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# COMMENT

## THE U.S.-JAPAN SEMICONDUCTOR AGREEMENT: CHIPPING AWAY AT FREE TRADE

Charles S. Kaufman†

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#### TABLE OF ABBREVIATIONS

AMD	Advanced Micro Devices (a U.S. merchant chip manufacturer)
CAD	Computer Assisted Design
CMOS	Complementary Metal Oxide on Silicon
CSPP	Computer System Policy Project
DRAM	Dynamic Random Access Memory chip
EC	European Community
DSP	Digital Signal Processor
EPROM	Erasable Programmable Read Only Memory chip
GATT	General Agreement on Tariffs and Trade
GSI	Giga Scale Integration
IC	Integrated Circuit
LSI	Large Scale Integration
MFN	Most Favored Nation
MITI	Japan's Ministry of International Trade and Industry
RISC	Reduced Instruction Set Computer (a type of advanced design chip)
SIA	Semiconductor Industry Association
TRIM	Trade-Related Investment Measure
TI	Texas Instruments
ULSI	Ultra Large Scale Integration
USTR	United States Trade Representative
VLSI	Very Large Scale Integration

#### I. INTRODUCTION

Semiconductors are tiny but essential bits of modern technology that move through international trade in vast streams

amounting to over \$75 billion annually.<sup>1</sup> Semiconductors, most importantly microchips, have also joined textiles and automobiles as subjects of perennial trade friction between Japan and the United States.

In the mid-1980s, U.S. semiconductor makers suffered unaccustomed losses as Japanese firms dumped computer memory chips worldwide. This initiated a wave of U.S. lawsuits against Japanese manufacturers. In response to these dumping suits and a Section 301 suit by the U.S. semiconductor industry alleging unfair "targeting," Japan entered negotiations with the United States. These negotiations led to the 1986 Semiconductor Arrangement ("the Arrangement").

In the Arrangement, Japan agreed to set floor prices for exported chips and promised to take measures to open Japan's semiconductor market, which is the world's largest. The most controversial feature of the Arrangement is an ambiguous promise, originally hidden in a secret side letter, of a twenty percent market share for "foreign" or U.S. chips. Such a concession to one nation would clearly violate the fundamental GATT principle of equal treatment for most-favored nations (MFN).<sup>2</sup>

In 1993, the Arrangement remains in place (revised and renewed in 1991), the U.S. semiconductor industry is thriving, and U.S. semiconductor imports have reached the twenty percent target level in Japan.<sup>3</sup> Following on the Arrangement's apparent success, the U.S. government is using the renewed power of Super 301 to press Japan to agree to similar targets in other sectors of the Japanese market in bilateral "economic framework" negotiations.<sup>4</sup> These negotiations possibly portend an era of managed trade between the two nations.

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1. *Semiconductor Market Expected to Grow 29 Percent in 1993*, SIA Report Says, 10 Int'l Trade Rep. (BNA) 1856 (1993).

2. General Agreement on Tariffs and Trade, *opened for signature* Oct. 30, 1947, 61 Stat. pts. 5, 6, T.I.A.S. No. 1700, 55 U.N.T.S. 187 at art. I [hereinafter GATT].

3. In fact, Japan reached the 20% target level during only a single quarter, the fourth quarter of 1992. In each subsequent quarter, import figures have hovered just under the 20% level. *U.S. Vows to Act Quickly to Sanction Japan if Chip Imports Fail to Rise*, BNA Int'l Trade Daily, Mar. 10, 1994 [hereinafter *Chip Imports Fail to Rise*]. The USTR has protested the drop; nevertheless, the share is about double that of a decade before.

4. *Super 301 Renewal Said Designed to Send Message to Japan to Open Markets*, BNA Int'l Trade Daily, Mar. 7, 1994; *U.S. Insurance Demands Spurned in Bilateral Framework Negotiations*, 10 Int'l Trade Rep. (BNA) 1767 (1993) [hereinafter *U.S. Insurance Demands*]. The position of the U.S. Trade Representative in the economic framework negotiations follows a policy announced last year by Chief Economic Advisor Laura D'Andrea Tyson, who said on February 1 that "sectoral commitments are likely to prove more effective at enhancing access to Japan than the economy-wide SII [Structural Impediments Initiative] approach." *U.S. to Take Industry-Specific Approach to Trade With Japan*, Clinton Adviser Says, 10 Int'l Trade Rep. (BNA) 174 (1993) [hereinafter *U.S. to Take Industry-Specific Approach*].

This Comment will explore whether the Arrangement has in fact been a success worth duplicating. More specifically, it considers whether the slump and recovery in the U.S. semiconductor industry resulted from Japanese dumping and protectionism, or from market forces and managerial decisions. It evaluates how well the Arrangement conforms with U.S. and Japanese obligations under the GATT and whether the Arrangement is well tailored to the problems of the semiconductor trade. Finally, it discusses alternatives for dealing with the problem of U.S.-Japan semiconductor trade.

Part II begins with background information on semiconductors and the underlying economics of semiconductors in order to explain the context of the Arrangement. In addition, the background information seeks to demystify an area where trade issues often get lost amid technical jargon.

## II. PRELUDE TO THE 1986 ARRANGEMENT

### A. BACKGROUND

#### 1. *The Importance and Development of the Semiconductor Industry*<sup>5</sup>

Semiconductors,<sup>6</sup> which in their most basic form act as electronic amplifiers or switches, are an essential component of every modern electrical device more complicated than a flashlight. Initially semiconductors replaced vacuum tubes, then replaced entire soldered circuit boards with fingernail-sized chips. The "brains" of computers of all sizes, semiconductors have also replaced mechanical control devices in everything from engine fuel systems and machine tools to coffee makers and wristwatches. Semiconductors enable military forces to leverage weapons by increasing their precision, as demonstrated by the "smart" bombs and missile guidance systems of the Persian Gulf War.

The first semiconductor device was the transistor, developed by Bell Labs in 1947. Seen as a substitute for fragile vacuum tubes in military electronics, the transistor, like the jet engine, emerged from a wartime defense engineering initiative. The discovery that every electronic component—transistors, resistors, capacitors, and diodes—could be created in miniature by laying tiny wires ("channels" of a conducting metal) in layers of semi-

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5. The factual material in this section chiefly relies on MICHAEL G. BORRUS, *COMPETING FOR CONTROL: AMERICA'S STAKE IN MICROELECTRONICS* 55-183 (1988), and GEORGE GILDER, *MICROCOSM: THE QUANTUM REVOLUTION IN ECONOMICS AND TECHNOLOGY* 17-161 (1989).

6. Matter is divided into three classes: conductors of electricity like copper or aluminum, insulators like glass that do not conduct electricity, and semiconductors which can carry electricity under some conditions but not others.

conductor material led in 1959 to the integrated circuit (IC). The IC is an entire electronic system on a fingernail-sized chip of silicon. Civilian and military space programs put IC microcircuits to immediate use.

The semiconductor industry has since developed through a quest for ever-greater density or "integration" of devices on chips. As makers learned to etch finer and finer channels into chips, they began to create circuits of previously unimaginable complexity and function. Successive generations of density have included: LSI (Large Scale Integration), VLSI (Very Large Scale Integration), ULSI (Ultra Large Scale Integration), and the anticipated GSI (Giga Scale Integration—a billion transistors on a chip). Chip designers use a process called CAD (Computer Assisted Design), employing computer workstations to map out millions of microscopic components.

Most semiconductors are made of silicon, the cheapest mineral on earth. Aluminum, used as a conductor in the channels, is coincidentally the cheapest metal. These materials must be highly purified to be used in semiconductors. The silicon must be grown into long man-made crystals, then sliced into "wafers". Then, during fabrication, precise photolithographic printers called "wafer steppers" shine light or (more recently) x-rays through a stencil called a "mask" to etch the channels into each wafer of silicon crystal. Even a microscopic speck of dust will spoil the result, so chips must be made in "clean rooms"—enclosed factories with sophisticated air filtration systems and limited human presence. Capital investment in semiconductor fabrication facilities—known simply as "fabs"—is enormous. Since semiconductor fabricating equipment becomes obsolete every two to four years as successively denser scales of integration dominate the market, profitability hinges on yield. The yield is simply the defect-free output of the production lines. These lines are so prone to microscopic defects and mechanical breakdowns that initial yields may be as low as 5% (meaning 95% of chip output is useless). But yields rise as high as 90% with mature design and refined processing techniques.

Most discussions of semiconductor trade focus on the *merchant chip makers*. Merchant chip makers are firms like AMD, Intel, Texas Instruments (TI), and Motorola that chiefly sell chips rather than make them for internal consumption. Although IBM is one of the largest manufacturers of chips in the world, it is usually not counted in trade calculations because it does not sell to outside users.<sup>7</sup> Major Japanese semiconductor

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7. GILDER, *supra* note 5, at 344. Curiously, discussions of U.S. defense capability under a hypothetical cutoff of foreign chip sources also do not consider

firms like NEC, Toshiba, and Hitachi both sell in the merchant market and produce for internal use.

## 2. *Forward Pricing*

Chip densities double at a predictable rate, leading to a rapid cycle of innovation and obsolescence. As a result, a marketing strategy called "forward pricing" emerged among semiconductor makers. Under the forward pricing strategy, the maker of a new semiconductor product initially sells it for much less than its production cost. The low initial price enables the maker to sell enough units to build economies of scale and refinements of manufacturing techniques. In turn, those improvements lead to higher yields, so that during the useful life of a chip its manufacturing costs plunge to a level well below the money-losing introductory price.<sup>8</sup> The losses from selling below cost are recouped at this latter stage. Not surprisingly, trade negotiators have found it difficult to reconcile forward pricing and antidumping rules.<sup>9</sup>

## 3. *Segments of the Semiconductor Industry: Memory Chips, Specialized Logic Chips, and Semiconductor Equipment*

Discussions of semiconductor trade generally focus on three distinct segments of the industry: memory chips, specialized logic chips, and semiconductor equipment.

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whether the chip-making expertise of IBM, AT&T, or other vertically integrated producers would help meet military needs but focus on the viability of the merchant market. See, e.g., *Semiconductors: The Role of Consortia: Hearing Before the Subcomm. on Technology and Competitiveness of the House Comm. on Science, Space and Technology*, 102d Cong., 1st Sess. 97, 99 (1991) [hereinafter *Consortia*] (testimony of William J. Spencer).

8. FRED WARSHOFSKY, *The Chip War: The Battle for the World of Tomorrow* 48 (1989). The forward pricing technique may have been introduced along with the first integrated circuit for consumer electronic use by Fairchild Camera and Instrument (a pioneer in semiconductor technology later absorbed by National Semiconductor). When U.S. television makers began producing UHF-capable sets in 1963, Fairchild already had in production a military UHF chip ideally suited for television use—but it sold for \$150 and cost \$100 to fabricate, while RCA offered an advanced vacuum tube device that did the same job for \$1.05. Fairchild sold its \$150 chip to Zenith for \$1.05, and within two years was able to drop the price to 50 cents and still make a profit. GILDER, *supra* note 5, at 119-21.

9. PETER F. COWHEY & JONATHAN D. ARONSON, *MANAGING THE WORLD ECONOMY: THE CONSEQUENCES OF INTERNATIONAL ALLIANCES* 125 (1993); see also, e.g., Andrew Pollack, *Europe Sets Prices for Japan's Chips*, N.Y. TIMES, Jan. 24, 1990, at D5.

*Memory chips*, or DRAMs,<sup>10</sup> are standardized, interchangeable chips that give a computer its random access memory (RAM) capacity, or the amount of information it can actively manipulate. RAM capacity is distinguished from storage capacity. The circuitry of these chips is well established, differing mainly in speed and storage density (expressed by numbers such as 64K, 256K, 1Meg, etc., for thousands or millions of units of storage). These chips are a fungible commodity. Partly because they have little intellectual property content, they sell for close to the cost of manufacture. They have been denigrated as "jelly-beans" by American makers and "rice" by Japanese makers because of their low profitability, high volume, and interchangeable commodity status.<sup>11</sup> Nevertheless, they are the first product to roll out as fabricators test new density levels, and the semiconductor industry has viewed them as the leading edge of each new generation of chip technology.<sup>12</sup>

*Specialized logic chips* are high-value chips of a proprietary design. Specialized logic chips sell for many times their manufacturing cost at prices based largely on intellectual property content. One type, microprocessors (the brains of personal computers), incorporates copyrighted instruction codes that link the chip to families of established software. For example, Intel microprocessors (or close copies) are essential to using the IBM-standard DOS software that dominates American offices; likewise, Apple Macintosh software works only on machines using Motorola microprocessors. Sun Microsystems has largely captured the engineering workstation market with a Reduced Instruction Set Computer (RISC) microprocessor.<sup>13</sup> Other examples of high-value chips are Digital Signal Processors (DSPs), which are widely used by the telecommunications industry in its efforts to convert to digital equipment, graphics and mathematics co-processing chips for computers, and the myriad specialized chips designed for specific uses in aerospace, defense, and consumer electronics. Design plays the dominant role in all these chips.

*Semiconductor equipment* refers to the specialized machine tools of chip fabrication. In addition to the wafer steppers used in photolithography, essential equipment includes laser or electron beam printers to create masks, robotized handlers, and machinery for growing silicon crystals and cutting it into wafers.

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10. For this paper DRAMs (dynamic random access memory) will be grouped together with EPROMs (erasable programmable read only memory chips), a somewhat more sophisticated commodity chip also subject to dumping in the 1980s.

11. WARSHOFSKY, *supra* note 8, at 132.

12. BORRUS, *supra* note 5, at 17.

13. GILDER, *supra* note 5, at 158, 324.



Wafer steppers, like other tools of chip making, were once exclusively made in the United States. As recently as 1991, however, Japan's Nikon and Canon produced ninety percent of the goods in this market.<sup>14</sup> Such losses provoke concern, not only because the equipment industry generates revenue in its own right (a modern wafer stepper can easily cost \$500,000), but because the capacity to build a complete state-of-the-art production line using just U.S. equipment has become a benchmark of self-sufficiency.<sup>15</sup> Also, given the rapid turnover of semiconductor equipment, tooling technology represents a valuable industry that can thrive even if most chip fabrication moves offshore.<sup>16</sup>

While the Arrangement does not directly address the domestic equipment industry,<sup>17</sup> economists have argued that equipment makers can only succeed through close consultation with equipment users. This constitutes another motive for keeping a base of semiconductor manufacturing in the United States.<sup>18</sup>

## B. THE ALARM OF 1985

In 1985-86, growing Japanese strength in making commodity memory chips became outright dominance. Japan captured 85% of the world market for memory chips.<sup>19</sup> The semiconductor industry reported losses of nearly \$2 billion and 25,000 jobs in the two-year period.<sup>20</sup> Although U.S. manufacturers still held the lead in specialized chips like microprocessors, analysts found them to be losing ground to Japanese rivals in all areas and agreed that Japanese firms might soon capture higher-value segments of the industry.<sup>21</sup> They noted further that Japan, by displacing U.S. manufacturers of consumer electronics, had become the world's largest market for semiconductors—and that the United States only held nine percent of that vast market.<sup>22</sup>

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14. *Consortia*, *supra* note 7, at 100 (testimony of William J. Spencer, President and CEO, SEMATECH).

15. *Id.* at 115 (testimony of T.J. Rodgers, President and CEO, Cypress Semiconductor Corp.); Jonathan Weber, *U.S. Computer Chip Venture Faces Setback*, L.A. TIMES, Apr. 30, 1993, at A1 [hereinafter *Chip Setback*].

16. COWHEY & ARONSON, *supra* note 9, at 130.

17. The Arrangement differs in that respect from the SEMATECH Consortium, whose chief goal is to preserve U.S. self-sufficiency in chip making. *Consortia*, *supra* note 7, at 99.

18. *Id.*

19. GILDER, *supra* note 5, at 146.

20. CLYDE V. PRESTOWITZ, JR., *TRADING PLACES: HOW WE LET JAPAN TAKE THE LEAD* 55 (1988).

21. BORRUS, *supra* note 5, at 19-25.

22. *Id.* at 20. The nine percent market share figure was based on statistics compiled by the Semiconductor Industry Association ("SIA"); other analysts have disputed the validity of the figure. *See infra* note 61.

Leaders of the semiconductor industry, who had been petitioning Congress since 1981 over alleged Japanese dumping of memory chips, now warned that the loss of the crucial memory segment foreshadowed the loss of all semiconductor manufacturing in the United States.<sup>23</sup> Japanese targeting was about to torpedo America's high-tech future just as it had domestic television manufacturing.<sup>24</sup> These gloomy predictions rested on the notion that Japan's large, protected domestic market provided a ready outlet for enormous plants that could maximize efficiencies of scale and undercut U.S. products in every sector.<sup>25</sup>

By 1985, the Semiconductor Industry Association (SIA) had also assembled data to show that Japanese firms gained their market share through unfair trading practices. The SIA showed also that those practices, if unchanged, would preclude U.S. industry efforts to recoup its position.<sup>26</sup> A frequently duplicated chart produced by SIA showed the U.S. share of the Japanese chip market locked at about ten percent over the previous twenty-year period. The U.S. market share remained unmoved through changing market conditions, fluctuations in the yen-dollar exchange rate, the removal of Japanese tariffs, and the liberalization of Japanese procurement. The chart implied that Japan's Ministry of International Trade and Industry (MITI) had imposed a sub-rosa quota on U.S. semiconductor imports.<sup>27</sup>

As for the loss of the memory market, the United States had admittedly lagged behind Japan in developing crucial technologies for 64K and 256K chips. But as U.S. products came on line, Japanese chip makers seemed determined to hold the memory market by relentlessly dropping prices until they had fallen through the floor. It was beyond dispute that Japanese

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23. The efforts of Jerry Sanders, founder of Advanced Micro Devices (AMD), and Andrew Grove of Intel to gain support within the semiconductor industry and their lobbying efforts in Washington are documented in WARSHOFSKY, *supra* note 8, at 1-12, and (less sympathetically) in GILDER, *supra* note 5, at 142-49. The industry brought no formal antidumping action until 1985. BORRUS, *supra* note 5, at 183.

24. WARSHOFSKY, *supra* note 8, at 114-24.

25. BORRUS, *supra* note 5, at 30-31.

26. See, e.g., JAPANESE PROTECTION AND PROMOTION OF THE SEMICONDUCTOR INDUSTRY (Allan M. Wolff et al. eds. 1985).

27. PRESTOWITZ, *supra* note 20, at 63. The 10% figure echoes an earlier MITI pronouncement. TI, the first U.S. semiconductor maker to invest in Japanese facilities, first sought entry to Japan in 1961. In 1964, MITI finally granted TI's request on the condition that it accept a Japanese equity partner (Sony) and agree to license fundamental semiconductor patents to Japanese companies; MITI further warned that TI's market share would never exceed 10%. Statement of SIA member Michael Maibach in *Prospects for a New U.S.-Japan Semiconductor Agreement: Hearing Before the Subcomm. on Int'l Economic Policy and Trade, House Comm. on Foreign Affairs*, 102d Cong., 1st Sess. 3 (1991) [hereinafter *House Renewal Hearing*] (testimony of Michael Maibach, SIA member).

fabricators were dumping chips—and at margins as high as 180%.<sup>28</sup> This dumping was not of the type where manufacturers discriminate between domestic and foreign price structures. Rather, chips spewed forth into markets in Japan, Asia, and the United States at prices below manufacturing cost. Entrepreneurs could profitably buy chips at consumer marts in Tokyo and stuff them into suitcases to import to the United States.<sup>29</sup>

The Japanese chip makers could withstand continuing losses because all were units of *keiretsu*<sup>30</sup> trading groups with deep pockets. They shared a determination to use their excess capacity to gain prized semiconductor market share no matter what the cost. It has been estimated that the Japanese semiconductor industry lost over \$4 billion through memory chip dumping during the 1980s.<sup>31</sup>

### C. DEFENSE AND STRATEGIC CONCERNS

The Defense Science Board and the CIA joined the semiconductor industry in its state of alarm.<sup>32</sup> Modern weapons systems rely heavily on semiconductor-based electronics in all areas: communications, avionics, guidance systems for missiles and ballistics.<sup>33</sup> U.S. advantage in systems like the Stinger shoulder-fired anti-aircraft missile, the Tomahawk cruise missile, and the Patriot anti-missile system rested on U.S. leadership in their computer guidance systems.<sup>34</sup> These systems already used some Japanese-made chips, and defense analysts feared that erosion of U.S. semiconductor production, and the loss of U.S. sources for state-of-the-art chip-making equipment, would lead to a security-threatening dependence on Japan for defense electronics.<sup>35</sup>

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28. *House Renewal Hearing*, *supra* note 27, at 11.

29. WARSHOFSKY, *supra* note 8, at 8.

30. COWHEY & ARONSON, *supra* note 9, at 136-37. *Keiretsu* are large Japanese industrial groups like Sumitomo, Mitsubishi, and Mitsui, whose member companies are linked by cross-ownership of stock. Some are direct descendants of Japan's pre-war *zaibatsu* industrial conglomerates. Each *keiretsu* typically includes a trading company, which imports raw materials and components and exports finished products, and a bank, which pumps capital to member companies. They provide vertical integration, as in the case of Nikon's manufacturing of wafersteppers for its Mitsubishi sibling Mitsubishi Electric. *Id.* at 155.

31. GILDER, *supra* note 5, at 143.

32. PRESTOWITZ, *supra* note 20, at 56.

33. *See Report of Defense Science Board Task Force on Semiconductor Dependency*, Feb. 9, 1987.

34. *Id.*

35. *Id.*

#### D. LEGAL INITIATIVES LEADING UP TO THE 1986 AGREEMENT

The U.S. semiconductor industry began its coordinated efforts to shape trade policy with a dumping suit brought by memory chip maker Micron Devices against Japanese makers of 64K chips.<sup>36</sup> (It should be noted that by that time six of the eight major memory chip makers in the United States had already dropped out of the market, including Intel, which had invented the memory chip).<sup>37</sup> Micron also filed an antitrust suit, alleging that Japanese memory chip makers had conspired to monopolize the U.S. market.<sup>38</sup> The SIA followed with a Section 301 petition requesting the U.S. government to negotiate for increased access for U.S. semiconductor makers in Japan or, if it failed to obtain access, to retaliate with restrictions on Japanese semiconductors.<sup>39</sup>

After news that the U.S. trade deficit had reached \$150 billion, the Reagan administration took the unprecedented step of bringing an antidumping action of its own against Japanese makers of 256K DRAM chips. The Reagan administration felt the situation was too urgent to wait for private industry to file suit.<sup>40</sup> Pressure increased when the House of Representatives urged President Reagan by a vote of 408 to 5 to retaliate if negotiations failed. This vote was prompted by findings by the Commerce Department and the ITC that Japanese firms were massively dumping chips at margins as high as 180%.<sup>41</sup> These developments, and preliminary findings favorable to the SIA in its Section 301 action, pushed Japan to the bargaining table.<sup>42</sup>

Other government actions during the period leading up to the talks demonstrate the reigning trade climate. In 1986, pressure from the Reagan administration blocked Japan's Fujitsu from an intended purchase of Fairchild Semiconductor. Opponents argued that a Japanese purchase of a defense semiconductor contractor might compromise national security (this despite the fact that Fairchild was then controlled by Schlumberger Ltd.,

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36. BORRUS, *supra* note 5, at 186.

37. PRESTOWITZ, *supra* note 20, at 54.

38. BORRUS, *supra* note 5, at 186.

39. *Id.* The SIA was guided in its legal strategy by Alan William Wolff, Washington trade lawyer and former Deputy Trade Representative. *Id.* at 185. The SIA also filed an anti-dumping suit on EPROMS (Electronically Programmable Read Only Memory chips), a commodity computer chip of a more sophisticated type than DRAM memory chips. PRESTOWITZ, *supra* note 20, at 61.

40. PRESTOWITZ, *supra* note 20, at 56-57.

41. H.R. 4800, 99th Cong., 2d Sess. (1986).

42. BORRUS, *supra* note 5, at 186.

a French firm).<sup>43</sup> The underlying policy of this action crystallized into the Exon-Florio Amendment to the Omnibus Trade Act of 1988, which authorizes the President to suspend or prohibit any foreign merger or acquisition found to jeopardize national security.<sup>44</sup>

Then, in 1987 Congress established the Semiconductor Manufacturing Technology Initiative—the “SEMATECH” consortium—thus stepping gingerly toward the kind of government-sponsored industrial policy many credited for Japan’s semiconductor “victory.”<sup>45</sup> SEMATECH receives half of its funds from the defense department and half from fourteen participating semiconductor firms (including IBM and Intel).<sup>46</sup> Antitrust laws, which would normally preclude such industry colloquy, had been relaxed by the National Cooperative Research Act of 1984.<sup>47</sup> SEMATECH strives to promote the U.S. semiconductor equipment industry, setting uniform qualifications for purchases by all fourteen members and maintaining a cutting-edge, U.S.-tooled pilot fabrication line in Austin, Texas.<sup>48</sup>

### III. HOW DID JAPANESE PRODUCERS GAIN THE LEAD IN SEMICONDUCTORS?

#### A. THE UNFAIR TRADE PRACTICES ARGUMENT

##### 1. Targeting

The SIA compiled convincing evidence (using government documents and Japanese newspaper accounts) that the Japanese government “targeted” the advancement of semiconductor technology through several MITI-guided consortia.<sup>49</sup> Aiming partic-

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43. COWHEY & ARONSON, *supra* note 9, at 77. Fairchild Semiconductor, as Fairchild Camera and Instrument Company, pioneered semiconductors in the 1960’s, sharing the Wall Street spotlight with firms like Xerox, IBM and Polaroid, but it lost ground in later years as groups of key engineers left to form other firms like Intel. See generally GILDER, *supra* note 5. By 1986, Fujitsu probably possessed more advanced technology than Fairchild and chiefly sought Fairchild’s distribution channels, offering \$220 million in cash and investment guarantees. WARSHOFSKY, *supra* note 8, at 302-3, 310. After the “Fairjitsu” deal failed, National Semiconductor bought Fairchild for \$122 million in stock and warrants, tendering no cash. *Id.*

44. Omnibus Trade and Competitiveness Act of 1988, 102 Stat. 1107 (1988), tit. V. pt. II. § 5021(a),(c).

45. *Consortia*, *supra* note 7, at 101 (statement of William J. Spencer, President and CEO of SEMATECH).

46. *Id.*

47. 15 U.S.C.A. § 4301 (West 1993).

48. *Consortia*, *supra* note 7, at 103. SEMATECH was consciously modeled on Japanese consortia, like the MITI-sponsored group which made a successful leap to VLSI technology in the 1970s. *Id.* In 1993 SEMATECH demonstrated a capability to make chips with channels measuring .35 microns (the smallest anywhere) with a purely domestic production line. *Chip Setback*, *infra* note 104.

49. See generally WOLFF, *supra* note 26.

ularly at equipment and process technology for VLSI-level integration, favorable-rate loans were issued for development of key technologies.<sup>50</sup> MITI labs joined with manufacturers to coordinate research, formulate standards, and “rationalize” the industry by limiting competition in specific sectors. All of this occurred within a relaxed antitrust environment.<sup>51</sup> Japanese firms ultimately dominated the DRAM market through superior VLSI technology, with Toshiba introducing the first 64K DRAMs. Targeting thus became a basis of the Section 301 action that led to the 1986 Arrangement.<sup>52</sup>

The illegality or unfairness of export targeting in general has been a matter of debate. GATT contains no provision concerning industrial targeting, although the GATT Subsidy Code allows countervailing duties as a remedy to more direct export subsidies.<sup>53</sup> In its 301 action the SIA argued that Japanese targeting tended to “nullify or impair” benefits accruing from GATT obligations.<sup>54</sup>

The United States is vulnerable to a countercharge that its defense procurement of semiconductors subsidized commercial spinoffs and acted as a form of targeting, since weapons purchasers picked winners among emerging technologies.<sup>55</sup> Defense spending has generally been the only politically palatable form of government-led industrial development in the United States,<sup>56</sup> and it played an important role in early U.S. semiconductor development. But the trade benefits of weapons research and development were incidental and short-lived. By the 1980s defense procurement had lost much of its effectiveness as a technology

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50. *Id.* at 25-30.

51. The 1978 “*kijō hō*” relaxed Japanese antitrust laws to permit “concerted acts” by producers in key industries targeted for growth. Law No. 84 of 1978, *Law for Provisional Measures for the Promotion of Specific Machinery and Information Industries* (“*Kijō hō*”), reprinted in WOLFF, *supra* note 26, at 16. The MITI commentary on the “*kijō hō*” asserts that any antitrust illegality arising in joint actions by Japanese companies to fulfill the provisions of the “*kijō hō*”—including “rationalization” of production (allocation of market segments) and standardization—is “discarded”; rather, a broader standard of “unfair trading methods” would apply. WOLFF, *supra* note 27, at 16-18.

52. PRESTOWITZ, *supra* note 20, at 56 (citing *Petition of the Semiconductor Industry Association Pursuant to Section 301 of the Trade Act of 1974, as Amended, for Relief From the Effects of Industrial Targeting Practices of the Government of Japan* (San Jose, Calif., Semiconductor Industry Association, June 1985)).

53. Lynn G. Kamarck, *An Examination of Foreign Industrial Targeting Practices and Their Relationship to International Agreements and Trade Laws*, in INTERNATIONAL TRADE POLICY: THE LAWYER'S PERSPECTIVE 15-17 (J. Jackson et al. eds. 1985).

54. PRESTOWITZ, *supra* note 20, at 55-56.

55. BORRUS, *supra* note 5, at 63-65.

56. *Id.* at 251.

driver, because commercial uses of semiconductors surpassed military uses in both volume and in general specifications.<sup>57</sup>

The United States has eschewed nonmilitary industrial policy, guided by a belief that a competitive market, refereed by strict antitrust rules but free from direct government guidance, produces the greatest efficiency.<sup>58</sup> If this view is correct, then targeting should eventually be self-defeating. If the view is incorrect, on the other hand, and targeting can make an economy invincible, it would be more appropriate to embrace targeting than to outlaw it.

## 2. Protection

Until the 1970s, Japan's domestic semiconductor market was substantially closed by tariffs, quotas, and other barriers. Foreign investment, when permitted, was predicated on transfers of technology to Japanese firms.<sup>59</sup> Once Japan approached technological parity with the United States, however, it gradually removed controls, eliminating duties entirely in 1985.<sup>60</sup> In the absence of direct trade barriers, the SIA's prime evidence of Japanese protectionism was empirical: the famous chart showing U.S. market share in Japan locked at ten percent while it reached fifty percent worldwide.<sup>61</sup> Non-tariff barriers alleged to have produced this disparity included *keiretsu* purchasing practices and MITI administrative guidance.

### a. *Keiretsu* Purchasing Practices

Each of Japan's top six semiconductor manufacturers is a member of a *keiretsu*, one of the giant corporate families of Japan. *Keiretsu* are interrelated companies typically grouped around a common bank and a common trading company.<sup>62</sup> Users of semiconductors and makers of semiconductor equip-

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57. *Id.*

58. PRESTOWITZ, *supra* note 20, at 230-33.

59. BORRUS, *supra* note 5, at 100.

60. *Id.* at 15-26. The Japanese government cushioned manufacturers from the effects of trade liberalization with 150 billion yen in subsidies and stepped-up export development initiatives. *Id.*

61. PRESTOWITZ, *supra* note 20, at 62-63. Critics of the SIA view have noted that their statistics count all Japanese output—even chips produced for intra-company use—while excluding the significant output of integrated American producers like IBM. However, since most U.S. semiconductor makers are relatively small independents, while Japanese makers are large, integrated firms attached to even larger *keiretsu*, a fair definition of the merchant market is difficult to reach and counting methods have become a source of contention in implementing the Arrangement's target. COWHEY & ARONSON, *supra* note 9, at 144.

62. BORRUS, *supra* note 5, at 106.

ment are likewise *keiretsu* members.<sup>63</sup> Linked by corporate ties, long-term supply arrangements, and an ongoing chain of reciprocal business favors, members feel compelled to buy from a *keiretsu* sibling even when an outside product offers a more economically justifiable choice.<sup>64</sup> Thus, the argument goes, the business culture of Japan can thwart sales of U.S. semiconductors even if they are freely imported and packed with comparative advantage.

#### b. MITI Administrative Guidance

Japan's powerful Ministry of International Trade and Industry (MITI) is a daily force in the life of a Japanese corporation.<sup>65</sup> It is run by an elite corps of top graduates from prestigious universities (ninety percent from Tokyo University) who have the power to make ordinances (akin to U.S. administrative regulations), to propose legislation to the Japanese Diet, and to further government policy through theoretically non-binding administrative guidance.<sup>66</sup>

The continuing need to petition MITI for import and export licenses and for approval of financing for projects makes good relations with MITI essential. In fact, MITI administrative guidance is binding for all practical purposes.<sup>67</sup> For example, until recently the application for a license to import a computer required the importer to explain why a Japanese-made computer would not be satisfactory. Although Japan has no restrictions on computer imports, the *in terrorem* effect of requiring an explanation discouraged many would-be importers.<sup>68</sup> As late as the 1980s, MITI issued standing instructions to semiconductor users that "[i]f a Japanese model is an equivalent with a foreign model, the Japanese model should be selected."<sup>69</sup> Historically, MITI officials have guarded their power and refused to relinquish procedural controls on imports even when political leaders publicly committed Japan to greater openness.<sup>70</sup>

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63. COWHEY & ARONSON, *supra* note 9, at 136.

64. PRESTOWITZ, *supra* note 20, at 161.

65. "A hypothetical U.S. version of MITI would include the departments of Commerce and Energy, the Office of the U.S. Trade Representative, the Export-Import Bank, the Small Business Administration, the National Science Foundation, the Overseas Private Investment Corporation, the Environmental Protection Agency, and parts of the departments of Defense and Justice." PRESTOWITZ, *supra* note 20, at 115.

66. PRESTOWITZ, *supra* note 20, at 112-17.

67. *Id.*

68. WARSHOFSKY, *supra* note 8.

69. *Id.* at 180. Note the absence of an economic component in the choice dictated.

70. PRESTOWITZ, *supra* note 20, at 121.



### 3. *Impediments to Investment*

U.S. firms were long blocked from direct investment in semiconductor manufacturing in Japan unless they accepted Japanese equity partners and licensed patents to other Japanese producers. IBM was able to establish its wholly-owned subsidiary in Japan only through massive transfers of technology.<sup>71</sup> Most U.S. firms simply stayed out, accepting patent royalties from Japanese licensees instead of sales. One economist estimates that these practices in strategic industries (not just semiconductors) gained Japan several hundred billion dollars worth of U.S. technology at a cost of \$9 billion.<sup>72</sup> Even though the Japanese semiconductor industry was declared open in 1975, it has been virtually impossible for an American firm to purchase a Japanese firm, with Japan investing overseas at twenty times the rate of inbound investment.<sup>73</sup>

By contrast, while the EC protects its semiconductor market,<sup>74</sup> it has offset protectionist measures like local content rules by welcoming foreign direct investment. U.S. chip makers have bought directly into the European market without the onerous requirements to share equity and share technology that stifled investment in Japan. As a result, the U.S. semiconductor industry has maintained a leading fifty percent share of the European market.<sup>75</sup>

## B. COUNTERVAILING MARKET EXPLANATIONS FOR TRENDS IN THE SEMICONDUCTOR TRADE

While the SIA supports the view that the U.S. semiconductor industry slumped in the mid-1980s due to targeting and dumping, then recovered due to the ameliorating effects of the Arrangement, strong evidence also suggest that management responses to market conditions produced the industry bust and boom.<sup>76</sup>

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71. *Id.*

72. BORRUS, *supra* note 5, at 249.

73. *Japan: Japan's MITI, Private Firms to Create New Company To Aid Foreign Investors*, 10 Int'l. Trade Rep. (BNA) 423 (1993) [hereinafter *Aid Foreign Investors*].

74. Some have alleged the EC protects to a greater degree than the Japanese. *Consortia*, *supra* note 7, at 119 (testimony of T.J. Rodgers). This is certainly true in terms of tariffs, where the EC imposes a 14% tariff on semiconductor imports, while the U.S. and Japan have no tariffs on semiconductors at all. *Leaders of Uruguay Round Talks Meet But Make no Progress, U.S. Official Says*, 10 Int'l Trade Rep. (BNA) 1797 (1993). In October, 1993, EC representatives offered to reduce the tariff on semiconductor imports to nine percent. *Id.*

75. BORRUS, *supra* note 5, at 195-97; COWHEY & ARONSON, *supra* note 9, at 157.

76. *See generally* GILDER, *supra* note 5, at 139-49.

First, the U.S. industry suffered a competitive disadvantage in the early 1980s because of an early failure to pursue CMOS,<sup>77</sup> a chip design technology. U.S. chip makers were surprised when CMOS turned out to be not a limited-use design, but the key technology to VLSI chips like 64K DRAMs.<sup>78</sup> The Japanese had aggressively pursued CMOS. Their research, though conducted through the VLSI consortium, was not dictated by a prescient MITI but by the demands of Japan's domestic consumer electronics industry, which made battery-powered devices that could *only* use CMOS chips.<sup>79</sup> At a critical stage, U.S. chip makers found themselves years behind Japan in this key area. The resurgence of the U.S. semiconductor industry parallels its achievement of parity with Japan in CMOS and related technologies.<sup>80</sup>

The other market factor in U.S. resurgence has been the industry's abandonment of low-profit memory chips and concentration on high value, specialized logic chips like microprocessors and DSPs. Even Japan had to ship much manufacturing of commodity memory chips to overseas plants or cede the market to lower cost producers in Korea. The making of commodity memory chips has followed the path of other high-skills, labor intensive industries, like electronic assembly, to newly industrialized Asian nations.<sup>81</sup> As Japan has focused on process technology, the U.S. semiconductor industry has achieved unquestioned dominance of the most profitable segment of the market—namely, design.<sup>82</sup>

The notion that the United States needed a robust domestic DRAM manufacturing base to maintain higher value segments of the industry was a fallacy—one the industry itself recognized when it failed to endorse the U.S. Memories Consortium in

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77. "Complementary Metal Oxide on Silicon," pronounced "sea-moss." The technical aspects of CMOS are beyond the scope of this paper. It is valuable to understand, however, that because it first seemed a power-saving but slow-running design, U.S. makers dismissed it as important only to battery-powered devices. Therefore U.S. semiconductor firms were satisfied to license chip designs to Japanese firms like Toshiba, who produced CMOS versions of U.S. logic designs for use in battery-powered devices like calculators and laptop computers. *Id.*

78. *Id.* at 147.

79. *Id.* Borrus considers the U.S. loss of its domestic consumer electronics industry, both as a market and as a learning tool, to be a key factor in the semiconductor industry difficulties of the 1980s. BORRUS, *supra* note 5, at 103-11.

80. "The agonies of the 1980s, ascribed to Japanese dumping, government subsidies, and unfair trade, in fact were attributable mostly to Japanese prowess in the mass production of CMOS gained from their success in consumer products." GILDER, *supra* note 5, at 148.

81. WARSHOFSKY, *supra* note 8.

82. *Consortia*, *supra* note 7, at 47-51 (statement of T.J. Rodgers).

1990.<sup>83</sup> Rather, a trend toward division of labor has enabled the United States to maintain dominance of chip design, the phase which produces the greatest value.<sup>84</sup> Fabrication takes place in a core of U.S. plants, in overseas subsidiaries, and through co-ventures with Japanese and Korean firms. Some successful firms, like Cyrix, do no fabrication but contract their work to domestic and overseas "foundries."<sup>85</sup> Microprocessor makers, like Intel, have enjoyed ballooning profits by introducing higher performance designs that are "downwardly compatible" with vast bodies of software already in use, capitalizing on the enduring U.S. lead in software. Finished computers, like IBM clones, are increasingly made in the U.S. with high-value chips from U.S. firms.<sup>86</sup>

The semiconductor equipment industry (makers of chip-fabricating tools) appears to have suffered its losses due to simple failure to compete. U.S. chip makers complained in the mid-1980s that domestic suppliers of chip-making tools refused to customize their machinery to meet user needs, while Japanese suppliers were eager to do so.<sup>87</sup> Even worse, domestic equipment suppliers complacently accepted mean-time-between-failure rates of 150 hours in their machinery while Japanese suppliers pushed beyond 1000 hours.<sup>88</sup> With yield the key to profitability, the choice of Japanese equipment was economically dictated. Even today, GCA has produced a high-quality state-of-the-art wafer stepper with the help of SEMATECH, but has not yet found customers, in part because of a reputation for producing "junk" in the 1980s.<sup>89</sup>

### C. RECONCILING THE ROLES OF THE MARKETPLACE AND PROTECTIONISM

The current state of the U.S. semiconductor industry supports the market view of the last decade. Intel's record earnings of \$2.3 billion in 1993 (up from \$1.07 billion in 1992) make its \$200 million loss in 1987 look like a cyclical downturn.<sup>90</sup> The argument is strengthened by the fact that Intel recovered without returning to memory chip making. The Japanese makers' losses

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83. Andrew Pollack, *Computer Makers Halt a Challenge to Japanese Chips*, N.Y. TIMES, Jan. 13, 1990, at A1.

84. COWHEY & ARONSON, *supra* note 9, at 131.

85. Bill Powell & John Schwartz, *Goodbye Mr. Chips*, NEWSWEEK, Aug. 3, 1992, at 60; see also *Consortia*, *supra* note 7, at 81 (statement of Jerry Rogers, President and CEO of Cyrix Corporation).

86. GILDER, *supra* note 5, at 326.

87. WARSHOFSKY, *supra* note 9, at 141.

88. *Id.*

89. *Chip Setback*, *infra* note 104.

90. Lawrence M. Fisher, *Intel's Earnings Jump 38% Amid Demand for its Chips*, N.Y. TIMES, Jan. 19, 1994, at D5.

of \$4 billion in their ultimately futile bid to capture the commodity memory chip market hardly suggest omnipotent trade policy.

But the pure market view advocates miss an important point: if U.S. firms had complete access to the Japanese market in the late 1970s, particularly through direct investment, they too could have responded to the consumer electronic industry's demand for CMOS technology and could have followed the same development path as their Japanese rivals. The purchases now compelled by the twenty percent target have succeeded in bringing U.S. chip makers into closer consultation with Japanese customers and spurred long-term corporate alliances.<sup>91</sup> Without some form of trade intervention, the invisible hands of MITI and *keiretsu* preferences would likely keep the United States out of the world's most important semiconductor market and perhaps out of touch when the next technological breakthrough arises.

The slump and recovery of the U.S. semiconductor industry in the last ten years thus resulted from a combination of market forces and trade manipulation. U.S. semiconductor makers have not been unreasonable in praying for trade relief. However, the importance of the original subject of the antidumping provision of the semiconductor Arrangement—commodity memory chips—was exaggerated. In addition, the U.S. semiconductor industry appears to have recovered even before Japan raised its imports to twenty percent. The U.S. industry is now thriving based on its expertise in designing and marketing high value chips.<sup>92</sup>

#### IV. THE 1986 ARRANGEMENT

##### A. TERMS OF THE ARRANGEMENT

The semiconductor Arrangement was signed on September 2, 1986, by United States Trade Representative and chief negotiator Clayton Yuetter, and Ambassador Nobuo Matsunaga.<sup>93</sup> It contains three provisions.

Article I, "Market Access," declares that both countries anticipate improved opportunities for foreign semiconductor sales in Japan.<sup>94</sup> Further, Japan promises to establish an organization

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91. COWHEY & ARONSON, *supra* note 9, at 142-43.

92. *Id.* at 131.

93. Arrangement Concerning Trade in Semiconductor Products, U.S.-Japan, Sept. 2, 1986, *reprinted in* 25 I.L.M. 1409.

94. *Id.* art. I § 1. Clyde R. Prestowitz, Jr., a member of Yuetter's negotiating team, reports the terms of Article I as commitments to U.S. semiconductor firms, not foreign firms. PRESTOWITZ, *supra* note 20, at 65. This slip reinforces suspicions that the parties intended the Arrangement's benefits for the U.S., and that use of the term "foreign" and the assurances of GATT legality in Article III represent a pro forma attempt to follow GATT MFN requirements. The vague terms of Article I

to assist foreign semiconductor producers and to encourage long-term relationships between Japanese semiconductor purchasers and foreign suppliers.<sup>95</sup>

Article II, "Prevention of Dumping," suspends pending U.S. antidumping actions.<sup>96</sup> It calls on MITI to monitor prices of Japanese chips exported to the United States to ensure that prices reflect "fair value" based on company-specific, product-specific costs.<sup>97</sup> Japan also promises that MITI will monitor costs and export prices on exports to third countries "as appropriate."<sup>98</sup> The 1986 Arrangement makes no accommodation for forward pricing.

Article III, "General Provisions," provides for implementation of the agreement and further consultations. In what might be termed a GATT savings clause, Article III also declares that the Arrangement is not intended to "undermine the interest of third countries" and not intended to affect the parties' rights and obligations under the GATT.<sup>99</sup> It also lists types of devices covered by the Arrangement and provides for new products to be added in later consultations.<sup>100</sup>

In answer to concerns voiced by Ambassador Matsunaga, then Attorney General Arnold I. Burns sent a letter expressing his opinion that Article II § 7 of the Arrangement, which calls for MITI to restrain exports of underpriced chips, would not violate U.S. antitrust laws.<sup>101</sup>

## B. THE SECRET SIDE LETTER

During negotiations, the United States insisted that Japan double the existing foreign market share to meet a target of twenty percent (nearly all of this foreign market share was to be

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have only gained meaning by the putative contents of the secret side letter said to set 20% as a "benchmark" for appropriate U.S. market penetration, and by the 1991 renewal. See *supra* notes 58-61 and accompanying text.

95. Arrangement Concerning Trade in Semiconductor Products, art. I, § 3(1)a-b.

96. *Id.* art. II, § 1.

97. *Id.* art. II, § 2. Items for cost calculation, which include a quantum for profit, are contained in an annex. In establishing company-specific prices, the Arrangement rejects an earlier MITI offer of industry-wide price floors. PRESTOWITZ, *supra* note 20, at 60.

98. Arrangement Concerning Trade in Semiconductor Products, *supra* note 93, art. II, § 3.

99. *Id.* art. III, §§ 7-8.

100. *Id.* at annex. The term of the original Arrangement was five years. *Id.* art. III, § 13. It was amended and renewed for five years in 1991. See *infra* note 124 and accompanying text.

101. Letter from Acting Attorney Gen. Arnold I. Burns to Ambassador Nobuo Matsunaga (Sept. 2, 1986), 25 I.L.M. at 1428 (1986).

U.S. chips).<sup>102</sup> While this figure does not appear in any document, it is said to have been acknowledged in a confidential side letter. In any event, contemporary news accounts reported it and renewal hearings in 1991 were predicated on the notion that the Arrangement included a twenty percent target.<sup>103</sup> The twenty percent share is usually called a "target" or "goal" in remarks to the U.S. press.<sup>104</sup> In contrast, it is referred to as a "benchmark" or "measure of success" in discussions between proponents of the arrangement and opponents of managed trade.<sup>105</sup>

### C. DOMESTIC OPPOSITION TO THE ARRANGEMENT

Domestic users of semiconductors, including computer makers like Compaq, objected vociferously to the agreement. They expected it to increase their costs and prices and thus diminish their sales.<sup>106</sup> It would also put domestic chip users at a competitive disadvantage internationally if prices rose domestically but Japan still leaked underpriced chips to third country users or integrated users in Japan.<sup>107</sup> These protests did not block the Arrangement. Moreover, although the Arrangement did result in shortages and dramatic price increases in computer memory chips,<sup>108</sup> by 1991 computer system makers had adjusted to the new, stable pricing structure. In the end, a prominent industry spokesperson testified before Congress in favor of the Arrangement's renewal.<sup>109</sup>

Other opponents warned that managing trade through numerical targets subverted the free market system.<sup>110</sup> A final argument focused on combatting unfair trade policy by pursuing antitrust actions against colluding Japanese firms, rather than collaborating with MITI in creating a cartel.<sup>111</sup>

### D. EARLY ENFORCEMENT

When chip dumping through third countries continued into 1987, President Reagan imposed duties of up to 300% on a select

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102. PRESTOWITZ, *supra* note 20, at 65.

103. *House Renewal Hearing*, *supra* note 27, at 29 (testimony of Joseph Tasker, Jr., Director, Federal Regulatory Affairs, Compaq Computer Corporation).

104. *See, e.g., No Growth in Foreign Share of Japan's Chip Market*, *USTR Says*, 10 Int'l Trade Rep. (BNA) 4 (1993) [hereinafter *Chip Setback*].

105. *See, e.g., House Renewal Hearing*, *supra* note 27, at 30 (testimony of Joseph Tasker, Jr., Compaq Computer Corporation).

106. *Id.*

107. *Id.*

108. COWHEY & ARONSON, *supra* note 9, at 141.

109. *House Renewal Hearings*, *supra* note 27, at 29-32 (statement of Joseph Tasker, Jr., Compaq Computer Corporation).

110. PRESTOWITZ, *supra* note 20, at 64.

111. *Id.* at 66.

package of Japanese imports, including televisions and power tools.<sup>112</sup> These measures were discontinued by President Reagan on November 4, 1987, after third country dumping had "ceased."<sup>113</sup>

#### E. GATT-BASED OBJECTIONS TO THE ARRANGEMENT BY THE EC

Objecting to both major provisions of the Arrangement as infringing on GATT obligations, the European Community (EC) initiated formal consultations and later obtained a GATT dispute resolution panel that considered three objections to the Arrangement.<sup>114</sup> First, the EC argued that the arrangement allocated a specific market share to the U.S., violating MFN treatment.<sup>115</sup> Second, the EC argued that the Arrangement's extension of price floors to exports to third countries violated the limited scope of GATT Article VI. Article VI does not prohibit dumping, but simply creates a remedy for an importing country claiming material damage due to dumping.<sup>116</sup> Finally, the EC argued that the Arrangement's export "monitoring" system, the exercise of administrative guidance by MITI to stop exports at below-floor prices, constituted quantitative controls in violation of Article XI.<sup>117</sup>

The panel rejected the EC's first two arguments. The rejections stemmed from the fact that at the time the United States and Japan denied the existence of the undocumented twenty percent target, and from the fact that the Arrangement neutrally referred to "foreign" producers. The EC had not produced adequate evidence of an MFN violation.<sup>118</sup> The panel also dis-

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112. *Id.* at 66-67.

113. *Report of the Panel Adopted on 4 May 1988: Japan-Trade in Semiconductors*, GATT Doc. L/6309 (May 4, 1988) 35 GATT Basic Instruments and Selected Documents Supp. 116 at 133 (1989) [hereinafter *Semiconductors*].

114. Panel proceedings described in Amelia Porges, *GATT Dispute Settlement Panel Report, Mar. 24, 1988. Japan—Trade in Semiconductors*, 83 A.J.I.L. 388 (1988).

115. *Semiconductors*, *supra* note 113, at 116, 138, 151.

116. GATT, *supra* note 2, at art. VI(6)(b)-(c) allows an importing country to apply antidumping duties against one exporter to relieve harm to another exporter (e.g., EC members could levy duties on imports of dumped Japanese chips to prevent harm to U.S. chip exporters in the EC market), but Article 12 of the Antidumping Code clearly gives the importing country the power to decide whether to proceed with an antidumping action. GATT Antidumping Code, art. 12 § 4. The EC argued that the Arrangement invaded "the sovereign choice of the importing country" as to whether dumping has harmed its industries or not. *Semiconductors*, *supra* note 113, at 128.

117. *Semiconductors*, *supra* note 113, at 131.

118. *Id.* at 160-61.

missed the GATT Article VI sovereignty objection, finding Article VI to be "silent on actions by exporting countries."<sup>119</sup>

The panel did, however, agree with the EC's third objection, making two important findings. First, it found that banning exports below a set price *is* a quantitative restriction.<sup>120</sup> Second, it found that MITI administrative guidance constitutes a "government measure" under GATT Article XI.<sup>121</sup>

In response to these findings, the United States and Japan worked to bring the Arrangement into conformity with GATT. Japan had already separated its semiconductor export licensing procedures from price monitoring in November 1987.<sup>122</sup> Eventually, MITI restrained dumping by applying administrative guidance not to exports but to production and the growth of excess capacity.<sup>123</sup>

## F. RENEWAL OF THE ARRANGEMENT

The United States and Japan renewed the Arrangement in 1991 for a term of five years.<sup>124</sup> The twenty percent market share, characterized as an "expectation," explicitly appears in the revised text.<sup>125</sup> The parties also agree to qualitative as well as quantitative goals for market participation, emphasizing "design-ins and other long-term relationships."<sup>126</sup> The revised Arrange-

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119. *Id.* at 159.

120. *Id.* at 153.

121. *Id.* at 154-55. Japan had argued that MITI administrative guidance was merely hortatory; however, the panel looked to another recent panel report in which Japan had made the contrary argument that administrative guidance did constitute government measures under GATT Article XI; *see also id.* at 154 (citing Restrictions on Imports of Certain Agricultural Products (No. L/6253), panel report (Nov. 19, 1989)). The Panel concluded that the difference between MITI administrative guidance and mandatory measures was "one of form and not of substance." *Id.* at 155.

Panel decisions do not technically have precedential weight, but if accepted the panel finding could have far-reaching implications. U.S. VRAs (Voluntary Restraint Agreements covering, for example, automobiles) with Japan have relied on MITI to restrain exports on the theory that MITI administrative guidance is hortatory and producers simply choose not to export beyond VRA-set limits. Under the semiconductor panel's interpretation, such VRAs would clearly be quantitative restraints in violation of the GATT Article XI.

122. Porges, *supra* note 114, at 393-94.

123. PRESTOWITZ, *supra* note 20, at 68-69.

124. *Agreement Between the United States and Japan Concerning Trade in Semiconductor Products, with Arrangement*, June 11, 1991, KAV No. 3059, available in WESTLAW, 1991 WL 495165, Treaty Database.

125. *Id.* art. II § 10. "The Government of Japan recognizes that the U.S. semiconductor industry expects that the foreign market share will grow to more than 20 percent of the Japanese market by the end of 1992 and considers that this can be realized. The Government of Japan welcomes the realization of this expectation. The two Governments agree that the above statements constitute neither a guarantee, a ceiling nor a floor on the foreign market share." *Id.*

126. *Id.* art. II § 7(a).



ment alters the monitoring process in a manner that conforms better to GATT and might assuage EC concerns: rather than controlling or monitoring exports, MITI now undertakes to simply maintain data on manufacturing costs.<sup>127</sup> Dumping actions employing the data would be initiated by the United States, or third countries under Article 12 of the GATT Antidumping Code.<sup>128</sup> The data would be supplied to the United States or third countries when dumping complaints arose to permit importers to impose duties based on dumping margins.<sup>129</sup>

Computer system manufacturers, as semiconductor customers, had spoken out against the original Arrangement. In spite of this, the Computer System Policy Project (CSPP), an industry group, agreed to join the SIA in supporting a new Arrangement if its needs could be addressed. A prime concern of CSPP was to permit forward-pricing on advanced semiconductors.<sup>130</sup> Since under the revised Arrangement the United States makes the choice to impose duties based on an evaluation of "normal value," it appears to have the flexibility to allow below-cost introductory pricing.<sup>131</sup>

#### G. AN ANALYSIS OF CURRENT GATT LEGALITY OF THE ARRANGEMENT

The amended Arrangement's use of import duties rather than export controls to restrain potential dumping brings it in general compliance with the GATT Antidumping Code and with Article XI as interpreted by the semiconductor panel. The Arrangement's blanket authorization of duties could, however, be construed to skip over the finding of "material injury" required before importing countries take antidumping measures under GATT Article VI(6)(a). Nevertheless, blanket authorization does seem to be a needed streamlining in a fast-moving industry. More troubling in light of GATT is the market share target, which evaded panel review due to concealment by Japan and the United States. The promise of a fixed market share to any country would on its face violate MFN. The renewal does not exactly promise a U.S. market share, but refers instead to a twenty percent foreign market share as a vaguely enforceable "expecta-

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127. *Id.* art. III § 2.

128. *Id.* arts. III-VI.

129. *Id.* art. III § 7.

130. *Renewal of the United States-Japan Semiconductor Agreement: Hearing Before the Subcomm. on Int'l Trade of the Senate Finance Comm.*, 102d Cong., 1st Sess. 11-12 (1991) [hereinafter *Senate Renewal Hearing*] (testimony of Joseph Cannon, President and CEO of Compaq Computer Corporation).

131. *Semiconductors*, *supra* note 113, at art. III.

tion.”<sup>132</sup> Since U.S. producers held virtually all foreign market share at the time of the original Arrangement, both U.S. and EC observers have assumed that the Arrangement intended “U.S.” for “foreign.”<sup>133</sup> Moreover, the revised Arrangement gives the EC no role in certifying its increased Japanese market share.<sup>134</sup>

No party has stepped forward to test the legality of the revised, more explicit Arrangement under the GATT dispute resolution process, leaving the legitimacy of the target provision as written open to speculation. As yet, the EC has not used the explicit twenty percent “expectation” in the amended Arrangement to renew its formal protest to import targeting, which was dismissed by the 1988 GATT semiconductor panel because the EC then had no evidence that a target existed.<sup>135</sup>

When first adopted, some suggested that the target should be viewed as an “affirmative action program” needed to compensate for injuries due to past discrimination.<sup>136</sup> However, an affirmative numerical import quota—even if non-discriminatory—would violate the spirit if not the letter of Article XI’s rejection of quantitative restraints.<sup>137</sup> In light of the current economic framework talks, in which the United States seeks to establish numerical import targets in several sectors of the Japanese market,<sup>138</sup> the uncertain legal status of import targets under the GATT is troubling.

## V. ALTERNATIVES

The Arrangement’s twenty percent target is of dubious legality under GATT. In addition, the Arrangement’s Article II provisions to curb dumping of Japanese commodity chips have lost much of their relevance, because the semiconductor industries of both Japan and the United States no longer depend on commodity chip sales. Therefore, one must ask whether alternative trade measures might more closely address the problems of

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132. See *supra* text accompanying note 80.

133. PRESTOWITZ, *supra* note 20, at 65-66; *A Target for Protection*, ECONOMIST, Mar. 27, 1993, at 65. Congressional remarks during the Arrangement’s renewal and the trans-Pacific relief when foreign producers reached the 20% mark in the final quarter of 1992 suggest that the United States viewed the commitment as binding. *Senate Renewal Hearing*, *supra* note 130, at 18-19 (statement of Senator John C. Danforth); Andrew Pollack, *Japan Gets New Demands on Chip Imports*, N.Y. TIMES, Mar. 24, 1993, at D1.

134. COWHEY & ARONSON, *supra* note 9, at 143.

135. *Semiconductors*, 35 GATT B.I.S.D. at 160-61.

136. See, e.g., PRESTOWITZ, *supra* note 20, at 51.

137. Rejection of quantitative controls was a prime motive of GATT and contemporary multilateral trade initiatives. Porges, *supra* note 114, at 390-92.

138. *U.S. Insurance Demands*, *supra* note 4.

the semiconductor industry, and at the same time avoid quantitative controls.

Another problem with the twenty percent target is that it may be too *low*. The head of the SIA recently stated that the current 19.2% U.S. share in Japan's semiconductor market proves that Japan has not opened its markets, in light of the fact that U.S. semiconductor products have overtaken those of Japan worldwide.<sup>139</sup> If that is so, the United States faces a choice of increasing the target—to, say, 30% or 40%—or addressing barriers to semiconductor imports to Japan that the Arrangement ignores.

Full reciprocity of direct investment opportunities between Japan and the United States would likely result in improved American market penetration in Japan; it could also create the kind of economic integration which the revised Arrangement attempts to reach by monitoring for "design-ins."<sup>140</sup> Ideally, a U.S. manufacturing firm should be able to buy control of a Japanese firm for its *keiretsu* ties just as a Japanese firm acquires distribution channels by purchasing a U.S. firm. But because the U.S. merchant chip makers are independent firms, while Japanese chip makers are units of electronics giants like NEC and Toshiba, U.S. chip makers would likely find few opportunities to buy existing Japanese enterprises.<sup>141</sup>

As discussed earlier,<sup>142</sup> U.S. semiconductor makers have found investment an important surrogate for export to the EC. This avenue is even more valuable in Japan, where non-tariff barriers have proven to be subtle and deeply rooted in government and corporate institutions. Direct investment could enable U.S. companies rich in design expertise to acquire process technology expertise and to place themselves close to customers in Japan's computer and consumer electronics industries.

The United States has one measure to increase investment within its control. Present U.S. efforts to increase trade flows into Japan by depressing the relative value of the dollar impede U.S. investment there, because the high yen simultaneously makes U.S. investment in Japan more expensive.<sup>143</sup> Allowing the

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139. *Foreign Share of Japan's Chip Market Falls for Second Straight Quarter*, 10 Int'l. Trade Rep. (BNA) 1588 (1993).

140. *U.S. and Japan Sign Semiconductor Pact Targeting 20 Percent Share, Design-Ins*, 8 Int'l Trade Rep. (BNA) 845 (1991).

141. In contrast, U.S. automobile manufacturers have succeeded in purchasing substantial shares of Japan's second-tier automobile makers; for example, GM has an interest in Isuzu, and Ford, in Mazda. COWHEY & ARONSON, *supra* note 9 at 91-124.

142. See *supra* part III(A)(3).

143. James Flanigan, *A Toast, and a Push, for Opening Japanese Markets*, L.A. TIMES, Apr. 18, 1993, at D1.

dollar to rise against the yen would make it cheaper to set up shop in Japan or to buy an existing enterprise there.

To some extent, international corporate alliances have already sprung up to marry the respective strengths of U.S. and Japanese semiconductor firms.<sup>144</sup> Some analysts argue that these alliances are better than direct investment because direct investment carries the extra burdens of information and transaction costs in managing a multinational company.<sup>145</sup> That may be so, but Japanese firms displayed eagerness to enter corporate alliances only as a result of U.S. trade pressure.<sup>146</sup> This eagerness could be transitory. In place of Section 301 pressure, a contingent of wholly-owned U.S. subsidiaries in Japan could serve as a consistent competitive stimulus for Japanese firms to join alliances, just as the presence of Japanese auto imports in the United States has compelled U.S. auto firms to enter corporate alliances to compete with Japanese auto makers.<sup>147</sup>

Solutions that rely on continuous jawboning to sell U.S. products in Japan do not alleviate the long-term problem of economic nationalism. The Arrangement, like the less formal initiative to make Japanese auto makers design U.S. parts into their cars,<sup>148</sup> merely perpetuates Japanese notions that purchases of U.S. goods are a kind of enforced charity, a strong nation's imposition on a weak, island nation. Open U.S. (and European) investment in all spheres, on the other hand, might ameliorate economic nationalism by bringing home the advantages of free trade to Japanese consumers and perhaps nurturing the anti-protectionist polity so far lacking in Japan. Further, the Arrangement has done little to resolve friction between the two nations in the semiconductor sector. Disagreement re-emerges each quarter as statistics show Japanese semiconductor imports hovering at just below the twenty percent level.<sup>149</sup> USTR Mickey Kantor, while describing the semiconductor Arrangement as a "clear success," indicated he would press for sanctions on Japan if figures for the fourth quarter of 1993 failed to bring the annual average above twenty percent.<sup>150</sup> Since figures were below

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144. Andrew Pollack, *Sony to Share Data at U.S. Plant*, N.Y. TIMES, Feb. 21, 1990, at C1.

145. COWHEY & ARONSON, *supra* note 9, at 9.

146. *Id.* at 142. The earlier tendency in U.S.-Japan trade was to make royalties on licensing of U.S. designs the only avenue to U.S. participation in Japan. *Id.* at 128.

147. *Id.* at 106.

148. Donald W. Nauss, *Japan Shaving the Trade Gap in Auto Parts*, L.A. TIMES, May 10, 1993, at C1.

149. Kantor Says U.S. to Press Japan on Improving Chip Market Access, BNA Int'l Trade Daily, Mar. 16, 1994.

150. *Chip Imports Fail to Rise*, *supra* note 3.

twenty percent for the first three quarters, Japanese chip users would have to greatly accelerate their fourth quarter purchases to meet the target.<sup>151</sup> Such a fourth quarter surge would suggest that Japanese chip buyers are making hasty inventory purchases to meet the target rather than buying chips for real needs.

The Arrangement's twenty percent target represents a pragmatic approach to stifled U.S. trade into Japan. Rather than challenging MITI's power to distort economic decisions as protectionist, or violating Japan's own professed antitrust principles, the negotiators of the Arrangement sought to harness MITI's power to promote U.S. trade interests. Given Japan's long history of successful top-down guidance of its industries,<sup>152</sup> using MITI may be more realistic than trying to curb its power. Unfortunately, this approach engages the U.S. government as a partner in managing trade and creates the danger that companies with the most political influence will benefit from supervised participation, not the most energetic or innovative. That will compound economic distortion and make trade with Japan more of a sop to entrenched, politically powerful firms than a stimulus to future U.S. competitiveness.<sup>153</sup>

Although lightening MITI's hand on the levers of commerce may be (from the U.S. standpoint) a Utopian solution, the same determination that forced Japanese negotiators to accept the detested twenty percent target could instead be applied to squarely addressing MITI as a protectionist arm of the Japanese government. Quasi-official protectionist measures by MITI must be vigilantly monitored by a permanent, multinational staff in Tokyo. They should scrutinize every form and every consultation that discourages a Japanese manager from purchasing foreign goods. If a supervisory institution must be created, it should be an economically neutral one that removes barriers, rather than an interventionist one that counts and evaluates purchase and supply arrangements.

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151. *Id.*

152. In the late nineteenth century Japan's first post-feudal government parceled out major industries to favored clans, which became *zaibatsu* industrial combines. PRESTOWITZ, *supra* note 20, at 142. These government-launched combines powered Japan's successful and rapid industrialization and in some cases evolved into today's *keiretsu*. *Id.* at 294.

153. As a parallel, U.S. auto manufacturing representatives who accompanied President Bush to Japan received promises of sales for their automobiles irrespective of Japanese demand for them, in a concession not germane to the issue of Japanese penetration of the U.S. auto market. *Japan: Japanese Companies and Automakers Plan Extension of Imports Due to Bush's Visit*, 9 Int'l Trade Rep. (BNA) 46 (1992). Commerce Secretary Ron Brown has suggested that the U.S. will use Super 301 power to demand that Japan import 100,000 U.S. automobiles. *Super 301 Renewal Said Designed to Send Message to Japan to Open Markets*, BNA Int'l Trade Daily, Mar. 7, 1994.

Two ongoing negotiation settings offer the hope of a less interventionist approach to improving the flow of U.S.-Japan semiconductor trade. The first is the Structural Impediments Initiative (SII),<sup>154</sup> a series of negotiations aimed at removing Japan's non-tariff barriers.<sup>155</sup> Although U.S. officials have recently expressed doubt that the SII process will lead to more open markets,<sup>156</sup> the "get tough" approach required to negotiate a series of mandatory targets might yield gains in SII. A key goal should be changing Japan's financial structure enough to permit U.S. acquisition of equity interests in more Japanese corporations.

The new Agreement on Trade-Related Investment Measures ("TRIM Agreement")<sup>157</sup> offers a second alternative for improving semiconductor market access. The TRIM Agreement in general applies GATT articles III (national treatment) and XI (no quantitative controls) to investment.<sup>158</sup> The annex to the TRIM Agreement appears to forbid member governments from linking investment with import and export behavior.<sup>159</sup> Since MITI provides essential approval for financing industrial products,<sup>160</sup> MITI and related agencies apparently are prohibited from instructing Japanese companies not to import any product. Even subtle pressure where "compliance is necessary to obtain an advantage" violates the TRIM Agreement.<sup>161</sup>

The United States could seek redress for violation of the TRIM Agreement through the Uruguay Round's enhanced enforcement procedures.<sup>162</sup> Those procedures now allow cross-sector countermeasures (e.g., placing a tariff on televisions to compensate for semiconductor restraints) to compensate for persistent violations of GATT obligations.<sup>163</sup> Such countermea-

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154. *U.S. to Take Industry-Specific Approach*, *supra* note 4.

155. Some of SII's results, such as the formation of a Japanese company to aid entry by foreign firms, end up suggesting that outsiders cannot compete in Japan's market without special indulgence. *Aid Foreign Investors*, *supra* note 73.

156. *Id.*

157. *Final Act Embodying the Results of the Uruguay Round of Multilateral Trade Negotiations*, Office of the U.S. Trade Representative, Dec. 15, 1993, at Part II, Annex 1A, LEXIS, Genfed library, EXTRA File [hereinafter TRIM Agreement].

158. *Id.* art. 2.

159. "TRIMs that are inconsistent with the obligation of national treatment . . . include those enforceable under domestic law or under administrative rulings, or compliance with which is necessary to obtain an advantage, and which require: . . . the purchase or use by an enterprise of products of domestic origin from any domestic source, whether specified in terms of particular products, in terms of volume or value of products, or in terms of a proportion of volume or value of its local production . . ." *Id.* art. 9(1)(a)

160. *See supra* notes 67-68 and accompanying text.

161. *Id.* at Annex, Illustrative List, 1.

162. *Final Act Embodying the Results of the Uruguay Round of Multilateral Trade Negotiations*, *supra* note 157, at Part II, Annex 2.

163. *Id.* at 22.3.

asures are not as far-reaching as Super 301 retaliation, but the United States should at least attempt to work within the new multilateral framework before resorting to unilateral means.

## VI. CONCLUSION

The U.S.-Japan Semiconductor Arrangement has succeeded in several respects. Japan has increased its U.S. purchases of semiconductors, which helps the balance of payments deficit with Japan. Japan is designing more U.S. chips into sophisticated products, Japanese chipmakers and U.S. chipmakers are entering into mutually beneficial alliances, and suppressed U.S. exports are overcoming stubborn bureaucratic and management resistance.

On the other hand, the phenomenal recovery of the U.S. chip industry probably owes little to the Arrangement. The recovery is due more to U.S. firms' superior technology and design of high-value chips than the Arrangement. The U.S. industry has evolved beyond the point where dumping of foreign commodity chips poses a threat.

While the twenty percent target satisfied some U.S. goals, U.S. semiconductor makers will not enjoy full participation in the Japanese market (and Japanese consumers will not have the benefit of U.S. participation) until the mechanisms that can fix imports at 10% or 20%—or any percent—are removed and sales of U.S. products rise and fall with their true competitiveness.

As the United States reconstructs an overall economic framework with Japan, it may be tempted to harness MITI as an import expeditor, since MITI has functioned so well as an import inhibitor. But it must be remembered that the twenty percent target did not bring about the recovery of the U.S. semiconductor industry. The indiscriminate application of the targeting method in other sectors could force Japanese businesses to purchase useless or uneconomical goods, reducing the trade deficit in the short-term but doing little to enhance the competitiveness of U.S. industry or to integrate the two economies. Targets, if used at all, should be offered as an alternative to greater transparency and the verifiable removal of structural barriers to the entry of U.S. goods and investment.

There are indications that Japan may have clung too long to mercantilist policies. For example, it was slow to deregulate its national communications industry, and as a result Japanese firms rank low as participants in the booming international telecom-

munications industry.<sup>164</sup> The realization that protectionist policies may not always serve Japan's interests might grow if MITI ceased using its formidable public relations power to characterize foreign investments as dangerous alien incursions on Japanese soil.<sup>165</sup>

If the U.S. Department of Commerce really has the power to negotiate numerical targets in other sectors of the Japanese economy patterned on the Arrangement, then it has the power to go back and negotiate a comprehensive agreement that removes control mechanisms rather than channeling them. U.S. negotiators should offer a timetable for eliminating all semiconductor targets and numerical controls in exchange for (1) reform of Japan's securities system to allow free foreign direct investment, and (2) multinational monitoring of MITI for quasi-official impediments to imports. A phased removal of the target would allow foreign firms to evaluate whether investment brings the same "design-in" benefits as supervised purchasing. The resulting system would not only reward competitive U.S. firms with market access to Japan, but also integrate the two economies and bring unexpected benefits to Japanese consumers and companies alike.

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164. When NTT (Nippon Telephone and Telegraph) was forced to accept bids from foreign equipment suppliers, one official reported that the only things foreigners could sell NTT were "mops, buckets and telephone poles." PRESTOWITZ, *supra* note 20, at 122. This was at a time when the United States not only had an undisputed lead in semiconductors, but a U.S.-EC firm could sell fiber-optic cable at one third the cost of inferior product made in Japan. *Id.* at 131-33. As a result of such policies Japan has not only failed to develop an internationally competitive telecommunications industry, but Japan itself has been saddled with a less efficient communications infrastructure than other industrialized nations. COWHEY & ARONSON, *supra* note 9, at 165.

165. PRESTOWITZ, *supra* note 20, at 144-45.