THE ANTICOMPETITIVE NATURE
AND POLITICAL ECONOMY ISSUES
OF CURRENT U.S. ANTIDUMPING LAW

DISSERTATION

Presented in Partial Fulfillment of the Requirements for
the Degree of Doctor of Philosophy in the Graduate
School of The Ohio State University

By

James Francis Nieberding, B.A., M.A.

The Ohio State University

1994

Dissertation Committee:

Howard P. Marvel

Edward J. Ray

David S. Reisman

Approved by

Howard P. Marvel

Advisor

Department of Economics
Copyright by
James Francis Nieberding
1994
To My Parents
ACKNOWLEDGMENT

I would like to thank all the people who made this dissertation possible, especially my family and friends. In particular, a great debt is owed to the teachers in my life who both awakened my intellectual curiosity and guided my scholastic development. These teachers span the educational gamut, from the nuns at Saint Clement's Grade School to the economists at Ohio State. But most of all I would like to thank my parents -- the greatest teachers of them all -- who helped me in ways too numerous to list here and without which this dissertation would not have come to fruition.
VITA

2 December 1964. ................................................................. Born -- Cleveland, Ohio

May, 1987. ................................................................. B.A., Xavier University
 (University Scholar)
 Cincinnati, Ohio

June, 1990. ................................................................. M.A., The Ohio State University
 Columbus, Ohio

Fields of Study

Major Field: Economics

Studies in: International Trade/Economic Development, Industrial Organization,
 Applied Microeconomics
TABLE OF CONTENTS

Acknowledgments.......................................................................................................................... iii
Vita.................................................................................................................................................. iv
List of Tables.................................................................................................................................... viii
List of Figures................................................................................................................................... x

Chapter........................................................................................................................................ Page

I. Introduction................................................................................................................................. 1

II. An Overview of U.S. Antidumping Law and Its Anticompetitive Nature............................................................ 6

II.1 U.S. Antidumping Law, the GATT, and International Trade....................................................... 6

II.2 The Anticompetitive Nature of Current Antidumping Law....................................................... 8

II.2.1 Statutory Mechanics of Current U.S. Antidumping Law......................................................... 8

II.2.2 Are U.S. Firms Employing Antidumping Law Strategically?................................................ 10

II.3 The Conflict Between Antidumping Law and Antitrust Law.................................................... 14

II.3.1 An Overview of the Legislative History of U.S. Antidumping Law.................................... 16

II.3.2 Antidumping Law as an Antitrust Violation?.................................................................18

II.4 Concluding Remarks.............................................................................................................24
III. The Strategic Nature of Nontariff Trade Barriers

III.1 Introduction and Overview

III.2 The Strategic Effect of VERs

   III.2.1 Theoretical Discussion
   III.2.2 Empirical Evidence

III.3 The Strategic Effect of Antidumping Law

   III.3.1 Theoretical Discussion
   III.3.2 Market Power Issues
   III.3.3 Empirical Evidence

III.4 The Effect of Antidumping Law in a Noncooperative Duopoly Game

   III.4.1 Scenario 1: The Case of No Antidumping Law
   III.4.2 Scenario 2: The Imposition of Antidumping Law
   III.4.3 Numerical Example
   III.4.4 Scenario 3: The Imposition of Antidumping Duties

IV. The Anticompetitive Consequences of U.S. Antidumping Law:
   Empirical Evidence

   IV.1 The Model
   IV.2 A Study of Petition Acceptance
      IV.2.1 The Semiconductor Industry
      IV.2.2 The Tapered-Roller-Bearings-Industry
   IV.3 A Study of Petition Withdrawal: The Steel Industry
   IV.4 A Study of Petition Rejection: The Hydraulic Cement Industry
   IV.5 Concluding Remarks
# LIST OF TABLES

<table>
<thead>
<tr>
<th>Table</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Summary of Outcomes of U.S. Antidumping Cases</td>
<td>13</td>
</tr>
<tr>
<td>2. Numerical Solutions to Scenarios 1 and 2</td>
<td>51</td>
</tr>
<tr>
<td>3. Numerical Solutions to Scenarios 1, 2, and 3</td>
<td>59</td>
</tr>
<tr>
<td>4. Pre- and Post Petition Acceptance Market Power Statistics:</td>
<td></td>
</tr>
<tr>
<td>The Semiconductor Industry</td>
<td>67</td>
</tr>
<tr>
<td>5. Pre- and Post Petition Acceptance Market Power Statistics:</td>
<td></td>
</tr>
<tr>
<td>(Controlling for the Cents/Yen Exchange Rate):</td>
<td></td>
</tr>
<tr>
<td>The Semiconductor Industry</td>
<td>69</td>
</tr>
<tr>
<td>6. Pre- and Post Petition Acceptance Market Power Statistics:</td>
<td></td>
</tr>
<tr>
<td>The Timken Company</td>
<td>72</td>
</tr>
<tr>
<td>7. Pre- and Post Petition Acceptance Market Power Statistics:</td>
<td></td>
</tr>
<tr>
<td>(Controlling for the Cents/Yen Exchange Rate):</td>
<td></td>
</tr>
<tr>
<td>The Timken Company</td>
<td>73</td>
</tr>
<tr>
<td>8. Pre- and Post Petition Withdrawal Market Power Statistics:</td>
<td></td>
</tr>
<tr>
<td>The Steel Industry</td>
<td>78</td>
</tr>
<tr>
<td>9. Pre- and Post Petition Rejection Market Power Statistics:</td>
<td></td>
</tr>
<tr>
<td>The Hydraulic Cement Industry</td>
<td>82</td>
</tr>
<tr>
<td>10. Number of Antidumping, Countervailing Duty, and Escape Clause</td>
<td></td>
</tr>
<tr>
<td>Investigations in the U.S., 1980-91</td>
<td>86</td>
</tr>
<tr>
<td>11. Antidumping Case Summary for ACCEPTED Petitions, 1980-91,</td>
<td></td>
</tr>
<tr>
<td>by TSUSA Code</td>
<td>87</td>
</tr>
</tbody>
</table>

viii
14. Explanatory Variables in the Probit Analysis.......................................................................................................................... 93
15. Probit Results -- Coefficient Estimates......................................................................................................................... 104
16. Comparison of Probit Results With Those of Previous Studies............................................................ 109
17. The Semiconductor Industry: Coefficient Estimates.......................................................... 116
18. The Timken Company: Coefficient Estimates........................................................................ 117
19. The Steel Industry: Coefficient Estimates.................................................................................. 118
20. The Hydraulic Cement Industry: Coefficient Estimates.......................................................... 119
21. Summary of Variables......................................................................................................................... 120
22. Contingency Table.............................................................................................................................. 135
# LIST OF FIGURES

<table>
<thead>
<tr>
<th>Figure</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. The Effect of a VER on a Cournot-Nash Equilibrium</td>
<td>29</td>
</tr>
<tr>
<td>2. An Antidumping Investigation</td>
<td>38</td>
</tr>
<tr>
<td>3. The Effect of Antidumping Law on a Bertrand-Nash Equilibrium</td>
<td>41</td>
</tr>
<tr>
<td>4. Scenarios 1 and 2 Graphically</td>
<td>53</td>
</tr>
<tr>
<td>5. Distribution of AD Investigations for Probit Analysis, 1980-91</td>
<td>95</td>
</tr>
</tbody>
</table>
CHAPTER I

INTRODUCTION

GATT members increasingly have sought relief from imports through administered protection programs. The most commonly employed nontariff trade barriers are voluntary export restraints, orderly market arrangements, antidumping actions, and countervailing duty investigations. Over the last few decades or so, the two most popular means of securing protection have been through the use of GATT-sanctioned so called fair trade laws. These are meant to remedy either foreign-firm dumping or foreign-government subsidization of exports and are administered through each countries' antidumping and countervailing duty law, respectively.

---

1 The introduction of labor and environmental standards into the proposed World Trade Organization's list of rules could open the door for newer and even more innovative forms of protection.

2 In addition to securing relief from the "unfair" trading practices of foreign rivals through either antidumping or countervailing duty law, a domestic industry in the United States may seek protection by (1) attempting to negotiate a voluntary export restraint with a major exporter under the auspices of the U.S. government, (2) initiating an escape clause action (under Section 201 of the 1974 Trade Act) to obtain temporary relief from the competitive pressures of imports, and (3) calling on the U.S. Trade Representative to invoke the recently revived "Super 301" (as specified in the Omnibus Trade and Competitiveness Act of 1988) in which the U.S. Trade Representative explicitly labels a foreign country an unfair trader. This menu of protective options is by no means unique to the United States.
The focus of this dissertation is current U.S. antidumping law. The Trade Agreement Act of 1979 repealed existing antidumping legislation and rewrote U.S. antidumping law effective January 1, 1980. Since then the favorite fair trade law of protection-seekers in this country has been the antidumping statute.\(^3\) This paper (1) examines the reasons for the popularity of the antidumping statute, (2) discusses the conflict between antidumping law and antitrust law, (3) presents a theoretical discussion addressing how the unilateral adoption of an antidumping law alters the domestic market structure, and (4) investigates empirically the anticompetitive aspects and the political economy issues surrounding the current statute.

The unfair trade laws in this country are contained in Title VII of the Tariff Act of 1930, and allow for tariffs (or duties) to be imposed on the subject imports to offset the injurious effects of either foreign-firm dumping or foreign-government subsidization of exports deemed to be "unfair".\(^4\) Dumping is said to occur when a foreign firm either sells comparable products at a lower U.S. price than the price charged in the foreign market or sells goods in the U.S. at a price below the total cost of production. While dumping may be nothing more than international price discrimination, it is often viewed

---


\(^4\) U.S. countervailing duty law has the same statutory mechanics as antidumping law and only differs in that the duties are intended to offset unfair foreign-government subsidization of exports as opposed to below foreign-market-value sales by firms. "Unfair" foreign-government subsidies refer to the amount of any direct or implicit assistance targeted for firms who export and which is unavailable to all firms in the foreign country.
as consisting of sales at "less-than-fair value" and is seen as a realization of the predatory intent of the foreign seller.

The U.S. Department of Commerce and the U.S. International Trade Commission (ITC) jointly administer and enforce the current U.S. antidumping statute. Commerce is in charge of determining whether the subject imports are being sold at less-than-fair value while the ITC decides whether these unfair imports have injured the U.S. plaintiffs. In order for duties to be assessed, Commerce must determine that the imports are being dumped and the ITC must determine that these imports are injurious to the U.S. industry producing the like product.

Relief achieved through a successful application of antidumping law, and the resulting diminution of foreign competition due to the imposition of antidumping duties, theoretically allows for an increase in the market power of the protection-seeking firms. Prusa (1990, 1992) proposes that U.S. firms which initiate and then subsequently withdraw an antidumping petition prior to the resolution of the case do so only after negotiating a collusive price or quantity arrangement with the defendants. As a result, these plaintiffs are suspected of using antidumping law strategically in order to augment their domestic market power. If supracompetitive benefits accrue to U.S. firms utilizing this form of protection, they ought to be measurable.

This dissertation presents an empirical investigation of the anticompetitive implications for domestic firms seeking redress under current antidumping law. The market power consequences are examined for each of the three possible resolutions of
an antidumping investigation: petition accepted, petition rejected, or petition withdrawn. This is accomplished by employing a firm-level empirical test for the difference between price and marginal revenue which will be significantly positive if a firm exercises market power.\(^5\) For each of the three petition outcomes, an industry case study is presented and the market power test conducted. Evidence is presented supporting the belief that plaintiffs receiving protection under the antidumping statute enhance their domestic market power, while plaintiffs having their petition rejected experience a diminution in market power. The evidence is less clear for firms that withdraw their antidumping petition prior to the final resolution of the investigation.

During the 1980s the United States filed an unprecedented number of unfair trade complaints against foreign rivals. For example, Finger (1993) finds that from the passage of the first substantial U.S. antidumping law in 1921 through December 31, 1967, the U.S. government had conducted a total of 706 antidumping investigations. For the period 1980-91, 541 antidumping petitions were filed. It is interesting from a political economy standpoint whether or not certain factors enhance the probability of trade officials siding with the U.S. plaintiffs in an antidumping investigation.\(^6\) These include, but are not limited to, the criteria encoded by Congress in the Trade Agreement Act of 1979 which enumerate the factors the ITC ought to consider in ascertaining

---

\(^5\) This market power test was developed by Martin (1988). See Appendix B for a complete derivation of the model.

\(^6\) See Prusa (1991), Moore (1992), and Anderson (1993) for a discussion of various political economy considerations pertinent to U.S. antidumping law.
whether or not "an industry in the United States is materially injured or threatened with material injury, or that the establishment of an industry is being materially retarded by reason of allegedly dumped imports." A probit model is estimated to determine the significance of such factors in explaining the ITC injury decisions for the period 1980-91. It is found that although the ITC considers several of the mandated criteria in its determination, the most significant factors are not among the encoded injury standards.

The paper is organized as follows. Chapter II briefly reviews the history of U.S. antidumping law, examines its protectionist nature, and discusses the inherent conflict between antidumping law and antitrust law. Chapter III reviews the anticompetitive nature of voluntary export restraints as it relates to current U.S. antidumping law. Chapter III also presents a theoretical discussion illustrating how the unilateral adoption of an antidumping law alters the domestic market structure, and how the market power of firms seeking redress through the antidumping statute is thought to change depending on the outcome of the investigation. Chapter IV presents an industry case study for each of the three possible investigation outcomes and conducts the market power test under each scenario. Chapter V discusses the political economy of current antidumping law and contains the results of the probit estimation. A short conclusion completes the dissertation.

7 The ITC is instructed to consider whether or not the "dumped" imports are adversely impacting the performance of the domestic industry producing the like product through such measures as declining output, sales, market share, profits, and capacity utilization. See 19 U.S.C. 1677(7)(C)(iii) for a complete text of the enabling legislation. "Material Injury" is defined in 19 U.S.C. 1677(7)(A) of the Trade Act of 1930 as "harm which is not inconsequential, immaterial, or unimportant."
CHAPTER II

AN OVERVIEW OF U.S. ANTIDUMPING LAW
AND ITS ANTICOMPETITIVE NATURE

II.1 U.S. Antidumping Law, the GATT, and International Trade

In 1947, most Western countries became signatories to the GATT accord which included general guidelines for antidumping investigations (Article VI).\(^8\) At the conclusion of the Kennedy Round of multilateral trade negotiations, GATT members produced the Antidumping Code of 1967.\(^9\) The main objective of this agreement was to limit use of antidumping law for protectionist purposes. As stated in the preamble to the Code, “anti-dumping should not constitute an unjustifiable impediment to international trade.”\(^10\) The 1967 Code was updated in the Antidumping Code of 1979 to further guard against protectionist abuses in the administration of antidumping laws.\(^11\)

---


\(^10\) See Lloyd (1977) and Finger (1993) for a more detailed analysis of antidumping law and the GATT.

VI of the GATT and the Antidumping Code of 1979 constitute current international law regarding dumping.  

As Finger (1993) reports, from the passage of the Antidumping Act of 1921 through December 31, 1967, the U.S. Government had undertaken a total of 706 antidumping investigations with all but 75 of them resulting in a negative determination. From 1921 to the end of the Kennedy Round, antidumping law was not much of a trade barrier in the United States. For the period January 1, 1980 through December 31, 1991, however, 541 antidumping petitions were filed. The majority of these investigations were not rejected by trade officials. Rather, the bulk of these petitions have resulted in either the petition being accepted by trade officials (and antidumping duties levied) or the petition being withdrawn by the plaintiffs after a negotiated outcome is reached with the defendants. Many international trade observers are concerned that current antidumping law has been captured and misused by protectionist forces in this country (with the backing of Congress) and is resulting in economically inefficient outcomes. 

---

12 See Alford (1991) for a detailed presentation of the international law concerning dumping.

II.2 The Anticompetitive Nature of Current Antidumping Law

The presence of actual or potential foreign competition exerts market discipline upon U.S. producers. The introduction of antidumping law and its use by domestic firms against foreign rivals results in the diminution of imports and reduces this desirable disciplinary effect. As a result, U.S. plaintiffs in an antidumping action can behave more monopolistically than otherwise possible when successfully employing antidumping law against foreign competitors. And since U.S. firms are the ones who initiate antidumping actions, it is suspected that they often do so as a means to enhance their own market power. Several authors recently have expressed concern that the existing literature has failed to properly investigate the incentives and strategic asymmetries created when a country enacts antidumping law. Considering these aspects allows one to comment on the welfare consequences of antidumping law (even if duties are never levied). Before focusing on the strategic effects of U.S. antidumping law, a brief summary of the statutory mechanics of this law is in order.

II.2.1 Statutory Mechanics of Current U.S. Antidumping Law

The Antidumping Code of the GATT permits its signatories to impose antidumping duties when an investigation by a signatory country finds trade to be both

---

14 See Marvel (1980) and Feinberg and Shaanan (1994) for both a theoretical and an empirical treatment of how foreign suppliers discipline U.S. firms.

15 This overview draws on information provided in Prusa (1990) and Boltauck and Litin (1991). The interested reader may consult these sources for a more detailed presentation.
unfair and injurious. U.S. antidumping law is contained in Title VII of the Tariff Act of 1930 (also known as the Smoot-Hawley Tariff Act), as amended by the Trade Agreement Act of 1979. Under this law, the administration of antidumping duties is divided between the Department of Commerce's International Trade Administration (DOC) and the U.S. International Trade Commission (ITC). The role of the DOC is to determine whether foreign merchandise is being sold in the U.S. at less-than-fair value (LTFV) and, if so, to estimate the margin of dumping. The DOC issues both a preliminary and final LTFV determination. The role of the ITC is to determine whether an industry in the U.S. is being materially injured or is threatened with material injury, or whether the establishment of an industry is being materially retarded by reason of LTFV imports. The ITC is required to issue both a preliminary and final injury determination. If the DOC determines that a foreign firm is dumping and the ITC decides that these unfair imports are injurious to a U.S. industry, a dumping duty is assessed on the offending imports to offset the calculated margin of dumping. This duty is to equal the amount by which the foreign firm's home market price exceeds its export price.

An investigation is terminated upon (1) an ITC preliminary negative injury determination, (2) a final negative LTFV determination by the DOC, or (3) an ITC final negative injury determination. Current antidumping law also allows an investigation to be terminated by either having the plaintiff withdraw the petition or having the petition suspended by means of a government sanctioned agreement between domestic and foreign producers (and possibly the foreign government). A suspension agreement may
be negotiated between the foreign defendants and the DOC if the DOC and at least 85% of the exporters of the imports subject to the investigation agree that (1) LTFV imports will be eliminated, (2) shipments will cease within 6 months of the suspension, or (3) prices will be adjusted to eliminate the injurious effects of the LTFV imports.

Prusa (1990) finds that petition withdrawal agreements have proven to be much more popular than suspension agreements. For the 1980-85 period, Prusa finds that 85 petitions were withdrawn and only 6 suspension agreements were achieved. This should not be surprising as the antidumping code explicitly restricts the settlement process concerning suspension agreements so that any upward price revisions contained in such agreements cannot exceed the estimated margin of dumping. Antidumping petitions terminated because of petition withdrawal, however, are unencumbered by such constraints. Prusa focuses on the settlement incentives that current U.S. antidumping law evinces, and is concerned that the Trade Agreement Act of 1979 encourages domestic firms to withdraw a petition subsequent to filing. He suspects this happens only after domestic firms achieve some sort of negotiated outcome with foreign rivals. It is interesting to note that the Commerce Department has never refused to terminate an antidumping petition after a withdrawal request by the petitioner.

II.2.2 Are U.S. Firms Employing Antidumping Law Strategically?

A growing literature examines the efficiency and welfare implication associated with the introduction of antidumping law. This theoretical literature illustrates that
antidumping law either facilitates tacit collusion among rivals (when the plaintiffs are allowed to withdraw the suit subsequent to an upward price revision by the defendants) or enhances the market power of the plaintiff through the constraint placed upon the foreign competitors. Commensurate with either the increased collusion or the diminished imports is a general deterioration in the national welfare of the policy-active country.\footnote{16 For a detailed discussion of antidumping law and the associated welfare implications see Prusa (1990, 1992), Slaight and Wolak (1991), Cuevas (1992) Hartigan (1992), Webb (1992) and Fink (1993).}

Subsequent to the Trade Agreement Act of 1979, the mechanism of choice of U.S. protection-seekers has been antidumping law. It is suspected that this preference reflects the fact that the enforcement of antidumping measures allows the U.S. firms to exercise a greater degree of market power than otherwise possible. Plaintiffs may also be using antidumping law not only as a means to harass foreign rivals, but also as a "facilitating practice" to collude with the defendants. Once a negotiated outcome is reached, the U.S. firms then withdraw the antidumping petition.

The ability of U.S. firms to withdraw their antidumping petitions and terminate voluntarily an investigation is the focus of a later paper by Prusa (1992). He categorizes the outcomes of each antidumping cases initiated between 1980 and 1985 as: petition accepted (and dumping duties levied), petition rejected, or petition withdrawn. He finds that each outcome occurs with a frequency of about one third. Since Prusa argues that the bulk of the legal and data gathering expenses of the plaintiff are sunk, it is somewhat
surprising to see roughly one third of the investigations terminated by means of petition withdrawal. What is even more interesting is Prusa's finding that the majority of cases withdrawn are done so after the DOC's preliminary LTFV determination. The apparent popularity for petition withdrawal is the impetus for concern that this occurs only after the plaintiff achieves some sort of mutually beneficial price/quantity arrangement with the foreign rival.17

Using LEXIS to access both the Federal Register and the ITC library, I was able to ascertain the outcome of every antidumping petition filed for the period 1980-91. Table 1 presents a summary of these outcomes. For the period 1980-86, I also find that each of the three possible outcomes account for approximately one third of the actual outcomes. For the period 1987-91, petitions accepted account for 47% of the outcomes, petitions rejected account for 45% of the outcomes, and petitions withdrawn account for the remaining 8% of the outcomes. During the 1987-91 period, domestic firms were using petition withdrawal less frequently as a means to terminate an antidumping investigation than during the 1980-86 period. Also, the number of petitions filed in the latter half of the 1980s is lower than in the first half of the 1980s. For the period 1980-86, there were 371 petitions filed; for 1987-91, there were 170 filings.

To test his collusion hypothesis, Prusa (1992) compares the value of trade in the year after the antidumping petition was resolved with the value of trade in the year the

17 It is interesting to note that in the European Union, Eymann and Schuknecht in Finger (1993) find that 40% of all European antidumping investigations during the period 1980-90 ended in petition withdrawal after the plaintiff(s) were able to negotiate price revisions with the defendant(s).
Table 1

Summary of Outcomes of U.S. Antidumping Cases, 1980-86

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Petition Accepted</td>
<td>9 (24%)</td>
<td>5 (33%)</td>
<td>13 (20%)</td>
<td>19 (41%)</td>
<td>9 (12%)</td>
<td>26 (41%)</td>
<td>43 (60%)</td>
<td>124 (33%)</td>
</tr>
<tr>
<td>Petition Rejected</td>
<td>18 (49%)</td>
<td>6 (40%)</td>
<td>22 (34%)</td>
<td>22 (48%)</td>
<td>25 (34%)</td>
<td>19 (30%)</td>
<td>21 (30%)</td>
<td>133 (36%)</td>
</tr>
<tr>
<td>Petition Withdrawn</td>
<td>10 (27%)</td>
<td>4 (27%)</td>
<td>30 (46%)</td>
<td>5 (11%)</td>
<td>40 (54%)</td>
<td>18 (29%)</td>
<td>7 (10%)</td>
<td>114 (31%)</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>37</td>
<td>15</td>
<td>65</td>
<td>46</td>
<td>74</td>
<td>63</td>
<td>71</td>
<td>371</td>
</tr>
</tbody>
</table>

Summary of Outcomes of U.S. Antidumping Cases, 1987-91

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Petition Accepted</td>
<td>8 (53%)</td>
<td>22 (52%)</td>
<td>14 (61%)</td>
<td>19 (44%)</td>
<td>18 (38%)</td>
<td>81 (47%)</td>
</tr>
<tr>
<td>Petition Rejected</td>
<td>5 (33%)</td>
<td>20 (48%)</td>
<td>6 (26%)</td>
<td>21 (49%)</td>
<td>24 (51%)</td>
<td>76 (45%)</td>
</tr>
<tr>
<td>Petition Withdrawn</td>
<td>2 (14%)</td>
<td>0 (0%)</td>
<td>3 (13%)</td>
<td>3 (7%)</td>
<td>5 (11%)</td>
<td>13 (8%)</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>15</td>
<td>42</td>
<td>23</td>
<td>43</td>
<td>47</td>
<td>170</td>
</tr>
</tbody>
</table>
petition was filed. A ratio less than one implies that trade fell the year following the petition. Those products that had petitions rejected experienced an increase in the volume of trade (1981 ratio was 1.12; 1982 ratio was 1.07).\textsuperscript{18} This suggests that a petition by itself does not give the domestic petitioner a strategic advantage over its foreign rival. As expected, those products that had antidumping petitions accepted experienced a fall in the volume of trade (1981 ratio was 0.44; 1982 ratio was 0.84). Finally, those products that had petitions withdrawn experienced a fall in the volume of trade (1981 ratio was 0.57; 1982 ratio was 0.80). Prusa suggests that since petition withdrawals have essentially the same effect on the growth in the value of trade as does levying duties, these settlement agreements grant significant market power to domestic firms. This conclusion is based solely upon trade volume data. A more precise way to investigate the effect on market power would be to use profit data (as done in Chapter IV).

II.3 The Conflict Between Antidumping Law and Antitrust Law

U.S. antitrust law is intended to protect and promote both competition and consumer welfare whereas antidumping law is intended to protect U.S. producers from "unfair" imports. As a result, antidumping law often is at odds with antitrust law. They both are seen as remedies to the anticompetitive behavior embodied in predatory pricing.

\textsuperscript{18} The ratio measuring the change in the value of all imports was 1.09 for 1981 and 0.97 for 1982.
but antidumping law protects competitors whereas antitrust law protects competition.¹⁹

In fact, antidumping law most likely inhibits competition by raising the costs to foreign
firms of competing in the U.S. market.

The specific antitrust law most akin to antidumping law is the Robinson-Patman
Act.²⁰ This law prevents certain types of price discrimination by domestic firms if such
actions lessen competition, and was not intended to protect competitors as is the intent
of antidumping law. Price discrimination (both domestic and international) is considered
by many to be undesirable due to its perceived predatory intent. However, arguments
supporting predatory pricing as a rational business strategy have proven more plausible
to attorneys than to economists. But, in the Matsushita v. Zenith case,²¹ the Supreme
Court recognized the irrationality of pricing below cost particularly for relatively long
periods of time and exonerated Matsushita on summary judgment.²²

---

¹⁹ It should be noted that many economists consider U.S. antitrust law special-interest legislation
enacted by Congress under pressure from small firms who were seeking protection from larger, more
efficient firms (See DiLorenzo (1985) and Armentano (1990)). As a result, the economists subscribing
to this school of thought would argue that antitrust legislation serves as a vehicle to protect competitors
in this country more so than competition.

²⁰ The Robinson-Patman Act (Robinson-Patman Act, 15 U.S.C. Section 13 (1988)) was a 1936
amendment to Section 2 of the Clayton Act. Alford (1991) discusses at length the relevance of this Act
to dumping.

²¹ Matsushita Electrical Industrial Co., Ltd. et al. v. Zenith Radio Corporation et al., 475 U.S. 574
(1986).

²² The recent conviction of Wal-Mart (at the state court level) for predatory pricing under the Arkansas
Unfair Trade Practice Act of 1937 (American Drugs Inc. et al v. Wal-Mart Stores, Inc.), may signal a
renewed belief by the courts in the theory that predatory pricing is a viable strategy in achieving market
foreclosure. The case currently is being heard by a state appellate court.
II.3.1 An Overview of the Legislative History of U.S. Antidumping Law

Historically, antidumping law in the U.S. was enacted in response to the alleged dumping threat from highly cartelized German industries who, operating in a protected domestic market, might periodically unload their excess capacity onto the U.S. market. The rationale for laws against dumping is that such behavior is seen as a realization of the predatory intent of the foreign seller.

The first U.S. law aimed at protecting domestic industries from the predation of foreign cartels was the Antidumping Law of 1916.23 This Act made it a criminal action to dump products with the intent of destroying or injuring an industry in the United States, and basically was an extraterritorial extension of U.S. antitrust laws. Much like the Sherman Antitrust Act of 1890, the 1916 Act allowed the injured parties to collect private treble damages.24 Because it was difficult (if not impossible) to prove intent, and because it did not provide the intended amount of protection for domestic industries, the 1916 Act was replaced (although never repealed) by the Antidumping Act of 1921.25 The 1921 Act allowed for the imposition of antidumping duties without any proof of

---


24 The only antitrust action initiated under the 1916 Act was Matsushita v. Zenith in 1970 (supra note 21). This was a private suit seeking treble damages for violations both of the 1916 Act and of other antitrust laws (see Elzinga (1994) for a detailed discussion of the relevant antitrust issues in this case).

predatory pricing, and is the basis of present U.S. antidumping law (as amended by both the Tariff Act of 1930 and the Trade Agreement Act of 1979). The 1921 Act differed from the 1916 Act in that no "intent to injure" had to be proved, and enforcement of the antidumping law became an administrative matter handled by the Secretary of the Treasury rather than a criminal statute.²⁶

With the passage of the 1921 Act, the focus of antidumping law shifted from the insidious actions of foreign cartels to the injurious nature of less-than-fair value imports. Dumping became more of a political rather than an antitrust concern, and enforcement of the 1921 Act (as well as all future amendments) were to be handled by bureaucrats rather than the courts. As Prusa (1990) and Finger (1993) discuss, the GATT rules pertaining to antidumping were more competitive than the U.S. standards as defined by the 1921 Act. In particular, the U.S. injury standard was much less stringent than the GATT's "material injury" standard. But because the GATT accord contained a "grandfather" clause for those countries with pre-existing antidumping laws which were in conflict with GATT standards, the U.S. was able to adhere to its less rigorous injury standards despite being a GATT signatory.

The Trade Agreement Act of 1979 was the first major revision of U.S. antidumping law since the 1921 Act and basically rewrote the statute.²⁷ The 1979 Act

²⁶ In 1954, the "injury" determination was transferred from Treasury to the Tariff Commission (later renamed the International Trade Commission), and in 1979, the "LTFV" determination was transferred from Treasury to the Department of Commerce.

brought U.S. policy into closer formal agreement with the GATT principles (particularly with respect to the injury standards) even as it diverged from the spirit of that policy. As discussed in greater detail in Chapter V, the popularity of the current antidumping stems from the fact that the law has been misused by protection-seekers in this country (with the complicity of Congress).

II.3.2 Antidumping Law as an Antitrust Violation?

Since both foreign and domestic firms involved in an antidumping investigation are competitors in a given market, one would expect that either privately negotiated settlements or publicly condoned restraint agreements between them would draw the attention of antitrust officials. Moreover, because antidumping law results in higher prices for U.S. consumers, why is not such an anticompetitive outcome prosecutable under U.S. antitrust laws?

The statutes which form the bulk of U.S. antitrust law are the Sherman Act (1890),\textsuperscript{29} the Clayton Act (1914),\textsuperscript{30} and the Federal Trade Commission (FTC) Act (1914).\textsuperscript{31} Section 73 of the Wilson Tariff Act of 1894 also is considered to be in the

\textsuperscript{28} See Palmeter (1989) and especially McGee (1993) for a strong discussion concerning this issue.


realm of antitrust law. This Act was an attempt by Congress to apply the Sherman Act extraterritorially by making unlawful every conspiracy or combination that was engaged in importing with the intent to either restrict trade or increase the price of imports to U.S. consumers (see Finger (1993)). In addition to the Department of Justice and the FTC, private individuals (or firms) that suffer an injury that antitrust laws were designed to prevent can bring antitrust suits and receive treble damages if successful. An interesting question is: Can a consumer bring an antitrust suit against a U.S. firm that (1) succeeds in reducing foreign imports by obtaining protection through the antidumping statute, or (2) colludes with a foreign defendant in an antidumping suit and negotiates an upward price revision? Some key rulings by the courts may prove insightful.

Carlton and Perloff (1994), in discussing who has legal standing under U.S. antitrust laws, cite the Supreme Court's decision in Illinois Brick.\textsuperscript{32} In this case, the Court limited the right of indirect purchasers to sue under the antitrust laws when manufacturers are accused in a conspiracy to raise prices. But even if consumers were deemed to be directly affected when U.S. plaintiffs and foreign defendants jointly elevate prices as a means to settle an antidumping suit, an individual consumer would not have the incentive to sue if all that could be recovered were the price "overcharge" (trebled).

plus attorney fees. A class-action suit may overcome this disincentive except that ascertaining who the injured parties are (and to what extent) might prove intractable.

Because numerous antidumping suits result in VER-like arrangements, several rulings by the courts in this area may be applicable to the legality of antidumping suits disposed of in this manner. As noted in the Harvard Law Review (1983)\textsuperscript{33} and Jackson (1991), the authority of the President to negotiate and enter into VERs without congressional approval was challenged in Consumers Union of the United States, Inc. v. Kissinger, Secretary of State, et. al.\textsuperscript{34} In this case, the Court of Appeals for the District of Columbia ruled that VERs were in the realm of presidential power as they did not involve any "formal" agreement on behalf of the U.S. government.\textsuperscript{35} When appealed to the Supreme Court, the case was denied a hearing. To the extent that any price or quantity revision is "volunteered" by the foreign defendants to the DOC (or the U.S. Trade Representative) in an antidumping suit, and absent any "formal" agreement, the precedent established in Consumers Union may shield this type of agreement from antitrust laws. Moreover, since the domestic plaintiffs typically withdraw their petition


\textsuperscript{34} 506 F. 2d 136 (D.C. Cir 1974), cert. denied, 421 U.S. 1004 (1975).

\textsuperscript{35} Consumers Union initially challenged VERs on antitrust grounds but lacked the resources to sustain a major antitrust litigation. Because of the withdrawal of the antitrust claims, the court only addressed the "presidential authority" issue. However, serious legal and antitrust concerns were raised in the dissenting opinion of the court with respect to VERs (see Harvard Law Review (1983) supra note 33 for an in depth analysis of both the facts and the issues surrounding this case).
only after the foreign defendants voluntarily raise their price, such "tacit" collusion is not prosecutable under the Sherman Act per the Court's decision in *Theatre Enterprises*.

In *Consumers Union*, the Court established the right of the President to enter into mutually acceptable "informal" agreements to resolve a trade dispute. The other legal issue raised by VERs is their potential violation of antitrust law. However, as discussed in *Harvard Law Review* (1983), the Department of Justice took the position that because government actions were involved, VERs could not be regarded as agreements violating antitrust laws. The basis for their position was the Court's ruling in *Parker v. Brown* that the Sherman Act does not apply to state actions. This position by the Justice Department may protect any VER-like arrangement used to settle an antidumping suit, particularly because trade officials are merely following the congressional mandate codified in the Trade Act of 1979.

Unlike antitrust law, antidumping law requires no proof concerning the existence of market power or the lessening of competition for U.S. plaintiffs to successfully seek relief from imports. It depends only on Commerce's finding of LTFV sales and the ITC's determination that such imports have materially injured an industry producing the like product. This contrast to the anticompetitive "measures" encoded in antitrust law

---


37 *Parker v. Brown*, 317 U.S. 341 (1943). See *Harvard Law Review* (1983), supra note 33, for a more detailed analysis of the *Parker Doctrine*. It should be noted that in defining the limits of the *Parker Doctrine*, a federal court of appeals has ruled that there must be a clear indication on the part of Congress that it was authorizing an action that would otherwise conflict with antitrust laws (*Hecht v. Pro-Football, Inc.*, 444 F.2d 931, 947 (D.C. Cir. 1971)).
required to prove injury is interesting as both antitrust law and antidumping law are concerned with predatory pricing. Like antitrust law, antidumping law ought to promote competition rather than protect U.S. firms from foreign competitors. Boltuck and Kaplan (1993) argue that no antidumping remedy is due when the act of dumping does not cause the U.S. price to fall below the competitive level. Although "injury" per se is incurred by the U.S. industry, the goal of antidumping law should not be the protection of supranormal U.S. profits. Like antitrust law, antidumping should not count the portion of injury attributable to the loss of monopoly rents.

The political economy forces behind why the analysis of similar issues in antitrust law and international trade law diverge is addressed by Cass (1993). He argues that government regulators are rewarded for promoting vigorous competition among domestic producers because the benefits of increased efficiency shared by consumers and the successful firms exceed the losses to the less-competitive firms. Government officials, however, are not similarly rewarded by promoting competition when the source of the competition comes from outside the United States. In such a case, the gains to foreign producers are not a source of votes for elected officials while the losses to domestic producers are politically costly. But, antitrust laws do allow U.S. firms to join in export cartels affecting foreign consumers because such harm lies outside the cost-benefit analysis of U.S. lawmakers while the gains to U.S. producers do not. The Webb-Pomerene Act and the Export Trading Company Act\textsuperscript{38} permit for export cartels directed

at foreign markets, and cartels organized under these laws are exempt from the Sherman Act. However, the Sherman Act can be applied against foreign cartels if there is significant harm inflicted on U.S. interests (see Schoenbaum (1994)).

Staiger and Wolak (1992) illustrate how antidumping law can be used as a means to enforce international cartel stability. They consider the impact of domestic antidumping law in a two-country partial equilibrium model where domestic and foreign firms attempt to collude (tacitly) in the domestic market. The introduction of antidumping law in the domestic market affects the extent to which foreign firms can dump their excess capacity. This, in turn, impacts the degree of collusion sustainable by the foreign cartel as this excess capacity, previously "dumped" in the domestic market, may now have a price-depressing effect if sold on the foreign markets. Furthermore, when made available to cartel members for use against each other, antidumping law may become a tool to enforce collusion. These authors illustrate that higher levels of collusion can be supported with antidumping law than would be possible in its absence. That is, antidumping law may serve as a "facilitating practice" providing international cartel members the means for enforcing their elevated pricing arrangements. And if the

---

39 Much controversy surrounds the application of the U.S. antitrust laws to conduct in other countries (see Schoenbaum (1994)).

40 Staiger and Wolak cite the Second International Steel Cartel of the 1930s as an example of how a cartel can exploit antidumping law to police the dumping activities of its members. In January 1938, the South African Iron and Steel Corporation filed an antidumping petition against steel producers in the U.S. for selling steel in the South African market at prices below those agreed upon by the International Steel Cartel. Dumping duties were levied and the Cartel's pricing arrangements restored.
result is higher prices in the U.S. market, does not antidumping law constitute an antitrust violation under the Sherman Act (and allow for private action) through its adverse effect on U.S. consumers?

Prusa (1990, 1992) and Schoenbaum (1994) argue that the right of U.S. firms to use antidumping law may be protected by a legal principle called the Noerr-Pennington doctrine. This is a judicially created antitrust exemption which subordinates antitrust considerations to the firms' constitutional right to participate in the legislative process.\footnote{The Supreme Court's decision in the Noerr case protected the right of a coalition of railroads to seek the adoption of certain anti-trucking legislation (Eastern Railroad Presidents Conference v. Noerr Motor Freight, Inc., 365 U.S. 122 (1961)). The truckers complained that the railroads were engaged in such activity in order to eliminate competition. The decision in the Pennington case protected the right of large coal mine operators to lobby for a minimum wage even though small mine operators alleged that this was a ploy to drive them out of business (United Mine Workers of America v. Pennington, 381 U.S. 637 (1965)).}

Although Noerr-Pennington provides antitrust immunity for private parties initiating and participating in trade relief actions, a settlement agreement directly with foreign competitors may be illegal under section 1 of the Sherman Act. However, since there has never been an antitrust case testing the legality of U.S. plaintiffs to initiate (and possibly settle) an antidumping suit, the legal precedent in this area has yet to be established.

\section*{1.4 Concluding Remarks}

Initially, U.S. antidumping law was essentially an extension of U.S. antitrust law. However, with the passage of the Antidumping Act of 1921, the process of obtaining
relief through an antidumping action was made substantially easier than the criteria used in antitrust cases. This less rigorous standard more easily satisfied domestic firms' demand for protection through administrative rather than legal channels.

Prior to the Trade Agreement Act of 1979, U.S. antidumping law possessed a more protectionist bent than the standards set forth by the GATT. While the 1979 Act brought U.S. antidumping law more into agreement with the GATT standards, other aspects of the Act have made current U.S. antidumping law the favorite tool of protection-seekers in this country. For example, generous terms for the withdrawal or the suspension of an antidumping petition prior to the completion of the investigatory process are encoded in the 1979 Act which provide both the incentive and the statutory framework for plaintiffs in an antidumping suit to collude with the foreign defendants. Such collusion, not otherwise possible in a noncooperative environment such as free trade, may be one reason why firms prefer this method of protection.\(^{42}\) It was not until the Trade Agreement Act of 1979 that U.S. protection-seekers began to rely heavily on the antidumping statute. The current popularity of this statute as a means to secure protection from imports may be related to the rent-seeking behavior of the plaintiffs rather than the "unfair" trading practices of their foreign rivals.

\(^{42}\) See Prusa (1990), Alford (1991), McGee (1993), Finger (1993) and Schoenbaum (1994) for a more detailed historical comparison of how the various U.S. antidumping statutes have compared and contrasted with the standards set forth in the GATT.
CHAPTER III

THE STRATEGIC NATURE OF NONTARIFF TRADE BARRIERS

III.1 Introduction and Overview

The purpose of this chapter is to review the literature pertinent to my research, particularly with respect to the effect that nontariff trade barriers have upon an oligopolistic equilibrium. Trade models traditionally have relied upon the assumption that market structures could be modeled as perfectly competitive. However, in the past decade or so, these models have been re-examined under the assumption that international markets are primarily imperfectly competitive. Once trade theory allowed for the existence of oligopolistic markets, the nature of strategic interaction among international firms became germane. Consequently, the costs of nontariff trade barriers must be expanded to include the deleterious welfare effects of a more collusive environment which may be engendered by the adoption of such policies. In analyzing the strategic implications of these policies, standard industrial organization techniques

43 See Krugman (1984), Brander and Spencer (1985), and Eaton and Grossman (1986) for the seminal work in this area. "New trade theory" usually assumes that the source of the market imperfection arises either because there exists a small number of firms or because international products are differentiated.
ranging from static Cournot or Bertrand games to dynamic (sequential) games have been employed.

The two trade policies which have received the most scrutiny in the literature are voluntary export restraints (VERs) and the use of antidumping law by domestic firms against foreign rivals. In the U.S., firms can directly initiate an antidumping investigation by filing petitions with both Commerce and the ITC. This fact, coupled with the unprecedented number of antidumping petitions filed in the U.S. during the 1980s, has led many to suspect that U.S. firms are employing antidumping law for strategic reasons unrelated to the unfair trading practices of their foreign rivals. Since the analysis of the strategic implications associated with current antidumping law is closely linked to that of VERs, section III.2 briefly reviews the VER literature. However, unlike the literature concerning VERs, there is a dearth of empirical work investigating the welfare and/or market power effects concomitant with the use of antidumping law.

Probably the most notable VER is the limitation on auto exports to the United States by Japan negotiated in 1981. It is well known that a VER is more costly to the importing country than a tariff that limits imports to the same amount. This is so because what would have been revenue to the importing country under a tariff becomes rents earned by foreigners under the VER. The literature and economics textbooks are replete with estimates, both theoretical and empirical, illustrating these costs associated
with a VER. Several authors have identified an additional source of welfare loss due to a VER: namely, it alters the strategic environment confronting the rival firms leading to a more collusive outcome which enhances the profits of both domestic and foreign firms at the expense of domestic consumers.  

III.2 The Strategic Effect of VERs

III.2.1 Theoretical Discussion

Both Harris (1985) and Krishna (1989) present an analysis of the strategic effect upon an oligopolistic equilibrium of introducing a VER upon an importing firm. These authors demonstrate how a VER set at the free trade level of imports succeeds in raising both foreign and domestic firms' profits. A VER is shown to facilitate price leadership by the domestic firm resulting in increased profits for both the foreign and domestic firm relative to the noncooperative free trade equilibrium. This is so because a VER effectively alters the nature of competition in the industry by placing a constraint on foreign imports. A graphical presentation of their analysis is shown in Figure 1.

44 A recent general equilibrium analysis of U.S. foreign trade policy by de Melo and Tarr (1992) found that about two-thirds of the costs to consumers of the three major U.S. VERs (textiles and apparel, steel, and autos) is accounted for by the rents earned by foreigners.

45 The use of VERs is curious because, as Niskanen (1988) points out, the VER with Japan (as with all VERs) was entirely "extralegal" in that it was not authorized under either U.S. law or the GATT.

46 As Krishna (1989) points out, this result is not similar to the conclusions relating to the literature on strategic trade policy. With a VER, there is no profit shifting from foreign to domestic firms. The increase in the domestic firms' profits occurs solely at the expense of the domestic consumers, who also pay for the increase in the foreign firms' profits.
Figure 1

The Effect of VER on a Cournot-Nash Equilibrium
A duopolistic industry is modeled with one domestic firm (firm \( h \)) and one foreign firm (firm \( f \)) competing in terms of price in the standard Bertrand-Nash fashion. The imposition of a VER at the "free trade level" restricts imports of firm \( f \) to the quantity corresponding to the noncooperative Nash price, \( P_f^N \). Hence, the VER constraint (\( PP \)) passes through the Nash point \( N \). This VER acts like a capacity constraint on the foreign firm and alters the nature of competition thus affecting the equilibrium.

The foreign reaction curve in Figure 1 is the "hashed" line. If the profit-maximizing foreign price (i.e., \( R_f \)) is to the "left" of \( PP \), then the import constraint (when imposed) is binding on firm \( f \) and its best response becomes \( PP \). If \( R_f \) is to the "right" of \( PP \), the VER is not binding on firm \( f \) and its best response remains \( R_f \). That is, if firm \( h \) prices above \( P_h^N \) the profit-maximizing foreign firm will always choose to produce up to the VER limit. Failure to do so would involve firm \( f \) violating the VER. For \( P_h \) below \( P_h^N \), the VER constraint is not binding and \( R_f \) remains the foreign firm's best response. Intuitively, when firm \( f \)'s profit maximizing price is higher than that which would result if the VER were made to bind (i.e., when \( R_f \) is to the "right" of \( PP \)), domestic demand is high and the domestic firm may not find it necessary to make the VER bind on its foreign competitor. Conversely, if firm \( f \)'s profit maximizing price is lower than that which would result if the VER were made to bind (i.e., when \( R_f \) is to the "left" of \( PP \)), domestic demand is low and firm \( h \) may price so as to enforce the VER.
constraint on its foreign competitor. Of course, this result occurs only when the goods are substitutes in consumption.

Since both firms are aware of this constraint, pricing decisions are no longer independent. Harris (1985) interprets this to mean that firm $f$ must choose $P_f$ such that whatever value of $P_a$, the VER constraint binds. This places firm $h$ in the position of a price leader to which firm $f$ reacts; as such the foreign firm becomes a price follower. The new equilibrium is denoted in Figure 1 by point $V$ which represents a tangency of iso-profit locus $\Pi^V$ for firm $h$ with the VER constraint, $PP$. The price of both the domestic good and the import-competing good has risen. As a result, a VER set at the free trade level of imports succeeds in raising the profits of both firm $h$ and firm $f$. This can be seen by noting that at point $V$, firm $h$ is placed on a higher iso-profit curve than otherwise attainable in the noncooperative game. Firm $f$'s profits increase because in moving from point $N$ to $V$, its output is constant but its price is higher. Harris suggests that this is what puts the "voluntary" in VER; namely, the imposition of a VER forces the domestic firm into a position of price leadership which results in the industry attaining a degree of mutually beneficial price collusion not feasible in the absence of the VER. Since at prices "above" the VER constraint $PP$ the demand for firm $f$'s product exceeds the VER level, some consumers of the foreign product would be rationed which affects the demand for firm $h$'s product (see point $A$ in Figure 1). The specific rationing rule used by Krishna (1989) in modeling this spillover of demand allows for costless
arbitrage. This results in firm $h$ obtaining the profits of a Stackelberg leader. However, a different rationing rule need not generate this outcome.

Krishna's paper develops the strategies open to firm $h$ when a VER is imposed by examining how this change in environment affects its best response function. In Figure 1, $(p_f^H, P_h^H)$ denotes the point where the iso-profit curve of firm $h$ is tangent to $PP$ which maximizes firm $h$'s post-VER profits. Let $(p_f^L, P_h^L)$ be the point where this iso-profit contour intersects firm $h$'s reaction curve $R_h$; $(p_f^N, P_h^N)$ denotes the Bertrand-Nash free-trade equilibrium.

Firm $h$ must decide whether or not to make the VER bind on firm $f$. If firm $f$'s price $p_f > p_f^1$, firm $h$ can obtain the profits associated with its reaction curve, $R_h$ (heavily shaded portion). Since these profits exceed the maximum that it can get by making the VER bind, namely iso-profit curve $\Pi^V$, firm $h$ will price according to $R_h$. If $p_f < p_f^1$, firm $h$ can obtain profits $\Pi^V$ by opting to charge $P_h^H$ and making the VER bind. This is optimal for firm $h$ because if it chooses not to make the VER bind, it can only obtain the profits along $R_h$ which are less than $\Pi^V$ when $p_f < p_f^1$. If $p_f = p_f^1$, firm $h$ is indifferent between $P_h^L$ (evaluated at $p_f^1$) and $P_h^H$ as they both yield profits of $\Pi^V$. Firm $h$'s reaction curve is discontinuous at firm $f$'s price of $p_f^1$. Krishna illustrates that there is no equilibrium in pure strategies for firm $h$. This non-existence of
pure strategy equilibria should not be surprising because the VER acts like a capacity constraint on the foreign firm; and the non-existence of a Bertrand-Nash equilibrium in pure strategies in the presence of capacity constraints has been recognized since Edgeworth advanced his solution to the Bertrand Paradox.47

The unique mixed strategy equilibrium characterized by Krishna consists of firm $f$ charging $p^1_f$, and firm $h$ randomizing over $P^H_h$ and $P^L_h$ charging $p^H_h$ with probability $\alpha$ and $p^L_h$ with probability $1-\alpha$. With this strategy, Krishna concludes that the imposition of a VER at or close to the free trade level raise firm $h$'s price and profits in equilibrium. In fact, with the costless arbitrage assumption, firm $h$ attains the level of profits of a Stackelberg leader. From Figure 1, it is evident that a VER at the free trade level raises firm $h$'s expected profits from $\Pi^N$ to $\Pi^V$ where $\Pi^V$ is the level of profits associated with the Stackelberg leader. The expected profits of the foreign firm also rise as it charges a price exceeding $p^N_f$ for a constant level of output. However, in contrast to Harris, the profits that accrue to firm $f$ are less than those of a Stackelberg follower due to its equilibrium price $p^1_f < p^H_f$ (the price of a Stackelberg follower).

The primary insight of Harris (1985) and Krishna (1989) is to dispel any belief that by setting a VER exactly equal to the amount the importing firm sells with no intervention (i.e., the "free trade level"), there would be no impact on the oligopolistic

47 For a discussion of the Edgeworth Solution to the Bertrand Paradox, see Tirole (1988) page 211.
equilibrium. The equilibrium is altered because protection through a VER creates a strategic asymmetry favoring the domestic firm. Chapter III will present similar implications pertaining to antidumping law.

III.2.2 Empirical Evidence

Several authors have examined empirically the strategic aspects of VERs. Dixit (1988) adopts a novel approach to investigate the collusive effects of the U.S.-Japan VER on autos and the implication for U.S. welfare. He models the rivalry between U.S. and Japanese auto firms as oligopolistic with conjectural variations (CV) in the context of a calibrated model. The process of "calibration" assumes specific demand functions for U.S. and Japanese cars and uses the actual prices and quantities for the time period under consideration. The coefficients in these functions are then treated as parameters and their values are determined from the data. A properly calibrated model reproduces the actual price and quantity data for the benchmark year. Counterfactual simulations are then performed to see how specific perturbations alter the market equilibria relative to the benchmark scenario. From this, the implied CV parameters yield a measure of market conduct. Specifically, Dixit looks at the years 1979, 1980 and 1983 and poses the following question: if the actual outcome with the VERs were to be replicated in a

---

48 While insightful, the analysis pertaining to Figure 1 suffers the shortcomings common to both Cournot and Bertrand models: namely, firms are assumed to move simultaneously and never really interact. More recent oligopoly models addressing the strategic aspects of VERs use dynamic (sequential) games to overcome this limitation (see Miyagiwa and Ohno (1992)).
CV model without VERs, how collusive would the conduct have to be? The outcomes for 1983 (the first complete year of the VER) show the extent of collusion that would have replicated the actual prices and quantities observed under the VER. Dixit found strong evidence of increased collusion on the part of the Japanese firms. However, collusion by the U.S. firms did not appear to be significantly strengthened by the VER. Dixit suggests that perhaps competition among U.S. car manufacturers is strong enough that the Japanese firms' restraint did not bring forth parallel restraint from U.S. firms. As a result, Dixit concludes that the presence of imperfect competition did not cause much additional harm to U.S. consumers (due to the change in the strategic environment) when this VER was imposed.

Martin (1988) investigates empirically whether or not the U.S.-Japan VER allowed the four leading U.S. auto manufacturers to exercise a greater degree of market power. He accomplishes this by first developing a firm-level test for market power. Not surprisingly, but in contrast to the conclusion of Dixit (1988), Martin finds that each firm realized an increase in domestic market power after the VER on autos was negotiated.

Dinopoulos and Kreinin (1988, 1989) both address the welfare effects of VERs. In Dinopoulos and Kreinin (1988), the authors use three independent approaches (supply functions, hedonic regressions, and casual evidence) to investigate the effect of the U.S.-Japan VER on the behavior of European car producers. All three methods yield similar results with respect to European auto prices, namely, that these prices rose by roughly $6,500 for the VER period 1981-84. In estimating welfare effects of the
VER, the authors found that the annual total U.S. welfare loss is made up of three components: the loss to Japan (estimated at $2.3 billion in 1982 and $2.4 billion in 1984); the loss to Europe (estimated at $1.5 billion in 1982 and $3.4 billion in 1984); and a social loss within the U.S. over and above the redistribution of income from consumers to producers ($208 million in 1982). Last, they conclude that each U.S. job saved by the VER in the auto industry cost the country $180,000.

The importance of the two Dinopoulos and Kreinin papers is that they highlight the discriminatory nature of VERs and stress the importance of considering the VER-induced behavior of unrestrained suppliers in estimating the effects of VERs. In addition to presenting the theoretical framework for this result (e.g., Dinopoulos and Kreinin (1989)), they gather empirical evidence to back it up.49

The empirical work cited above confirms the deleterious welfare effects of VERs for the policy-active country. Not only is the rent-shifting aspect of VERs confirmed, but as both Martin (1988) and Dinopoulos and Kreinen (1988) illustrate, the market power of domestic firms increases due to the change in the strategic environment occasioned by a VER. The voluntary nature of VERs is an indication of the increased profitability for all parties involved, and the empirical evidence supports this notion.

49 In another paper, Dinopoulos and Kreinin (1991) investigate econometrically the effects of the U.S. VER on machine tools negotiated with Japan and Taiwan in 1986 and the VER threat against Germany and Switzerland. During the first year of the VER, the authors find that the U.S. price of machine tools rose 17 percent and the rent transfer to Japan and Taiwan was $100 million. As expected, the prices of the exports to the U.S. by Japanese, German, and Taiwanese suppliers also rose.
III.3 The Strategic Effect of Antidumping Law

III.3.1 Theoretical Discussion

Protection achieved through a successful application of antidumping law, and the resulting constraint placed upon foreign competition, is suspected to allow the dominant firms in an industry seeking protection to behave more oligopolistically than otherwise possible under free trade. Prusa (1990, 1992) even argues that U.S. firms who initiate and subsequently withdraw an antidumping petition prior to the resolution of the investigation do so only after reaching a collusive agreement with the foreign defendants. This section presents a theoretical discussion illustrating the market power effects concomitant with the use of antidumping law. If the domestic market power increases for U.S. firms that either succeed in having antidumping duties levied or negotiate a collusive settlement with the defendants, then both an allocative inefficiency and a transfer of wealth from consumers to producers occurs. If these costs were properly incorporated into the ITC's assessment of injury, then it is likely that the liberal use of current antidumping law is a net loser in terms of our national welfare.

Figure 2 reproduces Prusa's (1992) model of an antidumping investigation under current U.S. law:
Figure 2: An Antidumping Investigation
A domestic plaintiff submits an antidumping petition simultaneously with the ITC and the DOC. $C_i$ reflects the initial expenses associated with filing a petition; $\Pi_D$ is the domestic industry's Nash equilibrium profit. Within 45 days the ITC issues a preliminary injury decision, and within 235 days the DOC issues a final LTFV decision. If either decision is negative the investigation is terminated. If both decisions are positive, the industry must decide whether to continue the process incurring additional expenses of $C_o$ or withdraw the petition. If the petition is not withdrawn, the ITC issues its final determination between 280 and 420 days after the petition was initiated depending on the complexity of the case. $\Pi_D$ denotes the profit that will be earned by the domestic industry if dumping duties are levied against the foreign defendant, where $\Pi_D > \Pi_N$. The probability that the ITC will levy dumping duties is denoted by $\rho$. The domestic firm's expected profit, given that the investigation proceeds to a final ITC decision, is

\[ E\Pi = \rho \Pi_D + (1 - \rho) \Pi_N - C_i - C_o \]

(1)

\[ = \Pi_N + \rho (\Pi_D - \Pi_N) - C_i - C_o \]

Prusa's concern is that the withdrawal of an antidumping petition is not evidence that the domestic plaintiff's case has failed. Rather, a petition may be withdrawn after the plaintiff has achieved some type of price revision or quantity restriction with its foreign rival. These collusive settlements can be made with or without government approval.
Therefore, $\Pi_S - C_j$ is the net profit from settling where $\Pi_S$ is the profit resulting from a settlement, and $\Pi_S > \Pi_N$.

### III.3.2 Market Power Issues

Prusa (1990, 1992) presents evidence concerning the market power consequences associated with antidumping law. Using both trade data (as discussed in Chapter II.2.2) and a Bertrand-Nash game, it is posited that the market power of U.S. firms will: (1) increase when trade officials accept the antidumping petition and duties are levied; (2) be unchanged or fall when the petition is rejected; and (3) increase when domestic plaintiffs withdraw the petition. Prusa's main concern is that U.S. firms who withdraw an antidumping petition prior to the ITC final injury determination are doing so for collusive reasons. Given the above framework, when the profit resulting from a settlement exceeds the expected profit when the investigation proceeds to a final ITC decision, a domestic firm will settle the case. That is, if

$$\Pi_N + \rho (\Pi_D - \Pi_N) - C_0 < \Pi_S$$  \hspace{1cm} (2)

the case should be settled.

Figure 3 depicts the Bertrand-Nash game developed in Prusa (1992). $RR$ corresponds to the domestic firm's reaction curve and $R^*R^*$ denotes the foreign firm's
Figure 3

The Effect of Antidumping Law on a Bertrand-Nash Equilibrium
reaction curve. The Nash equilibrium is at point \( N \) with prices \( (P_N, P_N^*) \). The point \( s^* \) (s) is the Stackelberg equilibrium for the foreign (domestic) firm. \( \Pi_N^* \) denotes the foreign firm Nash equilibrium profit. If dumping is determined (i.e., the petition is "accepted"), a dumping duty of \( (P_D^* - P_N^*) \) will be levied on each unit of the imported product. The foreign firm now will earn \( \Pi_D^* - (P_D^* - P_N^*)Q_D^* \). With the foreign firm facing price \( P_D^* \), the domestic firm's best response is to charge price \( P_D^* \). Assuming that (1) the foreign firm still collects \( P_N^* \); (2) \( Q_D^* \) is the foreign quantity demanded at \( P_D^* \); and (3) \( \Pi_D^* \) is the foreign firm's duty-inclusive profit, then:

\[
\Pi_D^* - (P_D^* - P_N^*)Q_D^* < \Pi_N^* \quad (3)
\]

The foreign firm's post-dumping-duty profit is less than its Nash equilibrium profit (see point \( E \) in Figure 3). This illustrates the case when \( P_D^* \) is sufficiently greater than the Stackelberg leader price (see point \( s^* \) in Figure 3). It may be the case that the foreign firm's price (inclusive of dumping duties) falls between \( P_D^* \) and \( P_N^* \). In this case the foreign firm's profits are elevated above the Nash equilibrium level (see the shaded area in Figure 3). In either case, the domestic firm's profitability increases as a result of having a petition accepted.
If a domestic firm has an antidumping petition rejected, the domestic and foreign firm will continue to earn the Nash profit levels ($\Pi_N, \Pi_N^*$). This will not affect the domestic firm's profitability. However, if an ITC rejection sends a signal to foreign competitors that aggressive price competition will be tolerated, then domestic firm profitability may be eroded.

The Trade Agreement Act of 1979 provides generous terms for the U.S. plaintiff(s) to withdraw their antidumping petition prior to the ITC final decision. As discussed in Chapter II.2.1 there are two avenues open to firms that wish to settle a case. The first is a settlement achieved under the auspices of the DOC. The antidumping code specifically restricts any price increases contained in this type of "suspension" agreement to not exceed that which is necessary to eliminate the margin of dumping. The second means of achieving a settlement is through private negotiation among the firms involved in the investigation. Agreements achieved in this manner are unencumbered by any pricing constraints. It is not surprising that U.S. firms prefer to use the second method of settlement rather than the first.

Referring to Figure 3, since the foreign rival can offer to restrict its price/quantity to insure that $\Pi_S > \Pi_N$ and $\Pi_S^* > \Pi_N^*$ (anywhere in the shaded area), a mutually profitable arrangement can be negotiated which circumvents the uncertain investigation outcome. Even when it is highly unlikely that antidumping duties will be levied (i.e., $\rho$ close to zero) the foreign and domestic firm prefer to settle as this allows an upward
revision of price. When it is very likely that antidumping duties will be levied (i.e., \( \rho \) close to one) the foreign firm prefers to settle since this allows it to internalize the potential dumping duties. The domestic firm will settle if \( \Pi_S > \Pi_D \) and the foreign firm can assure this by its upward price revision. Therefore, Prusa suspects U.S. firms that withdraw an antidumping petition do so in order to augment their market power.

### III.3.3 Empirical Evidence

Unlike the literature concerning VERs, very little empirical evidence exists which investigates the effect of U.S. antidumping law on domestic industry performance. One paper that does explore the effect that dumping duties has on firm profitability is by Hartigan, Perry, and Kamma (1989). These authors employ a capital market event study to see whether an injury decision by the ITC has a significant positive impact on the firms involved. In addition, they explore the importance of the distinction between "threat of injury" and "actual injury" as an ITC decision criterion. These authors find that when all three potential petition-terminating decisions (i.e., ITC preliminary, DOC final, and ITC final) are affirmative, there is a positive and significant market response. They also find that relief from dumping is only profitable to the firms' owners if it comes before the industry has incurred damage.
III.4 The Effect of Antidumping Law in a Noncooperative Duopoly Game

This section presents a simple duopoly model in which the foreign firm is constrained by the imposition of antidumping law in the domestic market, and illustrates that the use of such law against a foreign competitor enables the domestic firm to behave more monopolistically. The model is based upon several simplifying assumptions. The U.S. market is modeled as imperfectly competitive.\textsuperscript{50} There are two firms: a domestic firm and a foreign firm. Denote the foreign firm “firm $f$” and the domestic firm “firm $us$”. Firm $f$ sells in both the foreign market and the U.S. market; firm $us$ sells in the U.S. market only. That is, firm $f$ is a monopolist in its own market and a Cournot duopoly game is played out in the U.S. market. Costs are assumed to be both twice differentiable and either increasing in output or constant. For simplicity, costs are assumed to be zero. Inverse demands are assumed to be twice differentiable in both markets. For example:

\begin{align*}
P_{us} &= a - b(q_{us}^f + q_{us}) \quad (4) \\
P_f &= k_1 a - k_2 b q_f \quad (5)
\end{align*}

where:

\textsuperscript{50} It is well understood that international markets need to be imperfectly competitive so that firms set prices instead of taking the market prices as given in order for “dumping” to occur (\textit{supra} note 43).
\( q_{JS} \) = foreign firm's output in U.S. market

\( q_{US} \) = U.S. firm's output in U.S. market

\( q_f \) = foreign firm's domestic output

\( P_{US} \) = price in the U.S. market

\( P_f \) = price in the foreign market

The above inverse demands are linear (i.e. \( P' = 0 \)). For simplicity, an assumption that \( (k_1 = k_2 = 1) \) is invoked so that the inverse demand function is identical in both markets. In the discussion presented below, the inverse demand function will be assumed to equal

\[ P = 100 - Q \text{ where } Q = q_{JS} + q_{US}. \]

III.4.1 Scenario 1: The Case of No Antidumping Law

The objective functions of firm \( US \) and firm \( f \) are, respectively:

\[ \Pi_{US} = P_{US} q_{US} = (100 - q_{JS} - q_{US}) q_{US} \]  \hspace{1cm} (6)

\[ \Pi_f = P_f q_f + P_{US} q_{JS} = (100 - q_f) q_f + (100 - q_{JS} - q_{US}) q_{JS} \]  \hspace{1cm} (7)
Under this scenario the U.S. market and the foreign market are assumed to be segmented for reasons not explicitly modeled here.\textsuperscript{51} Firm $f$ behaves as a monopolist in its home market and a Cournot game is played in the U.S. market. Taking the necessary first and second order conditions of these objective functions, and totally differentiating each firms’ reaction function (in the U.S. market), it's straightforward to show a standard result for a noncooperative duopoly game:

\[-1 < \frac{dq_{us}}{dq_f} < 0 \text{ and } -1 < \frac{dq_f}{dq_{us}} < 0 \tag{8}\]

That is, when firm $f$’s U.S. output decreases (increases), firm $us$’s output increases (decreases)\textsuperscript{52}. The same is true with respect to firm $us$’s output. It is also straightforward to solve for: $q_f^*$, $q_{us}^*$, $q_{us}^{us*}$, $q_{us}^*$, $Q_{us}^*$, $P_{us}^*$, $P_f^*$, $\Pi_{us}^*$, $\Pi_f^*$, $MS_{us}^*$ and $MS_f^*$ under Scenario 1 where “starred” variables represent equilibrium values. Firm $us$’s and firm $f$’s market shares are denoted $MS_{us}$ and $MS_f$, respectively. The numerical example presented in Chapter III.4.3 provides explicit solutions for these variables.

\textsuperscript{51} It may be that the foreign market is relatively closed compared to the U.S. market thereby effectively segmenting the two markets. Or in the case of consumer durables such as automobiles, transportation costs likely inhibit price arbitrage from completely unifying markets.

\textsuperscript{52} See Tirole (1988, Supplementary Section 5.7) for the necessary conditions for (8) to hold.
III.4.2 Scenario 2: The Imposition of Antidumping Law

When firm $f$'s profit maximizing behavior is constrained by an antidumping law requiring that firm $f$'s foreign price equal the U.S. market price, firm $f$ solves:\footnote{This analysis builds on the model presented in Webb (1992). The results presented for Scenario 2 also can be generated if firm $f$ maximizes the following profit function: $\Pi_f = P_f q_f + P_{us} q_{us}^f t - t q_{us}^f$ subject to the constraint $t = q_{us} + q_{us}^f - q_f$ where $t$ represents a per-unit dumping duty.}

$$\ell = P_f q_f + P_{us} q_{us}^f + \lambda (P_f - P_{us}) \quad (9)$$

The first order conditions are:

$$\frac{\partial \ell}{\partial q_f} = P_f + q_f P'_f = -\lambda P'_f \quad (10)$$

$$\frac{\partial \ell}{\partial q_{us}^f} = P_{us} + q_{us}^f P'_{us} = \lambda P'_{us} \quad (11)$$

$$\frac{\partial \ell}{\partial \lambda} = P_f - P_{us} = 0 \quad (12)$$

Dividing (10) by (11) yields (13):
\[ \frac{P_f + q_f P'_f}{P_{us} + q_{us} P'_{us}} = -\frac{P_f}{P_{us}} \quad (13) \]

Firm \( f \) now sets home sales and U.S. sales simultaneously in both markets according to (13). For firm \( us \), it remains that:

\[ \frac{\partial \Pi_{us}}{\partial q_{us}} = P_{us} + P'_{us} q_{us} = 0 \quad (14) \]

III.4.3 Numerical Example

Using the linear demand \( P = 100 - Q \), under Scenario 2 firm \( f \) solves:

\[ \ell = P_f q_f + P_{us} q_{us} + \lambda(P_f - P_{us}) \quad (15) \]

\[ \ell = (100 - q_f) q_f + (100 - q_{us} - q_{us}^{us}) q_{us} + \lambda[(100 - q_f) - (100 - q_f^{us} - q_{us})] \quad (16) \]

The first order conditions are:

\[ \frac{\partial \ell}{\partial q_f} = 100 - 2q_f = \lambda \quad (17) \]
\[ \frac{\partial t}{\partial q_f^{\mu}} = 100 - 2q_f^{\mu} - q_{us} = -\lambda \]  
(18)

\[ \frac{\partial t}{\partial \lambda} = (100 - q_f) = (100 - q_f^{\mu} - q_{us}) \]  
(19)

Dividing (17) by (18) yields (20):

\[ \frac{100 - 2q_f}{100 - 2q_f^{\mu} - q_{us}} = -1 \]  
(20)

For firm us, the first order condition is identical to that of Scenario 1:

\[ \frac{\partial \Pi_{us}}{\partial q_{us}} = 100 - 2q_{us} - q_f^{\mu} = 0 \]  
(21)

The equilibrium solutions to the variables for both Scenario 1 and 2 are presented in Table 2.
Table 2

Numerical Solutions to Scenarios 1 and 2

<table>
<thead>
<tr>
<th></th>
<th>Scenario 1 (No AD Law)</th>
<th>Scenario 2 (AD Law)</th>
</tr>
</thead>
<tbody>
<tr>
<td>$q_f^*$</td>
<td>50.0</td>
<td>60.0</td>
</tr>
<tr>
<td>$q_{fus}^*$</td>
<td>33.3</td>
<td>20.0</td>
</tr>
<tr>
<td>$q_{us}^*$</td>
<td>33.3</td>
<td>40.0</td>
</tr>
<tr>
<td>$Q_{us}^*$</td>
<td>66.7</td>
<td>60.0</td>
</tr>
<tr>
<td>$P_f^*$</td>
<td>50.0</td>
<td>40.0</td>
</tr>
<tr>
<td>$P_{us}^*$</td>
<td>33.3</td>
<td>40.0</td>
</tr>
<tr>
<td>$\Pi_{us}^*$</td>
<td>1110.9</td>
<td>1600.0</td>
</tr>
<tr>
<td>$\Pi_f^*$</td>
<td>3610.9</td>
<td>3200.0</td>
</tr>
<tr>
<td>$MS_{us}^*$</td>
<td>0.5</td>
<td>0.67</td>
</tr>
<tr>
<td>$MS_f^*$</td>
<td>0.5</td>
<td>0.33</td>
</tr>
<tr>
<td>$CS_{us}^*$</td>
<td>2222.5</td>
<td>1800.0</td>
</tr>
</tbody>
</table>
As a result of the antidumping law, the two markets are now integrated. This is evident in Table 2 as $P_f^* = P_{us}^* = 40$ in Scenario 2. In addition, output by firm $f$ in the U.S. market has decreased and output by firm $us$ has increased. The U.S. price of the commodity has increased as well as have both the profits and market share of firm $us$. U.S. consumer surplus ($CS_{us}^*$) has diminished with the introduction of an antidumping law. Figure 4 illustrates these results graphically.

A consideration now facing the foreign firm is as follows: If firm $us$ increases its output ceteris paribus, $P_{us}$ falls relative to $P_f$, and the foreign firm is technically guilty of dumping. How does the foreign firm address this? From Scenario 2, it can be shown that:

\begin{align*}
q_f &= 50 + 0.25q_{us} \\
q_f^{us} &= 50 - 0.75q_{us}
\end{align*}

(22) \hspace{1cm} (23)

Totally differentiating (22) and (23) yields:

\begin{align*}
\frac{dq_f^{us}}{dq_{us}} &= -\frac{3}{4} \\
\frac{dq_f}{dq_{us}} &= +\frac{1}{4}
\end{align*}

(24) \hspace{1cm} (25)
Figure 4

Scenarios 1 and 2 Graphically
That is, if $q_{us}$ increases by 1 unit, the foreign firm decreases its U.S. output (i.e., $q_f^{us}$) by 0.75 units and increases its own-market sales (i.e., $q_f$) by 0.25. This action by the foreign firm will restore $P_{us} = P_f$. It should be noted that this price equalization does not result from arbitrage but rather from the antidumping constraint placed upon the foreign firm.

A simple numerical example illustrates this point. Assume that Scenario 2 is the initial price equilibrium where $P_{us} = P_f = 40$. A unit increase in $q_{us}$ causes $P_{us}$ to fall to 39.0. Firm $f$ technically is guilty of dumping in the U.S. market as now $P_{us} < P_f$. In response to the increase in sales by firm $us$, however, if firm $f$ decreases $q_f^{us}$ by 0.75 causing $P_{us}$ to rise to 39.75 and increases $q_f$ by 0.25 causing $P_f$ to fall to 39.75, then once again, $P_{us} = P_f = 39.75$. In a sense, U.S. antidumping law benefits foreign consumers if this occurs.54

---

54 This is a bit like the situation when a "large" country imposes a tariff on an imported good in hopes of extracting some favorable terms-of-trade concession. In this case, the tariff by the importing country will not increase the price of the imported good by the full amount of the tariff (unlike in the "small" country case). This occurs because the exporting country absorbs some of the incidence of the tariff by lowering its export price somewhat. The production and consumption distortions in the importing country may still outweigh any terms-of-trade gain, but if the domestic and foreign markets were partially or fully integrated (maybe via arbitrage), this may translate into lower prices for the foreign consumers.
III.4.4 Scenario 3: The Imposition of Antidumping Duties

A third scenario needs to be addressed, namely: what are the results in this model when a per unit tariff \( t \) (i.e., an antidumping duty) is placed on \( q_f^{us} \) rather than when, as under Scenario 2, firm \( f \) is allowed to adjust its behavior in order to eliminate the international price disparity. Suppose the initial situation is Scenario 1 where either international price discrimination is occurring or the game being played in the U.S. market generates a lower equilibrium market price than the equilibrium market price in the foreign market. As a result, the U.S. imposes a per-unit tax on firm \( f \)'s imports. The objective functions of firm \( us \) and firm \( f \) become:

\[
\Pi_{us} = P_{us} q_{us} = (100 - q_f^{us} - q_{us} \lambda_{us})
\]

\[
\Pi_f = P_f q_f + P_{us} q_f^{us} - t q_f^{us} \\
= (100 - q_f \lambda_f) + (100 - q_f^{us} - q_{us} \lambda_f^{us}) - t q_f^{us}
\]

The first order conditions are:

\[
\frac{\partial \Pi_{us}}{\partial q_{us}} = 0 \rightarrow q_{us} = 50 - \frac{q_f^{us}}{2}
\]

\[
\frac{\partial \Pi_f}{\partial q_f^{us}} = 0 \rightarrow q_f^{us} = 50 - \frac{q_{us} - t}{2}
\]

\[
\frac{\partial \Pi_f}{\partial q_f} = 0 \rightarrow q_f = 50
\]
Solving (28) and (29) yields:

\[ q_{us} = 333 + \frac{1}{3}t \]  \hspace{1cm} (31)

\[ q_{uf} = 333 - \frac{2}{3}t \]  \hspace{1cm} (32)

Note that when \( t=0 \), the results from Scenario 1 obtain. How does the imposition of an antidumping duty \( r \) (i.e., a tariff) impact the oligopolistic equilibrium in the U.S. market?

The following comparative statics exercise yields the standard result. That is, totally differentiating firm \( u_s \)'s reaction curve (equation 28) and firm \( f \)'s reaction curve (equation 29) with respect to \( q_{us} \), \( q_{uf}^{us} \) and \( t \) yields:

\[
\begin{bmatrix}
\frac{\partial^2 \Pi_{us}}{\partial^2 q_{us}} & \frac{\partial \Pi_{us}}{\partial q_{us}} & \frac{\partial}{\partial q_{us}} \\
\frac{\partial \Pi_f}{\partial q_{uf}} & \frac{\partial^2 \Pi_f}{\partial^2 q_{uf}} & \frac{\partial \Pi_f}{\partial q_{uf}} \\
\frac{\partial \Pi_f}{\partial q_{uf}} & \frac{\partial^2 \Pi_f}{\partial^2 q_{uf}} & \frac{\partial \Pi_f}{\partial q_{uf}}
\end{bmatrix}
\begin{bmatrix}
\frac{dq_{us}}{dt} \\
\frac{dq_{uf}^{us}}{dt} \\
\frac{dq_{uf}}{dt}
\end{bmatrix} = \begin{bmatrix}
0 \\
1
\end{bmatrix}
\]  \hspace{1cm} (33)

It is straightforward to show that:

\[ \frac{dq_{us}}{dt} > 0 \]  \hspace{1cm} (34)
\[
\frac{dq_f^{us}}{dt} < 0 \quad (35)
\]

\[
\frac{dP_{ms}}{dt} > 0 \quad (36)
\]

\[
\frac{dM_{ms}}{dt} > 0 \quad (37)
\]

\[
\frac{dMS_{ms}}{dt} > 0 \quad (38)
\]

The above comparative statics exercise illustrates that when an antidumping duty is placed on \( q_f^{us} \): (1) the quantity sold in the U.S. market by firm \( us \) increases, (2) the quantity sold in the U.S. market by firm \( f \) decreases, (3) the U.S. price of the good in question rises, and (4) the profits of firm \( us \) increase along with its market share.

Scenario 3 incorporates an antidumping duty which replicates the equilibrium in Scenario 2 without linking the duty rate to the foreign market price. That is, Scenario 3 illustrates a tariff that provides an identical level of protection to firm \( us \) as does Scenario 2, but which is not linked to the differential \( P_f - P_{us} \). The per-unit duty which accomplishes this is 20.0 (i.e., \( t = 20.0 \) in equations (31) and (32)). Under Scenario 2, firm \( f \) responds to the imposition of the antidumping law by cutting foreign prices and foregoing monopoly profit in that market to avoid paying duties. The burden of the antidumping law is financed in part by foreign reats. This can be seen in Table 2 as firm \( f \)'s home-market profits fall from 2500 in Scenario 1 (the monopoly-profit level) to 2400
in Scenario 2. In Scenario 3, however, firm $f$ retains monopoly power in its home market and earns a profit of 2500 there as the two markets again are segmented (as in Scenario 1).

The numerical solutions of Scenario 3 are presented in Table 3 together with the equilibrium values under Scenarios 1 and 2. The foreign firm prefers Scenario 2 to Scenario 3 as its profits are greater in Scenario 2. Scenario 2 is akin to the petition withdrawal scenario in that firm $f$, as a result of the antidumping law, restricts its U.S. output without the imposition of duties. Firm $us$ is indifferent between Scenarios 2 and 3 as are U.S. consumers. However, since there is a transfer from the foreign firm to the U.S. government in Scenario 3 in the form of tariff revenue ($400), Scenario 3 may be politically preferred to Scenario 2 by the U.S. government.

As evident from Table 3, the introduction of antidumping law into the unconstrained duopoly game (i.e., Scenario 1) alters the equilibrium. Whether, as in Scenario 2, firm $f$ is allowed to adjust its behavior so as to eliminate the price disparity between $P_f$ and $P_{us}$, or, as in Scenario 3, an antidumping duty is imposed on the foreign firm, the result is that the U.S. firm's profitability increases as does its market share relative to Scenario 1. Whether or not the market power of the U.S. plaintiffs change as a result of the outcome of an antidumping investigation is explored empirically in Chapter IV.
Table 3

Numerical Solutions to Scenarios 1, 2, and 3

<table>
<thead>
<tr>
<th></th>
<th>Scenario 1 (No AD Law)</th>
<th>Scenario 2 (AD Law)</th>
<th>Scenario 3 (AD Duty)</th>
</tr>
</thead>
<tbody>
<tr>
<td>$q_f^*$</td>
<td>50.0</td>
<td>60.0</td>
<td>50.0</td>
</tr>
<tr>
<td>$q_f^{us^*}$</td>
<td>33.3</td>
<td>20.0</td>
<td>20.0</td>
</tr>
<tr>
<td>$q_{us^*}$</td>
<td>33.3</td>
<td>40.0</td>
<td>40.0</td>
</tr>
<tr>
<td>$Q_{us^*}$</td>
<td>66.7</td>
<td>60.0</td>
<td>60.0</td>
</tr>
<tr>
<td>$P_f^*$</td>
<td>50.0</td>
<td>40.0</td>
<td>50.0</td>
</tr>
<tr>
<td>$P_{us^*}$</td>
<td>33.3</td>
<td>40.0</td>
<td>40.0</td>
</tr>
<tr>
<td>$\Pi_{us^*}$</td>
<td>1110.9</td>
<td>1600.0</td>
<td>1600.0</td>
</tr>
<tr>
<td>$\Pi_f^*$</td>
<td>3610.9</td>
<td>3200.0</td>
<td>2900.0</td>
</tr>
<tr>
<td>$MS_{us}^*$</td>
<td>0.5</td>
<td>0.67</td>
<td>0.67</td>
</tr>
<tr>
<td>$MS_f^*$</td>
<td>0.5</td>
<td>0.33</td>
<td>0.33</td>
</tr>
<tr>
<td>$CS_{us^*}$</td>
<td>2222.5</td>
<td>1800.0</td>
<td>1800.0</td>
</tr>
</tbody>
</table>
CHAPTER IV

THE ANTICOMPETITIVE CONSEQUENCES OF U.S. ANTIDUMPING LAW: EMPIRICAL EVIDENCE

IV.1 The Model

It was argued theoretically in Chapter III that the market power of U.S. plaintiffs in an antidumping investigation will: (1) increase when trade officials accept their petition and levy duties, (2) remain unchanged or fall when the antidumping petition is rejected, and (3) increase when domestic plaintiffs withdraw a petition. This chapter presents four case studies of industries which have utilized current antidumping law during the 1980s. The semiconductor industry and the tapered-roller-bearings industry both serve as an example of industries having had their antidumping petition accepted. The steel industry is presented as an example of U.S. plaintiffs who withdrew their petition once a VER had been negotiated among the U.S. firms, the foreign firms, and the U.S. government. The hydraulic cement industry is presented as a case study of plaintiffs who have had their antidumping petition rejected by U.S. trade officials. For each industry, the facts of the case are presented and an empirical market power test conducted.
Much of the previous empirical work testing the profits-concentration relationship utilized cross-sectional data for a large sample of industries in a given year. Such studies investigated the relationship between variations in industry profitability and various indicators of industry structure and conduct.\textsuperscript{55} The theoretical underpinnings for this approach was the “structure-conduct-performance” paradigm pioneered by Edward Mason and Joe Bain. According to this model, the structure of a particular market (exogeneously determined) leads to firm conduct within that market which determines market performance. As pointed out by Tirole (1990), though, the relationships that emerge from regressions based upon this paradigm must be viewed at best as “descriptive statistics” and not as causal relationships. Measures of performance (such as industry profitability), conduct (such as R&D or advertising expenditures), and structure (such as the number of sellers in the market) are jointly endogenous and must be determined simultaneously.\textsuperscript{56}

As a result of this simultaneity bias, the positive correlations found in these inter-industry cross-sectional studies between various measures of market conduct and profitability are difficult to interpret. In addition, the cross-sectional approach fails to account for the fact that different industries may face different price elasticities of demand. The shortcoming of this is that a highly concentrated industry with a relatively high price elasticity of demand will show a lower price-cost margin than an equally

\textsuperscript{55} Examples of such research can be found in Collins and Preston (1969) and Weisb (1974).

\textsuperscript{56} See Martin (1979) for a study which addresses this simultaneity problem.
concentrated industry with a lower price elasticity of demand. Failure to control for the differences in industry elasticities lessens the robustness of the findings which emerged from these studies.

In response to the inadequacies of the structure-conduct-performance model, more recent empirical research into the nature of market power has been at either the firm level or single-industry level. This approach avoids the shortcomings inherent in the structure-conduct-performance paradigm, and also allows one to separate the influence of firm market share and industry concentration on firm profitability. The results of such studies indicate that the positive effect of industry concentration on industry profitability found in the cross-sectional studies appear to have been spurious and reflect the effect of firm market share on firm profitability. Moreover, in firm-level regressions, neither the four-firm concentration ratio nor the Hirschman-Herfindahl index is positively associated with firm profitability when market share is included as an explanatory variable.\(^{57}\)

The specific model that will be used in this chapter for a test of market power was developed by Martin (1988). It is a firm-level empirical test for the difference between price and marginal revenue which will be significantly positive if a firm exercises market power. The test amounts to an estimation of the Lerner Index of monopoly power and is derived from information and techniques familiar in the

---

\(^{57}\) See Shepherd (1972) and Ravenscraft (1983) for studies estimating the effect of own market share on firm profitability. Scherer and Ross (1990) Chapter 11 provide a thorough treatment of the empirical literature on market structure and performance.
industrial organization literature (see Appendix B for a complete derivation of this model). The firm-level regression is

\[ PCM_i = \alpha_0 + \beta_1 MS_i + \beta_2 KSR_i + \beta_3 ISR_i + \beta_4 NSR_i + \epsilon_i \]  \hspace{1cm} (39)

where

- \( PCM \) = firm price-cost margin
- \( MS \) = firm U.S. market share
- \( KSR \) = firm capital stock-sales ratio
- \( ISR \) = firm ratio of interest expense to sales
- \( NSR \) = firm ratio of receipts from new stock issue to sales

All firm-specific variables in equation (39) except capital stock were obtained from Compustat (quarterly observations). Since accounting measures of capital stock are likely to be imprecise estimates of the economic value of such assets, capital stock values were obtained in much the same way as Martin (1988): namely, a base year Value Line accounting figure for capital stock is used, assuming depreciation according to the economic depreciation rates of Hulten and Wycoff (1981), adjusting for inflation according to the GNP deflator, and using Value Line figures for investment.59

---

58 Standard & Poor's Compustat is a financial database which tracks the performance of the majority of publicly-traded companies in the United States.

59 Value Line Investment Survey's Ratings and Reports contains detailed analysis on over 1700 stocks which are classified into 91 industry groups.
As shown in Appendix B, the test for market power depends on a combination of the first two coefficients in equation (39). To allow for estimates of market power before and after the resolution of an antidumping investigation, equation (39) can be estimated with an intercept dummy taking the value of 1 after the outcome has been determined and 0 otherwise; and also with an explanatory variable defined as the product of this dummy and firm market share. As a result, equation (39) becomes

\[ PCM_t = \alpha_0 + \beta_1 MS_i + \beta_2 KSR_t + \beta_3 ISR_t + \beta_4 NSR_t + \beta_5 D_t + \beta_6 D_t MS_t + \epsilon_t \]  

(40)

where

\[ D_t = \begin{cases} 1 & \text{after petition resolution} \\ 0 & \text{otherwise} \end{cases} \]

Table 21 of Appendix A summarizes the variables used in the estimation of equation 40 for all the firms studied in Chapter IV.2 through IV.4 below.
IV.2 A Study of Petition Acceptance

IV.2.1 The Semiconductor Industry

During the 1980s the steel industry in this country was viewed by many as "declining"; hence, its demand for protection during this period should not be surprising. The semiconductor industry, however, can hardly be viewed as "declining" during the 1980s in the same sense as the steel industry. Yet, during this period, the semiconductor industry successfully received protection under the antidumping statute. One possible explanation is that the semiconductor industry used antidumping law strategically, not only to increase its domestic market share and profitability but also to gain in the foreign market. Given the economies of scale that likely exist in such a high-tech industry, this may not be an unreasonable assertion.60

On September 9, 1985 an antidumping petition was filed by Advanced Micro Devices, Intel Corporation, and National Semiconductor Corporation against Japanese firms for allegedly dumping erasable programmable read only memory (EPROM) and dynamic random access memory (DRAM) semiconductor chips on the U.S. market. On July 30, 1986, the DOC suspended its antidumping investigation concerning these products and on July 31, 1986 the President announced that the U.S. and Japan had reached an agreement on semiconductor trade that, among other things, required the suspension of the ongoing antidumping investigation concerning EPROMs and DRAMs

60 This type of argument was advanced by Krugman (1984) in his paper discussing import protection as export promotion.
from Japan. This agreement called for Japanese producers and exporters to revise their U.S. prices to eliminate sales at LTFV. On August 26, 1986, however, the U.S. plaintiffs filed a request to continue the antidumping investigation. On October 30, 1986, the DOC issued its final determination that these products were being sold at LTFV; and, on December 29, 1986, the ITC issued its final injury determination affirming injury to the U.S. semiconductor industry. The effect of the affirmative determination by the ITC was to cause the terms of the 1986 Agreement (particularly the price floor on Japanese chip imports) to remain in force rather than having the ITC impose dumping duties. A negative determination would have rescinded the price floor contained in the Agreement.

I have estimated equation (40) for several of the leading U.S. semiconductor producers: Advanced Micro Devices, Intel Corporation, and Texas Instruments, Inc. National Semiconductor Corporation did not have a sufficient number of observations to allow for the implementation of the market power test. Texas Instruments, which was not a plaintiff in this investigation but nevertheless was a supporter of the petition, was

---

61 The Federal Register (52 FR 43146) discusses this Arrangement Concerning Trade in Semiconductor Products ("Arrangement") signed September 2, 1986 by President Reagan. This Arrangement addressed the lack of access of foreign-based companies (i.e., U.S. companies) to Japan's semiconductor market under section 301 of the Trade Act of 1974 (later called "Super 301" as amended by the 1988 Omnibus Trade and Competitiveness Act). It imposed duties on Japanese imports such as TVs and certain desktop computers until the Japanese semiconductor market became more open. Part of this Arrangement also imposed a price floor on both EPROMs and DRAMs much like a suspension agreement. However, since the semiconductor industry's antidumping petition completed the investigatory process, I treat this petition as accepted.

62 The main line of business for the U.S. plaintiffs in this investigation is Semiconductors and Related Devices as classified under SIC 3674.
substituted for National Semiconductor as Texas Instruments is a leading manufacturer of semiconductors. Adding Texas Instruments also allows me to test whether the imposition of antidumping duties benefits producers in the industry other than the plaintiff firms. That is, does the imposition of duties provide an "umbrella" for other firms in the industry? The data are from 1980.1 through 1991.4 (48 observations). The structural break during this period occurs in 1987.1 as the ITC's final affirmative injury decision was in December 1986.

Estimates of the market power statistics before and after the antidumping petition was accepted are presented in Table 4. These were obtained for each firm from the estimation of equation (40) (see Table 17 of Appendix A for the corresponding coefficient estimates). Each firm's market power statistic significantly increased after

<table>
<thead>
<tr>
<th>Firm</th>
<th>Market Power Statistic</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pre-Resolution</td>
</tr>
<tr>
<td>Advanced Micro Devices</td>
<td>0.2930</td>
</tr>
<tr>
<td>Intel Corporation</td>
<td>0.3801</td>
</tr>
<tr>
<td>Texas Instruments</td>
<td>0.3365</td>
</tr>
</tbody>
</table>
their antidumping petition was accepted and duties levied (Appendix C presents the statistical tests used in determining the significance of the market power statistics).63

The analysis developed in Appendix D suggests how the profitability of U.S. firms may be influenced by the foreign currency value of the dollar. There were significant losses in U.S. competitiveness both here and abroad in the early to mid 1980s due in large part to a substantial appreciation of the dollar on world financial markets. In the latter half of the 1980s, the dollar depreciated markedly somewhat reversing this loss in competitiveness. Equation (40) was re-estimated for each of the three semiconductor firms controlling for the volatility of the U.S. dollar during the 1980s. Since Japan was the major target of unfair trade complaints by the U.S. semiconductor industry during the 1980s (see Flanum (1993)), equation (40) was re-estimated for each of the firms controlling for the dollar/yen exchange rate. The “re-calculated” market power statistics are reported in Table 5 (see Table 17 of Appendix A for the corresponding coefficient estimates).64

63 All market power statistics reported in Table 4 are greater than zero at the 1% level of significance. Also, a t-test was conducted for all three semiconductor firms to test the null hypothesis that the difference between the Pre-Resolution and Post-Resolution market power statistic equals zero against the alternative that this difference is not equal to zero. The resulting t-statistics allow for rejection of the null hypothesis for each firm at the 1% level of significance (see Appendix C).

64 All market power statistics reported in Table 5 are greater than zero at the 1% level of significance. A t-test was conducted to test the null hypothesis that the difference between the Pre-Resolution and Post-Resolution market power statistic for each firm equals zero against the alternative that this difference is not equal to zero. The resulting t-statistics allow for rejection of the null hypothesis for each firm at the 1% level of significance (see Appendix C).
Table 5

Pre- and Post Petition Acceptance Market Power Statistics
(Controlling for the Cents/Yen Exchange Rate):
The Semiconductor Industry

<table>
<thead>
<tr>
<th>Firm</th>
<th>Market Power Statistic</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pre-Resolution</td>
<td>Post-Resolution</td>
</tr>
<tr>
<td>Advanced Micro Devices</td>
<td>0.2740</td>
<td>0.3577</td>
</tr>
<tr>
<td>Intel Corporation</td>
<td>0.3652</td>
<td>0.5684</td>
</tr>
<tr>
<td>Texas Instruments</td>
<td>0.2588</td>
<td>0.3181</td>
</tr>
</tbody>
</table>

The exchange rate variable reflects the dollar price of yen expressed in U.S. cents. The a priori expectation is that if this variable is significant it ought to have a positive coefficient. That is, dollar appreciation against the yen ought to be associated with lower U.S. semiconductor firm profitability and dollar depreciation against the yen ought to be associated with higher profitability. This exchange rate variable was included in equation 40 to see how much of the variability in firm profitability is explained by the variation in the cents/yen exchange rate, and how the computed "market power statistics" change when equation 40 controls for the dollar volatility against the yen.65

---

65 The coefficient of the cents/yen exchange rate variable had the correct sign for two of the three semiconductor firms. However, for all three firms the coefficient of this variable was insignificant.
The rationale for including the exchange rate variable in equation 40 was to see if the significant increase in the market power statistic for each firm subsequent to the ITC affirmative injury decision could be "explained away" by controlling for the cents/yen volatility. As seen in Table 5, each firm's market power statistic still increases subsequent to receiving protection under the antidumping statute even when equation 40 controls for the cents/yen exchange rate. It interesting to note that for Intel and Texas Instruments, the magnitude of the market power statistics both before and after the antidumping petition was accepted are smaller in Table 5 than in Table 4. Why might the inclusion of the cents/yen variable cause the market power statistics to fall for two of the three semiconductor firms for the two sub-periods relative to when equation 40 did not control for this?

As Flamm (1993) discusses, during the 1980s the majority of the allegations of unfair trade complaints voiced by U.S. semiconductor producers were directed at Japanese firms. In the early to mid 1980s, successful coordinated restraint on exports by Japanese semiconductor producers usually occurred after U.S. manufacturers threatened to initiate unfair trade actions against them. The appreciation of the dollar against the yen during this period was the likely force behind such trade friction. When the dollar was depreciating against the yen in the latter part of the 1980s, one would expect the profitability of U.S. firms to increase and their market power to be augmented as relative prices changed in favor of U.S.-made semiconductors. When equation (40) controls for the variability in the cents/yen exchange rate, the market power statistics of Intel and
Texas Instruments reported in Table 5 are lower than those reported in Table 4 as some of the market power, both before and after the petition resolution, is accounted for by movements in the exchange rate, and not the protection received through the antidumping statute.

IV.2.2 The Tapered-Roller-Bearings Industry

During the 1980s a lot of activity was occurring on the trade front in the U.S. semiconductor industry (see Flamm (1993)). The repeated threats of trade sanctions and the signing of the 1986 Semiconductor Trade Agreement may be seen as confounding events unique to this industry which helped generate the above market power results. Therefore, this section presents a second case study of an industry which succeeded in having antidumping duties levied against “dumped” imports. This investigation concerned “tapered roller bearings and parts thereof, and certain housings incorporating tapered roller bearings” from Hungary, Italy, Japan, the People’s Republic of China, Romania, and Yugoslavia. The domestic plaintiff was The Timken Company. The antidumping petition was filed on August 25, 1986. On September 23, 1987 the ITC issued an affirmative final injury determination, and on October 6, 1987 the DOC issued the antidumping duty order.

The Timken Company is the world’s largest producer of tapered roller bearings for the auto, truck, machinery, construction, and railroad industries. There were 10

\[66\] The Timken Company invented the modern tapered roller bearing and patented it in 1898.
producers that manufactured tapered roller bearings during the course of the investigation (i.e., 1983-87), but Timken historically has dominated the U.S. industry accounting for well over half of U.S. industry sales. Timken is the only fully integrated U.S. tapered-roller-bearing producer, supplying tubing and wire for its bearing production from its steel facilities.

I have estimated equation (40) for The Timken Company. The data are from 1982.1 through 1992.4 (44 observations). The structural break during this period occurs in 1987.4 as the ITC's final affirmative decision was in September 1987. Estimates of the market power statistic before and after the antidumping petition was accepted are presented in Table 6 (see Table 18 of Appendix A for the corresponding coefficient estimates). Timken's market power increased significantly as a result of having its petition accepted and duties levied.67

<table>
<thead>
<tr>
<th>Firm</th>
<th>Market Power Statistic</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pre-Resolution</td>
<td>Post-Resolution</td>
</tr>
<tr>
<td>Timken</td>
<td>0.3677</td>
<td>0.4302</td>
</tr>
</tbody>
</table>

67 The market power statistics presented for The Timken Company in this section are greater than zero at the 1% level of significance. Also, a t-test was conducted to test the null hypothesis that the difference between the Pre-Resolution and Post-Resolution market power statistic in Table 6 equals zero against the alternative that this difference is not equal to zero. The resulting t-statistic allows for rejection of the null hypothesis at the 1% level of significance (see Appendix C).
As in the case of semiconductors, when equation (40) control for the cents/yen exchange rate, Timken's market power statistic decreases both before and after the petition resolution relative to when equation 40 did not control for this. That is, some of the market power is "explained away" by movements in the exchange rate. In fact, when equation 40 controls for the cents/yen exchange rate, the increase in Timken's market power statistic is no longer significant as a result of having its antidumping petition accepted and duties levied. That is, the depreciation of the dollar against the yen in the second half of the 1980s accounts for most of the increase in Timken's market power exhibited in Table 6. The "re-calculated" market power statistics for The Timken Company are reported in Tables 7.

Table 7

Pre- and Post Petition Acceptance Market Power Statistics (Controlling For the Cents/Yen Exchange Rate):
The Timken Company

<table>
<thead>
<tr>
<th>Firm</th>
<th>Market Power Statistic</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pre-Resolution</td>
</tr>
<tr>
<td>Timken</td>
<td>0.2754</td>
</tr>
</tbody>
</table>

68 The importance of the cents/yen exchange rate is explained by the fact that Japanese imports of tapered roller bearings comprised the majority of the imports subject to investigation. The percentage of Japanese imports relative to all imports subject to the investigation was 77% in 1983, 78% in 1984, 77% in 1985, and 63% in 1986.

69 A t-test was conducted to test the null hypothesis that the difference between the Pre-Resolution and Post-Resolution market power statistic in Table 7 equals zero against the alternative that this difference is not equal to zero. The resulting t-statistic does not allow for rejection of the null hypothesis.
IV.3 A Study of Petition Withdrawal: The Steel Industry

In the last 20 years or so the steel industry has been very active in protection-seeking activities.\textsuperscript{70} A drop in world steel prices in 1975, coupled with a 1975 steel VER between Japan and the EC, precipitated an increase in the imports of steel into the U.S. market during the late 1970s. As a result, U.S. steel producers successfully sought protection from these imports.

On December 6, 1977 President Carter approved implementation by the Treasury Department of a Trigger Price Mechanism (TPM) to monitor import prices of steel mill products.\textsuperscript{71} Effective January 1, 1978 the first Trigger Price Mechanism (TPM) was enacted. Production costs of steel mill products in Japan, deemed to be the most efficient producers in the world, formed the basis of the trigger prices. Imports priced below trigger prices were considered potential sales at LTFV. If substantial quantities of steel mill products entered the U.S. below the applicable trigger prices, an antidumping investigation could be "triggered" by the DOC on its own motion. In essence, the TPM established a price floor for imported steel based on Japanese production costs plus a markup for transportation costs and profit. Not satisfied with the 1978 TPM, U.S. Steel Corporation filed both antidumping and countervailing duty petitions in April 1980 against steel producers in numerous EC countries. The Carter

\textsuperscript{70} This overview of the protection-seeking activities of the steel industry is based upon information provided in Lenway and Schuler (1991), de Melo and Tarr (1992), and various ITC documents.

\textsuperscript{71} Responsibility for administering the TPM was transferred to the Department of Commerce on January 2, 1980.
administration rescinded the TPM on March 1980 in response to these filings by U.S. Steel. On October 8, 1980, following the withdrawal of the antidumping complaints, the TPM was reinstated with 12% higher trigger prices.

This second TPM proved to be unsatisfactory to the steel industry. In January 1982, seven domestic steel firms filed numerous antidumping and countervailing duty complaints against steel firms located mostly in Europe, but also in Asia and South America. The petitions against firms from EC countries were withdrawn only after a VER was negotiated limiting them to 5.5% of the U.S. market. This VER took effect on November 1, 1982 and was to run until December 31, 1985. U.S. steel producers continued to pursue unfair trade actions against non-EC exporters. By November 1985, 15 VERs had been negotiated covering 80% of U.S. steel imports, and were to last for a five-year period.

On July 25, 1989 President Bush announced a Steel Trade Liberalization Program under which the existing VERs were extended until March 31, 1992. The President directed the U.S. Trade Representatives Office to negotiate VERs at an overall restraint level of 18.4% (the 1988 VER import-penetration level). Also, the President authorized an additional 1% import penetration annually that would be available to certain countries that entered into Bilateral Consensus Agreements (BIAs) on tariffs, subsidies, and other non-tariff measures.72

72 When the VERs were extended in 1989, the U.S. sought to address the causes of unfair trade and reduce subsidization and over capacity in the steel industry. The BIAs were commitments by countries to prohibit most subsidies for their steel industry, reduce tariff and nontariff barriers to steel trade, and incorporate a binding arbitration mechanism for trade disputes. The BIAs were to have been
On March 30, 1992, most foreign companies' limitations of steel exports to the U.S. expired. In June 1992 twelve major U.S. steel producers (later joined by the United Steelworkers union) responded by filing antidumping petitions against 20 countries (and countervailing duty petitions against 13 countries). Subsequent to these filings, the DOC issued a final affirmative LTFV determination against 19 of the countries with estimated dumping margins as high as 109%. The FTC, however, found that only half of the cases in which sales were at LTFV were injurious to the domestic steel injury.

I have estimated equation (40) for several of the leading U.S. steel producers that were active in filing antidumping petitions during the 1980s: Armco, Incorporated, Bethlehem Steel Corporation, and LTV Corporation. Armco is a major U.S. integrated steel producer manufacturing stainless steel and steel products, processed carbon steel sheet and strip, and low-carbon flat-rolled steels (through a joint venture with Kawasaki Steel). Bethlehem is the second largest domestic integrated steel producer. LTV, the third largest U.S. steel company, is a fully integrated steel producer and one of the largest suppliers of hot and cold rolled steel sheet for the automotive and consumer durable markets. The company recently regained its financial viability as it

---

73 The main line of business for the plaintiffs in this investigation is Blast Furnaces and Steel Mills as classified under SIC 3312.
had been operating under Chapter 11 of the U.S. Bankruptcy Code since 1986. These three firms are the only steel companies with enough available historical data to allow for the implementation of the market power test.74 The data are from 1978.1 through 1989.4 (48 observations). The structural break during this period occurs in 1983.1. This is so because it was in November 1982 that the VER with EC steel producers, the majority of the defendants in the unfair trade complaints, was negotiated. Estimates of the market power statistic before and after the antidumping petition was withdrawn are presented in Table 8. These were obtained for each firm from the estimation of equation (40) (see Table 19 of Appendix A for the corresponding coefficient estimates).75

74 The most active protection-seeking steel firm during the 1980s was U.S. Steel, the nation’s largest integrated steelmaker. In 1986 it changed its name from U.S. Steel to USX Corporation to reflect its move into the energy business, which has accounted for more than 50% of its revenues since the 1982 acquisition of Marathon Oil Company. During the 1982-1989 period, financial information was reported only for USX as a whole. As a result, there is no data specific to U.S. Steel for the 1982-89 period. Recently, however, shareholders of USX approved the conversion of USX common stock into two new classes to reflect the separate performances of the company’s energy and steel businesses. USX-U.S. Steel Group (X, NYSE) comprises USX’s steel segment, still the largest U.S. integrated steelmaker.

75 All market power statistics reported in Table 8 are greater than zero at the 1% level of significance. Also, a t-test was conducted for all three steel firms to test the null hypothesis that the difference between the Pre-Resolution and Post-Resolution market power statistic equals zero against the alternative that the difference is not equal to zero. For Bethlehem and LTV, the resulting t-statistic allow for rejection of the null hypothesis at the 1% level of significance. For Armco, the null hypothesis of equal market power statistics for the two periods cannot be rejected (see Appendix C).
Table 8

Pre- and Post Petition Withdrawal Market Power Statistics:
The Steel Industry

<table>
<thead>
<tr>
<th>Firm</th>
<th>Market Power Statistic</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pre-Resolution</td>
<td>Post-Resolution</td>
</tr>
<tr>
<td>Arnco Steel</td>
<td>0.0663</td>
<td>0.0696</td>
</tr>
<tr>
<td>Bethlehem Steel</td>
<td>0.4618</td>
<td>0.8828</td>
</tr>
<tr>
<td>LTV Corporation</td>
<td>0.1463</td>
<td>0.1027</td>
</tr>
</tbody>
</table>

Despite the large increase in market power for Bethlehem subsequent to the petition withdrawal (and the marginal increase for Arnco), LTV's market power appears to have slipped post-petition withdrawal.

The information in Table 8 provides at best mixed evidence in support of Prusa's (1990, 1992) contention that U.S. firms withdraw antidumping petitions only after achieving some sort of collusive arrangement with the foreign defendants. Why might this be? The likely reason is that the industry selected for the case study of petition withdrawal is not a good "choice" primarily because it may be in decline for reasons other than the "dumping" of foreign steel.\(^6\) In fact, Prusa and Hansen (1993) provide

\(^6\) An industry which withdrew an antidumping petition of its own volition prior to the completion of the investigation, and without any VER being negotiated by the U.S. government, would be the preferred choice for this scenario. However, due to data availability constraints this was not possible. Also, because the majority of petition withdrawal cases are from the steel industry (most of which have
strong evidence for this occurrence. They find that industries using either the unfair trade laws or the "escape clause" to secure protection are declining industries, and restraining foreign trade does not reverse this decline.\textsuperscript{77} Since declining industries are the ones most likely to seek administrative protection, they also are the ones most likely to exhibit injury and obtain protection (even though the injury may not be causally related to imports). So, even if firms are able to negotiate a favorable price/quantity revision with the defendants (either under the auspices of the U.S. government or privately), this may not translate into increased market power for firms in an industry declining for reasons unrelated to import penetration.

Equation (40) was re-estimated for Armco, Bethlehem, and LTV controlling for the volatility of the dollar in order to ascertain what impact, if any, this might have on the market power statistics for these firms. This was accomplished by including an index reflecting the trade-weighted foreign currency value of the dollar as an explanatory variable.\textsuperscript{78} The results (not reported) are consistent with the analysis above. Namely, when equation (40) controls for the dollar's volatility, the market power statistic for

\textsuperscript{77} The "escape clause" or "safeguard" protection, contained in both U.S. trade law (Section 201 of the Trade Act of 1974) and international rules of the GATT (Article XIX), is supposed to provide temporary relief from import surges that harm domestic industries without a finding of "unfairness" by the foreign competitor.

\textsuperscript{78} The index used is reported in the Federal Reserve Bulletin and represents the weighted-average exchange value of the dollar against the currencies of ten industrial countries. The weight for each of the ten countries is the 1972-76 average world trade of that country divided by the average world trade of all ten countries combined.
Armco does not change significantly while that of LTV decreases. The market power statistic for Bethlehem still exhibits a significant increase after the antidumping petition is withdrawn.

IV.4 A Study of Petition Rejection: The Hydraulic Cement Industry

On October 30, 1986 an antidumping petition was filed on behalf of the American Cement Trade Alliance alleging that an industry in the U.S. is materially injured or threatened with material injury by reasons of LTFV imports of portland hydraulic cement and cement clinker. In December 1986 the ITC issued a preliminary determination in which they found no reasonable indication that an industry in the U.S. was materially injured or threatened with material injury due to the alleged "dumped" imports.

Portland hydraulic cement consists mainly of compounds of calcium and silica which, when mixed with water, sand, and stone, chemically react to form concrete. Cement clinker is an intermediate material formed in the process and used to produce portland hydraulic cement. Of the four major categories of hydraulic cement, portland hydraulic cement accounts for approximately 95% of domestic production.

79 The defendants in the investigation were Columbia, France, Greece, Japan, Mexico, The Republic of Korea, Spain, and Venezuela.

80 The name "portland" was given in 1824 by Joseph Aspdin, a bricklayer of Leeds, England, to a hydraulic lime that he patented because when set with water and sand it resembled a natural limestone quarried on the Isle of Portland, England. "Hydraulic" cements are distinguished from nonhydraulic cements by the fact that they will harden under water.
In order to implement the market power test, several of the largest U.S. cement producers were researched. However, only two firms had enough publicly available data for the analysis to be carried out. These two firms are Lafarge, Corporation and Southdown, Incorporated. Lafarge is the second-largest cement producer in North America with 15 cement plants. It is majority-owned by France's Lafarge Corp., SA. It is also a significant supplier of concrete-based construction materials. Southdown is the nation's third-largest cement and ready-mix concrete producer. The data are from 1983.1 through 1992.4 (40 observations). The structural break during this period occurs in 1987.1. Estimates of the market power statistics before and after the petition was rejected are presented in Table 9. These were obtained for each firm from the estimation of equation (40) (see Table 20 for the corresponding coefficient estimates).

Table 9
Pre- and Post Petition Rejection Market Power Statistics: The Hydraulic Cement Industry

<table>
<thead>
<tr>
<th>Firm</th>
<th>Market Power Statistic</th>
<th>Pre-Resolution</th>
<th>Post-Resolution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lafarge</td>
<td></td>
<td>0.4347</td>
<td>0.4122</td>
</tr>
<tr>
<td>Southdown</td>
<td></td>
<td>0.4081</td>
<td>0.3922</td>
</tr>
</tbody>
</table>

81 The main line of business for these two firms is Hydraulic Cement as classified under SIC 3241.
The market power for both firms decreased significantly as a result of having their antidumping petition rejected.\textsuperscript{82}

\section*{IV.5 Concluding Remarks}

This chapter employs an empirical method for testing the anticompetitive nature of U.S. antidumping law. The market power consequences for firms seeking this type of protection were examined for each of the three possible outcomes of an antidumping investigation: petition accepted, petition rejected, and petition withdrawn. For each of these outcomes an industry case study is presented and the market power test conducted. As expected in the case of petition acceptance, the rents of the protection-seeking firms increased. All three of the leading semiconductor firms under study experienced an increase in market power subsequent to a final affirmative injury determination by the ITC. This result was replicated in the analysis of the tapered-roller-bearing industry. The steel industry was presented as an example of plaintiffs withdrawing their antidumping petition prior to the final resolution of the case. While providing less than convincing evidence that these firms experienced an increase in market power, it was argued in the chapter that the industry studied was less than ideal.

\textsuperscript{82} All market power statistics reported in Table 9 are greater than zero at the 1\% level of significance. Also, a $t$-test was conducted for both firms to test the null hypothesis that the difference between the Pre-Resolution and Post-Resolution market power statistic equals zero against the alternative that the difference is not equal to zero. For both companies, the $t$-test allows for rejection of the null hypothesis at the 1\% level of significance. Since there is evidence that positive serial correlation exists in the
for this scenario. Finally, the portland hydraulic cement industry was presented as an industry that had its antidumping petition rejected by trade officials. There is evidence that such firms do experience a diminution of market power.
CHAPTER V

THE POLITICAL ECONOMY OF ANTIDUMPING LAW

V.1 The Popularity of Current U.S. Antidumping Law

During the 1980s the U.S. filed an unprecedented number of antidumping complaints against foreign rivals, and more than ever these petitions are being either accepted or withdrawn.\textsuperscript{13} Anderson (1993a, 1993b) finds that there were 197 outstanding antidumping duty orders at the end of 1990. This is almost double the number in 1983; in 1968, there were less than twenty-five. Finger (1993) offers a detailed exposition on the origins and evolution of antidumping law among nations. It is evident from this perspective that allegations of dumping are not a new phenomena but have been advanced in the past primarily as a means to secure nondiscriminatory tariff protection. With the GATT's prohibition on unilateral tariff enactment, however, allegations of dumping now are addressed through administrative protection programs. Such nontariff trade barriers often result in tariffs being levied in a discriminating manner.

\textsuperscript{13}To illustrate this, Finger (1993) finds that of the 706 antidumping investigations undertaken in this country from 1921 through 1967, all but 75 had ended with a negative determination. The preference for petition withdrawal was at its height during the first half of the 1980s, and only became a viable option for U.S. plaintiffs subsequent to the Trade Agreement Act of 1979.
against the defendants in an investigation. And since U.S. firms are the ones who initiate such investigations (the most popular of which is current antidumping law), political economy considerations are integral to understanding the preference U.S. firms have exhibited for this statute.\footnote{While the Department of Commerce reserves the right to initiate an unfair trade action of its own volition, it rarely has done so. One notable exception was the antidumping complaint levied against Japan involving DRAMs of 256 KB (and above) in December 1985.}

Table 10 gives the numbers of antidumping, countervailing duty (CVD), and escape clause investigations in the U.S. during 1980-91. For this period, there were 541 antidumping petitions filed, 301 CVD petitions filed, and only 25 escape clause investigations.\footnote{During 1980 and 1982 U.S. steel firms filed a massive number of antidumping petitions against a host of defendants. They also simultaneously filed countervailing duty (CVD) petitions against the same defendants in an apparent effort to "overload the system." This ploy succeeded. In 1980 the Trigger Price Mechanism was reinstated, and in 1982 a VER was implemented (see Chapter IV.3). Given this ploy by the steel industry, the number of "genuine" CVD investigations may be overstated in Table 10.} The most popular means of attempting to secure import relief during this period is through the antidumping statute. Furthermore, it is interesting to see which industries are the most frequent users of this law. Table 11 shows which industries (by TSUSA code) have had their antidumping petition accepted most frequently, Table 12 shows which industries have withdrawn their petitions most frequently, and Table 13 shows which industries have had their petitions rejected most frequently. These tables illustrate that the Metals and Metals Products industry (MMP) has been the heaviest user of antidumping law for the period 1980-91 accounting for
### Table 10

Numbers of Antidumping, Countervailing Duty (CVD), and Escape Clause Investigations in the United States, 1980-91

<table>
<thead>
<tr>
<th>Year</th>
<th>Antidumping</th>
<th>CVD</th>
<th>Escape Clause</th>
</tr>
</thead>
<tbody>
<tr>
<td>1980</td>
<td>37</td>
<td>68</td>
<td>6</td>
</tr>
<tr>
<td>1981</td>
<td>15</td>
<td>7</td>
<td>1</td>
</tr>
<tr>
<td>1982</td>
<td>65</td>
<td>115</td>
<td>3</td>
</tr>
<tr>
<td>1983</td>
<td>46</td>
<td>8</td>
<td>1</td>
</tr>
<tr>
<td>1984</td>
<td>74</td>
<td>26</td>
<td>6</td>
</tr>
<tr>
<td>1985</td>
<td>63</td>
<td>31</td>
<td>3</td>
</tr>
<tr>
<td>1986</td>
<td>71</td>
<td>20</td>
<td>2</td>
</tr>
<tr>
<td>1987</td>
<td>15</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>1988</td>
<td>42</td>
<td>8</td>
<td>1</td>
</tr>
<tr>
<td>1989</td>
<td>23</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td>1990</td>
<td>43</td>
<td>5</td>
<td>1</td>
</tr>
<tr>
<td>1991</td>
<td>47</td>
<td>6</td>
<td>1</td>
</tr>
</tbody>
</table>

**1980-91 total:**

|          | 541 | 301 | 25 |

**1982-1986 subtotal:**

|          | 319 | 200 | 15 |

**1987-1991 subtotal:**

|          | 170 | 26  | 3  |

Source: Compiled by author from ITC's Annual Reports, 1980-92.
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>100 Animal/vegetable products</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>1</td>
<td>8</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>14</td>
</tr>
<tr>
<td>200 Wood, paper and printed matter</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>300 Textile fibers and products</td>
<td>2</td>
<td>0</td>
<td>2</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>4</td>
<td>3</td>
<td>0</td>
<td>2</td>
<td>15</td>
</tr>
<tr>
<td>400 Chemicals</td>
<td>4</td>
<td>1</td>
<td>2</td>
<td>6</td>
<td>1</td>
<td>0</td>
<td>6</td>
<td>3</td>
<td>2</td>
<td>8</td>
<td>4</td>
<td>2</td>
<td>39</td>
</tr>
<tr>
<td>500 Nonmetallic metals</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>600 Metals and metal products</td>
<td>2</td>
<td>4</td>
<td>9</td>
<td>12</td>
<td>4</td>
<td>21</td>
<td>28</td>
<td>5</td>
<td>15</td>
<td>1</td>
<td>8</td>
<td>11</td>
<td>120</td>
</tr>
<tr>
<td>700 Misc. products</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>4</td>
<td>2</td>
<td>12</td>
</tr>
<tr>
<td>TOTAL</td>
<td>9</td>
<td>5</td>
<td>13</td>
<td>19</td>
<td>9</td>
<td>26</td>
<td>43</td>
<td>8</td>
<td>22</td>
<td>14</td>
<td>19</td>
<td>18</td>
<td>205</td>
</tr>
</tbody>
</table>
TABLE 12

Antidumping Case Summary for WITHDRAWN petitions, 1980-91, by TSUSA Code

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>100 Animal/vegetable products</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>200 Wood, paper and printed matter</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>300 Textile fibers and products</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>400 Chemicals</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>0</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>9</td>
</tr>
<tr>
<td>500 Nonmetallic metals</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>600 Metals and metal products</td>
<td>10</td>
<td>4</td>
<td>30</td>
<td>3</td>
<td>39</td>
<td>17</td>
<td>5</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>113</td>
</tr>
<tr>
<td>700 Misc. products</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>TOTAL</td>
<td>10</td>
<td>4</td>
<td>30</td>
<td>5</td>
<td>40</td>
<td>18</td>
<td>7</td>
<td>2</td>
<td>0</td>
<td>3</td>
<td>3</td>
<td>5</td>
<td>127</td>
</tr>
</tbody>
</table>
TABLE 13

Antidumping Case Summary for REJECTED petitions, 1980-91, by TSUSA Code

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>100 Animal/vegetable products</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>5</td>
<td>3</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>200 Wood, paper and printed matter</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>9</td>
<td>0</td>
<td>12</td>
</tr>
<tr>
<td>300 Textile fibers and products</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>5</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>5</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>12</td>
</tr>
<tr>
<td>400 Chemicals</td>
<td>10</td>
<td>0</td>
<td>2</td>
<td>2</td>
<td>3</td>
<td>3</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>1</td>
<td>1</td>
<td>28</td>
</tr>
<tr>
<td>500 Nonmetallic metals</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>14</td>
<td>2</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>23</td>
</tr>
<tr>
<td>600 Metals and metal products</td>
<td>6</td>
<td>5</td>
<td>13</td>
<td>8</td>
<td>12</td>
<td>12</td>
<td>4</td>
<td>2</td>
<td>5</td>
<td>3</td>
<td>10</td>
<td>20</td>
<td>100</td>
</tr>
<tr>
<td>700 Misc. products</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>2</td>
<td>4</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>7</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>17</td>
</tr>
<tr>
<td>TOTAL</td>
<td>18</td>
<td>6</td>
<td>22</td>
<td>22</td>
<td>25</td>
<td>19</td>
<td>21</td>
<td>5</td>
<td>20</td>
<td>6</td>
<td>21</td>
<td>24</td>
<td>209</td>
</tr>
</tbody>
</table>
roughly 60% of the accepted cases and 90% of the withdrawn cases. The chemical industry is the second heaviest user of antidumping law. 86

V.2 Previous Studies

The objective of this chapter is to determine empirically which factors are significant in the ITC Commissioners' material injury decisions during 1980-91.87 Various factors have been discussed in the literature which may enhance the probability of trade officials ruling in favor of U.S. plaintiffs in an antidumping investigation. These include, but are not limited to, the criteria encoded by Congress in the Trade Agreements Act of 1979. A probit model is estimated to ascertain the significance of such factors in explaining the outcome of antidumping investigations for the period 1980-91.88

Several recent papers have addressed this issue. The two most relevant to my investigation are Moore (1992) and Anderson (1993a) who both employ standard probit estimation techniques to test their hypotheses. Moore (1992) analyzes individual commissioner votes in antidumping injury decisions from 1980 to 1986, and tests

86 These findings mimic those of Prusa (1991) who did a similar classification for the period 1980-88.

87 There are six ITC commissioners who are appointed by the President and confirmed by the Senate. No more than three commissioners may be from the same political party, and all ITC determinations are reviewable by the U.S. Court of International Trade.

88 A probit model is used due to the dichotomous nature of the dependent variable which equals 1 if the ITC commissioners find material injury, and zero otherwise.
whether the ITC votes are based only on the economic criteria consistent with the enabling legislation (his null hypothesis), or whether other political-economic variables come into play (his alternative hypothesis). His results primarily support the null hypothesis. However, there is evidence that factors not set forth in the antidumping law also influence commissioners’ decisions. The most interesting of these is that petitions having plaintiffs’ production facilities located in a Senate trade subcommittee member’s constituency are more likely to receive protection.\textsuperscript{89} Anderson (1993a) investigates whether ITC decisions are based upon agency discretion or statutory requirements. In contrast to Moore he finds that, on average, commission decisions are not based on political considerations not set forth in the antidumping statute. In particular, Anderson measures an industry’s influence with the relevant trade subcommittee by including variables that represent the number of members on such subcommittees that have plaintiffs’ production facilities located in their district. These variables have both negative but insignificant coefficients. The probit model estimated in this chapter extends the work of Moore in two ways. First, ITC decisions are analyzed over a longer time period (i.e., 1980-91). Second, a more comprehensive set of explanatory variables is considered.

\textsuperscript{89} The Senate Finance Committee and the House Ways and Means Committee both have oversight over the ITC via their respective trade subcommittees. However, as Moore cautions, the significance of the Senate variable must be viewed cautiously, especially since a negative and significant coefficient on the corresponding dummy variable for the House was obtained. In addition, Anderson’s (1993a) Congressional representation variables have negative rather than positive signs attached to them (but are insignificant).
V.3 Factors Which May Influence the ITC Commissioners' Decisions

Table 14 lists and defines the explanatory variables used in the probit analysis together with the expected signs of their coefficients. The ITC is instructed to consider whether or not "an industry in the United States is materially injured or threatened with material injury, or that the establishment of an industry is being materially retarded by reasons of allegedly dumped imports."90 The antidumping statute instructs the ITC to consider such factors as declining output, sales, market share, profits, and capacity utilization in making an injury determination. Since the law instructs that declines in these variables be considered, Table 14 lists "changes" in the relevant economic variables, as well as controlling for their levels.91

For the period 1980-91, ninety-one antidumping investigations were found to contain a complete set of observations for the variables listed in Table 14. Figure 5 illustrates the distribution of these cases over the time period. All variables except 11 and 12 were obtained directly from a reading of the ITC material injury reports. Observations on changes in the unemployment rate (variable 11) and real GNP (variable 12) were obtained from The Economic Report of the President and the Survey of Current Business, respectively.

The twenty-one variables in Table 14 are divided into three groups. The first group of variables are expressed in "changes" form. The Commission reports trends in

90 Supra note 7.

91 See Frasa (1991), Moore (1992), and Anderson (1993a) for a discussion of this issue.
Table 14

Explanatory Variables in the Probit Analysis

1. Changes

<table>
<thead>
<tr>
<th>Number</th>
<th>Variable Name</th>
<th>Variable Definition</th>
<th>Expected Sign</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>PROD</td>
<td>Production of Domestic Industry</td>
<td>-</td>
</tr>
<tr>
<td>2</td>
<td>CU</td>
<td>Capacity Utilization</td>
<td>-</td>
</tr>
<tr>
<td>3</td>
<td>EMP</td>
<td>Employment of Production and Related Workers</td>
<td>-</td>
</tr>
<tr>
<td>4</td>
<td>WAG</td>
<td>Hourly Wages or Total Compensation</td>
<td>-</td>
</tr>
<tr>
<td>5</td>
<td>PROF</td>
<td>U.S. Industry's Profitability</td>
<td>-</td>
</tr>
<tr>
<td>6</td>
<td>USMS</td>
<td>U.S. Industry's Market Share</td>
<td>-</td>
</tr>
<tr>
<td>7</td>
<td>DIMP</td>
<td>Volume of Defendants' Imports</td>
<td>+</td>
</tr>
<tr>
<td>8</td>
<td>AIMP</td>
<td>Volume of All Imports</td>
<td>0</td>
</tr>
<tr>
<td>9</td>
<td>EXP</td>
<td>Exports of U.S. Industry</td>
<td>0</td>
</tr>
<tr>
<td>10</td>
<td>REX</td>
<td>Real Exchange Rate</td>
<td>-</td>
</tr>
<tr>
<td>11</td>
<td>UNEM</td>
<td>Unemployment Rate</td>
<td>+</td>
</tr>
<tr>
<td>12</td>
<td>RGNP</td>
<td>Real GNP</td>
<td>-</td>
</tr>
</tbody>
</table>
Table 14 (Continued)

Explanatory Variables in the Probit Analysis

II. Levels

<table>
<thead>
<tr>
<th>Number</th>
<th>Variable Name</th>
<th>Variable Definition</th>
<th>Expected Sign</th>
</tr>
</thead>
<tbody>
<tr>
<td>13</td>
<td>PRW</td>
<td>Number of Production and Related Workers (PRWs)</td>
<td>?</td>
</tr>
<tr>
<td>14</td>
<td>NUM</td>
<td>Number of Firms in Industry</td>
<td>-</td>
</tr>
<tr>
<td>15</td>
<td>USMSL</td>
<td>U.S. Industry’s Market Share</td>
<td>-</td>
</tr>
<tr>
<td>16</td>
<td>PROFL</td>
<td>U.S. Industry’s Profitability</td>
<td>-</td>
</tr>
<tr>
<td>17</td>
<td>NSTATES</td>
<td>Number of States Represented by the Plaintiffs</td>
<td>+</td>
</tr>
</tbody>
</table>

III. Dummy Variables

<table>
<thead>
<tr>
<th>Number</th>
<th>Variable Name</th>
<th>Variable Definition</th>
<th>Expected Sign</th>
</tr>
</thead>
<tbody>
<tr>
<td>18</td>
<td>ASIAN</td>
<td>1 if Defendants are Asian 0 otherwise</td>
<td>0</td>
</tr>
<tr>
<td>19</td>
<td>INT</td>
<td>1 if Intermediate Good 0 otherwise</td>
<td>+</td>
</tr>
<tr>
<td>20</td>
<td>CVD</td>
<td>1 if CVD Petition Filed 0 otherwise</td>
<td>+</td>
</tr>
<tr>
<td>21</td>
<td>MULT</td>
<td>1 if More Than 2 Defendants 0 otherwise</td>
<td>+</td>
</tr>
</tbody>
</table>
FIGURE 5

Distribution of Antidumping Investigations for Probit Analysis, 1980-91
variables 1-10 usually for a two year period prior to their report. Therefore, all variables in group I are calculated as the percent change over the two year period ending with the last full year of the ITC's period of investigation. When variables in group I are already in percentage form (such as market shares and profit margins), the difference in percentages is used. The second group of variables are reported in "levels" and are used to scale certain variables from group I. The last group consists of four dummy variables that the author feels may increase the probability of observing an affirmative ITC material injury decision (as discussed below).

In the first group of variables, the expected sign associated with variables 1-6 reflect the idea that ITC Commissioners are more likely to find material injury for domestic industries faced with falling production, capacity utilization, employment, wages, profitability, and market share (even though there may not be a casual link between the domestic industry's performance and imports). An increase in the volume of the defendants' imports (variable 7) is expected to be associated with an affirmative injury determination. Changes in the volume of all like-product imports (variable 8) serves as a control for variable 7, but should have no influence on the ITC decision as these imports are not the subject of investigation.92 The ITC injury reports often cites the change in the exports of the domestic industry (variable 9). While increases in this variable may be a sign of vitality in a domestic industry, it is unrelated to the defendants'

---

92 It is not uncommon to see the volume of all imports *fall* while those of the defendants' *rise* during the period of an investigation.
LTFV sales and should not influence the ITC's decision.\textsuperscript{93} Variable 10 is constructed to reflect changes in the real dollar-price of foreign currency. Changes in the real exchange rate serves as a summary statistic measuring shifts in the competitiveness of U.S. industries. Appreciation (depreciation) of the real exchange rate during the period of investigation is expected to increase (decrease) the probability of observing an affirmative ITC injury decision. Last, variables 11 and 12 control for the macroeconomic environment surrounding an antidumping investigation. Rising unemployment and falling real GNP growth is expected to increase the probability of an affirmative ITC injury finding.

Group II of Table 14 consists of five variables measured in "levels". The expected sign associated with variable 13 is ambiguous depending on whether one believes larger industries are more likely or less likely to receive protection. If larger industries (as measured by high levels of employees) exert more political pressure than smaller industries, than the sign associated with variable 13 ought to be positive. However, if one believes that smaller groups form rent-seeking coalitions easier than larger groups in order to earn relatively high rents per capita, then variable 13 ought to have a negative sign.

As seen in Chapter V.1, the Metal and Metals Products (MPP) industry and the

\textsuperscript{93} Finger, Hall, and Nelson (1982) argue that nations with which the U.S. enjoys a high level of economic interdependence (as measured by relatively high levels of exports) exert greater influence on antidumping outcomes than nations with which we are less interdependent. As a result, these authors might attach a negative sign to this variable.
chemical industry were the most frequent users of antidumping law during 1980-91. Both the chemical industry and the sub-industries comprising the MMP industry consist of a relatively small number of large firms. Hence, the costs of forming a protection-seeking coalition is small relative to the benefits per capita to be gained from obtaining protection. In addition, the free-rider problem inherent in forming coalitions is diminished the fewer the number of firms in an industry. Therefore, the coefficient of variable 14 is expected to have a negative sign. Variable 15 and 16 are expected to have negative signs associated with their coefficients. The higher the level of either the plaintiff-industry’s market share or the plaintiff-industry’s profitability, the less likely is an affirmative ITC injury determination.\textsuperscript{94-95} Variable 17 serves as a proxy for a measure of the geographic dispersion of the plaintiffs, and was constructed by ascertaining the number of states containing production facilities of the plaintiff firms. The coefficient of variable 17 is expected to be positive because if a large number of states containing plaintiffs’ plants is involved in an antidumping investigation, the more politically sensitive may be the case. This heightened visibility may increase the amount of political pressure that can be brought to bear on trade officials to render a favorable decision than

\textsuperscript{94} A given decrease in either the market share or profitability of a plaintiff industry ought to be less significant the higher the level of that industry’s market share or profitability.

\textsuperscript{95} Two additional variables originally included in Table 14 were later excluded. These were variables capturing both changes in the defendants’ market share and levels of the defendants’ market share. Because it was often the case that the defendants’ imports comprised the bulk, if not all, of the “like products” imports, these two variables were collinear with variables 6 and 15, and subsequently dropped from the estimation.
if only a few states were represented by the plaintiffs.

Group III of Table 14 consists of several dummy variables, three of which are suspected to be explanatory in the probit estimation. Since the 1980s was a period of increased import penetration by relatively labor abundant nations (particularly in Asia), an Asian dummy (variable 18) is included to test for any bias in the ITC's decisions. This variable's coefficient is expected to be zero as the location of the defendants should not enter into the ITC's decision rules.

Variables 19-21 all are expected to have positive signs associated with their coefficients. Ray (1990), in an earlier study, found that post-Kennedy Round tariff rates were higher in industries producing goods for final sales to consumers, reflecting the fact that a lack of buyer concentration likely prevents consumers from forming a lobby to offset any producers' coalition. Additional findings include a positive relationship between the share of sales to final consumers in an industry and nontariff barrier protection. However, the vast majority of products from industries seeking protection under antidumping law are intermediate goods, not final consumer goods. This may indicate that firms who produce intermediate goods and seek redress under antidumping law realize that they are less susceptible to consumer reaction than are firms manufacturing final consumer goods.96 An accepted petition from intermediate-good industries spreads the cost of protection widely across consumers indirectly through an

---

96 A recent decision by the three major U.S. auto manufacturers to drop a plan to file numerous antidumping petitions because a dumping suit could label them as anti-consumer provides anecdotal evidence of this occurrence (see USA Today, February 10, 1993, page 1B).
increase in intermediate good prices, and not directly through an increase in final consumer good prices.

Variable 20 reflects whether or not the plaintiff(s) filed a CVD petition along with the antidumping petition. The simultaneous filing of a CVD petition(s) against the same defendant(s) named in an antidumping investigation increases the visibility of the case and may pressure trade officials to render a favorable decision.\textsuperscript{97} Therefore, variable 20 is assigned a positive sign. Last, when a U.S. firm initiates an antidumping investigation against a certain imported product, multiple petitions are often filed (i.e., against more than one country). This is thought to serve as an impetus for a quick resolution of the case due to its heightened international visibility. As a result, the coefficient of variable 21 is expected to have a positive sign.

V.4 Understanding Plaintiffs' Preference for Antidumping Law

The preference for seeking protection through unfair trade laws particularly the antidumping statute, rather than escape clause actions or government-negotiated VERs, was explored in Finger, Hall, and Nelson (1982). These authors labeled unfair trade laws as low, or technical, track. Cases here are "determined," not "decided," according to administrative law. Higher-track decisions, such as escape clause cases and VERs, require governmental attention and public decision-making. Politicians prefer cases to

\textsuperscript{97} This was a favorite strategy of the steel industry in the early 1980s (supra note 85).
be decided on the technical track so as to minimize their political exposure. Firms usually prefer the technical track too as their interests can be served with a lower likelihood of being challenged by consumers than if their complaints were addressed on higher-track venues. Industries may also prefer the technical track for reasons advanced by Palmeter (1989), namely, U.S. firms may have "captured" either the DOC or ITC regulatory process meant to monitor their use of unfair trade laws, and now exploit them for use against rivals. The popularity of unfair trade laws, as discussed in Palmeter (1989) and Prusa and Hansen (1993), may also be due to: (1) the escape clause's injury standard is more difficult to satisfy than that encoded in the unfair trade laws, (2) the relief embodied in unfair trade laws is automatic rather than at the discretion of the president, and (3) escape clause protection is only temporary whereas protection under the unfair trade laws only is reviewed periodically and may continue indefinitely.

Another reason why firms seeking protection may prefer antidumping law is that DOC procedures are biased toward higher dumping margins, and therefore higher antidumping duties, than may be warranted.\textsuperscript{98} The Brookings Institution has recently published a book entitled Down in the Dumps: Administration of the Unfair Trade Laws (1991) which is a compilation of articles illustrating the methodological flaws inherent in the calculation of dumping margins by the DOC.\textsuperscript{99} They contend that the existence of

\textsuperscript{98} Specifically, it is the International Trade Administration of the Department of Commerce which determines the margin of dumping.

nonexistence of dumping frequently is an artifact of the methods used by the DOC. The
most egregious of the methodological flaws cited are: (1) the use by DOC of Best
Information Available (BIA) which normally comes from the U.S. plaintiffs that entered
the complaint, (2) the DOCs comparison of individual U.S. prices with the average
foreign market value which allows for dumping to be found even though no dumping
exists, (3) the exclusion of foreign home-market sales below average total cost rather
than the more sensible average variable cost (with cost frequently "constructed" by the
DOC to include an arbitrary minimum of 10% for general overhead and 8% for profit),
and (4) the arbitrary assignment of foreign exchange risk to the defendant(s) so that a
depreciation of the U.S. dollar during a fixed sales contract may translate into dumping
by the foreign firm.\footnote{See, for example, The Wall Street Journal, Vol. LXXV, No. 222 (August 26, 1994) where Toyota
indicated that it will substantially raise its U.S. prices to reflect the yen’s sharp rise against the dollar to
avoid criticism of dumping cars in the U.S. market.}

These practices which result in an upward bias for dumping margins, coupled
with the fact that the DOC determines dumping to exist whenever their estimated margin
equals or exceeds one-half of one percent (i.e., 0.005) of the U.S. price, almost always
guarantees that foreign defendants are guilty of selling at LTFV. In fact, during the
1980-91 period, only 6% of all antidumping petitions filed were rejected because DOC
determined foreign sales were not made at LTFV. Domestic firms are aware that the
DOC’s procedures are "stacked in their favor". This may have been an intentional move
on the part of policy makers to entice plaintiffs seeking protection to use antidumping
law (a "low-track" venue) rather than a more "visible" mechanism to settle trade disputes.

V.5 Results of the Probit Estimation

Table 15 reports the results of several estimations of the probit model. In Table 15, Model 1 includes variables 1-8, whereas Model 2 includes these same variables as well as variables 13-21 as regressors. Model 3 is identical to Model 2 except that Model 3 includes variables 11 (UNEM) and 12 (RGNP) in order to test for what impact, if any, the overall state of the economy has on ITC decisions.

Model 1 represents the "base" model as these regressors closely resemble what Congress has mandated the ITC look at when determining injury in an antidumping investigation. Of variables 1-7, five have the expected sign but only declining profitability (PROF -- variable 5) and falling market share (USMS -- variable 6) of the plaintiff-industry are significant.101

Model 2 builds on Model 1 by including the "levels" variables (variables 13-17) and the dummy variables (variables 18-21). Going from Model 1 to Model 2, declining industry profitability (PROF -- variable 5) and falling U.S. market share (USMS -- variable 6) still are significant in increasing the probability that the ITC finds material

---

101 Industry profitability, as reported by the ITC, represents operating income divided by net sales.
### Table 15

**Probit Results**

**Coefficient Estimates**  
(Asymptotic t-statistics)

<table>
<thead>
<tr>
<th>Var. #</th>
<th>Var. Name</th>
<th>Model 1</th>
<th>Model 2</th>
<th>Model 3</th>
<th>Expected Sign</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>PROD</td>
<td>0.335E-02</td>
<td>-0.817E-02</td>
<td>-0.911E-02</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.87)</td>
<td>(-1.33)</td>
<td>(-1.39)</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>CU</td>
<td>-0.117E-01</td>
<td>0.599E-01†</td>
<td>0.374E-01</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(-0.62)</td>
<td>(1.77)</td>
<td>(1.10)</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>EMP</td>
<td>0.284E-02</td>
<td>-0.234E-01‡</td>
<td>-0.266E-01‡</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.30)</td>
<td>(-1.67)</td>
<td>(-1.60)</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>WAG</td>
<td>-0.253E-01</td>
<td>-0.661E-01§</td>
<td>-0.581E-01§</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(-1.45)</td>
<td>(-2.44)</td>
<td>(-1.83)</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>PROF</td>
<td>-0.483E-01‡</td>
<td>-0.142*</td>
<td>-0.133*</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(-1.76)</td>
<td>(-2.64)</td>
<td>(-2.51)</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>USMS</td>
<td>-0.682E-01b</td>
<td>-0.106b</td>
<td>-0.902E-01‡</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(-2.33)</td>
<td>(-2.13)</td>
<td>(-1.76)</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>DIMP</td>
<td>0.387E-03</td>
<td>0.171E-02</td>
<td>0.237E-02</td>
<td>+</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(1.20)</td>
<td>(1.25)</td>
<td>(1.54)</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>AIMP</td>
<td>-0.116E-02</td>
<td>0.199E-02</td>
<td>0.350E-02</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(-0.55)</td>
<td>(0.69)</td>
<td>(1.12)</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>EXP⁴</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>0</td>
</tr>
<tr>
<td>10</td>
<td>REX⁴</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>-</td>
</tr>
</tbody>
</table>
### Probit Results

#### Coefficient Estimates
(Asymptotic t-statistics)

<table>
<thead>
<tr>
<th>Var. #</th>
<th>Var. Name</th>
<th>Model 1</th>
<th>Model 2</th>
<th>Model 3</th>
<th>Expected Sign</th>
</tr>
</thead>
<tbody>
<tr>
<td>11</td>
<td>UNEM</td>
<td>--</td>
<td>--</td>
<td>-0.358*</td>
<td>+</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(-1.80)</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>RGNP</td>
<td>--</td>
<td>--</td>
<td>0.639E-01</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(0.83)</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>PRW</td>
<td>--</td>
<td>-0.611E-04*</td>
<td>-0.691E-04*</td>
<td>?</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(-2.76)</td>
<td>(-2.93)</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>NUM</td>
<td>--</td>
<td>0.459E-03</td>
<td>0.486E-03</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(0.31)</td>
<td>(0.35)</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>USMSL</td>
<td>--</td>
<td>-0.474E-01*</td>
<td>-0.616E-01*</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(-3.07)</td>
<td>(-3.11)</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>PROFL</td>
<td>--</td>
<td>-0.986E-01b</td>
<td>-0.822E-01*</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(-2.32)</td>
<td>(-1.86)</td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>NSTATES</td>
<td>--</td>
<td>-0.585E-01</td>
<td>-0.636E-01</td>
<td>+</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(-0.95)</td>
<td>(-1.03)</td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>ASIAN</td>
<td>--</td>
<td>0.913</td>
<td>0.869</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(1.47)</td>
<td>(1.25)</td>
<td></td>
</tr>
<tr>
<td>19</td>
<td>INT</td>
<td>--</td>
<td>1.888*</td>
<td>2.441*</td>
<td>+</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(2.85)</td>
<td>(3.03)</td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>CVD</td>
<td>--</td>
<td>2.088*</td>
<td>1.936*</td>
<td>+</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(3.20)</td>
<td>(2.84)</td>
<td></td>
</tr>
</tbody>
</table>
Table 15 (Continued)

Probit Results

Coefficient Estimates
(Asymptotic t-statistics)

<table>
<thead>
<tr>
<th>Var. #</th>
<th>Var. Name</th>
<th>Model 1</th>
<th>Model 2</th>
<th>Model 3</th>
<th>Expected Sign</th>
</tr>
</thead>
<tbody>
<tr>
<td>21</td>
<td>MULT (&gt;2)</td>
<td>--</td>
<td>-0.190</td>
<td>0.934E-02</td>
<td>+</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(-0.33)</td>
<td>(0.15)</td>
<td></td>
</tr>
</tbody>
</table>

Number of observations: 91 91 91

Likelihood Ratio Test Statistic: 21.16\(^a\) 64.53\(^a\) 68.78\(^a\)

% Correct Predictions: 71.4% 85.7% 86.8%

\(^a\) statistically different from zero at the 1% level.
\(^b\) statistically different from zero at the 5% level.
\(^c\) statistically different from zero at the 10% level.
\(^d\) see text for discussion of the result of including this variable.
\(^e\) this statistic tests the significance of the entire set of slope coefficients.
injury. Other significant “changes” variables in Model 2 are decreasing employment (EMP -- variable 3) and decreasing hourly wages (WAG -- variable 4). All variables in Model 2 have the expected sign with the exception of CU (changes in industry capacity utilization), NUM (number of firms in industry), NSTATES (number of states containing plaintiffs’ production facilities), and MULT (multiple defendants). Of these, only CU is significant (but only at the 10% level). With respect to the “levels” variables (variables 13-17), three of these five regressors are significant: PRW (number of production and related workers in the plaintiff industry), USMNL (plaintiff-industry market share), and PROFL (plaintiff-industry profit margin). That is, small industries with low market shares and low profit margins are more likely to receive protection by the ITC than not. The variable NSTATE has the wrong sign but is insignificant. The two dummy variables which are significant in Model 2 are INT and CVD (both at the 1% level). That is, if the product under consideration is an intermediate good and if a CVD petition is filed along with the antidumping petition, the likelihood of an affirmative injury determination by the ITC increases.

Model 3 is identical to Model 2 except for the inclusion of variables 11 (UNEM) and 12 (RGNP) which control for the macroeconomic conditions in which an ITC injury decision is made. Going from Model 2 to Model 3, with respect to the “changes” variables, EMP, WAG, PROF, and USMNL all retain their significance. The three “levels” variables which were significant in Model 2 remain significant in Model 3, as well as do the two dummy variables. The interesting result in Model 3 is that the
probability of an affirmative ITC injury decision is related *pro"cyclically* to the two macroeconomic variables UNEM and RGNP. That is, it is more likely that the ITC finds injury in a case when there is falling unemployment and rising real GNP. However, the coefficient for RGNP is insignificant and the one attached to UNEM is significant only at the 10% level.\footnote{The variables UNEM and RGNP were computed by taking the quarterly average prior to the quarter in which the antidumping petition was resolved minus the quarterly average two years before. A likelihood ratio test was conducted to test the null hypothesis that the slope coefficients of variables 11 and 12 in Model 3 are zero against the alternative that they are different from zero. The result of this test does not allow for rejection of the null hypothesis at the 5% level of significance.}

Table 16 presents a comparison of the probit results summarized in Chapter V.5 with those of two similar studies, Moore (1992) and Anderson (1993a). With respect to variables 4 (change in wages), 7 (change in volume of subject imports), 8 (change in volume of all like imports), 13 (number of employees), and 16 (profit level), my results are consistent with the findings of Moore and Anderson but often differ in the degree of significance. In contrast to Moore, however, my coefficient attached to variable 11 (change in the national unemployment rate) is negative and significant at the 10% level, whereas his was positive but insignificant. However, Moore's measure of national unemployment captured the "level" whereas mine measures the "change".

Only a subset of the 91 observations contained information on changes in plaintiff-industry exports (EXP -- variable 9) and on changes in the relevant real exchange rate (REX -- variable 10). There were 49 investigations containing observations on variable 9. These 49 observations were run with and without EXP
Table 16

Comparison of Probit Results With Previous Studies

(Sign and Significance of Coefficient)

<table>
<thead>
<tr>
<th>Var. #</th>
<th>Explanatory Variable</th>
<th>Expected Sign</th>
<th>Nieberding (Model 3)</th>
<th>Moore</th>
<th>Anderson</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>PROD</td>
<td>-</td>
<td>Negative</td>
<td>Negative&lt;sup&gt;a&lt;/sup&gt;</td>
<td>Positive&lt;sup&gt;d&lt;/sup&gt;</td>
</tr>
<tr>
<td>2</td>
<td>CU</td>
<td>-</td>
<td>Positive</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>3</td>
<td>EMP</td>
<td>-</td>
<td>Negative&lt;sup&gt;c&lt;/sup&gt;</td>
<td>Positive</td>
<td>Negative</td>
</tr>
<tr>
<td>4</td>
<td>WAG</td>
<td>-</td>
<td>Negative&lt;sup&gt;g&lt;/sup&gt;</td>
<td>Negative&lt;sup&gt;h&lt;/sup&gt;</td>
<td>-</td>
</tr>
<tr>
<td>5</td>
<td>PROF</td>
<td>-</td>
<td>Negative&lt;sup&gt;b&lt;/sup&gt;</td>
<td>Negative</td>
<td>Positive</td>
</tr>
<tr>
<td>6</td>
<td>USMS</td>
<td>-</td>
<td>Negative&lt;sup&gt;c&lt;/sup&gt;</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>7</td>
<td>DIMP</td>
<td>+</td>
<td>Positive</td>
<td>Positive&lt;sup&gt;e&lt;/sup&gt;</td>
<td>Positive</td>
</tr>
<tr>
<td>8</td>
<td>AIMP</td>
<td>0</td>
<td>Positive</td>
<td>Positive&lt;sup&gt;e&lt;/sup&gt;</td>
<td>-</td>
</tr>
<tr>
<td>11</td>
<td>UNEM</td>
<td>+</td>
<td>Negative&lt;sup&gt;c&lt;/sup&gt;</td>
<td>Positive&lt;sup&gt;e&lt;/sup&gt;</td>
<td>-</td>
</tr>
<tr>
<td>12</td>
<td>GNP</td>
<td>-</td>
<td>Positive</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>13</td>
<td>PRW</td>
<td>?</td>
<td>Negative&lt;sup&gt;i&lt;/sup&gt;</td>
<td>Negative&lt;sup&gt;f&lt;/sup&gt;</td>
<td>-</td>
</tr>
<tr>
<td>14</td>
<td>NUM</td>
<td>-</td>
<td>Positive</td>
<td>-</td>
<td>Positive</td>
</tr>
<tr>
<td>15</td>
<td>USMSL</td>
<td>-</td>
<td>Negative&lt;sup&gt;g&lt;/sup&gt;</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>
Table 16 (Continued)

Comparison of Probit Results With Previous Studies

(Sign and Significance of Coefficient)

<table>
<thead>
<tr>
<th>Var. #</th>
<th>Explanatory Variable</th>
<th>Expected Sign</th>
<th>Nieberding (Model 3)</th>
<th>Moore</th>
<th>Anderson</th>
</tr>
</thead>
<tbody>
<tr>
<td>16</td>
<td>PROFL</td>
<td>-</td>
<td>Negative(^a)</td>
<td>Negative(^b)</td>
<td>Negative(^b)</td>
</tr>
<tr>
<td>17</td>
<td>NSTATES</td>
<td>+</td>
<td>Negative</td>
<td></td>
<td>------</td>
</tr>
<tr>
<td>18</td>
<td>ASIAN</td>
<td>0</td>
<td>Positive</td>
<td></td>
<td>------</td>
</tr>
<tr>
<td>19</td>
<td>INT</td>
<td>+</td>
<td>Positive(^b)</td>
<td></td>
<td>------</td>
</tr>
<tr>
<td>20</td>
<td>CVD</td>
<td>+</td>
<td>Positive(^b)</td>
<td></td>
<td>------</td>
</tr>
<tr>
<td>21</td>
<td>MULT (&gt;2)</td>
<td>+</td>
<td>Negative</td>
<td></td>
<td>------</td>
</tr>
</tbody>
</table>

Number of observations: 91 886 67

Likelihood Ratio Test Statistic: 68.78\(^a\) 919.3\(^*\) 31.08\(^*\)

% Correct Predictions: 86.8%  ------  73.1%

\(^a\) statistically different from zero at the 1% level.
\(^b\) statistically different from zero at the 5% level.
\(^c\) statistically different from zero at the 10% level.
\(^d\) represents change in shipments as opposed to change in production.
\(^e\) measured in “levels” and not “changes” form.
\(^f\) represents number of workers in the 4-digit SIC category.
under the three different models (results not reported). Under all three scenarios the coefficient of variable EXP had a negative sign but was insignificant. In addition, including EXP had no effect on the significance of the other variables. There were 62 investigations containing observations on variable 10. These 62 observations were run with and without REX under the three different models (results not reported). Under all three scenarios the variable REX had the expected sign (negative) but was insignificant.

V.6 Concluding Remarks

Antidumping duties are seen by many as remedies for the "unfair" actions of foreign firms. Hence, such duties are not viewed as protectionist but are necessary to promote "fair" trade. Under current antidumping law, Congress has enumerated various factors for the ITC Commissioners to consider in making their material injury determinations. The results contained in this chapter indicate that for the ninety-one antidumping investigations considered, several of the significant regressors satisfy the statutory criteria. Namely, industries experiencing declines in employment, wage levels, profitability, and market share were likely to have been "injured" according to the ITC. However, several other significant variables were not among the mandated criteria. If industries (1) consisted of relatively few employees, (2) produced intermediate goods, (3) had low levels of market share and profits, and (4) filed a simultaneous CVD petition, then the likelihood of an affirmative injury decision was increased.
CHAPTER VI

CONCLUSIONS

Since the Trade Agreement Act of 1979, the favorite fair trade law of protection-seekers in this country has been the antidumping statute. For the most part this law was designed to allow firms to obtain protection in a politically commodious manner, and currently is applied mechanistically by bureaucrats resulting in a net welfare loss to the U.S. economy. This dissertation has examined why firms prefer this method of protection, presented a theoretical discussion and an empirical test of the anticompetitive nature of this law, and examined some of the relevant political economy issues surrounding the statute.

It was argued in Chapters II and III that firms using antidumping law do so in part to enhance their domestic market power. If this occurs then both an allocative inefficiency and a transfer of wealth from consumers to producers results. This fact is often obfuscated in the “fair trade” rhetoric of rent-seeking firms. Also, if domestic firms fail to either minimize costs or compete effectively against foreign rivals, it is U.S. consumers who are penalized in the form of higher prices when those firms receive
protection through antidumping law. An escape clause action often is a more appropriate means of relief except that, as discussed in Chapter V.4, firms prefer the current antidumping statute.

Chapter IV empirically examined the anticompetitive consequences for each of the three possible resolutions of an antidumping investigation. For each of these outcomes an industry case study was presented and the market power test conducted. In the case of petition acceptance, empirical evidence supports the assertion that plaintiffs augment their domestic market power when trade officials impose antidumping duties. The evidence also suggests that plaintiffs experience a diminution in their market power subsequent to having their petition rejected. The empirical evidence for the case of petition withdrawal is less clear.

A discussion of the political economy issues pertinent to antidumping law was the subject of Chapter V. Since the DOC almost always finds defendants named in an antidumping investigation guilty of dumping, the injury determinations of the ITC were scrutinized. A probit model was estimated to ascertain whether or not certain factors enhanced the probability that the ITC issued an affirmative material injury decision for antidumping investigations conducted during the period 1980-91. These factors included, but were not limited to, the statutory criteria Congress encoded in the Trade Agreement Act of 1979. While the results indicate that the ITC does follow the statute in part, the most significant factors in explaining the ITC decision-making process were not among the mandated criteria.
U.S. plaintiffs in an antidumping investigation realize that it is often difficult for trade officials to distinguish "beneficial dumping" (based upon comparative advantage) from "injurious dumping" (based upon unfair trading practices). Domestic firms also are aware that the 1979 Act was designed to serve their demand for protection discreetly (a low-track venue) rather than through a more politically visible mechanism. And since U.S. producers are able to internalize relatively large benefits per capita from a successful bout with antidumping law, while the loss to consumers is greatly dispersed, mostly indirect, and relatively low per-capita, U.S. industries most likely are employing antidumping law for rent-seeking reasons unrelated to the "unfair" trading practices of their foreign competitors. As suggested by Palmeter (1989) and McGee (1993), the referral of antidumping complaints to international tribunals might lead to greater impartiality in the administration of such law, much like the establishment of the bilateral appeals panel by the Canada-United States Free Trade Agreement.
APPENDIX A

Regression and Data Tables
### TABLE 17

The Semiconductor Industry

Coefficient Estimates

(*t*-statistics)

<table>
<thead>
<tr>
<th>Firm</th>
<th>Constant</th>
<th>$\beta_1$</th>
<th>$\beta_2$</th>
<th>$\beta_3$</th>
<th>$\beta_4$</th>
<th>$\beta_5$</th>
<th>$\beta_6$</th>
<th>$\beta_7$</th>
<th>$R^2$</th>
<th>Mean MS</th>
</tr>
</thead>
<tbody>
<tr>
<td>AMD</td>
<td>0.003</td>
<td>6.028</td>
<td>-0.071</td>
<td>1.205</td>
<td>-0.364</td>
<td>0.523</td>
<td>-8.434</td>
<td>—</td>
<td>0.659</td>
<td>0.055</td>
</tr>
<tr>
<td></td>
<td>(0.04)</td>
<td>(3.53)</td>
<td>(-5.29)</td>
<td>(0.38)</td>
<td>(-2.23)</td>
<td>(2.51)</td>
<td>(-2.57)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>INTC</td>
<td>0.215</td>
<td>1.487</td>
<td>-0.068</td>
<td>-5.263</td>
<td>0.130</td>
<td>0.372</td>
<td>-1.455</td>
<td>—</td>
<td>0.878</td>
<td>0.144</td>
</tr>
<tr>
<td></td>
<td>(1.92)</td>
<td>(1.62)</td>
<td>(-6.85)</td>
<td>(-3.40)</td>
<td>(2.16)</td>
<td>(3.42)</td>
<td>(-1.62)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TXN</td>
<td>0.467</td>
<td>-0.275</td>
<td>-0.085</td>
<td>-9.775</td>
<td>0.198</td>
<td>-0.059</td>
<td>0.343</td>
<td>—</td>
<td>0.388</td>
<td>0.434</td>
</tr>
<tr>
<td></td>
<td>(2.83)</td>
<td>(-1.25)</td>
<td>(-3.88)</td>
<td>(-2.07)</td>
<td>(0.90)</td>
<td>(-0.32)</td>
<td>(0.74)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Equation 40

<table>
<thead>
<tr>
<th>Firm</th>
<th>Constant</th>
<th>$\beta_1$</th>
<th>$\beta_2$</th>
<th>$\beta_3$</th>
<th>$\beta_4$</th>
<th>$\beta_5$</th>
<th>$\beta_6$</th>
<th>$\beta_7$</th>
<th>$R^2$</th>
<th>Mean MS</th>
</tr>
</thead>
<tbody>
<tr>
<td>AMD</td>
<td>-0.015</td>
<td>6.014</td>
<td>-0.071</td>
<td>1.282</td>
<td>-0.359</td>
<td>0.526</td>
<td>-8.353</td>
<td>-0.031</td>
<td>0.659</td>
<td>0.055</td>
</tr>
<tr>
<td></td>
<td>(-0.11)</td>
<td>(3.47)</td>
<td>(-5.02)</td>
<td>(0.387)</td>
<td>(-2.10)</td>
<td>(2.48)</td>
<td>(-2.46)</td>
<td>(-0.12)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>INTC</td>
<td>0.190</td>
<td>1.576</td>
<td>-0.068</td>
<td>-5.357</td>
<td>0.133</td>
<td>0.378</td>
<td>-1.574</td>
<td>0.041</td>
<td>0.878</td>
<td>0.144</td>
</tr>
<tr>
<td></td>
<td>(1.31)</td>
<td>(1.60)</td>
<td>(-6.61)</td>
<td>(-3.34)</td>
<td>(2.15)</td>
<td>(3.37)</td>
<td>(-1.56)</td>
<td>(0.27)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TXN</td>
<td>0.376</td>
<td>-0.247</td>
<td>-0.090</td>
<td>-8.787</td>
<td>0.164</td>
<td>-0.021</td>
<td>0.149</td>
<td>0.183</td>
<td>0.406</td>
<td>0.434</td>
</tr>
<tr>
<td></td>
<td>(2.00)</td>
<td>(-1.1)</td>
<td>(-4.01)</td>
<td>(-1.82)</td>
<td>(0.74)</td>
<td>(-0.2)</td>
<td>(0.30)</td>
<td>(1.02)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Equation 40 (controlling for the cents/yen exchange rate)

Note: $\beta_7$ is the coefficient of the cents/yen exchange rate variable.
### TABLE 18

The Timken Company

**Coefficient Estimates**

(t-statistics)

<table>
<thead>
<tr>
<th></th>
<th>( \beta_1 )</th>
<th>( \beta_2 )</th>
<th>( \beta_3 )</th>
<th>( \beta_4 )</th>
<th>( \beta_5 )</th>
<th>( \beta_6 )</th>
<th>( \beta_7 )</th>
<th>( R^2 )</th>
<th>Mean MS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Constant</strong></td>
<td></td>
<td>0.146</td>
<td>-0.082</td>
<td>4.586</td>
<td>0.722</td>
<td>0.192</td>
<td>-0.199</td>
<td></td>
<td>0.635</td>
</tr>
<tr>
<td></td>
<td>(2.21)</td>
<td>(2.02)</td>
<td>(-5.39)</td>
<td>(2.22)</td>
<td>(2.23)</td>
<td>(2.74)</td>
<td>(-1.93)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Equation 40**

<table>
<thead>
<tr>
<th></th>
<th>( \beta_1 )</th>
<th>( \beta_2 )</th>
<th>( \beta_3 )</th>
<th>( \beta_4 )</th>
<th>( \beta_5 )</th>
<th>( \beta_6 )</th>
<th>( \beta_7 )</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0.125</td>
<td>0.200</td>
<td>-0.081</td>
<td>3.822</td>
<td>0.667</td>
<td>0.184</td>
<td>-0.265</td>
</tr>
<tr>
<td></td>
<td>(0.67)</td>
<td>(2.14)</td>
<td>(-5.28)</td>
<td>(1.71)</td>
<td>(2.02)</td>
<td>(2.60)</td>
<td>(-2.11)</td>
</tr>
</tbody>
</table>

**Equation 40 (controlling for the cents/yen exchange rate)**

<table>
<thead>
<tr>
<th></th>
<th>( \beta_1 )</th>
<th>( \beta_2 )</th>
<th>( \beta_3 )</th>
<th>( \beta_4 )</th>
<th>( \beta_5 )</th>
<th>( \beta_6 )</th>
<th>( \beta_7 )</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0.125</td>
<td>0.200</td>
<td>-0.081</td>
<td>3.822</td>
<td>0.667</td>
<td>0.184</td>
<td>-0.265</td>
</tr>
<tr>
<td></td>
<td>(0.67)</td>
<td>(2.14)</td>
<td>(-5.28)</td>
<td>(1.71)</td>
<td>(2.02)</td>
<td>(2.60)</td>
<td>(-2.11)</td>
</tr>
</tbody>
</table>

**Note:** \( \beta_7 \) is the coefficient of the cents/yen exchange rate variable.
<table>
<thead>
<tr>
<th>Firm</th>
<th>Constant</th>
<th>$\beta_1$</th>
<th>$\beta_2$</th>
<th>$\beta_3$</th>
<th>$\beta_4$</th>
<th>$\beta_5$</th>
<th>$\beta_6$</th>
<th>$R^2$</th>
<th>Mean MS</th>
</tr>
</thead>
<tbody>
<tr>
<td>ARMCO</td>
<td>0.3582</td>
<td>-2.1134</td>
<td>-0.0116</td>
<td>-0.0670</td>
<td>0.0662</td>
<td>-0.0867</td>
<td>0.0435</td>
<td>0.302</td>
<td>0.114</td>
</tr>
<tr>
<td></td>
<td>(2.86)</td>
<td>(-2.13)</td>
<td>(-0.64)</td>
<td>(-0.02)</td>
<td>(0.12)</td>
<td>(-0.36)</td>
<td>(0.03)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BEETH</td>
<td>0.8175</td>
<td>-2.1951</td>
<td>-0.0833</td>
<td>-2.7510</td>
<td>-0.0547</td>
<td>0.5927</td>
<td>-1.3351</td>
<td>0.610</td>
<td>0.155</td>
</tr>
<tr>
<td></td>
<td>(4.32)</td>
<td>(-1.71)</td>
<td>(-4.86)</td>
<td>(-0.75)</td>
<td>(-0.11)</td>
<td>(1.80)</td>
<td>(-0.74)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>LTV</td>
<td>0.1870</td>
<td>-0.2655</td>
<td>-0.0599</td>
<td>0.0049</td>
<td>0.0765</td>
<td>0.2702</td>
<td>-1.4757</td>
<td>0.143</td>
<td>0.183</td>
</tr>
<tr>
<td></td>
<td>(0.47)</td>
<td>(-0.11)</td>
<td>(-0.96)</td>
<td>(0.001)</td>
<td>(0.20)</td>
<td>(0.43)</td>
<td>(-0.44)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Equation 40
<table>
<thead>
<tr>
<th>Firm</th>
<th>Constant</th>
<th>$\beta_1$</th>
<th>$\beta_2$</th>
<th>$\beta_3$</th>
<th>$\beta_4$</th>
<th>$\beta_5$</th>
<th>$\beta_6$</th>
<th>$r^2$</th>
<th>Mean MS</th>
</tr>
</thead>
<tbody>
<tr>
<td>LFRG</td>
<td>0.4685</td>
<td>-0.1851</td>
<td>-0.0747</td>
<td>-1.7181</td>
<td>0.2432</td>
<td>0.0262</td>
<td>-0.1252</td>
<td>0.789</td>
<td>0.232</td>
</tr>
<tr>
<td></td>
<td>(3.03)</td>
<td>(-0.28)</td>
<td>(-3.75)</td>
<td>(-1.06)</td>
<td>(1.42)</td>
<td>(0.23)</td>
<td>(-0.22)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SDN</td>
<td>0.3329</td>
<td>0.3550</td>
<td>-0.0280</td>
<td>-2.2245</td>
<td>0.2459</td>
<td>0.1173</td>
<td>-0.5676</td>
<td>0.256</td>
<td>0.249</td>
</tr>
<tr>
<td></td>
<td>(0.87)</td>
<td>(0.20)</td>
<td>(-1.48)</td>
<td>(-1.01)</td>
<td>(1.11)</td>
<td>(0.28)</td>
<td>(-0.31)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 20

The Hydraulic Cement Industry

Coefficient Estimates
($t$-statistics)

Equation 40
Table 21

Summary of Variables

The Semiconductor Industry


<table>
<thead>
<tr>
<th>Variable</th>
<th>Maximum</th>
<th>Minimum</th>
<th>Mean</th>
<th>St. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>PCM</td>
<td>0.2920</td>
<td>-0.2970</td>
<td>0.0249</td>
<td>0.1278</td>
</tr>
<tr>
<td>MS</td>
<td>0.0860</td>
<td>0.0318</td>
<td>0.0553</td>
<td>0.0135</td>
</tr>
<tr>
<td>KSR</td>
<td>6.5800</td>
<td>1.5700</td>
<td>4.1794</td>
<td>1.4862</td>
</tr>
<tr>
<td>ISR</td>
<td>0.0280</td>
<td>0.0050</td>
<td>0.0148</td>
<td>0.0062</td>
</tr>
<tr>
<td>NSR</td>
<td>0.2982</td>
<td>-0.0880</td>
<td>0.0584</td>
<td>0.0901</td>
</tr>
</tbody>
</table>

### Intel: 1980.1-1991.4; N = 48

<table>
<thead>
<tr>
<th>Variable</th>
<th>Maximum</th>
<th>Minimum</th>
<th>Mean</th>
<th>St. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>PCM</td>
<td>0.2790</td>
<td>-0.3400</td>
<td>0.1282</td>
<td>0.1263</td>
</tr>
<tr>
<td>MS</td>
<td>0.2410</td>
<td>0.0903</td>
<td>0.1441</td>
<td>0.0462</td>
</tr>
<tr>
<td>KSR</td>
<td>5.900</td>
<td>1.6600</td>
<td>3.6085</td>
<td>0.8965</td>
</tr>
<tr>
<td>ISR</td>
<td>0.0370</td>
<td>0.0050</td>
<td>0.0203</td>
<td>0.0087</td>
</tr>
<tr>
<td>NSR</td>
<td>0.4776</td>
<td>-0.0160</td>
<td>0.0741</td>
<td>0.1217</td>
</tr>
</tbody>
</table>

### Texas Instruments: 1980.1-1991.4; N = 48

<table>
<thead>
<tr>
<th>Variable</th>
<th>Maximum</th>
<th>Minimum</th>
<th>Mean</th>
<th>St. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>PCM</td>
<td>0.1000</td>
<td>-0.3360</td>
<td>0.0284</td>
<td>0.0753</td>
</tr>
<tr>
<td>MS</td>
<td>0.6770</td>
<td>0.3240</td>
<td>0.4340</td>
<td>0.0784</td>
</tr>
<tr>
<td>KSR</td>
<td>5.0100</td>
<td>1.4600</td>
<td>3.3535</td>
<td>1.0216</td>
</tr>
<tr>
<td>ISR</td>
<td>0.0123</td>
<td>0.0020</td>
<td>0.0070</td>
<td>0.0030</td>
</tr>
<tr>
<td>NSR</td>
<td>0.1930</td>
<td>0.0000</td>
<td>0.0203</td>
<td>0.0446</td>
</tr>
</tbody>
</table>
Table 21 (Continued)

The Tapered Roller Bearings Industry

The Timken Company: 1982.1-1992.4; \( N = 44 \)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Maximum</th>
<th>Minimum</th>
<th>Mean</th>
<th>St. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>PCM</td>
<td>0.1180</td>
<td>-0.4680</td>
<td>-0.0003</td>
<td>0.0969</td>
</tr>
<tr>
<td>MS</td>
<td>0.9320</td>
<td>0.2050</td>
<td>0.5719</td>
<td>0.3163</td>
</tr>
<tr>
<td>KSR</td>
<td>7.950</td>
<td>3.230</td>
<td>5.7682</td>
<td>0.8758</td>
</tr>
<tr>
<td>ISR</td>
<td>0.0270</td>
<td>0.0010</td>
<td>0.0144</td>
<td>0.0067</td>
</tr>
<tr>
<td>NSR</td>
<td>0.2350</td>
<td>-0.0130</td>
<td>0.0137</td>
<td>0.0367</td>
</tr>
</tbody>
</table>

The Steel Industry

Armco: 1978.1-1989.4; \( N = 48 \)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Maximum</th>
<th>Minimum</th>
<th>Mean</th>
<th>St. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>PCM</td>
<td>0.1900</td>
<td>-0.5160</td>
<td>0.0012</td>
<td>0.1306</td>
</tr>
<tr>
<td>MS</td>
<td>0.2120</td>
<td>0.0440</td>
<td>0.1144</td>
<td>0.0402</td>
</tr>
<tr>
<td>KSR</td>
<td>15.230</td>
<td>2.5000</td>
<td>5.6858</td>
<td>3.0237</td>
</tr>
<tr>
<td>ISR</td>
<td>0.0450</td>
<td>0.0078</td>
<td>0.0262</td>
<td>0.0123</td>
</tr>
<tr>
<td>NSR</td>
<td>0.2030</td>
<td>-0.0120</td>
<td>0.0095</td>
<td>0.0311</td>
</tr>
</tbody>
</table>

Bethlehem: 1978.1-1989.4; \( N = 48 \)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Maximum</th>
<th>Minimum</th>
<th>Mean</th>
<th>St. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>PCM</td>
<td>0.2080</td>
<td>-1.0270</td>
<td>-0.0114</td>
<td>0.1641</td>
</tr>
<tr>
<td>MS</td>
<td>0.2080</td>
<td>0.1210</td>
<td>0.1546</td>
<td>0.0249</td>
</tr>
<tr>
<td>KSR</td>
<td>12.200</td>
<td>4.0900</td>
<td>8.0467</td>
<td>2.5723</td>
</tr>
<tr>
<td>ISR</td>
<td>0.0350</td>
<td>0.0077</td>
<td>0.0173</td>
<td>0.0070</td>
</tr>
<tr>
<td>NSR</td>
<td>0.1630</td>
<td>0.0000</td>
<td>0.0124</td>
<td>0.0338</td>
</tr>
</tbody>
</table>
Table 21 (Continued)

LTV: 1978.1-1989.4; \( N = 48 \)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Maximum</th>
<th>Minimum</th>
<th>Mean</th>
<th>St. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>PCM</td>
<td>0.0814</td>
<td>-1.2010</td>
<td>-0.0533</td>
<td>0.2172</td>
</tr>
<tr>
<td>MS</td>
<td>0.2700</td>
<td>0.1180</td>
<td>0.1827</td>
<td>0.0407</td>
</tr>
<tr>
<td>KSR</td>
<td>5.0400</td>
<td>1.3400</td>
<td>2.9133</td>
<td>0.9628</td>
</tr>
<tr>
<td>ISR</td>
<td>0.0500</td>
<td>0.0000</td>
<td>0.0211</td>
<td>0.0145</td>
</tr>
<tr>
<td>NSR</td>
<td>0.4490</td>
<td>-0.3530</td>
<td>0.0122</td>
<td>0.0847</td>
</tr>
</tbody>
</table>

The Hydraulic Cement Industry

LaFarge: 1983.1-1992.4; \( N = 40 \)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Maximum</th>
<th>Minimum</th>
<th>Mean</th>
<th>St. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>PCM</td>
<td>0.1970</td>
<td>-0.4270</td>
<td>0.0176</td>
<td>0.1388</td>
</tr>
<tr>
<td>MS</td>
<td>0.3800</td>
<td>0.1230</td>
<td>0.2315</td>
<td>0.0699</td>
</tr>
<tr>
<td>KSR</td>
<td>8.560</td>
<td>2.8200</td>
<td>4.7370</td>
<td>1.5302</td>
</tr>
<tr>
<td>ISR</td>
<td>0.0900</td>
<td>0.0140</td>
<td>0.0345</td>
<td>0.0161</td>
</tr>
<tr>
<td>NSR</td>
<td>0.3610</td>
<td>0.0000</td>
<td>0.0392</td>
<td>0.0698</td>
</tr>
</tbody>
</table>

Southdown: 1983.1-1992.4; \( N = 40 \)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Maximum</th>
<th>Minimum</th>
<th>Mean</th>
<th>St. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>PCM</td>
<td>0.5390</td>
<td>-0.5580</td>
<td>0.0512</td>
<td>0.1730</td>
</tr>
<tr>
<td>MS</td>
<td>0.4660</td>
<td>0.1620</td>
<td>0.2485</td>
<td>0.0683</td>
</tr>
<tr>
<td>KSR</td>
<td>11.020</td>
<td>3.8400</td>
<td>7.1570</td>
<td>1.7116</td>
</tr>
<tr>
<td>ISR</td>
<td>0.1140</td>
<td>0.0280</td>
<td>0.0717</td>
<td>0.0202</td>
</tr>
<tr>
<td>NSR</td>
<td>0.7380</td>
<td>0.0000</td>
<td>0.4825</td>
<td>0.1443</td>
</tr>
</tbody>
</table>
APPENDIX B

The Market Power Model
The Market Power Model

The specific model used for a test of market power was developed by Martin (1988). It is a firm-level empirical test for the difference between price and marginal revenue which will be significantly positive if a firm exercises market power. The test amounts to an estimation of the Lerner Index of monopoly power and is derived from information and techniques familiar in the industrial organization literature. The model considers both input and financial markets using a specification that is a generalization of that used by Collins and Preston (1969), can be carried out with various common accounting measures, and does not assume constant returns to scale. In addition, the model incorporates a "conjectural elasticities" term to parameterize the reactions (if any) the firm expects from its rivals in response to its own actions; and is developed with consideration given to both the cost and demand conditions faced by the firm.

The model assumes an oligopolistic industry facing a constant-elasticity demand curve

\[ P = a(Q^{-i} + q)^{-\frac{1}{\ell}} \]  

(41)
To capture possible firm interaction, a conjectural elasticity term

$$\alpha = \frac{q}{Q^{-i}} \frac{dQ^{-i}}{dq}$$  \hspace{1cm} (42)

is introduced which will be positive if the firm expects its rivals to restrict output when it restricts output. Firm i's output is denoted by $q$ and industry output (less that of firm i) is denoted $Q^{-i}$ Incorporating equation 42 and equation 41 into the firm's profit-maximization problem easily yields the firm's marginal revenue (MR)

$$MR = P \left(1 - \frac{\alpha + (1 - \alpha)MS_i}{\varepsilon}\right)$$  \hspace{1cm} (43)

where $MS_i$ is the firm's market share. A firm does not exercise market power if

$$\frac{\alpha + (1 - \alpha)MS_i}{\varepsilon} = 0$$  \hspace{1cm} (44)

If the left-hand-side expression of equation 44 is significantly different from zero, then the firm does exercise market power. Equation 44 is the basis for the test of market power that will be implemented.
In developing the cost side of the model, Martin considers a limited liability firm and takes into account the firm's costs in factor markets and the firm's costs in financial markets. With respect to financial markets, it is assumed that the firm finances investment by the sale of bonds and/or raises funds through the sale of stock.

At the start of each period, the firm inherits a certain number of physical units of equity capital \((K_e)\) from the past which is the initial capital risked by the owners of the firm. The original owners of the firm also own \((S_e)\) shares of stock at the beginning of the period. The firm purchases additional capital \((I)\) at cost \(p_0^k\) per unit. The result is total capital \(K = K_e + I\) with an initial value of \(p_0^kK\). The firm can raise funds for investment by sale of \(B\) one-period bonds for $1 each, and also by sale of \(S_n\) new shares of stock, each sold at price \(m\). If firm bankruptcy does not occur, all bonds are redeemed at the end of the period, and the firm pays each bondholder \$\((1 + r)\) per bond. The firm then passes on a fraction \((1 - \delta)\) of its capital for use in the following period. It should be noted that \(\delta\) represents the economic (or true) depreciation of capital. The firm is assumed to pay \(W\) per unit for \(L\) units of labor services.

If the firm were to finance investment through bond sales only, it would face the financing constraint

\[
B = p_0^k I = p_0^k(K - K_e)
\]

(45)
If the firm raises funds by both stock and bond sales, the financing constraint becomes

\[ B + mS_n + p_0^K K_e = p_0^K K \]  \hspace{1cm} (46)

To derive the objective function that the firm seeks to maximize, the present discounted value of the firm (PDV) net of initial equity is

\[ PDV = B + mS_n - p_0^K K + \frac{PQ - WL - (1+r)B + (1-\delta)p_0^K K + \psi}{1+r^*} \]  \hspace{1cm} (47)

where \( r^* \) is the rate of return on a safe asset, and \( \psi \) is a random variable capturing beginning-of-period uncertainty by owners of the firm about the end-of-period situation of the firm. The original owners of the firm are assumed to select \( L, K, B, \) and \( S_n \) to maximize the expected value of their return

\[ B + mS_n - p_0^K K + \frac{S_e}{S_e + S_n} \left( \frac{PQ - WL - (1+r)B + (1-\delta)p_0^K K + \pi_\omega + E_\omega}{1+r^*} \right) \]  \hspace{1cm} (48)

where \( E_\omega \) is owners' conditional expected value of \( \psi \) given that bankruptcy does not occur. Income is received from the sale of bonds and new stock issues, investment
purchases are made, and capital $K_F$ is committed at the start of the period whether or not end-of-period bankruptcy occurs. Because of this, the first three terms in equation 48 are not multiplied by a probability term, $\pi$, which represents the probability owners assign to the avoidance of end-of-period bankruptcy. Since the cost to the original shareholders of selling new stock is the dilution of their ownership of the firm, term four in equation 48 represents the fraction of end-of-period worth accruing to the original owners.

The last bit of notation needed to proceed is

$$FC = \frac{K(MP_k) + L(MP_l)}{Q}$$

(49)

which is a measure of returns to scale. Values of this "function coefficient" greater than one indicate increasing returns to scale, values less than one indicate decreasing returns to scale, and a value of unity indicates constant return to scale.

The first-order conditions for labor and capital derived from maximizing equation 48 subject to equation 46, together with equation 43 and equation 49 and some tedious algebra, yield the following price-cost margin equation

$$\frac{PQ_i - WL}{PQ_i} = \left(1 - FC + FC \frac{\alpha}{\epsilon}\right) + FC \frac{1-\alpha}{\epsilon} MS_i + \lambda \frac{\mu K}{PQ_i} + FC\epsilon rQ_i \frac{rB}{PQ_i}$$

$$- FC(1 + r_{st}) e mQ \frac{mS_n}{PQ_i}$$

(50)
where \( \lambda \) is the marginal rental cost of capital services to the firm; \( \varepsilon, Q \) is the elasticity of the firm's interest rate with respect to output (expected sign is negative); \( r_{ib} \) is the marginal cost of capital to the firm; and \( \varepsilon_{wQ_i} \) is the elasticity of the price of stock with respect to the firm's output (expected sign is positive). Equation 50 leads to the linear equation

\[
\frac{PQ_i - WL}{PQ} = a_0 + a_1 MS_i + a_2 \frac{\overline{PQ}}{PQ_i} + a_3 \frac{\overline{B}}{PQ_i} + a_4 \frac{\overline{S}}{PQ_i}
\]  
(51)

where \( WL \) represents the cost of all variable factors. The left-hand-side is the rate of return on sales revenue. Equation 51 is a linear regression that can be estimated with time series data for a firm on the assumption that the error term possesses the "usual" properties and that the right-hand-side variables are treated as parameters to be estimated. Equation 51 can be made to yield a test for market power.

From equation 44, if a firm exercises market power, then

\[
\frac{\alpha + (1 - \alpha) MS_i}{\varepsilon} > 0
\]  
(52)

However, this expression cannot be estimated since the parameters estimated in equation 50 include the function coefficient (FC) as well as \( \alpha \) and \( \varepsilon \). But, since
\[ a_0 + a_1 MS_i = \left(1 - FC + FC \frac{\alpha}{\varepsilon}\right) + FC \frac{1 - \alpha}{\varepsilon} MS_i \]  \hspace{1cm} (53)

It is easy to show that

\[ \frac{\alpha + (1 - \alpha) MS_i}{\varepsilon} = 1 - \frac{1 - (a_{01} + a_1 MS_i)}{FC} \]  \hspace{1cm} (54)

Equation 53 is satisfied if and only if

\[ a_0 + a_1 MS_i > 1 - FC \]  \hspace{1cm} (55)

in a statistically significant sense.

As shown in equation 53 through equation 55 the test for market power depends on a combination of the first two coefficients of the linear regression equation 51. The market power statistic is simply the left-hand-side of equation 55 evaluated at the sample-mean value for market share, MS

\[ a_0 + a_1 MS \]  \hspace{1cm} (56)
A \( t \)-statistic can be computed on the null hypothesis that the true value of this expression is zero, which tests for marginal revenue equal price if the value of FC is assumed to be one.

All firm-specific variables in equation 51 except capital stock were obtained from Compustat (quarterly observations). These variables are:

\[
\begin{align*}
\text{PCM} & = \text{firm profit - sales ratio} \\
\text{MS} & = \text{firm market share} \\
\text{KSR} & = \text{firm capital - sales ratio} \\
\text{ISR} & = \text{firm interest expense - sales ratio} \\
\text{NSR} & = \text{firm new stock receipt - sales ratio}
\end{align*}
\]

To allow for estimates of the market power statistic before and after the resolution of the antidumping investigation, equation 51 can be estimated with an intercept dummy taking the value of 1 after the outcome has been determined and 0 otherwise; and also with an explanatory variable defined as the product of this dummy and firm market share.
APPENDIX C

Significance Tests Concerning the Market Power Statistics
Significance Tests Concerning the Market Power Statistics

This appendix presents the methodology used for the statistical tests of significance for the market power statistics in Chapter IV. The $t$-test testing whether any market power statistic is significantly different from zero is the standard $t$-test for a population mean (variance unknown):

$$ t = \frac{(\bar{x} - \mu_0)}{s/\sqrt{n}} \quad (57) $$

With respect to my analysis, the appropriate hypotheses are:

$$ H_0: \beta_0 + \beta_1 \bar{MS} = 0 $$
$$ H_A: \beta_0 + \beta_1 \bar{MS} \neq 0 \quad (58) $$

The $t$-statistic testing whether the null can be rejected in favor of the alternative is:

$$ t = \frac{(\beta_0 + \beta_1 \bar{MS})}{s/\sqrt{n}} \quad (59) $$

where
\[ s = \text{sample standard deviation} \]
\[ n = \text{sample size} \]

The statistical test determining whether the pre- and post-market power statistics are significantly different from each other is a t-test for the difference between two population means, with variances both unknown and unequal (see Kanji (1993) for a summary of this test). The appropriate test statistic is:

\[
t = \frac{(\bar{x}_1 - \bar{x}_2)}{\left(\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2}\right)^{\frac{1}{2}}}\tag{60}
\]

where, for my analysis:

\[
\bar{x}_1 = \text{Post-resolution market power statistic}
\]
\[
\bar{x}_2 = \text{Pre-resolution market power statistic}
\]

In this test, the degrees of freedom equal:

\[
d.f. = \left[ \frac{\left(\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2}\right)^2}{\frac{s_1^4}{n_1(n_1 + 1)} + \frac{s_2^4}{n_2(n_2 + 1)}} \right] - 2
\]
APPENDIX D

How Exchange Rates May Influence the Filing of Antidumping Petitions
How Exchange Rates May Influence the Filing of Antidumping Petitions

A glance at time series data during the 1980s shows that the nominal exchange rate and the real exchange rate of the dollar have moved almost in tandem (e.g., see Dornbusch and Fischer (1990)). Inflation rates were not substantially different among industrialized countries during the 1980s, but nominal exchange rates moved a lot. It has been argued that movements in nominal exchange rates during the 1980s have been a major force behind the changing fortunes of U.S. competitiveness.

An explanation of the U.S. dollar appreciation during 1980-85 can be found in the fact that during the early 1980s, the U.S. undertook an expansive fiscal policy in order to approach full employment. In doing so, a relatively large federal budget deficit was opened. As standard open-economy macroeconomics predicts, under a regime of flexible exchange rates and perfect capital mobility, a fiscal expansion does not change equilibrium output. Rather, it produces an offsetting exchange rate appreciation leading to a shift in the composition of domestic demand toward foreign goods and away from domestic goods. This is what happened in the U.S. for the period 1980-85 which was characterized by both a significant dollar appreciation and a worsening current account balance. However, since capital is not perfectly mobile, the U.S. was able to increase its output through fiscal expansion which was only partially muted by the dollar’s appreciation.
For the period 1986-91, the U.S. dollar has depreciated against major currencies which ought to improve the competitiveness of U.S. firms both here and abroad after accounting for the "J-curve" effect.\textsuperscript{103} As a result, one would expect that the demand for protection should decrease in the latter part of the 1980s. With respect to antidumping investigations, we should see fewer petitions filed during the 1987-91 period than the 1982-86 period (these periods allow for a two year adjustment lag to account for the "J-curve" effect). The number of antidumping petitions filed during 1982-86 was 319 compared to 170 filed during 1987-91 (the number of CVD investigations during these two periods were 200 and 26, respectively; escape clause actions during these two periods were 15 and 3, respectively).

It is interesting to investigate whether the outcomes of antidumping petitions filed during the period 1982-91 are independent of the periods when the dollar was appreciating (i.e., 1982-86) and when the dollar was depreciating (i.e., 1987-1991). To answer this, a contingency table is constructed which tests the null hypothesis that the outcomes of antidumping investigations are independent of movements of the nominal dollar exchange rate:

\textsuperscript{103} The "J-curve" effect underlies the adjustment lag of improvements in the U.S. current account in response to a depreciation of the dollar. In the short term following a dollar depreciation, import \textit{volumes} are relatively fixed but their value measured in dollars increases which exacerbates the U.S. trade balance. In the longer term, however, the increased relative prices of imports makes U.S. produced goods more competitive and shifts demand in volume terms toward them and away from imported goods. The volume effect eventually dominates the price effect thereby improving the current account. The adjustment lag seems to be about two years.
Table 22

Contingency Table

<table>
<thead>
<tr>
<th></th>
<th>1982-86 Period</th>
<th>1987-91 Period</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Petition Accepted</td>
<td>110</td>
<td>81</td>
<td>191</td>
</tr>
<tr>
<td>Petition Rejected</td>
<td>109</td>
<td>76</td>
<td>185</td>
</tr>
<tr>
<td>Petition Withdrawn</td>
<td>100</td>
<td>13</td>
<td>113</td>
</tr>
<tr>
<td>TOTAL</td>
<td>319</td>
<td>170</td>
<td>489</td>
</tr>
</tbody>
</table>

These data can be used to conduct a chi-square test statistic testing the validity of the null hypothesis. For the above numbers, \( \chi^2 = 35.14 \) which allows for the rejection of the null hypothesis (at the 1% level) that the outcomes of antidumping petitions are independent of the two time periods.

A possible story explaining this lack of independence may be that as the dollar depreciated during the 1987-1991 period, foreign firms had less of an incentive to privately settle with U.S. plaintiffs. During this period foreign firms were losing their competitiveness relative to U.S. firms and may have aggressively defended their market share by means of dumping. Reluctant to relinquish gains in market share obtained
during the early 1980s, these foreign firms may not have fully "passed through" the
depreciation of the dollar to the dollar price of their exports to the U.S.\textsuperscript{104} The
significant drop in the number of petitions withdrawn between the 1982-86 period (31%) and the 1987-91 period (8%) may have been due to foreign firms preferring to gamble on the uncertain outcome emerging from the antidumping process while engaging in aggressive price competition, rather than colluding with U.S. firms and yielding some gains in U.S. market share achieved in the early 1980s.

A graphical analysis of how an appreciation of the dollar impacts U.S. firms' profit margins is presented in Figure 6. Assume that U.S.-produced Good X and foreign-produced Good X are highly (if not perfectly) substitutable in consumption. Also, assume that the U.S. producers of Good X behave as a "perfect" cartel allowing them to be modeled as a single monopolist. In Figure 6, $D^{US}D^{US}$ represents the demand for Good X by U.S. consumers, and $MC^{US}$ represents the constant marginal cost of production incurred by U.S. firms. $S^f_0S^f_0$ represents the foreign firms' supply curve of Good X in the U.S. market. $MR^U_0$ represents the marginal revenue curve corresponding to the demand curve faced by U.S. producers, $D^{US}D^{US}D^{US}$. Given this arrangement, U.S. firms' price and output is $(p^U_0,q^U_0)$ and imports equal

\textsuperscript{104} As pointed out by Prusa (1990), in Roller Bearings From Japan (1987), U.S. producers alleged that Japanese producers had been selling at LTFV since 1985, and in its final determination, the DOC cited the failure of Japanese manufacturers to raise their U.S. prices to reflect the sharp rise in the yen since 1985 as the primary reason behind the finding of substantial dumping margins.
\[ q_0^i = q_0^{dem} - q_0^{us} \]. At this equilibrium, U.S. firms enjoy a positive price-cost margin indicating supra-normal profits. Also note that the U.S. firms' market share equals \( \frac{q_0^{us}}{q_0^{dem}} \) and the foreign firms' market share equals \( \frac{q_0^i}{q_0^{dem}} \).

As the U.S. dollar appreciated during the 1980-85 period, the change in the relative price of Good X produced here and abroad lead U.S. consumers to shift their demand toward foreign imports of Good X and away from domestically-produced Good X (with some lag). That is, domestic demand for Good X contracted and the foreign supply of Good X increased in the early to mid 1980s. Graphically, the U.S. residual demand curve \( D_0^{res} \) shifted inward to \( D_1^{res} \) and \( S_0^f \) shifted outward to \( S_1^f \) (assuming that the elasticity of the foreign supply curve remains constant). As a result, U.S. firms' price and output decreased to \( (p_1^{us}, q_1^{us}) \). The fall in U.S. industry-profit occasioned by falling total revenue is often presented as evidence of injury by plaintiffs in an antidumping investigation. It is the appreciation of the dollar and an influx of imports of Good X into the U.S., not an economy-wide demand contraction, which is causing the U.S. firms' demand and total revenue to fall.

As seen in Figure 6, because of the dollar appreciation foreign imports of Good X have increased from \( q_0^i \) to \( q_0^{dem} \) - \( q_0^{us} \). The U.S. firms' market share has declined to \( \frac{q_1^{us}}{q_1^{dem}} \) (as \( q_1^{us} < q_0^{us} \) and \( q_1^{dem} > q_0^{dem} \)), and the foreign firms' market share has
increased to \( \frac{q_i}{q_{\text{dem}}} \). It is also evident from Figure 6 that the U.S. firms' price-cost margin is lower.

For the period 1987-91 (which allows for the J-curve effect) one would expect to observe the "reverse" of the occurrences outlined above. Namely, as the U.S. dollar depreciated against major currencies, the resulting changes in relative prices ought to shift U.S. demand toward domestically-produced Good X and away from foreign imports of Good X. Graphically, \( D_i^{fes} \) ought to shift toward \( D_0^{fes} \) and \( S_i^f \) to \( S_0^f \). However, if foreign producers are reluctant to fully "pass through" the depreciating dollar into their U.S. prices in order to protect market share gained in the early 1980s, the initial equilibrium of \( (p_i^{fes}, q_i^{fes}) \) will not be re-established.
Figure 6

How Exchange Rate Appreciation Affects U.S. Firms' Market Share
List of References


