importers would be required to provide includes such expected data as the volume and value of imports and the source of the imports, and also "the process used to produce the goods and the estimated amount of toxic material emitted into the air, earth, and water as a result of that process;" and "wages and benefits paid to workers producing the goods." Section 102(b)(1)(M) and (N).

[19] The model therefore is able to capture the details of up- and down-stream impacts of trade protection, as well as the total costs to consumers and benefits to U.S. producers. It captures important linkages between sectors, in terms of both intermediate demands and competition in labor and capital markets. "Partial equilibrium" analysis can only capture the total costs to consumers and the benefits to the protected industries. The model used for this study defines the United States as a "large country," in other words, one with market power in import and export markets.

manufacturers; construction; and services. The Trade Partnership benchmarked the model's data for national income, trade flows and related data to the year 2000.[20] Appendix A provides details on the mapping of model sectors to more detailed sectors.

The Trade Partnership examined two scenarios, each under an assumption that the economy was at full employment, and under an assumption that the economy was not at full employment.[21] The first scenario is the full impact of the SRA: quotas on imports of raw materials, quotas on imports of finished steel products, and a 1.5 percent steel sales tax. The second is the impact of steel quotas on finished steel products only (using the SRA cutbacks, as shown in Table 2 above).

Impact of the SRA

Employment. The SRA would cost more jobs than it would preserve (see Tables 3a and 3b). Assuming the U.S. economy is currently at full employment (workers who lose their jobs could readily find new employment elsewhere), The Trade Partnership estimates that the SRA would protect less than 3,700 steel jobs (just over 4,000 would be protected by quotas, but reduced demand resulting from the steel tax would cost just under 350 jobs; see Table 3a).

More significantly, the SRA would cost steel-consuming sectors of the American economy 19,000 jobs, more than five times as many as the SRA protects in the steel industry. The sectors paying the highest price in terms of lost jobs would be fabricated metals, construction, non-electrical machinery and autos and auto parts.

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[20] Basic national income data came from the Global Trade Analysis Project (GTAP) data set, updated to the most recent full year, and supplemented with data from the U.S. Department of Commerce, the Bureau of Labor Statistics, the International Monetary Fund, and the American Iron and Steel Institute.

[21] A less-than-full-employment description of the economy may be the most appropriate one if economic growth continues to slow through the rest of the year. Numerous manufacturing and other layoffs have been announced in recent months. The manufacturing sector has experienced declining output over the five months running from October 2000 through February 2001, and the most recent index of leading economic indicators dropped again in March.

Table 3a
Estimated Employment Effects of SRA
Assuming Full Employment
(Number of Jobs)

	Quotas on Raw Materials, Finished Steel	Steel Tax	Total
Steel	4,022	-348	3,674
Major Steel-Consuming Industries	-10,306	-8,716	-19,021
Fabricated metals	-2,272	-2,557	-4,829
Autos and parts	-1,715	-1,302	-3,017
Other transportation equipment	-463	-160	-622
Electrical machinery	-1,707	-504	-2,211
Non-electrical machinery	-1,953	-1,962	-3,915
Chemicals, rubber & plastics	-225	588*	363
Construction	-1,971	-2,819	-4,790
Difference**	-6,284	-9,064	-15,347

* These sectors gain indirectly from a steel tax only because companies are able to finally hire needed workers from the sectors that lose workers as a result of the tax.
** Steel changes minus steel-consuming industry changes. The total employment effect on the economy as a whole would be zero because the economy is assumed to be at full employment. Jobs lost in one sector are quickly transferred to other sectors, which still require workers.

Source: The Trade Partnership

But if one were to assume that the American economy is not now at full employment (i.e., workers who lose their jobs do not readily find new jobs elsewhere), the employment costs of the SRA increase substantially. A total of 3,514 steel jobs are protected (see Table 3b), but more than nine times as many workers (32,414) in steel-consuming industries lose their jobs. Over the economy as a whole, employment declines by 144,060.

Table 3b
Estimated Employment Effects of SRA
Assuming Economy Is at Less-Than-Full Employment
(Number of Jobs)

	Quotas on Raw Materials, Finished Steel	Steel Tax	Total
Steel	3,945	-431	3,514
Major Steel-Consuming Industries	-14,086	-18,327	-32,414
Fabricated metals	-2,604	-3,405	-6,009
Autos and parts	-1,958	-1,923	-3,881
Other transportation equipment	-664	-671	-1,335
Electrical machinery	-2,153	-1,640	-3,794
Non-electrical machinery	-2,414	-3,133	-5,547
Chemicals, rubber & plastics	-708	-638	-1,346
Construction	-3,585	-6,917	-10,502
Difference*	-10,141	-18,758	-28,900
Net Job Effect Economy-wide**	-19,251	-124,809	-144,060

* Steel changes minus changes in steel-consuming industries.

** This includes jobs lost elsewhere in the economy as the income losses in steel-using sectors feed back through the rest of the economy (e.g., reduced spending on food, clothing and shelter from unemployed steel-using sector workers ultimately would have negative effects on employment in agriculture, retailing, services, banking, etc. when the economy is not at full employment).

Source: The Trade Partnership

These job losses happen to the so-called "good" jobs – i.e., high-wage manufacturing jobs – that union officials and members advocate policy makers must protect. Table 4 shows that the average annual earnings of production workers in the steel-using sectors that would suffer job losses under the SRA averaged $17 per hour, more than the average for manufacturing jobs generally. Some workers in steel-consuming industries, such as motor vehicles, earn every bit as much per hour as steelworkers. Clearly, loss of these jobs would fall into the category of unacceptable losses by anyone's measure, including that of the steel unions.

Table 4
Average Hourly Earnings of Production Workers, 2000
(Dollars per Hour)

Steel (blast furnaces and basic steel products`	$19.46
Major Steel-Consuming Industries:	$17.08
Petroleum refining	24.75
Fabricated metals	13.86
Industrial machinery and equipment	15.63
Transportation equipment	19.04
Motor vehicles and parts	19.58
Electrical machinery	13.42
Chemicals	17.94
Tires and inner tubes	19.97
Construction	17.86
Manufacturing	$14.38

Source: Bureau of Labor Statistics.

Consumer Costs. The quotas and steel tax come with a heavy price tag for consumers and the economy generally (see Table 5). The most conservative estimates (resulting from the assumption that the economy is at full employment and workers who lose their jobs in steel-consuming industries are readily re-employed elsewhere in the economy) indicate that the SRA's quotas on steel raw materials and finished steel products would costs consumers more than $335,000 per job protected in the steel industry. This amounts to roughly 4.5 times the average employment cost (wages and benefits) of a job in the steel industry in 2000. Even netting out the financial benefits of the quotas to steel producers leaves a cost to consumers of $259,000 per steel job.[22] Costs to

[22] These estimates are consistent with those calculated by the Institute for International Economics in a 1999 evaluation of a steel quota bill remarkably similar to the SRA. See Gary

consumers more than double to $732,241 per job protected if one assumes that the economy is no longer at full employment – again, an assumption that may be closer to reality as the economy continues to slow. At a minimum, we know that the cost would be somewhere between the two estimates.

Table 5
Estimated Annual Costs to Consumers of the SRA (Quotas on Raw Materials and Finished Steel Only)

	Economy Is At Full Employment	Economy Is At Less-Than-Full Employment
Total Consumer Costs (millions)	$1,348.9	$2,888.8
Consumer Cost per Job	$335,384	$732,241
Economy-wide Cost* (millions)	$1,039.9	$2,579.7
Economy-wide Cost per Job	$258,574	$653,881

* This cost nets out the benefits of the quotas to steel producers.

Source: The Trade Partnership

Impact of Finished Steel Quotas Alone

The Trade Partnership also estimated the likely impact of steel quotas on finished steel alone. This seems to be the lowest common denominator of protection most companies in the steel industry support, and in our view is the most likely outcome of a Section 201 investigation. Nevertheless, assuming that those quotas target, like the SRA, a reduction in import volumes to shares of production prevailing during the 1994-97 period, the costs to consumers generally and steel-consuming industries specifically remain large.

Employment. While the employment impact of quotas on finished steel products alone is naturally smaller than that of quotas on raw materials and semifinished steel, and of a steel tax, it remains significantly negative for steel-consuming industries. If one assumes the economy is at full employment, twice

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Clyde Hufbauer and Erika Wada, "Steel Quotas: A Rigged Lottery," International Economics Policy Briefs, Number 99-5, Institute for International Economics, June 1999. Hufbauer and Wada used a partial equilibrium model to estimate that steel quotas in the pending quota bill would costs consumers $1.5 billion. Their estimate of costs per job saved, $800,000 exceeds that reported above because they apparently used "iron and steel foundry" employment to define steel employment, rather than "blast furnaces, steel works, rolling and finishing mills." To put the employment effects in perspective, the greatest job losses (those reported in Table 3b) would add between 0.01 percentage points and 0.1 percentage points to the overall U.S. unemployment rate.

as many workers in steel-consuming industries (9,500) would lose their jobs as would be protected in the steel industry (4,200) (see Table 6a).

If one assumes the U.S. economy is *not* at full employment, Table 6b shows that the negative job effects of quotas on finished steel imports are even larger. While the steel industry gains 4,100 jobs, more than 12,600 workers in steel-consuming industries lose their jobs. More broadly, we estimate that almost five times as many workers elsewhere in the economy may lose their jobs relative to those in the steel industry who get or keep jobs protected by quotas.

Table 6a
Estimated Employment Effects of Quotas on Finished Steel Products Assuming Full Employment
(Number of Jobs)

Steel	4,172
Major Steel-Consuming Industries	-9,515
Fabricated metals	-2,135
Autos and parts	-1,581
Other transportation equipment	-429
Electrical machinery	-1,591
Non-electrical machinery	-1,664
Chemicals, rubber & plastics	-190
Construction	-1,925
Difference*	-5,343

* Steel changes minus steel-consuming industry changes. The total employment effect on the economy as a whole would be zero because the economy is assumed to be at full employment. Jobs lost in one sector are quickly transferred to other sectors, which still require workers.

Table 6b
Estimated Employment Effects of Quotas on Finished Steel Products Assuming Less-Than-Full Employment
(Number of Jobs)

Steel	4,142
Major Steel-Consuming Industries	-12,647
Fabricated metals	-2,411
Autos and parts	-1,783
Other transportation equipment	-596
Electrical machinery	-1,961
Non-electrical machinery	-2,045
Chemicals, rubber & plastics	-590
Construction	-3,261
Difference*	-8,505
Net Job Effect Economy-wide**	-19,035

* Steel job changes minus steel-consuming industry jobs changes.
** This includes jobs lost elsewhere in the economy as the income losses in steel-using sectors feed back through the rest of the economy (e.g., reduced spending on food, clothing and shelter from unemployed steel-using sector workers ultimately would have negative effects on employment in agriculture, retailing, services, banking, etc. when the economy is not at full employment).

Source: The Trade Partnership

Consumer Costs. The costs to consumers generally of quotas on imports of finished steel products are significant (see Table 7). Total consumer costs under the conservative assumption of full employment register $1.33 billion a year, or $318,000 per steel job protected. At less-than-full employment, the costs grow to $2.34 billion a year or $565,171 per steel job protected.

Table 7
Estimated Annual Costs to Consumers of Quotas on Finished Steel

	Economy Is At Full Employment	Economy Is At Less-Than-Full Employment
Total Consumer Costs (millions)	$1,325.4	$2,341.1
Consumer Cost per Job	$317,673	$565,171
Economy-wide Cost* (millions)	$1,313.4	$2,328.8
Economy-wide Cost per Job	$314,810	$562,178

* This cost nets out the benefits of the quotas to steel producers.

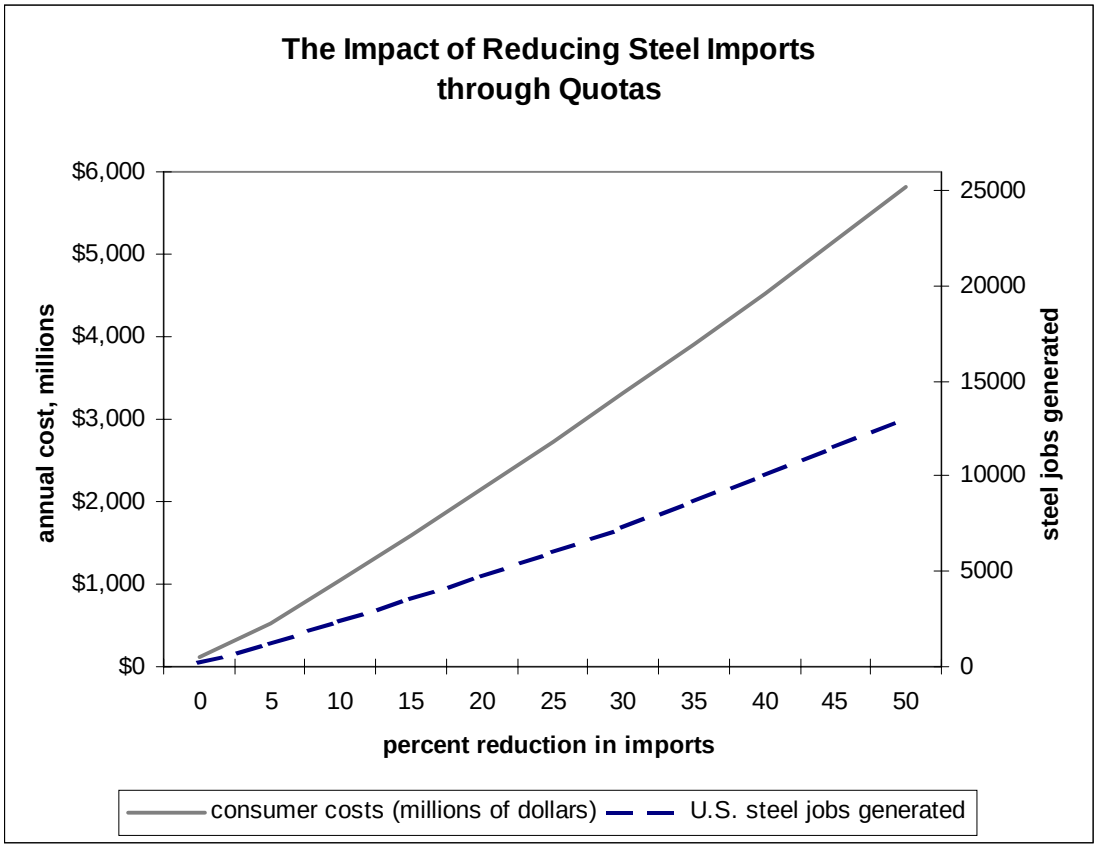
Source: The Trade Partnership

The Impact of Even Larger Reductions in Steel Imports

The estimates discussed so far have centered on a reduction in steel imports specified by the SLA: a 16.5 percent drop meant to restore imports to levels realized in the mid-1990s. As we have seen, this yields relatively minor gains to employment in the steel sector, while nevertheless imposing disproportionately larger costs downstream. It seems reasonable to expect that one reaction, at least from the steel camp, will be to call for even greater reductions in imports to preserve greater numbers of steel jobs. After all, if the goal is higher employment in the sector, maybe a heavy-handed intervention is called for. This could be accomplished, for example, through even smaller quotas than those now on the Congressional table. In this section we explore this issue.

The relationship of quota-based reductions in steel, the jobs gained in steel, and the cost to downstream industries (i.e. steel consumers) is illustrated in Figures 1 and 2. The figures summarize the results of an additional set of scenarios. In these scenarios, we reduce all steel imports incrementally, through import quotas. This involves reductions ranging from only 1 percent of 2000 import levels, all the way to 50 percent of 2000 steel imports.

Figure 1



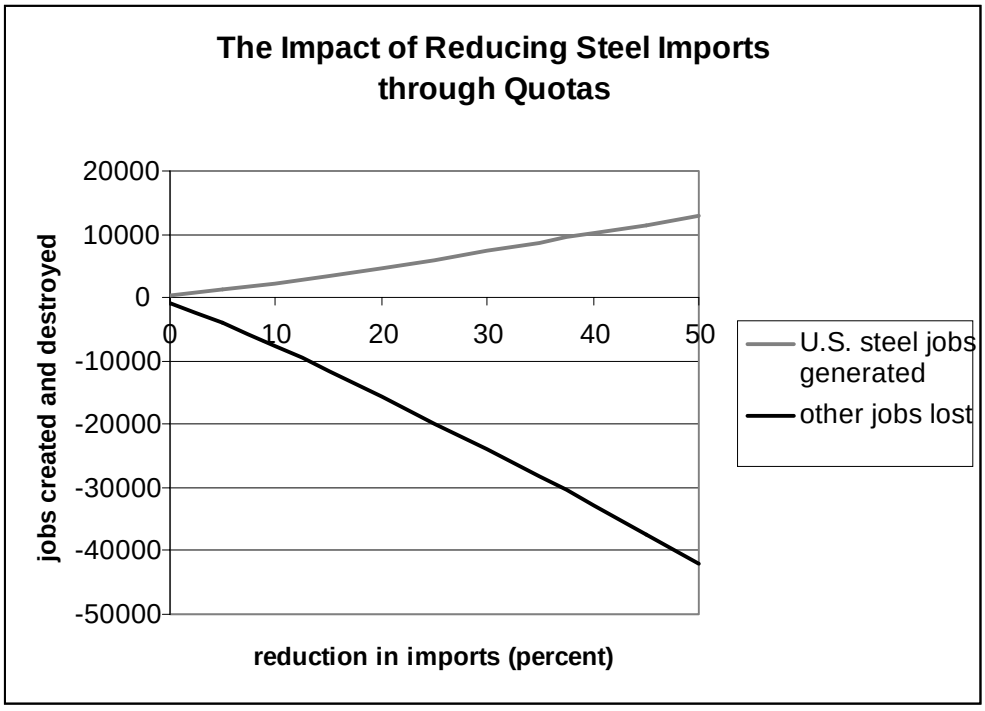
source: The Trade Partnership

The estimates include those reported in Table 3b and Table 5. They illustrate the trade-off between steel sector assistance through import restrictions, and the costs such quotas impose on consuming industries. Consider, for example, a reduction in imports equal to 25 percent of year 2000 steel import levels. This yields a net one-time gain, in terms of steel sector jobs, of roughly 6,000 jobs. But it comes at a substantial cost, as downstream industries and consumers are forced to pay roughly $2.7 billion *per year* for these steel jobs. At the extreme in the chart, we estimate that a 50 percent reduction in imports would yield almost 13,000 steel jobs. However, this would be at an *annual* cost to consumers of $5.8 billion. In just five years, the cost of such a jobs program would amount to $22 billion. Put another way, *this type of jobs program would require steel-using industries (and ultimately consumers as a whole) to pay $2.2 million per job over a five-year period*. As a job-creation program, this seems rather expensive by any standard.

Figure 2 illustrates a related issue – the cost in terms of non-steel industries as employment is forced upstream. It illustrates the following basic

rule of thumb – U.S. policy makers would destroy roughly three non-steel jobs for every steel job preserved through quotas.

Figure 2



source: The Trade Partnership

While employment in the steel industry is indeed under extreme pressure (as discussed above), trade based remedies do not address the forces of change, which are driven by technology. What they do accomplish is the imposition of substantial costs on downstream industries. This includes pressure on downstream profits, downstream employment, and consumer costs.

IV. Conclusion

Even under the most conservative assumptions, steel quotas will impose a disproportionately larger cost on steel-consuming industries and the economy generally than they will benefit the steel industry. Measured in terms of both jobs and income, steel-consumers lose more than steel producers and workers gain. These are not jobs to be sneezed at. The disadvantage is too significant for policy makers to discount or even ignore.

More broadly, what policy makers choose to do for steel will have much bigger ramifications than “just” the enormous costs to steel-consuming industries. Other sectors that covet protection from imports are closely watching to see what is given to the steel industry. These industries face greater degrees of import penetration and job losses -- also largely owed to productivity improvements -- which are easily but often unfairly attributed to imports. If protection is granted to steel producers despite the heavy costs to other sectors of the economy, it will be that much more difficult for policy makers to turn away similar pleas from other industries which are certain to follow.

Appendix A

An Overview of the Computational Model

A. Introduction
B. General structure
C. Taxes and policy variables
D. Trade and transport costs
E. The production structure
F. The composite household and final demand structure
G. Labor markets

A. Introduction

This appendix provides an overview of the basic structure of the computable general equilibrium (CGE) model employed for assessment of U.S. import restraints on steel. While this appendix provides a broad overview of the model, it does not provide a detailed discussion of mathematical structure. Rather, the reader is referred to Hertel (1996: http://www.agecon.purdue.edu/gtap/model/Chap2.pdf)[23] for a detailed discussion of the basic algebraic model structure represented by the core of the model's code. The model is implemented in GEMPACK -- a software package designed for solving large applied general equilibrium models. The model is solved as an explicit non-linear system of equations, through techniques described by Harrison and Pearson (1994). [24] More information can be obtained at the following URL -- http://www.monash.edu.au/policy/gempack.htm. Social accounting data are based on the Global Trade Analysis Project (GTAP) dataset, with updates necessary to benchmark the economic model to the year 2000. (The default GTAP benchmark year is 1997). Updated economic data are taken from public sources provided by the U.S. Department of Labor, the International Monetary Fund, the AISI, and the U.S. Department of Commerce.

B. General structure

The general conceptual structure of a regional economy in the model is represented in Figure A.1. Within each region (both the U.S. and the rest of the world are modeled explicitly as regional economies) firms produce output, employing land, labor, natural resources, and capital, and combining these with intermediate inputs. Firm output is purchased by consumers, government, the investment sector, and by other firms. Firm output can also be sold for export. Land and natural resources are only employed in some sectors, while capital and

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[23] Hertel 1996 Hertel, T., ed., (1996), *Global Trade Analysis*, Cambridge University Press: Cambridge MA.

[24] Harrison, W.J. and K.R. Pearson (1994), An Introduction to GEMPACK, Second edition.

labor (both skilled and unskilled) are mobile between all production sectors. Capital is fully mobile within regions. However, capital movements between regions are not modeled, but rather are held fixed in all simulations. Labor mobility and wage setting are discussed below.

All demand sources combine imports with domestic goods to produce a composite good, as indicated in Appendix Figure A.1. These are called “Armington” composites. Armington composites represent a combination of imported and domestic goods, which serve as imperfect substitutes for each other. The relevant set of trade substitution elasticities are presented in Appendix Table A.1.

The model includes 2 regions (the United States and the rest of world) and 15 sectors. The list of sectors is shown in Appendix Table A.1. A more detailed definition of these sectors is provided in Appendix Table A.2.

C. Taxes and policy variables

Taxes are included in the theory of the model at several levels. Production taxes are placed on intermediate or primary inputs, or on output. Some trade taxes are modeled at the border. Additional internal taxes are placed on domestic or imported intermediate inputs, and may be applied at differential rates that discriminate against imports. Their actual application in the model reflects underlying social accounting data. Where relevant, taxes are also placed on exports, and on primary factor income. Finally, where relevant (as indicated by social accounting data) taxes are placed on final consumption, and can be applied differentially to consumption of domestic and imported goods. For the present exercise, we introduce a 1.5% user tax, in some scenarios, implemented as a tax on intermediate purchases of steel.

Trade policy instruments are represented as import or export taxes/subsidies. This includes applied most-favored nation (MFN) tariffs, antidumping duties, countervailing duties, and other trade restrictions. We model steel import quotas explicitly, with quota rents collected by the exporting country. (This is identical to having an endogenous export tax, whose value is a function of the trade level determined by the export quota).

D. Trade and transportation costs

International trade is modeled as a process that explicitly involves trading costs, which include both trade and transportation services. These trading costs reflect the transaction costs involved in international trade, as well as the physical activity of transportation itself. Those trading costs related to international movement of goods and related logistic services are met by composite services purchased from a global trade/transportation services sector, where the composite "international trade services" activity is produced as a Cobb-Douglas

composite of regional exports of trade and transport service exports. Trade-cost margins are based on reconciled f.o.b. and c.i.f. trade data, as reported in the underlying GTAP dataset.

E. Production structure

The basic structure of production is depicted in Appendix Figure A.2. Basically, intermediate inputs are combined into a composite intermediate, and this composite intermediate is in turn combined with value added to yield a final product. For example, in the auto sector, steel is combined with plastics, machinery, and other physical inputs, and through value added activities (involving workers, equipment, and energy) yields automobiles as final output. At all stages this is represented by CES production functions. The value-added substitution elasticities are presented in Appendix Table A.1.

F. The composite household and final demand structure

Final demand is determined by an upper-tier Cobb-Douglas preference function, which allocates income in fixed shares to current consumption, investment, and government services. This yields a fixed savings rate. Government services are produced by a Leontief technology, with household/government transfers being endogenous. The lower-tier nest for current consumption is specified as taking a constant difference elasticity (CDE) functional form. The regional capital markets adjust so that changes in savings match changes in regional investment expenditures. (Note that the Cobb-Douglas demand function is a special case of the CDE demand function employed in the model code. It is implemented through GEMPACK parameter files.)

The basic structure of demand is based on Armington preferences, as illustrated in Appendix Figure 2. Under this approach, goods are differentiated by country of origin, and the similarity of goods from different regions is measured by the elasticity of substitution. Formally, within a particular region, we assume that demand goods from different regions are aggregated into a composite import according to the following CES function:

$$(1) \qquad q^{M}_{j,r} = \left[\sum_{i=1}^{R} \alpha_{j,i,r} M^{\rho_j}_{j,i,r} \right]^{1/\rho_j}$$

In equation (1), $M_{j,i,r}$ is the quantity of M_j from region i consumed in region r. The elasticity of substitution between varieties from different regions is then equal to σ^{M}_{j} , where $\sigma^{M}_{j}=1/(1-\rho_j)$. Composite imports are combined with the domestic good q^{D} in a second CES nest, yielding the Armington composite q.

$$(2) \qquad q_{j,r} = \left[\Omega_{j.M.r} \left(q^{M}_{j,r} \right)^{\beta_j} + \Omega_{j,D,r} \left(q^{D}_{j,r} \right)^{\beta_j} \right]^{1/\beta_j}$$

The elasticity of substitution between the domestic good and composite imports is then equal to σ^D_j, where $\sigma^D_j=1/(1-\beta_j)$. At the same time, from the first order conditions, the demand for import $M_{j,i,r}$ can then be shown to equal

$$M_{j,i,r} = [\alpha_{j,i,r} / P_{j,i,r}]^{\sigma^M_j} [\sum_{i=1}^{R} \alpha_{j,i,r}^{\sigma^M_j} P_{j,i,r}^{1-\sigma^M_j}]^{-1} E^M_{j,r}$$

$$= [\alpha_{j,i,r} / P_{j,i,r}]^{\sigma^M_j} P^M_{j,r}{}^{\sigma^M_j - 1} E^M_{j,r} \quad (3)$$

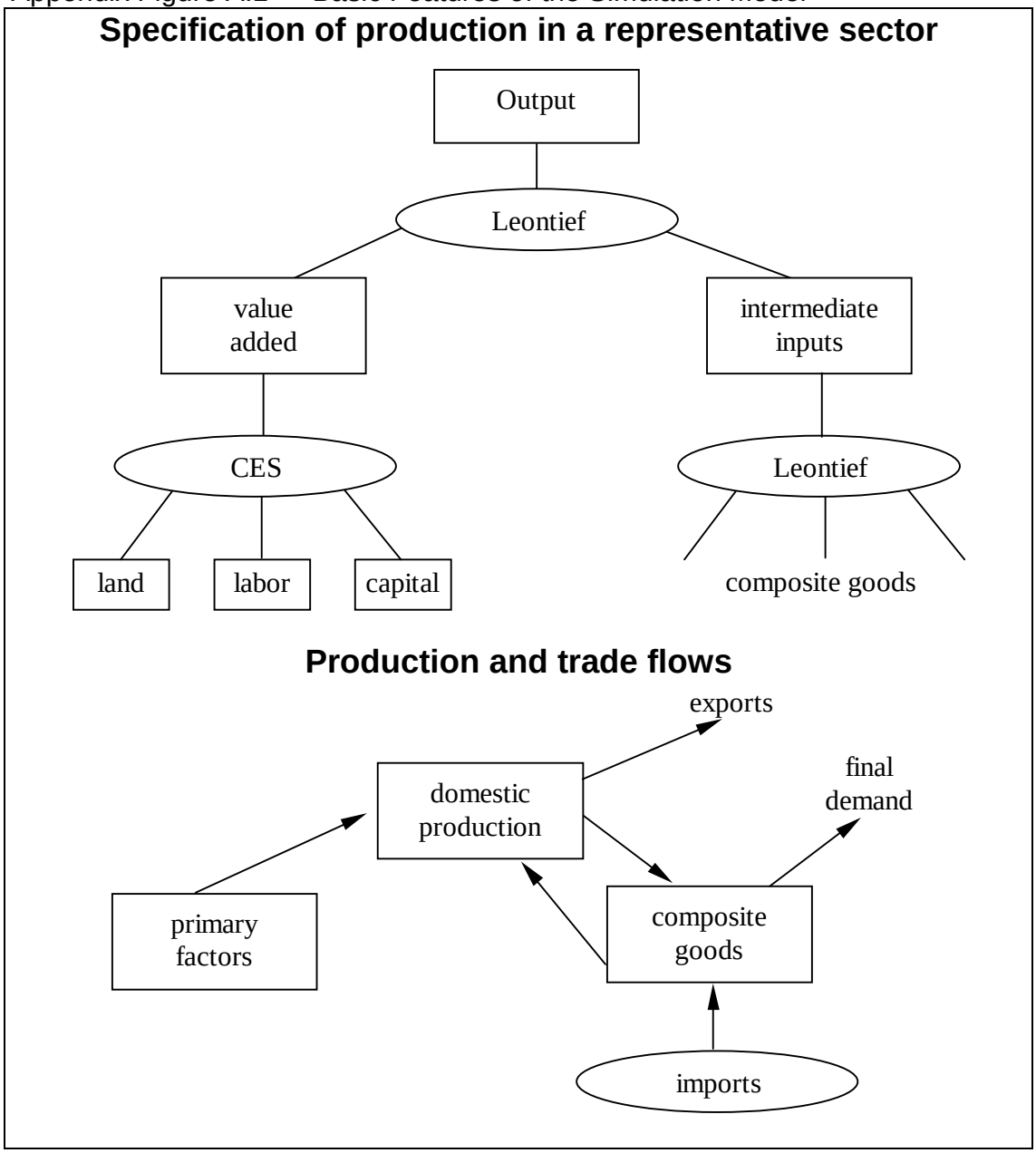
where $E^M_{j,r}$ represents expenditures on imports in region r on the sector j Armington composite.

In practice, because we have a two region model (the U.S. and rest-of-world), the two Armington CES nests are collapsed to a single nest. This implies that the substitution elasticities in equations (1) and (2) are equal. These elasticities are reported in Appendix Table A.1.

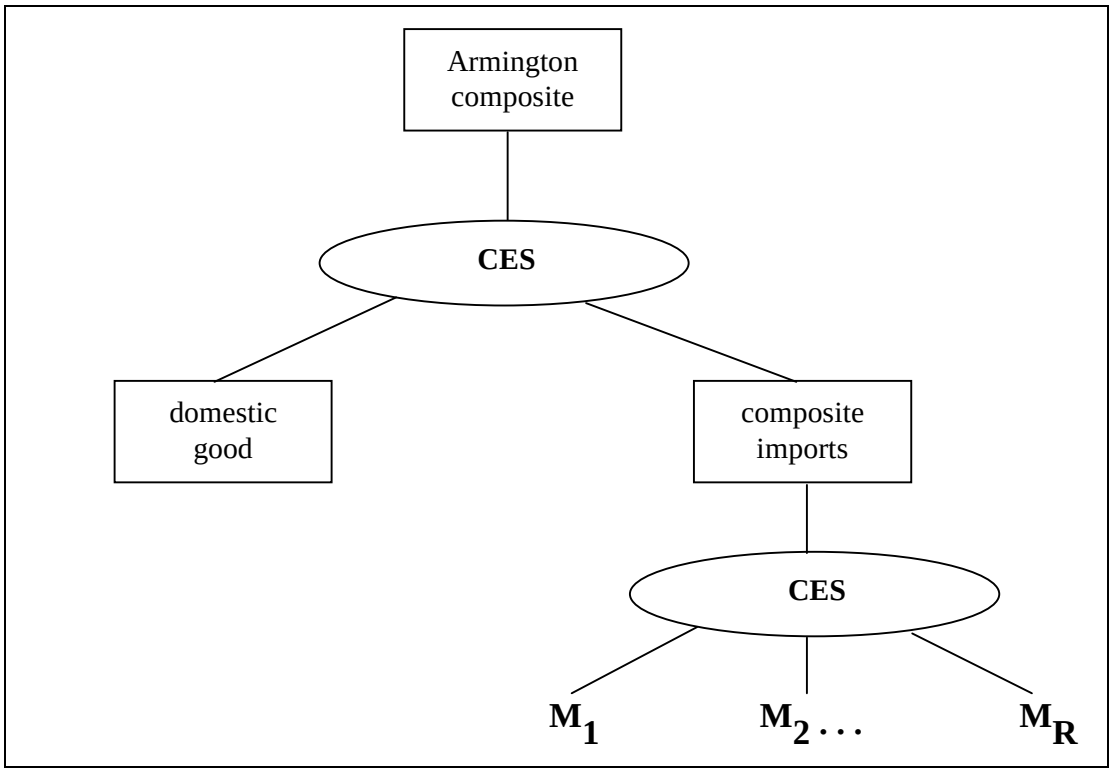
G. Labor markets

Our default closure involves modeling labor markets as clearing with flexible wages and full employment. This serves, in our view, as a reasonable representation of the U.S. economy through the 1990s. However, to allow for a more sluggish economy, with limited labor market flexibility and unemployment, we also employ an alternative labor market specification, where wages are held fixed and employment levels adjust. This alternative approach yields the results reported in the main text given unemployment.

Appendix Figure A.1 — Basic Features of the Simulation Model



Appendix Figure A.2 — Armington Aggregation Nest



Appendix Table A.1 – Model parameters

	A	B
	trade substitution elasticities	elasticity of substitution in production
1 Food	2.00	0.62
2 Other primary products	3.00	0.21
3 Mining	3.00	0.2
4 Steel	3.00	1.26
5 Non-ferrous metals	3.00	1.26
6 Fabricated metal products	3.00	1.26
7 Chemicals, rubber, and plastics	2.00	1.26
8 Refineries	2.00	1.26
9 Automobiles and parts	5.00	1.26
10 Transport equipment	5.00	1.26
11 Electrical machinery	3.00	1.26
12 Non-electrical machinery and equipment	3.00	1.26
13 Construction	2.00	1.4
14 Other manufactures	3.00	1.26
15 Services	2.00	1.39

source: GTAP database.

Table A.2
Concordance of Model Sectors to ISIC Sectors*

Food

(p) 1110 Agricultural & livestock production (paddy rice only)
(p) 1120 Agricultural services (servicing paddy rice production only)
(p) 1110 Agricultural & livestock production (wheat only)
(p) 1120 Agricultural services (servicing wheat production only)
(p) 1110 Agricultural & livestock production (grains except wheat & rice only)
(p) 1120 Agricultural services (servicing production of grains, except wheat & rice only)
(p) 1110 Agricultural & livestock production (non-grain crops only)
(p) 1120 Agricultural services (servicing non-grain crops production only)
(p) 1110 Agricultural & livestock production (wool only)
(p) 1120 Agricultural services (servicing wool production only)
(p) 1110 Agricultural & livestock production (other livestock production only)
(p) 1120 Agricultural services (servicing other livestock production only)
(p) 3116 Grain mill products (processed rice only)
3111 Slaughtering, preparing and preserving meat
3112 Manufacture of dairy products
3113 Canning and preserving of fruits and vegetables
3114 Canning, preserving & processing of fish, crustaceans and similar foods
3115 Manufacture of vegetable and animal oils & fats
(p) 3116 Grain mill products (except processed rice)
3117 Manufacture of bakery products
3118 Sugar factories and refineries
3119 Manufacture of cocoa, chocolate & sugar confectionery
3121 Manufacture of food products n.e.c.
3122 Manufacture of prepared animal feeds
3131 Distilling, rectifying & blending spirits
3132 Wine industries
3133 Malt liquors and malt
3134 Soft drinks & carbonated waters industries
3140 Tobacco manufactures

Other Primary Production

1130 Hunting, trapping & game propagation
1210 Forestry
1220 Logging
1301 Ocean and coastal fishing
1302 Fishing n.e.c.

Mining

2100 Coal mining
(p) 3540 Manufacture of miscellaneous products of petroleum and coal (briquettes only) **
(p) 2200 Crude petroleum & natural gas production (oil only)
(p) 2200 Crude petroleum & natural gas production (gas only)
(p) 3530 Petroleum refineries (LPG only) **
2301 Iron ore mining
2302 Non-ferrous ore mining
2901 Stone quarrying, clay and pits
2902 Chemical and fertiliser mineral mining
2903 Salt mining
2909 Mining and quarrying n.e.c.

Steel

3710 Iron and steel basic industries

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* This concordance is based on the SALTER/GTAP to ISIC concordance provided by the Australian Industry Commission.

(p) denotes partial allocation of 4-digit ISIC categories to a particular sector.

Table A.2
Concordance of Model Sectors to ISIC Sectors*

Other Non-ferrous Metals
3720 Non-ferrous metal basic industries

Fabricated Metal Products
3811 Manufacture of cutlery, hand tools and general hardware
3812 Manufacture of furniture and fixtures primarily of metal
3813 Manufacture of structural metal products
3819 Manufacture of fabricated metal products except machinery & equipment n.e.c.

Chemicals, rubber, and plastics
3511 Manufacture of basic industrial chemicals except fertilisers
3512 Manufacture of fertilisers and pesticides
3513 Manufacture of synthetic resins, plastic materials and man-made fibres except glass
3521 Manufacture of paints, varnishes and lacquers
3522 Manufacture of drugs and medicines
3523 Manufacture of soap and cleaning preparations, perfumes and cosmetics
3529 Manufacture of chemical products n.e.c.
3551 Tyre and tube industries
3559 Manufacture of rubber products n.e.c.
3560 Manufacture of plastic products n.e.c.

Refineries
(p) 3530 Petroleum refineries (except LPG) **
(p) 3540 Manufacture of miscellaneous products of petroleum and coal (except briquettes) **

Automobiles and parts
3843 Manufacture of motor vehicles
3844 Manufacture of motorcycles and bicycles

Transportation equipment
3841 Ship building and repairing
3842 Manufacture of railroad equipment
3845 Manufacture of aircraft
3849 Manufacture of transport equipment n.e.c.
3821 Manufacture of engines and turbines

Electrical machinery
3831 Manufacture of electrical industrial machinery and apparatus
3832 Manufacture of radio, television and communication equipment and apparatus
3833 Manufacture of electrical appliances and housewares
3839 Manufacture of electrical apparatus and supplies n.e.c.

* This concordance is based on the SALTER/GTAP to ISIC concordance provided by the Australian Industry Commission.

(p) denotes partial allocation of 4-digit ISIC categories to a particular sector.

Table A.2
Concordance of Model Sectors to ISIC Sectors*

Non-electrical machinery and equipment

3822 Manufacture of agricultural machinery and equipment
3823 Manufacture of metal and wood working machinery
3824 Manufacture of special industrial machinery and equipment except metal and wood working machinery
3825 Manufacture of office, computing and accounting machinery
3829 Machinery and equipment except electrical n.e.c.
3851 Manufacture of professional and scientific, and measuring and controlling equipment, n.e.c.
3852 Manufacture of photographic and optical goods
3853 Manufacture of watches and clocks

Construction

5000 Construction

Other manufactures n.e.c.

3211 Spinning, weaving & finishing textiles
3212 Manufacture of made-up textile goods excluding wearing apparel
3213 Knitting mills
3214 Manufacture of carpets & rugs
3215 Cordage, rope & twine industries
3219 Manufacture of textiles n.e.c.
3220 Manufacture of wearing apparel, except footwear
3311 Sawmills, planing & other wood mills
3312 Manufacture of wooden & cane containers & small caneware
3319 Manufacture of wood & cork products n.e.c.
3320 Manufacture of furniture & fixtures, except primarily of metal
3411 Manufacture of pulp, paper & paperboard
3412 Manufacture of containers & boxes of paper and paperboard
3419 Manufacture of pulp, paper & paperboard articles n.e.c.
3420 Printing, publishing & allied industries
3231 Tanneries & leather finishing
3232 Fur dressing & dyeing industries
3233 Manufacture of products of leather & leather substitutes, except footwear and wearing apparel
3240 Manufacture of footwear, except vulcanised or moulded rubber or plastic footwear
3610 Manufacture of pottery, china and earthenware
3620 Manufacture of glass and glass products
3691 Manufacture of structural clay compounds
3692 Manufacture of cement, lime and plaster
3699 Manufacture of non-metallic mineral products n.e.c.
3901 Manufacture of jewellery and related articles
3902 Manufacture of musical instruments
3903 Manufacture of sporting and athletic goods
3909 Manufacturing industries n.e.c.

Services

4101 Electric light and power
4102 Gas manufacture and distribution

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* This concordance is based on the SALTER/GTAP to ISIC concordance provided by the Australian Industry Commission.

(p) denotes partial allocation of 4-digit ISIC categories to a particular sector.

Table A.2
Concordance of Model Sectors to ISIC Sectors*

4103 Steam and hot water supply
4200 Water works and supply
6100 Wholesale trade
6200 Retail trade
6310 Restaurants, cafes, and other eating and drinking places
6320 Hotels, rooming houses, camps and other lodging places
7111 Railway transport
7112 Urban, suburban and inter-urban highway passenger transport
7113 Other passenger land transport
7114 Freight transport by road
7115 Pipeline transport
7116 Supporting services to land transport
7121 Ocean and coastal transport
7122 Inland water transport
7123 Supporting services to water transport
7131 Air transport carriers
7132 Supporting services to air transport
7191 Services incidental to transport
7192 Storage and warehousing
7200 Communication
0 Activities not adequately defined
8101 Monetary institutions
8102 Other financial institutions
8103 Financial services
8200 Insurance
8310 Real estate
8321 Legal services
8322 Accounting, auditing and bookkeeping services
8323 Data processing and tabulating services
8324 Engineering, architectural and technical services
8325 Advertising services
8329 Business services, except machinery and equipment rental and leasing, n.e.c.
8330 Machinery and equipment rental and leasing
9411 Motion picture production
9412 Motion picture distribution and projection
9413 Radio and television broadcasting
9414 Theatrical producers and entertainment services
9415 Authors, music composers and other independent artists n.e.c.
9420 Libraries, museums, botanical and zoological gardens, and other cultural services, n.e.c.
9490 Amusement and recreational services n.e.c.
9511 Repair of footwear and other leather goods
9512 Electrical repair shops
9513 Repair of motor vehicles and motorcycles
9514 Watch, clock and jewellery repair
9519 Other repair shops n.e.c.
9520 Laundries, laundry services, and cleaning and dyeing plants
9530 Domestic services
9591 Barber and beauty shops
9592 Photographic studios, including commercial photography
9599 Personal services n.e.c.
9100 Public administration and defence

* This concordance is based on the SALTER/GTAP to ISIC concordance provided by the Australian Industry Commission.

(p) denotes partial allocation of 4-digit ISIC categories to a particular sector.

Table A.2
Concordance of Model Sectors to ISIC Sectors*

9200 Sanitary and similar services
9310 Education services
9320 Research and scientific institutes
9331 Medical, dental and other health services
9332 Veterinary services
9340 Welfare institutions
9350 Business, professional and labour associations
9391 Religious organisations
9399 Social and related community services n.e.c.
9600 International and other extra-territorial bodies

* This concordance is based on the SALTER/GTAP to ISIC concordance provided by the Australian Industry Commission.

(p) denotes partial allocation of 4-digit ISIC categories to a particular sector.