

# Appendix A: Estimating the Economic costs of Export Controls

# A

**D**iscussing Clinton Administration changes in export control policy for computers, then-Deputy Secretary of Defense William Perry said that the economic burden to exporters imposed by controls on computers was “. . . a significant factor, but I do not know how to quantify it.”<sup>1</sup> This appendix illustrates the difficulties in trying to assign economic costs of nonproliferation export controls in the U.S. machine tool industry. First, however, is a discussion of the general difficulties of finding meaningful data.

## DATA

The Department of Commerce (DOC) computer system for managing export control application reviews began as a means of simply tracking the status of applications. A weakness of the system is that it is not designed to yield certain kinds of aggregate data that would help assess the economic impact of controls. The basic unit of record keeping is the license application. After determining whether a given product requires an export license, a company may need to apply for an Individual Validated License (IVL) to export the good to a specific buyer. However, a single license application may cover multiples of the same article, or it may cover several types of article, each with its own Export Control Classification Number. It may also include items that, if they were not to be shipped with a controlled product, would not require a license. (The Department maintains a “Commerce Control List” that

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<sup>1</sup> William J. Perry, transcript of Breakfast with Reporters, Oct. 15, 1993 (venue not state(l)).

specifies the kinds of goods and technology that are subject to export controls. Although some control numbers may be assigned each to a single, narrowly defined product, others may cover a broad range, and may contain either very general descriptions or large sublists of commodities.)

The result of this system is that the Commerce database can be searched either for numbers of license applications or for aggregate values of proposed shipments in licenses *containing* specific control numbers. But, short of individually examining each license application, it is not possible to determine the values of specific kinds of exports when several kinds are included in single licenses. In addition, licenses frequently are granted on the basis of 2-year forecasts by the applicants. The DOC has no way of knowing whether the licensed transactions actually take place. Given the shrinking development periods and life-cycles of high-technology goods, 2-year licenses may never be fully utilized.

Complicating matters is the fact that the Export Control Classification Numbers bear no relation to the ways in which other trade statistics are kept (e.g., the Bureau of the Census' export and import record system<sup>2</sup>). Thus, it becomes difficult to determine the actual portion of a particular industrial sector that is affected by the requirement to apply for an export license.

Even if such numbers could be determined, however, they do not tell the story of sales not made either because the buyers chose to shop in nations with less cumbersome export restrictions or because potential sellers chose not to bear the costs they perceive to be imposed by the system.

## CASE STUDY: MACHINE TOOLS

Machine tools cut and form metals or other hard materials with varying degrees of precision. Sometimes they are used directly in manufacturing, and sometimes they are used to make the machines that produce other articles. They are essential to civilian industry, but they have a range of military industrial applications as well. They are useful for manufacturing many types of conventional weapons and vehicles. They are also useful for building nuclear weapons, for manufacturing high-speed centrifuges that can enrich uranium to go into nuclear weapons, and for making precision missile parts. Numerically controlled (usually meaning computer-controlled) machine tools meeting certain performance specifications are on the Commerce Control List (CCL) for both nuclear and missile nonproliferation reasons. Related computer hardware and software are also on the list. In addition, some tools not on the list for nonproliferation reasons are there for national security, i.e., Coordinating Committee on Multilateral Export Controls (COCOM), reasons.

The U.S. machine tool industry declined dramatically between the 1970's and the 1980's: in constant 1982 dollars, shipments declined from a high of \$5.6 billion in 1980 to \$2.2 billion in 1992. Thus, if the entire industry were considered to be one corporation, its sales in 1992 would have ranked only 159th in the Fortune 500 list.<sup>3</sup> In exports:

- Total U.S. machine tool exports in 1992 were slightly over \$1 billion. The industry thus depended on exports for about 34 percent of its

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<sup>2</sup>The Census Bureau (since 1989) gathers trade statistics using the Harmonized System (HS), which many countries use to facilitate comparison of international trade by commodity for various countries. The classifications of products in the HS bear no relationship either to the Export Control Classification Numbers or to the product descriptions on the Commerce Control List.

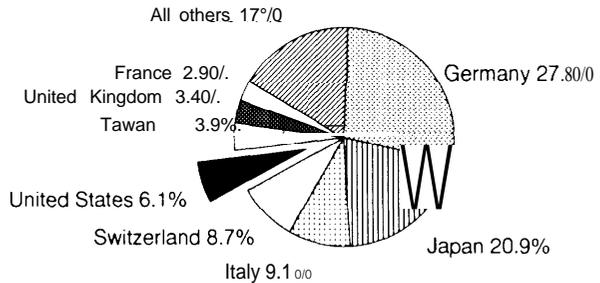
<sup>3</sup>"The Fortune 500 Largest U.S. Industrial Corporations," *Fortune*, Apr. 19, 1993, p. 190; with shipments estimated at \$3.02 billion in 1992 dollars, if the industry were a single corporation it would have ranked between the Berkshire Hathaway company of Omaha and the Jefferson Smurfit company of St. Louis. The number one corporation, General Motors, had sales about 44 times larger.

revenues. (The machine tool industries of other major producing countries are even more dependent on exports. See figure A- 1 for distribution of the world machine tool export market.)

- Machine tools accounted for about 3.4 percent of U.S. durable goods exported in 1992.
- Import penetration is high—in 1982 imports accounted for 26.4 percent of machine tools consumed in the United States, but by 1992 they were 46.3 percent of consumption (even though, for several years beginning in 1987, "voluntary restraint agreements" between the United States and several other machine tool producing countries helped restrict exports to this country).
- In the 1980s the United States consistently imported a billion or more dollars per year more machine tools than it exported. The difference went down to about \$700 million in 1992, but consumption also declined.

All types of machine tools are not subject to export controls. Those subject to nonproliferation export controls are primarily computer-control led tools of relatively high precision. Numerically controlled machine tools of all types accounted for about \$304 million, or 36 percent, of the U.S. machine tools exported in 1992, meaning that they accounted for about 12 percent of machine tool industry revenues. Table A-1 shows that in 1992, the Commerce Department approved 572 applications containing over \$454 million worth of machine tools controlled for national security (COCOM) or foreign policy reasons. In the same categories of control, over \$7 million in license applications were denied. Recall that IVLS are for 2-year periods and that the figures represent proposed sales, not actual shipments (nor shipments that would have taken place had a license not been denied). Moreover, machine tool shipments generally occur 9 to 18 months after orders are placed. Nevertheless, the table suggests that a substantial portion of U.S. machine tool exports require

**FIGURE A-1: 1992 Shares of Global Machine Tool Exports (All Types)**



SOURCE Association for Manufacturing Technology 1993 and Office of Technology Assessment 1994

IVLS. Note, on the other hand, that in the same year ( 1992), only two approved applications, valued at \$1.8 million, were for machine tools controlled only for nuclear nonproliferation reasons, and only one application for such an export, valued at about \$400,000, was denied. As COCOM controls are further altered, the impact of export controls on the industry should decline.

In terms of dollar value relative to the Gross National Product (GNP) or the overall export picture, machine tools are not of great significance; in terms of the dollar value of business subjected to individual export licensing requirements, machine tools constituted about 2.5 percent.

Nevertheless, individual machine tool firms may be at risk. They depend on exports to stay in business and to supply revenues for research, development, and modernization. Since 1985, the United States has imported 40 to 50 percent of its machine tools. Machine tool industry advocates argue that theirs is a strategic industry. building machines

... essential to our military readiness and our ability to respond quickly and effectively in the event of a national emergency ...4

<sup>4</sup>Thomas T. Connelly .. Statement on Behalf of AMT—The Association for Manufacturing Technology—before the Subcommittee on Economic Policy, Trade, and Environment of the House Committee on Foreign Affairs, " Nov.18, 1993, p. 2.

TABLE A-1: 1992 Machine Tool Individual Licenses

Reasons for control	Licenses approved		Licenses denied	
	Number	(Value \$ millions)	Number	(Value \$ millions)
National security (COCOM) only	312	309,4	6	6,3
National security and foreign policy	260	144,6	5	1,1
Foreign policy only	1	0,06	0	0
Nuclear proliferation only	2	1,8	1	0,4
Totals	575	455,8	12	7,8

SOURCE Department of Commerce, 1993

If the United States wants to maintain some elements of the U.S. machine tool industry for national security reasons, it may find that export controls that put the industry at a competitive disadvantage can interfere with that goal. The industry is highly dependent on exports for its livelihood and its research and development resource base; since it is a relatively small industry, business failure of a few key firms could have a major effect on the indigenous supply of advanced machine tools. In addition, industry advocates point out that U.S. companies are most competitive in the technological “high-end” products—the ones most likely to be subject to export controls.

### | Costs to U.S. Economy

On the other hand, of the eight countries that bought nearly 70 percent of U.S. machine tool ex-

ports in 1992, only two, China and Taiwan (together accounting for about 9 of those 70 percentage points) were likely to cause any proliferation concerns and possibly evoke licensing delays. At present, there is no concrete evidence to show that export controls in general, let alone the small fraction represented by nonproliferation controls, have in fact significantly harmed the industry. Better data, however, might show otherwise and give policy makers a better notion of whether one type of control or another places either the industry or particular firms at risk.