Retaliation, Bargaining, and the Pursuit of "Free and Fair" Trade

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Introduction

In this article we empirically examine the hypothesis that retaliation by the United States can successfully deter protectionism in its partner countries. A striking feature of any comparison of tariff and nontariff barrier (NTB) protection levels across countries and time is that, compared with any other OECD country or developing country, the United States is by far the freest trading country.[1] If anything is surprising, it is the fact that the United States has taken so long to use legislative means to systematically retaliate against lopsided protectionism in other developed countries. The reason, in large part, is because the United States enjoyed undisturbed growth and prosperity from World War II until the early 1970s. However, trade laws enacted since 1974 and amendments to them have been increasingly activist, allowing more room for retaliation. Restrictive trade policy for retaliation is likely used to deter undesirable foreign trade policy at minimum domestic cost. In this article we give systematic empirical content to the theories of retaliation laid out in the works of John A. C. Conybeare, Helen V. Milner and David Yoffie, and Richard Baldwin, among others.[2]

The view taken here, also shared by Conybeare and Richard Baldwin, is that trading nations' NTBs have two components—a political component that is a response to protectionist pressures,[3] which are substantially influenced by the lobbying efforts of private agents and the altruistic welfare-oriented motives of the government; and a retaliatory component that serves as a strategic deterrent against undesirable protectionist policies of its partners.[4] Our first objective is to demonstrate that this retalia-

We thank the editors of *IO*, two anonymous reviewers, and especially Professor John Odell for their helpful and insightful comments. The article is considerably improved as a result. We claim full responsibility for any errors.

1. An informative descriptive analysis of tariff and nontariff protection across developed countries is contained in Laird and Yeats 1992.
2. See Conybeare 1987; Milner and Yoffie 1989; and Baldwin 1990.
3. See also Putnam 1988.
4. In reality the retaliatory component is not without its political element since retaliation is provoked by domestic political reaction to another country's protectionism. Also, the political component may be

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tory component is empirically significant. Our second objective is to investigate whether retaliation has the potential to deter foreign protectionism. The empirical results also answer some questions posed by Marcus Noland's study of the determinants of formal actions taken by the U.S. Trade Representative (USTR) under Section 301.[5] Noland notes that the main factor that gets the attention of policymakers is the existence of formal barriers to trade in the partner country. Since Noland's study of U.S. actions treats partners' behavior as exogenous, he concludes that "more sophisticated model(s) that would treat partner country behavior as endogenous would obviously be a significant step forward." In this article we take this significant step.

Since little empirical work has been available on the subject of retaliation (which is bound to attract attention in the near future) our study breaks new ground.[6] Not only do we analyze the extent of U.S. retaliation where it already exists, but also we provide estimates of the deterrent effects of retaliation. We supplement the insightful case studies of Conybeare and Milner and Yoffie with a systematic cross-industry and cross-country study using NTB protection data from 1983. Methodologically, we follow John S. Odell's recommendation by carefully conditioning our study of retaliation on other hypotheses of trade protectionism advanced in the voluminous political economy literature.[7] We do this through a set of control variables that measure micro and macro influences.

The article is organized as follows. First, we state the research questions around which the article is built. We then discuss the types of NTBs, their use as retaliatory tools in trade policy, and previous work in this area. After laying out the empirical model, we describe how the results can be interpreted when viewed in the setting of a noncooperative game versus a bargaining game. We provide estimates of the degree of retaliation bilaterally between the United States and Japan, and between the United States and a bloc of four European Community countries (France, Germany, Italy, and the United Kingdom, referred to as EC4). Some insights from the estimates about underlying theories are then offered. We conclude by making some observations about the future.

Research Questions

We investigate the following four questions.

1. Is retaliation successful in lowering partner's barriers? If so, by how much?

motivated by a retaliatory calculus. We abstract from these interconnections by presuming that retaliation is based on a welfare-maximizing government. Our focus is not on motives behind retaliation, but rather on how effectively it is able to achieve its goals.

5. Noland 1997.

6. The two studies that have investigated this issue in depth are Conybeare 1987; and Gawande 1995. Here we empirically substantiate the basis for the forcefully argued policy of unilateral retaliation due to the presence of weak world institutions put forth by Judith Goldstein and Stephen Krasner. Goldstein and Krasner 1984.

7. Odell 1990.

To answer this question we first estimate two full bilateral NTB models, one for U.S.–Japan NTBs ($n = 326$ industries) and one for U.S.–EC4 (France, Germany, Italy, United Kingdom) NTBs where cross-industry data are pooled across the four EC countries ($n = 326 \times 4 = 1{,}304$). We find that retaliation with any kind of NTB has the potential to lower EC barriers, but only quantitative NTBs have the potential to do so against Japan.

2. Are the effects of retaliating against Japan and EC4 different from each other?

Another way to ask this question is whether the outcomes of the NTB games differ across the two partners. We find that the effects are different and present some reasons why trade relations with Japan are fundamentally different from trade relations with the EC4 countries. This leads us to the following more fundamental question.

3. What is the nature of the U.S.–Japan game, and how is it different from the U.S.–EC4 game?

We argue that U.S.–Japan NTB games are noncooperatively played, whereas U.S.–EC4 games are more like bargaining games. This requires us to interpret the results in light of whether the game is one of conflict or cooperation.

4. Are the effects of retaliating different across subsets of goods?

Finally, we estimate the bilateral NTB models after splitting the observations into four industry groups: food processing, resource intensive, general manufacturing, and capital intensive. We find clear differences not only among industry groups (vis-à-vis a partner country) but also heterogeneity within the same industry group across partner countries. For example, U.S. NTBs have the potential to reduce EC protectionism in all except general manufacturing, whereas U.S. quantitative NTBs can deter Japanese protectionism in general manufacturing.

NTBs and Their Retaliatory Component

In this article we employ data on NTBs to investigate whether bilateral U.S. trade barriers against five developed countries (Japan, France, Germany, Italy, and the United Kingdom) are retaliatory, and whether they are successful in achieving deterrence. For this study, all non ad valorem tariffs are considered NTBs, including, for example, antidumping duties, countervailing duties, and two-part tariffs. These we call price NTBs, as distinguished from quantitative NTBs (for example, quotas and voluntary export restraints [VERs]) and threat NTBs (for example, price and quantity monitoring). NTB coverage ratios, or the proportion of imports covered by some NTB, is the nontariff measure that we employ (for their construction, see the data appendix).[8]

8. For a detailed taxonomy of NTBs as well as an informative analysis of the structure of NTBs in developed countries, see Leamer 1990. An analysis of how the trade barrier landscape has changed following the explosion of NTBs in the 1980s is the subject of Deardorff and Stern 1987a.

NTBs are currently the trade barriers of choice, given the self-imposed limits on tariff escalation after the Tokyo Round and the recently concluded Uruguay Round of multilateral negotiations. The empirical relevance of the political component of NTBs, and hence the endogeneity of U.S. trade barriers, has been demonstrated in a number of studies by political scientists and political economists.[9] Is there, additionally, a basis for presuming that trade barriers are retaliatory? Richard Baldwin's model suggests that there should be and provides optimal retaliation rules to discourage the formation of politically motivated NTBs in the foreign country.[10] I. M. Destler and John Odell suggest that opposition to protection from traditional free traders may have eroded by the 1980s because of dissatisfaction with the U.S. trade situation and sympathy toward the idea of imposing U.S. restrictions in retaliation for foreign barriers to U.S. exports.[11] Alan V. Deardorff and Robert M. Stern indicate instances of both unilateral retaliation and the offensive use of GATT antidumping laws facilitated by a relaxation of U.S. trade laws.[12] They investigate the effects of a unilateral U.S. surcharge on imports, which is allowed under present U.S. trade laws, under various assumptions about a partner's response. Further, in agricultural trade scholars have long contended that tariffs and NTBs among developed countries have been historically retaliatory. To take a current example, the 1988 augmentations to Section 301 of the U.S. Trade Act—the Super 301 and Special 301 provisions—enable greater unilateral action by the United States and have led to greater retaliation to force open foreign markets.[13]

Even though explicit retaliation was never used under GATT dispute settlement rules,[14] scholars have long suspected that price NTBs have been used offensively by business people as strategic business tools. For example, Thomas J. Prusa suggests that with antidumping petitions, which have escalated since 1980, the mere initiation of an investigation against a foreign rival confers benefits to the domestic industry by harassing the foreign rival. Even though a third of antidumping petitions in the United States are withdrawn, this is done only after extracting a benefit such as a minimum price or quantity undertaking on the part of the foreign rival.[15] Similarly, J. Michael Finger and Andrzej Olechowski document the explosion of countervailing duty investigations and actions in the United States since 1980; these activities peaked in 1982 with 124 such investigations, of which 85 were against rivals from developed coun-

9. A sample of some important studies include the analysis of: (1) post–Kennedy Round Canadian tariff data in Caves 1976; (2) U.S. tariff data from the Tokyo Round of cuts in Baldwin 1985; (3) cross-country analysis of trade protection in Conybeare 1983 and Mansfield and Busch 1995; (4) U.S. NTB data from 1983 in Trefler 1993; (5) time-series data on average tariffs by Magee and Young 1987 and Gallarotti 1985; and (6) roll call votes on the 1988 Omnibus Trade Bill by Nollen and Quinn 1994.

10. Baldwin 1990.

11. Destler and Odell 1987.

12. Deardorff and Stern 1987b.

13. A set of papers with varying perspectives on Super 301 is contained in Bhagwati and Patrick 1990.

14. Under the 1947 dispute settlement procedures of GATT, contracting parties could obtain authorization (by majority vote) to suspend concessions and use retaliation, but through mid-1988 there had been only one instance of such authorization, and that authorization was never acted on. See Jackson 1989.

15. Prusa 1992.

tries.[16] During 1980–87, roughly two-thirds of all countervailing duty investigations led to some action (countervailing duties or minimum price undertaking by the exporter).[17]

Referring to Section 301 cases Thomas O. Bayard and Kimberly Ann Elliott claim that "a mere threat by USTR to accept a [Section 301] petition or initiate an investigation may have been sufficient to effect changes in foreign trade policies."[18] They also describe a number of cases where retaliation by the United States was carried out usually without referring the dispute to a GATT panel; these actions, taken under Section 301 before 1988, were usually unsuccessful against the EC countries and Japan, but with renewed vigor under Super 301 (after 1988) they met with a greater degree of success. Margaret Kelly and her colleagues identify sixty cases of explicit retaliation under Section 301 of the U.S. Trade Act of 1974, of which sixteen were directed against the EC and eight against Japan.[19]

Theories of Retaliation and the Empirical Framework

In modern theory, models have featured the endogenous determination of protection where the government balances the benefits from special-interest lobbying spending with the deadweight costs suffered by consumers due to protection. Within this framework, Milner and Yoffie, Conybeare, Richard Baldwin, and Gene M. Grossman and Elhanan Helpman, among others, have focused on retaliatory behavior between trading partners.[20] This recent literature is richer and more cognizant of the role of organizations and institutions in commercial policy than the traditional literature based on H. G. Johnson focusing purely on optimal tariff considerations by large countries with the market power to change their terms of trade.[21]

Milner and Yoffie argue that under conditions of large economies of scale, steep learning curves and large R&D requirements, firms' profits will be directly affected by access to foreign markets and by the behavior of foreign firms and governments. Under these conditions, "we should expect even the staunchest supporters of unconditional liberalization to make free trade at home contingent on freer trade abroad."[22] They further argue that we should expect strategic demands for retaliatory protection in order to pry open foreign markets.

16. Finger and Olechowski 1987.

17. Furthermore, in both AD and CVD investigations trade is disrupted very early in the process by the requirement that duties be posted after merely a preliminary affirmative ruling by the Commerce Department, pending final investigation. Since these duties are forfeited if the final ruling is affirmative, foreign firms have incentive to settle cases early.

18. Bayard and Elliot 1994, 56.

19. Kelley et al. 1988.

20. See Milner and Yoffie 1989; Conybeare 1987; Baldwin 1990; and Grossman and Helpman 1995.

21. The classic theoretical paper on trade retaliation is Johnson 1953. Much of the theoretical literature on protection as bargaining outcomes takes as its starting point (the "threat point") Johnson's noncooperative retaliation equilibrium.

22. Milner and Yoffie 1989, 245.

Conybeare's theoretical exposition is heavily based on optimal tariff considerations, but his case studies demonstrate the importance of domestic political considerations. Richard Baldwin theorizes the existence of an optimal retaliatory tariff directed at discouraging special-interest lobbying behavior in the foreign country. His conclusion is that optimally the home country should retaliate by erecting barriers against all foreign goods whether they are protectionist or antiprotectionist in the foreign country. Hence even if one good is subject to a foreign trade barrier, home imports of all goods are subject to a retaliatory trade barrier. The essence of this proposition is that by doing so the political formation of trade barriers is deterred through reduced incentives to lobby for protection as well as the reduced marginal effectiveness of lobbying expenditures.[23] Grossman and Helpman arrive at a particularly simple reduced-form prediction from their model: the cross-industry level of protection is negatively related to the import penetration ratio and positively related to the elasticity of import demand. They derive the level of protection as the sum of two components, a politically determined component and an optimal tariff component.[24] Conybeare's less formal description is remarkably prescient about the Grossman and Helpman predictions.

Based on these ideas, we focus our empirical analysis on testing the significance of the effectiveness of retaliatory trade barriers. The level of NTB protection to industry i in the United States on imports from a trading partner N_i is modeled as the sum of a domestic political component POL_i and a retaliatory component ϕN^*_{pi}, where ϕ is the retaliatory coefficient applied to the level of foreign NTB protection against its industry i imports from the United States N^*_i. Denoting foreign variables by asterisks, we use the following model for U.S.–partner bilateral NTBs across n industries:

$$N_i = POL_i + \phi N^*_i + u_i,\ i = 1, \ldots, n \qquad (1)$$

In equation (1) POL_i incorporates domestic political economic factors influencing U.S. protection to industry i, the retaliatory component ϕN^*_i is the focus of this study, and u_i is the error term. The political economic component POL_i has usually been modeled in empirical studies as the reduced form from a complex political economy model.[25] Robert Baldwin estimates an "umbrella" model where, in order to infer the validity of each separate political economy model, he combines a range of political economy models into a single estimating equation.[26] We follow this methodology, although we use a different set of variables that we believe more directly

23. Baldwin 1990.
24. Grossman and Helpman 1995.
25. An influential reduced-form study is Baldwin 1985. See the references there to a set of empirical studies by political scientists and economists that defined the literature until 1985. For influential later studies, see the references in footnote 9.
26. Baldwin 1985.

represents the theories than the variables employed in previous empirical studies. We thus have

$$POL_i = X_i b \tag{2}$$

where X_i is a vector of home political economy variables that represent special interest as well as public interest theories. Combining equations (1) and (2), we obtain an econometric model that forms the basis for the bilateral empirical analysis between the United States and its OECD partners using data across n industries,

$$N_i = X_i b + \phi N_i^* + u_i, \qquad i = 1, \ldots, n \tag{3}$$

The main issue is the estimation of the retaliation coefficient ϕ. Note that foreign NTBs are determined in a symmetric model:

$$N_i^* = X_i^* b^* + \phi^* N_i + u_i^*, \qquad i = 1, \ldots, n \tag{3}'$$

A Simultaneous Tobit Econometric Model of Bilateral Trade Barriers

Proper estimation of equations (3) and (3)′ needs to take account of (1) censoring involved in the measurement of the NTB variables, and (2) the endogeneity of N^* in equation (3) and N in equation (3)′, since both models are simultaneously determined. NTBs are measured as coverage ratios, that is, the proportion of imports covered by any NTB. Since data on negative NTBs such as export subsidies and other export promotion measures (by partner countries) are not available, our measure of NTBs is censored below zero, which requires a Tobit-type specification.[27] If the models shown in equations (3) and (3)′ apply symmetrically, then clearly N and N^* are both simultaneously determined in a game-theoretic equilibrium. We therefore estimate a two-equation simultaneous Tobit model with endogenous variables (N_i and N_i^*) truncated below zero:[28]

$$N_i = \phi N_i^* + X_i b + u_i$$

$$N_i^* = \phi^* N_i + X_i^* b^* + u_i^*$$

27. If such subsidies are not countervailed in the importing country, as is often the case, then true NTBs are in effect negative. Our measure of NTBs therefore needs to be modeled as being censored below zero.

28. This methodology has been used to model the endogenous determination of imports and NTBs by Trefler and between political action committee spending and NTBs by Gawande. See Trefler 1993; and Gawande 1997. For an exposition of the likelihood function and consistency conditions, see Maddala 1983.

where

$$N_i = \max\{N_i, 0\}$$

$$N_i^* = \max\{N_i^*, 0\}, i = 1, \ldots, n \quad (4)$$

In equation (4) the errors are identically independently distributed as bivariate normal, and X and X^* are matrices containing exogenous variables. Estimation of the simultaneous Tobit model is by full information maximum likelihood.[29] How we interpret the sign on the coefficients ϕ and ϕ^* depends on whether the game on which the specification is based is noncooperative or a bargaining game (see the section "Possible Outcomes in the Strategic Use of NTBs" for details). As a first approximation, a positive estimate of the home coefficient, ϕ, for example, may be interpreted as an offensive reaction by home to an increase in political foreign NTBs, that is, a retaliatory response; a negative estimate of the foreign coefficient, ϕ^*, for example, may be interpreted as a reduction in the political foreign NTB level due to an increase in offensive home NTBs, that is, an estimate of home's deterrence capability.

An important issue concerns the recovery of deterrence effects from cross-sectional data, since longitudinal data across this set of industries is simply not available and extremely expensive to construct.[30] A constructive way to view the cross-sectional data is as a set of case studies.[31]

Vinod K. Aggarwal, Robert O. Keohane, and David B. Yoffie, for example, construct a model of negotiated protection based on a deep analysis of three cases (textiles–apparel, color TVs, and footwear) and use that model to "predict" the outcome in two other cases (steel and autos). We do not predict, but infer about the nature and outcome of NTB games in four groups of industries. Whereas Aggarwal, Keohane,

29. For readers unsure about how to interpret the estimates from the simultaneous Tobit model, pretend that the NTB measures are the true uncensored measures. Then interpret the estimates simply as you would, say, two-stage least squares estimates from a linear simultaneous equation system, that is, the usual least squares estimates corrected for simultaneous equations bias.

30. Even if such time-series data were available, the only cases of retaliation that would be easy to identify are the clear-cut retaliation cases like those documented in Bayard and Elliott 1994. But retaliation is more subtle than such explicit cases. Consider the example of countervailing duties. If uncertainty of their timing and incidence is such that no clear time links can be established between when an export subsidy went into effect and when it was countervailed, then the use of an industry panel of NTBs across time periods would suffer from the same deficiency as cross-sectional data, namely that the identification of *timing* of the retaliation cases is not clear. Further, if our sample included *only* retaliation cases, this would severely restrict the inferences we could make. For example, we could infer about who loses *conditional* on retaliation having taken place. If a country does not retaliate, as might happen when a large country imposes an optimal tariff against a small country, there is no reason for excluding that from the sample. The methodology of the article would correctly conclude that the small country is "chicken." Having said that, it will be a rewarding refinement to construct a cross-industry panel over time to investigate the deterrence issue. Until then the results of our study may be taken as a first attempt at obtaining systematic evidence about NTB games. We believe it is a good attempt in view of how we interpret the information content of our data set, as we describe later.

31. Milner 1988; Aggarwal, Keohane, and Yoffie 1987; and Conybeare 1987; among many others, all use the case study method effectively.

and Yoffie make effective use of the case method, we use the econometric method. The information in the data can therefore be viewed as a collection of a set of (a few hundred) case studies. At every stage we additionally support the inferences from our data using available case study evidence.

Data

Table 1 contains a description of the variables used in the empirical analysis; their construction is detailed in the appendix. Table 2 describes the choice of regressors in the two-equation linear model. An asterisk in the two right-hand columns in Table 2 indicates that the variable is an included independent variable; "Dep" indicates that the variable is dependent. The issues of interest are the retaliation coefficients on N^* in the N equation (ϕ) and on N in the N^* equation (ϕ^*), whose estimates are reported in subsequent tables. The remaining variables in the system represent the political economic component of NTBs. Since our focus is on the retaliatory coefficients, the political economy variables take the important, but secondary, role as control variables.

Dependent Variables

The dependent variables, U.S. and partner NTBs (defined in Table 1 as N_{pi} and N^*_{pi}, respectively), are measured as coverage ratios—the proportion of an industry's imports that are covered by some NTB. The NTBs employed in this study are bilateral NTBs as of 1983, between the United States and Japan, France, Germany, Italy, and the United Kingdom. The NTB data span 326 four-digit SIC industries. Since a large proportion of antidumping cases and countervailing duty actions initiated by the United States as of 1983 were against Japan and the EC, analysis of bilateral NTBs against these partners is appropriate here.[32] NTBs are grouped primarily into three categories: price NTBs (for example, countervailing duties and antidumping duties), quantitative NTBs (for example, quotas and VERs), and threat NTBs (for example, price, quantity, and quality monitoring).[33] In addition to a measure aggregating these three different types of NTBs called "all NTBs," two specifications that employ U.S. price and U.S. quantitative NTBs are also estimated. Partner country NTBs are measured only at the aggregate all-NTB level.

32. The choice of 1983 as the year for the study is appropriate. Use of NTBs exploded in 1979, reaching a peak in 1982 (see, for example, Laird and Yeats 1990). Hence, the NTB data contain an inventory of all those events and trade policy activities. In connecting the estimates here with case studies using later data, we presume that the pattern of U.S. and partner NTBs from 1983 has remained somewhat sticky over the years without a pronounced structural break. Summary statistics by broad industry groups in Laird and Yeats 1990 for the year 1986 support that presumption. We do not argue that the 1988 act has had little effect, only that the need to strictly enforce Super 301 has not arisen often, so that its enactment has not led to the dramatic change in U.S. trade policy that it has the potential to do.

33. Details on the construction of NTBs are provided in the data appendix. For studies using NTB coverage ratios, see Leamer 1990; Trefler 1993; and Gawande 1995 and 1997.

TABLE 1. *Descriptions of variables used in the cross-industry econometric analysis*

Variable	*Description*
N_{pi}	U.S. NTB coverage on imports from partner p of good i
M_{pi}	Penetration of U.S. consumption by imports from partner p of good i
X_{pi}	U.S. exports to partner p of good i, scaled by consumption
N^*_{pi}	NTB coverage by partner p on its imports of good i from the United States
M^*_{pi}	Penetration of country p's consumption of good i by imports from the United States
X^*_{pi}	Partner p's exports of good i to the United States, scaled by its consumption
PACCORP	Average corporate political action committee spending per election cycle, 1977–84
UNION	Percentage of employees unionized, 1981
P_SCI	Percentage of employees classified as scientists and engineers, 1982
P_MAN	Percentage of employees classified as managerial, 1982
P_UNSK	Percentage of employees classified as unskilled, 1982
AVEARN	Average earnings per employee, 1982
SCALE	Measure of industry scale: Value added per firm, 1982
CONC4	Four-firm concentration ratio, 1982
REPRST	Number of states in which production is located, 1982
DI_b, $b = 1, \ldots, 14$	Fourteen two-digit SIC-level dummies (see appendix for description)
DG_a, $a = 1, \ldots, 4$	Aggregation of DI_b into four groups: FOOD, RES, MFG, CAP (see appendix)
TAR	Post–Tokyo Round ad valorem tariff rate

Note: U.S. data are across four-digit SIC industries in 1983 unless indicated otherwise.

NTB coverage ratios are imperfect measures of impact, but given the scope of the data these are the best measures of trade restrictiveness. Other impact measures would be either the tariff equivalents of the nontariff measures or purely quantity impact measures. Neither of these is easy to quantify at the scope of this study, and they entail myriad assumptions about elasticities in order to facilitate their computation. Further, even they are imperfect as measures of impact. Edward J. Ray provides some evidence of retaliation in a cross-sectional setting using two measures of NTBs: a binary indicator of the presence or absence of NTBs, and an index of NTBs.[34] The index was constructed as follows: fifteen NTBs were graded in order of their trade-restrictiveness, and for each industry the index equals the ratio of actual to potential protection (from all fifteen NTBs). Coverage ratios are decidedly superior to the binary indicators, since they contain more information. Further, since we disaggregate the NTBs into price and quantitative NTBs, this removes the ad hoc grading of NTBs inherent in the index used by Ray. Hence, we rely on coverage ratios that have been used in the studies by Edward E. Leamer, Daniel Trefler, and Kishore Gawande.[35] The regression model estimated by Bayard and Elliott is notable.[36] Their sample consists of seventy-two Section 301 cases initiated by the United States between 1975 and 1992. The dependent variable in their analysis is a binary measure of

34. Ray 1981.
35. See Leamer 1990; Trefler 1993; and Gawande 1997.
36. Bayard and Elliot 1994, chap. 4.

TABLE 2. *Two-equation simultaneous Tobit:* ($N_{pi}N^*_{pi}$)

Variable		
N_{pi}	*Dep*	*
N^*_{pi}	*	*Dep*
M_{pi}	*	
X_{pi}	*	
M^*_{pi}		*
X^*_{pi}		*
PACCORP	*	*
UNION	*	
P_SCI	*	
P_MAN	*	
P_UNSK	*	
AVEARN	*	
SCALE	*	
CONC4	*	
REPRST	*	
DI_b, $b = 1, \ldots, 14$	*	*
TAR		*

Model specification: An asterisk in the two right-hand columns indicates included variable; *Dep* indicates jointly dependent variables. Two-equation simultaneous Tobit models were estimated by maximum likelihood using (1) U.S.–Japan bilateral NTB data across four-digit SIC industries; (2) U.S.–EC4 bilateral NTB data, pooling four-digit SIC industry across the four EC countries (France, Germany, Italy, and the United Kingdom); and (3) U.S.–Japan and U.S.–EC4 runs but with data disaggregated by four commodity groups: food processing (FOOD), resource-intensive goods (RES), general manufactures (MFG), and capital-intensive goods (CAP).

Notes: (1) In the U.S.–Japan and U.S.–EC4 runs there are twenty-six right-hand-side variables in the N_{pi} equation and nineteen right-hand-side variables in the N^*_{pi} equation; (2) in the runs disaggregated by four commodity groups, the number of dummies depends on how many of the fourteen dummies from the full model apply. The mapping is provided in the data appendix. Hence, the number of right-hand-side variables in the $\{N_{pi}, N^*_{pi}\}$ system is as follows: FOOD: {13, 6}; RES: {16, 9}; MFG: {19, 12}; CAP: {14, 7}.

success or failure in those cases. Although their study does not directly use trade barrier data, a ''success'' indirectly allows inference about the probability of removal of implicit or explicit trade barriers in the partner country. In this article, we take the larger step of quantifying the extent of the success (or failure) in lowering partner trade barriers by explicitly measuring the amount of NTB protection.

Independent Variables

We employ a widely used set of explanatory factors from a number of different political economy models in order to condition our study of retaliation on the empirical political economic literature on protectionism. This literature is large and well established, and we merely summarize it to motivate the control variables in the

study.[37] First, based on comparative advantage arguments, scholars have suggested that labor-intensive industries that are more susceptible to import penetration (M_{pi}) are more likely to be granted protection. The classical comparative advantage argument, which originated with David Ricardo and was later refined by Eli Heckscher and Bertil Ohlin, has received empirical support but remains controversial.[38] By this reasoning, high-skill industries should be less likely to receive protection. Here we identify high-skill industries by their larger proportion of scientists (P_SCI) and larger proportion of managers (P_MAN).[39] Second, interest group models have incorporated both direct and indirect measures of special interest pressure for protection.[40] Drawing on this literature, we employ a number of measures of interest group pressure, such as concentration ratios (CONC4), corporate campaign contributions (PACCORP), degree of unionization (UNION), and geographic spread (REPRST) measured here by the number of states engaged in production in the industry. The case studies in Aggarwal, Keohane, and Yoffie emphasize barriers to entry, which we measure by average firm output (SCALE).[41] The studies by Destler and Odell and Milner point to export interests as influential sources of antiprotectionism, and we measure their intensity by the amount of exports scaled by the size of the market (X_{pi}).[42] Third, a group of theories emphasizing the public interest postulates that government officials and citizens adopt a long-term view of their self-interest and also consider the social impacts of protection, a view emphasizing social justice as well as a regard for the status quo.[43] Thus, industries with a large proportion of unskilled workers (P_UNSK) will be supplied higher levels of protection than other industries.[44] This social justice approach also presumes that through trade policy the government seeks to reduce income inequality. Scholars have offered this as an explanation for why industries without much political clout, such as apparel and textiles, have successfully obtained protection. According to this theory, the level of protection is thus higher for industries with a high proportion of low-income workers. Hence, protection is expected to be negatively related to average earnings (AVEARN). In addition to the variables already discussed, the N equation includes two-digit SIC dummies to control for the influence of omitted variables that may otherwise be captured by N and therefore spuriously affect estimates of the retaliation coefficient ϕ.[45]

37. See the references in footnote 9.
38. For empirical support, see Leamer 1984; and Trefler 1993.
39. See also Baldwin 1985.
40. For example, see Baldwin 1985; Gawande 1995 and 1997; and Hansen and Prusa 1996 and 1997.
41. Aggarwal, Keohane, and Yoffie 1987.
42. See Destler and Odell 1987; and Milner 1988.
43. The status quo model is ascribed to Max Corden, specifically his formulation of the conservative social utility function that lies behind government's altruistic actions. Corden 1974.
44. Baldwin 1985.
45. The twenty two-digit SIC dummies are further aggregated into fourteen dummies according to the scheme described in the appendix, because in some runs, although there is convergence, the presence of some dummies is responsible for the noninvertibility of the Hessian so that the variance-covariance matrix of the ML estimates is irrecoverable. The aggregation of the dummies solves the problems for these models. To maintain consistency across all models, we use fourteen industry dummies. For the models that do converge with all twenty dummies, the results are qualitatively no different from those reported here. Those results are available from the authors on request.

Home and foreign NTBs are modeled symmetrically, which requires the variables in the N^* equation to be the same as those in the N equation. In the N^* equation, import penetration and exports (scaled by consumption) of good i measure the comparative cost structure. Corporate lobbying expenditures in the United States are included in the N^* equation to allow inference about whether home lobbying has any impact on foreign NTBs. According to the theoretical model of Richard Baldwin, foreign retaliatory NTBs target lobbying by home industries, and hence we should find that greater lobbying leads to greater retaliatory NTBs by the foreign country.

In addition to these variables in the N^* equation, industry dummies at the two-digit SIC level are employed as proxies for partner's political-economic variables. Although the key comparative advantage variables are measures for partner countries, we lack other variables that are available only for the United States. The task of obtaining the same breadth of data for the other countries included in this analysis is daunting and is left open as an avenue for future research. Specifically, because of differences in reporting laws and data collection systems it is practically impossible to get comparable data on PAC contributions, political representation (REPRST), concentration ratios, scale, and the like for Japan and EC countries. Our solution is to capture the remaining industry-specific effects through a set of fourteen (see the appendix) two-digit SIC industry dummies. We do have some degree of success using the dummies, since the models are estimated with a fair degree of fit.

Possible Outcomes in the Strategic Use of NTBs

To interpret the results from the estimation, one must understand the nature of the games that presumably produce the data.[46] Our results can be interpreted from the viewpoint of either a noncooperative game or a bargaining game. In a noncooperative game each government maximizes its own welfare (considered a function of the home and foreign NTB levels), whereas in a bargaining game the two governments maximize a weighted sum of the welfare of both governments.[47] We will argue that, overall, U.S.–Japan NTBs as of 1983 were the result of noncooperative games, whereas, overall, U.S.–EC NTBs were the result of bargaining games. However, when we disaggregate the sample by industry groups, we find that the nature of games is not as clear-cut. For example, in industries with a high degree of intra-industry trade, as characterized by U.S.–Japan and U.S.–EC trade in manufacturing, we argue that bilateral NTBs in this sector are the result of bargaining games, since

46. Wagner warns against characterizing games simplistically as Prisoners' Dilemma (PD) or Stag Hunt (SH) or other popular but overly simple structures. Wagner 1983. He shows how simple extensions to the PD game can enrich our understanding of security dilemmas and lead to quite different solutions than the suboptimal PD solution. We are guilty of depicting our games in the same simplistic terms that Wagner criticizes, especially since NTB games are repeated games and are asymmetric in stakes and information. To avoid trivializing the depiction of the trade policy games, in this section we present two views of NTB games.

47. A technical statement of the two maximization problems is given, for example, in Grossman and Helpman 1995. The idea behind maximizing joint welfare is to avoid the deadweight welfare losses that arise in the noncooperative setting, which neither country avails.

home NTBs impose costs on downstream industries at home (similarly for foreign) and hence may face counterlobbying. On the other hand, protection in the food-processing sector reflects traditionally high protection in agricultural sectors; and due to the largely one-way trade in this sector, we argue that bilateral NTBs in this sector are from games of conflict.

NTBs as the Outcome of a Noncooperative Game

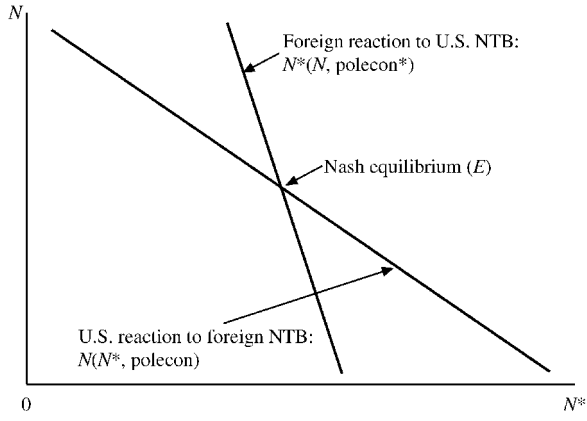
In viewing home and foreign NTBs as the outcome of a noncooperative game, we begin by supposing that each country possesses a reaction function.[48] Home's reaction function indicates the optimal level of protection it imposes given its conjecture about foreign's level of protection, whereas foreign's reaction function shows its optimal level of protection given its conjecture about home's level of protection.[49] Figure 1a depicts downward sloping reaction functions for home, N (N^*, polecon), and foreign, N^* (N, polecon*). The Nash equilibrium E is given at the intersection of the two reaction functions.

In theory, therefore, each data point we observe is endogenously determined in a Nash equilibrium. Since the reaction curves are conditioned on political economic variables, their intersections generate the NTB data. To estimate the reaction functions, we need to use simultaneous equations methods. Two points are noteworthy. First, reaction functions can be negatively or positively sloped. If both reaction functions are negatively sloped, then home and foreign NTBs are strategic substitutes for each other. For example, an increase in N induces a decrease in N^*. If both reaction functions are positively sloped, then home and foreign NTBs are strategic complements for each other. That is, an increase in N induces an increase in N^*.[50] Figure 1b depicts an equilibrium where N and N^* are strategic complements. Figure 1c depicts an equilibrium where N and N^* are strategic complements from home's perspective but are strategic substitutes from foreign's perspective. Second, we have focused on the endogenous determination of the home and foreign NTB levels. Their national welfare functions obviously depend not only on N and N^* but also on: (1) benefits from lobbying spending and costs due to deadweight losses from protection, (2) electoral variables that affect election chances such as employment in the industry, and (3) inherently altruistic variables that are driven by equity rather than efficiency considerations. These considerations enter as the exogenous variables denoted pole-

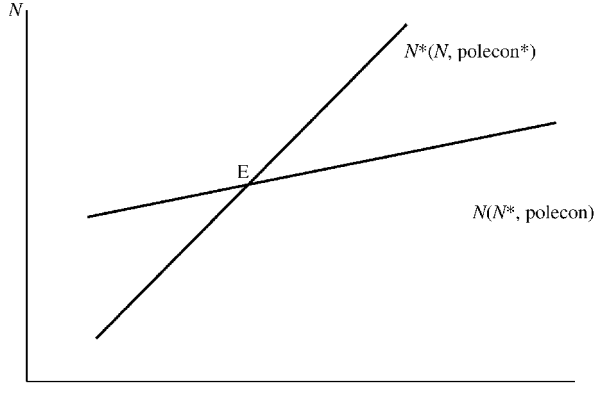
48. For an introduction to Cournot reaction functions, see Kreps 1990. The Cournot reaction functions are based on Cournot conjectures; that is, each of the two countries assumes that the other country will act to keep its NTB level fixed.

49. Suppose that we can write a national welfare function for each country as a function of N and N^*. Written in this form, the national welfare function incorporates "optimal tariff" considerations. See Johnson 1953. The Cournot reaction function for home (foreign), for example, is the outcome of the maximization of a home national welfare function over N (N^*), considering N^* (N) fixed. Consider the set of home's iso-welfare curves on the (N, N^*) plane. Each curve is the locus of (N, N^*) points that give home the same level of welfare. Then, given foreign NTB level N^*, home responds with the NTB level N that yields the highest iso-welfare curve. For each N^*, we can thus trace out home's Cournot reaction function; a similar exercise for foreign traces out its Cournot reaction function. The noncooperative Cournot equilibrium solution occurs at the intersection of the reaction curves.

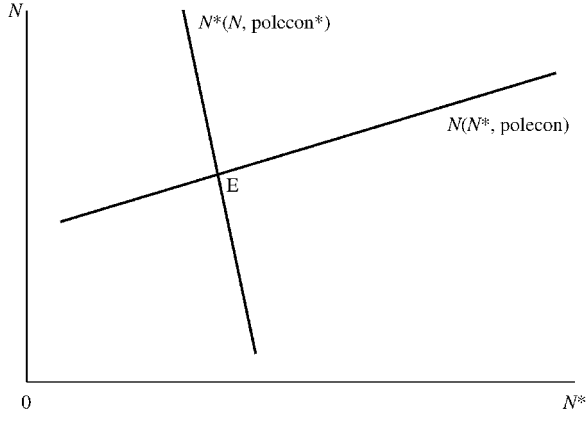
50. This terminology is borrowed from Bulow, Geanakoplos, and Klemperer 1985.



a. Strategic substitutes



b. Strategic complements



c. Strategic complements at home and strategic substitutes in foreign

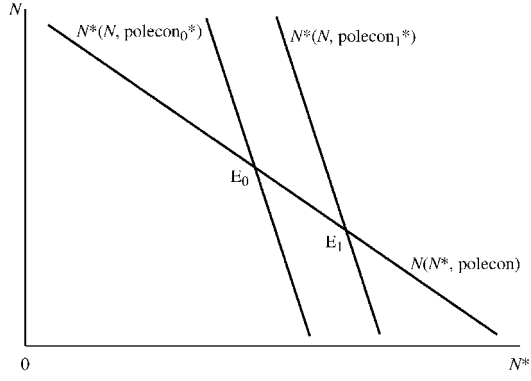
FIGURE 1. *NTB reaction curves*

con for home and polecon* for foreign. Changing them is akin to changing the "treatments" to the industry. Changing the political economic, electoral, and other characteristics of the industry at home (foreign) shifts the home (foreign) reaction function. A shift in the reaction curves produces a new set of observations on $\{N, N^*\}$ at their new intersection.

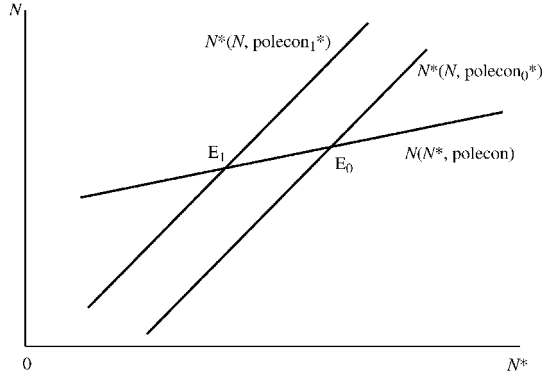
From this endogenously determined data we want to make inferences about the slopes of the home and foreign reaction curves. Once the reaction functions are estimated, we hypothesize whether the situation will likely lead to NTB escalation on both sides, deterrence on both sides, or with one country able to deter another through aggressive behavior. Note that the reaction curves estimated represent simultaneous move games and, strictly speaking, allow no "reaction" to an opponent's moves. Once we allow reactions, we are really referring to repeated games. It is well known that repeated games are able to attain a cooperative solution that is in the interest of both parties, where simultaneous-move one-period games would lead to a suboptimal solution (for example, Prisoners' Dilemma). In order to hypothesize about the final outcome, we make two simple assumptions: First, if NTBs are strategic substitutes from, for example, the home country's perspective (that is, if ϕ in equation (3) is negatively sloped, then home has a downward sloping reaction function, and similarly for foreign if ϕ^* is negative), then foreign plays an aggressive strategy in order to raise foreign's NTBs in the expectation of moving down home's reaction curve and lowering home's NTBs. This situation is depicted in Figure 2a, where the equilibrium moves from E_0 to E_1 after a shift in foreign's reaction function. A shift of the foreign reaction curve may be brought about, for example, by aggressive corporate lobbying by foreign lobbyists in order to strategically raise their NTBs and restrict market access if home indulges in protectionist behavior, or due to a change in the foreign administration's attitude that now seeks to forcibly open home markets through unilateral action. Second, if a player, for example, home, has a positively sloped reaction function, then foreign does not initiate an NTB increase, since that will automatically lead to an increase in home NTBs and probably promote escalation. Since NTBs are strategic complements from home's point of view, it pays foreign to actually lower its NTBs. This strategy works to lower NTBs on both sides if foreign also views NTBs as strategic complements. Such a situation is depicted in Figure 2b, where the equilibrium moves from E_0 to E_1. Chances are that home will respond similarly and corroborate the decrease.

Hence, in a noncooperative situation, the coefficients on ϕ and ϕ^* in equations (3) and (3)′, respectively, indicate one of four outcomes:

1. If both ϕ and ϕ^* are positive, there is a mutual lowering of NTBs.
2. If ϕ is positive but ϕ^* is negative, aggressive action by foreign (increase in N^*) will raise home's NTBs, but aggressive action by home (increase in N) will lower foreign's NTBs. We will characterize this as home playing bully.
3. If ϕ is negative but ϕ^* is positive, we have the converse of the second outcome, with foreign playing bully.
4. If ϕ and ϕ^* are both negative, we have the possibility of escalation as each country tries to move down the other's reaction function.



a. Strategic substitutes—shift in foreign's reaction function



b. Strategic complements—shift in foreign's reaction function

FIGURE 2. *Shift in foreign's reaction function*

NTBs as the Outcome of a Bargaining Game

To view bilateral NTBs as outcomes from bargaining games, one must first understand the region over which bargaining can occur.[51] The worst-case scenario for both countries is the "threat point," that is, the solution that occurs if negotiations break down.[52] In some cases the threat point may be the Nash noncooperative solution, but in others it may be worse. We adapt Robert D. Putnam's widely cited framework of two-level games to our setting.[53] At level I the two governments negotiate bilateral

51. For a formal account of a bargaining solution see Binmore, Rubinstein, and Wolinsky 1986; and for a theoretical application to trade barriers, see Grossman and Helpman 1995.

52. Although cooperation may be mutually beneficial to consumers in both countries, that is not generally true of producer interests. Hence, corporate lobbies may prevent cooperative agreements from taking place and enforce the threat point. In the absence of the legal machinery to punish noncooperation, some games may never evolve into cooperative games. On the other hand, repeated plays of noncooperative games may evolve into cooperative behavior even in the absence of international agencies.

53. Putnam 1988.

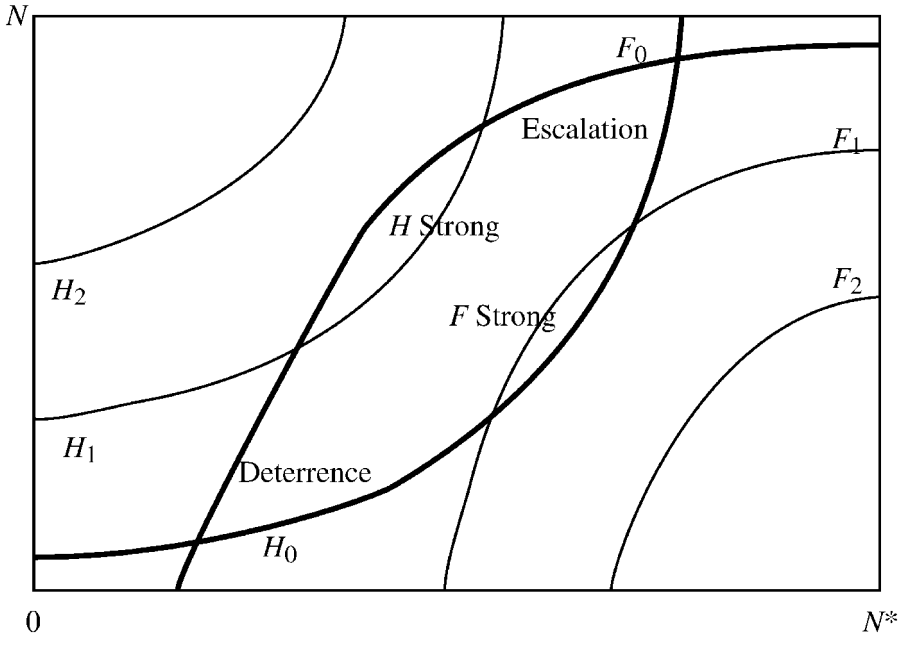


FIGURE 3. *Putnam's bargaining set in a two-level game using political indifference curves*

NTBs, and at level II constituents in the two countries negotiate among each other and "ratify" the level I agreement. In each country level II ratification takes the form of competition among opposing lobbies, or between domestic and foreign lobbies, or between protectionist producer and antiprotectionist consumer interests, with each interest group making contributions to the governments or expressing displeasure by withholding votes. Political economic interests of these level II actors define the bargaining set shown in Figure 3. The indifference curves for home indicate combinations of N and N^* that a government is indifferent between, where its objective function includes concerns for the public interest as well as special interest contributions from home and foreign lobbies. The home government's "utility" increases as we move toward the top left of Figure 3. The indifference curve labeled H_0 is the lowest level of utility it can tolerate, since it brings in the minimum allowable contributions. Similarly, foreign government's "utility" increases as we move to the bottom right. The indifference curve labeled F_0 is the lowest level of utility it will tolerate. The elliptical area enclosed by H_0 and F_0 is the set over which level I bargaining occurs. If foreign is the stronger bargainer, it will be able to force an outcome close to the point where its indifference curve is tangential to home's lowest acceptable indifference curve, H_0. If home is the stronger bargainer, it will be able to force an outcome close to the point where its indifference curve is tangential to foreign's lowest acceptable indifference curve, F_0.

Our econometric analysis exposes the weaker bargainer: the estimates point to instances where the United States can, through the threat of aggressive action, force a solution in the left corner of the set and instances where that is not possible. From the point of view of a bargaining game, our results have a simple interpretation.[54] The coefficient on ϕ and ϕ^*, in equations (3) and (3)′, respectively, indicates one of four outcomes:

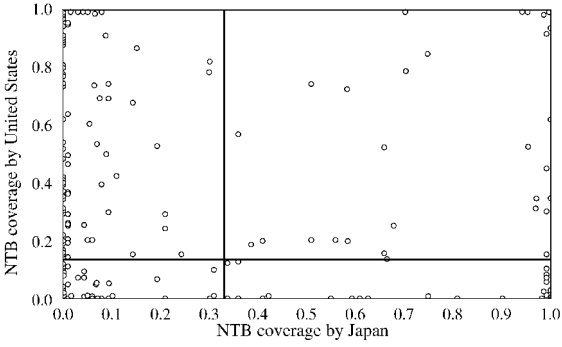
1. If both ϕ and ϕ^* are positive, then both countries are strong bargainers, and perhaps the bargaining sets only admit high-NTB solutions on both sides.
2. If ϕ is positive but ϕ^* is negative, home is the stronger bargainer: high N^* is associated with high home NTBs, whereas aggressive bargaining by home (increase in N) will deter or even lower foreign NTBs. Home can thus afford to play bully. We use the term *deterrence* rather than *compliance* (that is, a lowering of foreign NTBs) here even though a negative estimate of ϕ^* indicates compliance is possible.
3. If ϕ is negative but ϕ^* is positive, we have the converse of the second outcome.
4. If ϕ and ϕ^* are both negative, there is a high probability of mutual deterrence or lowering of NTBs. Perhaps the bargaining sets admit only low bilateral NTBs on both sides, or even if the bargaining sets are large, the pursuit of maximizing joint (rather than own) welfare leads to a mutual lowering of NTBs.

Note how the first and fourth outcomes differ from the noncooperative setting. In the following section we will mainly employ the language of bargaining games, although we will qualify the interpretation of the results where the first and fourth outcomes occur. Finally, we note that the data do not capture events where a country is deterred from raising NTBs because it anticipates retaliation, that is, instances where only threats without explicit retaliation occur. Threat data would be required for that purpose.

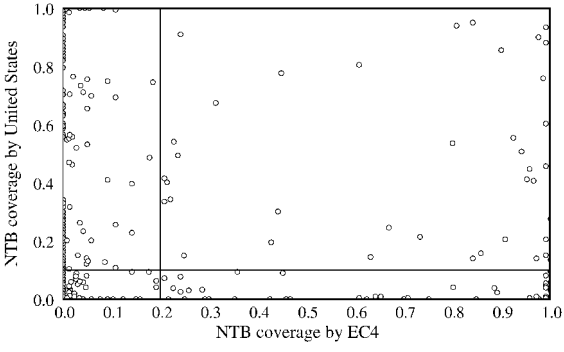
What factors enable one country to become the stronger bargainer? John McMillan hypothesizes that the advantage to the United States will increase under the following conditions: (1) if the harm to the targeted country is increased by having its access to the U.S. market limited, (2) if the targeted country's ability to harm the United States in retaliation is decreased, (3) if the costs of compliance within the targeted country are decreased, and (4) if the benefits to the United States are increased by the demanded liberalization.[55] As Odell puts it succinctly: "Within the target nation, the greater the net internal political cost of compliance for the execu-

54. Note that the data available are the *end* result after the bargaining process has fully worked itself out. Hence, we cannot and do not infer about the process of offers and counteroffers, that is, reactions to offers. For that, we would need data at each step as the bargaining unfolds. Hence, we do not estimate reaction curves as in the case of noncooperative games. Where outcomes arise from bargaining games, we simply observe NTB pairs that are (high, high), (high, low), (low, high), or (low, low). From this we infer, after controlling for political-economic factors, who is the stronger bargainer.

55. McMillan 1990.



a. U.S.–Japan NTBs (326 observations)



b. U.S.–EC4 NTBs (1,304 observations)

Note: The data sets are split into limit and nonlimit observations: [{$x > 0$, $y > 0$}, {$x = 0$, $y > 0$}, {$x > 0$, $y = 0$}, {$x = 0$, $y = 0$,}], where $x = N^*_{pi}$ and $y = N_{pi}$ as follows: U.S.–Japan: [148, 7, 146, 32]. U.S.–EC4: [107, 72, 409, 445].

FIGURE 4. *N_{pi} versus N^*_{pi}*

tive, relative to the net internal political cost of no-agreement, the less likely the target government will be to accept agreement on the terms demanded."[56]

Features of the Data

Some features of the data sets are portrayed by cross-industry scatters in Figure 4 of U.S.–partner NTBs, {N_{pi}, N^*_{pi}}, where p indexes partners and i indexes industries. In Figure 4a the horizontal line indicates the simple average across the 326 U.S. industry NTB coverage ratios on its imports from Japan, and the vertical line is the simple average of Japan's NTB coverage of its imports from the United States. Figure 4b depicts bilateral NTBs between the United States and its four EC partners, covering

56. Odell 1993.

$4 \times 326 = 1{,}304$ observations.[57] In both graphs the striking feature is the large difference in degree of protection between the United States and its major trading partners. The simple average of Japan's NTB coverage of imports from the United States is 34 percent, whereas the corresponding number for the U.S. coverage of imports from Japan is 19 percent. Against the EC4, the numbers are 18 percent coverage by the EC4 and 6 percent coverage by the United States.[58] These numbers adequately convey the disparity in protection[59] and by themselves provide a rationalization for U.S. retaliation against foreign protectionism in order to force fairer trade. From these averages it seems that the loss to the United States from retaliating by offensively raising its NTB coverage is lower than the loss to the targeted country, thus fulfilling a basic requirement to win at a bargaining game. The skewed protectionism seems to validate McMillan's first and fourth conditions. Further, since these countries ran trade surpluses with the United States, the second condition is likely also satisfied. However, the third condition is usually not satisfied, since it is often politically very costly for the government in the target country to accede to U.S. demands. This may set the stage for escalation of a trade war. As documented in the "Japan: Beef and Citrus" case study of Bayard and Elliott the two prominent Japanese political actors, Sadanori Yamanaka (chairman of the 260-member Livestock Industry Promotion Corporation and head of the Liberal Democratic party's Tax Policy Investigations Committee) and Tokutaro Higaki (chairman of the 200-member Tree Fruit Agriculture Promotion Caucus) lost their Diet seats because they did not prevent the elimination of Japanese import quotas in beef and citrus in 1988 following aggressive U.S. negotiations.[60] Because of such large political costs, unilateral action against Japan will not necessarily lead to deterrence, as our results will presently show.

Figures 5 and 6 break down U.S.–Japan and U.S.–EC4 NTBs, respectively, by four industry groups. They display the huge disproportionality in U.S., Japanese, and EC4 protection of food processing. In 1983 Japan covered 95 percent of its food processing imports from the United States with an NTB and the EC4 covered almost 70 percent, whereas the United States covered only 11 percent of its food processing imports from Japan and 25 percent of them from the EC4. High intra-industry trade with the EC4 in resource-intensive goods, general manufacturing, and capital-

57. Note that the pattern of data or correlations offer little information about the response of N to N^* (and conversely) because each point on the graph is generated from the intersection of reaction curves, which shift due to changes in the exogenous variables. The simultaneous equation estimation, which controls for shifts in these exogenous variables (which shift the reaction functions), provides that information.

58. Considerable heterogeneity exists among EC countries in the pattern of NTBs on their imports from the United States, which is the main reason we chose to pool the data across these partners rather than aggregate across them. For example, the simple average of France's NTB coverage of imports from the United States in 1983 was approximately 25 percent, whereas the corresponding numbers for Italy, Germany, and the United Kingdom were 10 percent, 19 percent, and 16 percent, respectively.

59. The disparity based on import-weighted NTB coverage averages is even greater. The problem with using weighted NTB coverage is, of course, that it understates the amount of protection; for example, a prohibitive NTB that succeeds in lowering imports to zero gets zero weight.

60. Bayard and Elliott 1994, chap. 10.

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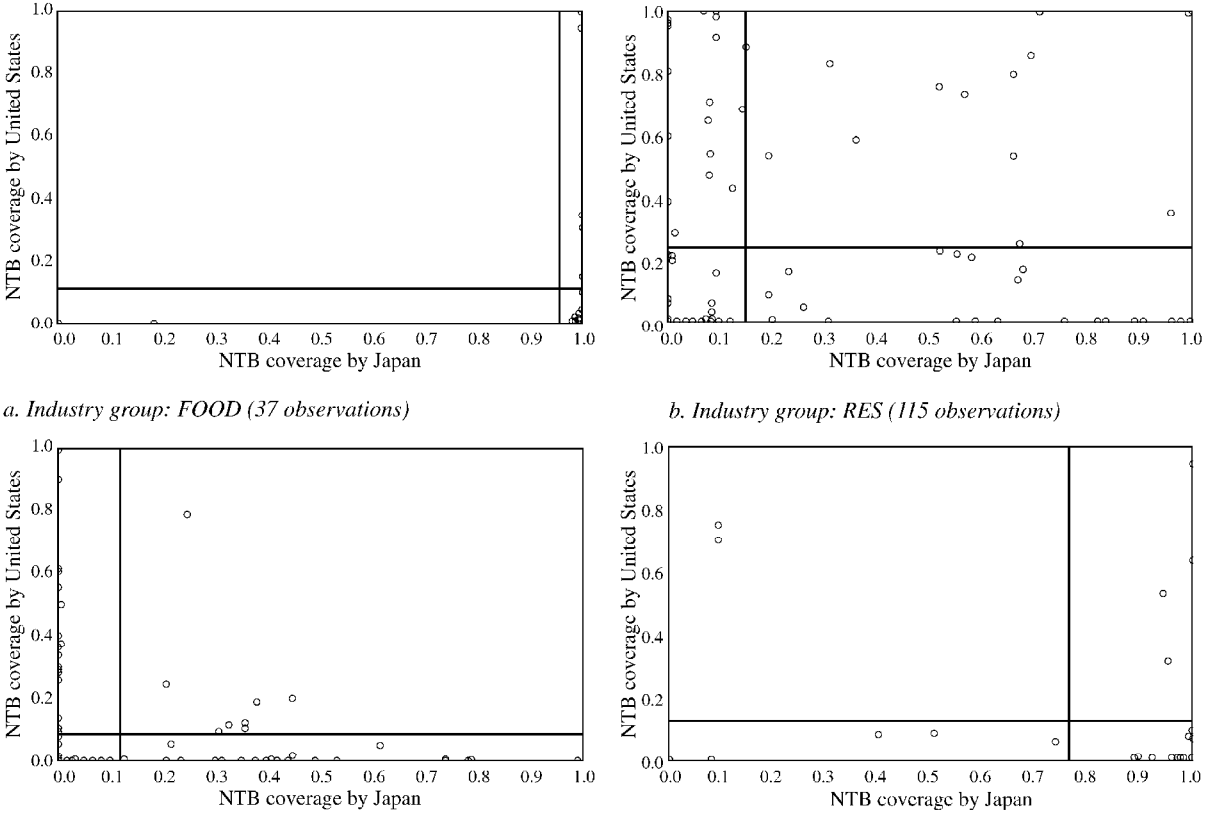

a. Industry group: FOOD (37 observations)

b. Industry group: RES (115 observations)

c. Industry group: MFG (143 observations)

d. Industry group: CAP (31 observations)

Note: The data sets are split into limit and non-limit observations: [{$x > 0, y > 0$}, {$x = 0, y > 0$}, {$x > 0, y = 0$}, {$x = 0, y = 0$}], where $x = N^*_{pi}$ and $y = N_{pi}$ as follows: FOOD [16, 1, 19, 1]; RES [62, 7, 28, 18]; MFG [29, 13, 48, 53]; CAP [16, 0, 13, 2].,

FIGURE 5. *N_{pi} versus N^*_{pi}: U.S.–Japan disaggregated by four industry groups*

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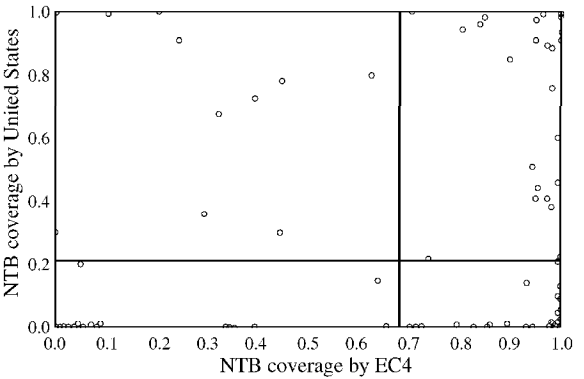
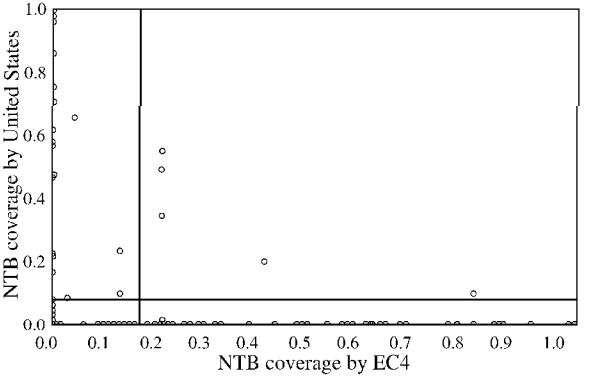
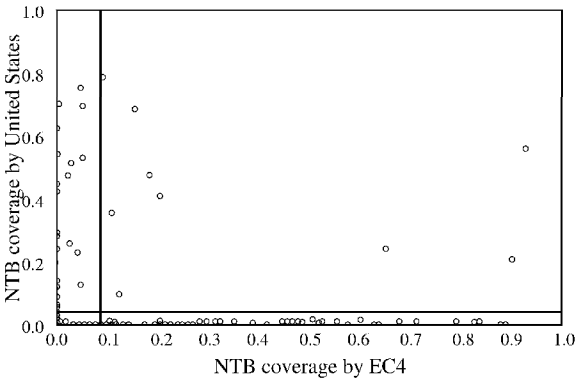


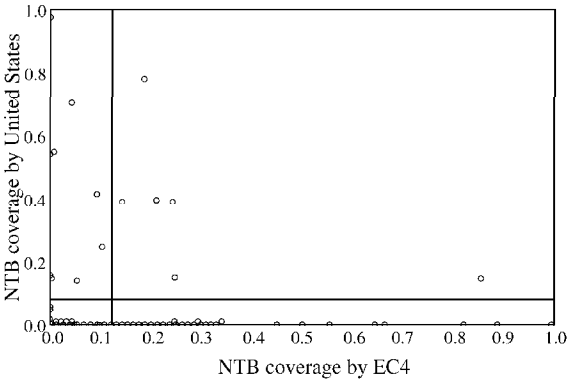
a. Industry group: FOOD (148 observations)



b. Industry group: RES (460 observations)



c. Industry group: MFG (572 observations)



d. Industry group: CAP (124 observations)

Note: The data sets are split into limit and nonlimit observations: [{$x > 0, y > 0$}, {$x = 0, y > 0$,}, {$x > 0, y = 0$,}, {$x = 0, y = 0$}], where $x = N^*_{pi}$ and $y = Npi$ as follows: FOOD [74, 3, 54, 17]; RES [27, 35, 220, 178]; MFG [55, 25, 201, 291]; CAP [53, 5, 52, 14].

FIGURE 6. *N_{pi} versus N^*_{pi}: U.S.–EC4 disaggregated by four industry groups*

intensive goods kept U.S.–EC4 NTBs low in those categories of manufactures; that was not the case with Japan, whose trade with the United States is more interindustry in nature than U.S.–EC4 trade. The disparity in U.S.–Japan average protection levels, though less marked than in food processing, was still significant in the three industry groups. Hence, a clear motivation for retaliation by the United States is therefore to "level the playing field."

Empirical Results: Estimates of Retaliation and Deterrence Coefficients

Aggregate Sample

The estimates of the retaliation (if positive) and deterrence (if negative) coefficients from the U.S.–Japan data and U.S.–EC4 data are presented in Table 3.[61] The (pseudo) R^2 values indicate an adequate fit for the cross-sectional data. The results indicate a striking difference in the nature of the NTB game between the United States and Japan, on the one hand, and the United States and the EC4 bloc, on the other. Consider first the column in Table 3 labeled Japan. We interpret the U.S.–Japan results from the point of view of a noncooperative game for reasons we describe later (but see footnote 64). The first row of Table 3 indicates that if the United States raised its NTB coverage of imports from Japan from zero coverage to full coverage ($N = 1$), Japan would retaliate by raising its NTB coverage ratio on imports from the United States by .459 (the estimate of ϕ^*).[62] If the initial response was an offensive action by the United States, this would only escalate Japanese overall NTBs. Further, Japanese offensive action against U.S. NTBs would actually lower U.S. overall NTBs, as the negative sign on ϕ indicates. Although escalation of NTBs from the Japanese side is very plausible due to the high political costs in Japan associated with bending in the face of offensive action by the United States, surprisingly, the United States would bow down to offensive action by Japan. Perhaps the inclusion of threat NTBs (for example, price and quantity monitoring) in the overall NTB measure produces that result in the all-NTB row. The estimated result may be reflecting the removal of threat NTBs, on retaliation from Japan, which do not impose significant real costs. A clearer picture emerges from the disaggregated U.S. price and quantitative NTB runs. The estimates indicate that retaliation by the United States, using price NTBs (for example, countervailing and antidumping duties) as instruments, will again lead to escalation by Japan, but the United States is fairly indifferent to retaliation by Japan (the estimate of $-.156$ on ϕ is not statistically significantly different from zero). On the other hand, the use of quantitative NTBs by the United States offen-

61. The program code for the simultaneous Tobit model was written in GAUSS v. 2.2. All the models reported in Tables 3 and 4 converged within twenty iterations using Newton's method.

62. It is important to realize that the estimates apply only to local changes, and the statement about the response of N^* to such a large change (from 0 to 1) in N is an approximation. Further, since the estimates come from a nonlinear system of equations, this statement really applies to the *latent* underlying unobserved variables, which are *measured* by N and N^* (and are truncated measures of the underlying latent variables). Rather than using the cumbersome term *underlying latent variable*, we simply use N (U.S. NTBs) and N^* (partner's NTBs).

TABLE 3. *Estimates of home and foreign retaliation coefficients (ϕ and ϕ^*)*

	Japan		*EC4*[a]	
U.S. NTB-type	ϕ	ϕ^*	ϕ	ϕ^*
N (all)	−.830**	.459**	−.445*	−.415**
P (price)	−.156	.447*	−.225	−.505**
Q (quantitative)	.918*	−.665**	−.891**	−.324*
N (observations)	326		1,304	
{*k*1, *k*2} (number of right-hand-side variables)	{26, 19}		{26, 19}	
Maddala's R^2: {*N*, *P*, *Q*}	{.690, .622, .741}		{.441, .416, .418}	

Data: 326 four-digit SIC industries for U.S.–Japan run; 1,304 industries for U.S.–EC4 runs. Simultaneous Tobit MLEs from the two-equation model of Table 2.

Notes: (1) ϕ is the estimate on the U.S. retaliation coefficient, that is, the response of U.S. NTBs to an increase in foreign NTBs. ϕ^* is the foreign retaliation coefficient. A negative value implies that the NTB level decreases as partner's retaliatory NTBs increase. Foreign NTBs are a union of all NTB types, whereas U.S. NTBs are measured at three different levels: all NTBs, price NTBs, and quantitative NTBs. See the appendix for further descriptions. (2) The simultaneous Tobit model is specified in Table 2. Maddala's R^2 is given by $1-(L_0/L_F)^{2/N}$, where L_0 and L_F are, respectively, the likelihoods of the null model (just intercept terms) and the full model, and N is the number of observations. (3) In concording bilateral imports and exports from the COMTAP database at the ISIC level to the four-digit SIC level (in order to construct M_p, X_p, M_p^*, X_p^*) 113 SIC industries were found to have missing values. Hence, of the 439 four-digit SIC industries for which industry characteristics data are available, 326 industries are included in this analysis. However, parallel runs using all 439 industries and setting missing bilateral imports and exports to zero led to results not qualitatively different from those reported in Table 4.

[a]France, Germany, Italy, and the United Kingdom.

$^{**}p < .023$ ($|t| > 2$).

$^{*}p < .160$ ($2 \geq |t| > 1$), where p is the observed level of significance.

sively against Japan's (overall NTB) protectionism is likely to achieve the greatest deterrence by Japan. Suppose, in retaliation to Japanese protection in an industry, the United States reacted by requiring all imports of that industry to be subject to a VER, starting from a free trade position. That is, suppose quantitative NTB coverage in the industry increased from 0 to 1. That would greatly deter Japanese protectionism; the estimate on ϕ^* indicates that would lower the Japanese (overall) NTB coverage ratio by .665. This implies that the costs to Japanese politicians from quantitative-NTB action by the United States exceeds the cost from the political fallout accompanying any compliance by Japanese politicians.[63]

63. If the U.S.–Japan results are viewed from the perspective of bargaining outcomes, then Japan emerges as the stronger bargainer if the United States employs only price NTBs, but the United States becomes the stronger bargainer when it uses quantitative NTBs. McMillan's first condition—the greater the harm to the targeted country from having its access to the U.S. market limited, the greater the U.S. advantage—applies with greater force in the case of quantitative-NTB retaliation by the United States than with price-NTB retaliation. In Figure 3 the United States can achieve a position close to F_0 and thereby achieve the highest indifference curve possible by threatening to use quantitative instruments. On the other

Super 301 makes the threat of quantitative sanctions both more credible and easier than was the case before 1988. The use of that threat was responsible for making the Japanese government eliminate their quotas in the beef and citrus industries. The estimates from the price and quantitative NTB runs convey the message that price NTBs by the United States are more tolerable to Japan than quantitative NTBs. This accords well with the conventional wisdom about Japan's ability to undercut prices (either through an implicit export subsidy or due to strategic market share reasons) abroad but extreme hesitation to roll back production and let the producers bear the brunt of what is a very inflexible and immobile labor market.

We interpret the overall U.S.–EC4 results from a bargaining point of view for the reasons we describe later. The estimates from the all-NTB run indicate that mutual deterrence is the likely result of bargaining. Since ϕ and ϕ^* are both negative, the results show that both countries react to a partner's offensive increase in NTBs by lowering their own NTBs. In a bargaining situation, we hypothesize that this will lead to a solution in the bottom-left corner of the bargaining set in Figure 3 as both countries decide that it is in their best interest to mutually scale down without getting into a trade war. The political fallout from deterrence is probably not as costly for politicians in the EC4 countries as it is for those in Japan, and the same is true for politicians in the United States (when complying with the EC4); therefore, by appealing to Odell's argument, there are grounds for mutual cooperation (or deterrence) between the United States and the EC4.[64]

The results raise two questions. What can we infer about the nature of the NTB games against these two partner blocs, and why are outcomes different across the two of them? The answers to these questions are highly interdependent, and we present six arguments that help infer answers to both questions.

The Nature of NTB Games

Transparency of trade barriers. Bayard and Elliott find strong evidence that successful 301 cases involved instances where partner's trade barriers were transparent (for example, explicit quotas and tariffs).[65] They speculate that this is because it is

hand, the likely outcome if it threatens only to use price instruments is either a position that favors Japan or an escalation.

64. The interpretation of the U.S.–EC4 results from the point of view of a noncooperative game is as follows: The reaction curves are both negatively sloped (the estimates of both ϕ and ϕ^* are negative from the all-NTB runs, statistically significant, and similar in magnitude), and hence there will be a tendency for lobbies to try and push for a position down the other country's reaction function. The end result will likely be an escalation of bilateral NTBs. Quantitative NTBs by the United States versus overall EC NTBs also yield negative reaction curves, which will probably lead to escalation. The United States seems to have an offensive edge with price NTBs, which are insensitive to an escalation on the EC4 side, whereas their use forces down EC4 overall NTB coverage. Hence, although quantitative U.S. NTBs are the effective offensive instrument against Japan, they are not seen to be effective against the EC countries in the sample. Price NTBs, which are not offensively effective against Japan, are somewhat more effective against EC countries.

65. Bayard and Elliot 1994, chap. 4.

easier for GATT panels to judge cases with transparent trade barriers simply because GATT rules are clearer regarding such barriers. It is more difficult to judge cases of less transparent barriers (for example, excessive quality control and health inspections) whose effects on imports may nevertheless be quite restrictive. Japanese barriers are widely viewed as less transparent and range from excessive quality monitoring that delays entry of goods, to restrictive shop floor laws that encourage exclusive dealings between seller and retailer. EC barriers, on the other hand, are considerably more transparent. Playing bargaining games is easier when the object of the bargain is transparent and measurable. Therefore, we conjecture that U.S.–EC games should be interpreted as the outcomes from bargaining games. U.S.–Japan games are better interpreted as noncooperative games, since the Japanese position implies that "unless you see it, we have no trade barriers."

Interindustry trade versus intra-industry trade. U.S. trade with the EC4 countries is highly intra-industry in nature, whereas U.S.–Japan trade is relatively interindustry trade based on comparative advantage. Although the main opposition to trade restrictions in an interindustry trade setting comes from organized consumer groups, in an intra-industry trade setting industries who are intermediate users of protected goods (that is, downstream users) counterlobby in order to remove that protection. We conjecture that this added pressure from the free-trade corporate lobby in both countries will lead to a more cooperative outcome. Hence, we infer that U.S.–EC4 games are mostly bargaining games, whereas U.S.–Japan games are noncooperative games, at least over the short run. Our conjecture is supported by the evidence on the source of antiprotectionist forces in the United States presented by Destler and Odell.[66] Of the many influential antiprotectionist forces they identify, the growth of trade dependence, both in terms of the growing use of intermediate imports and growing export interests, ranks high on the list. When domestic forces are organized against protection, it pays the country to bargain rather than play noncooperatively, and hence we interpret the U.S.–EC4 results in terms of the bargaining game. However, not all U.S.–EC4 trade is intra-industry, nor is all U.S.–Japan trade interindustry, and we will see later instances where one country can play bully.

Unbalanced trade. Japan has continually run trade surpluses with the United States, especially in sectors dominated by a few industries, such as autos, steel, and semiconductors. It is widely held that concentrated industries are also the largest lobbying contributors. This induces governments to play noncooperatively, and in many cases these games reduce to market share games. Additionally, if trade in an industry is lopsided, as was the case with autos, the United States does not risk retaliation in that industry for taking extreme measures. Hence, the use of quantitative NTBs by the United States looks offensively effective since it is selectively employed where trade is lopsided, lobbying contributions are considerable, and the United States is playing noncooperatively. This conjecture about unbalanced trade is consistent with No-

66. Destler and Odell 1987.

land's finding that unbalanced trade is a determinant of USTR attention, which may precede policy action.[67]

Defensive versus offensive instruments. Price NTBs are not effective against Japan and are therefore not the best instruments to be used noncooperatively. The U.S.–Japan results show that they are neither effective as a signal to play cooperatively nor taken seriously as threats of possible quantitative actions (ϕ^* is positive). Perhaps Super 301 is specifically a response to the belief, confirmed by the price NTB results, that antidumping and countervailing duties do not deter Japanese protection and are primarily defensive weapons in trade policy. By allowing more unilateral action, Super 301 has prepared the ground for using price NTBs offensively.

U.S.–EC postwar history. In his account of the U.S.–EC trade wars in the 1960s ("chicken" wars) and 1980s (steel) Conybeare provides insight into factors affecting the two parties' bargaining positions, elements of which are still relevant. Although the United States did not explicitly take a position against the Common Agricultural Policy (CAP) of the European Economic Community (EEC)—it recognized that the CAP was integral to the formation of the EEC—the chicken wars arose when the CAP was used to put protectionist policies into place. Even though the sides deadlocked (the United States playing a Prisoners' Dilemma strategy of conditional retaliation and the EEC playing the strategy of unconditional defection), the EEC allowed the case to be mediated by GATT and accepted a GATT panel's finding in favor of the United States. The answer to why the EEC allowed the case to be mediated is speculative but perhaps relevant to our results. Conybeare suggests that the EEC may have been apprehensive about the potential for the case to be linked with more serious threats such as NATO troop levels. The steel war of 1982 points to another influence leading the EEC to submit to U.S. pressure. The U.S. levies were offered on more favorable terms to some EEC countries (the United Kingdom), which produced discord within these countries. The additional effort and incentives needed to maintain internal cooperation gave the United States a bargaining advantage over the EC. In summary, when trade issues are linked to other international issues in the bargaining game, the United States has had the more advantageous position.[68]

GATT. Robert E. Hudec has expressed the unabashed view that GATT has been an effective mediator of disputes and has promoted freer trade than would otherwise have been the case.[69] Given the multilateral cuts in tariffs, that claim is hard to

67. Noland 1997.

68. Bayard and Elliott show the distribution of 301 cases. During the period 1980–93, out of the fourteen cases against the EC, eleven were in agriculture; whereas out of the eight cases against Japan, five were in manufacturing. Bayard and Elliott 1994, 60. Since trade in agriculture is interindustry in nature, the analysis of just the U.S.–EC agricultural cases would look very different from the results obtained here using manufacturing data.

69. Hudec 1993.

dispute. However, the explosion in NTBs does temper Hudec's view (which is certainly applicable to tariffs and probably also in ameliorating trade conflicts). We believe Hudec's view applies more to U.S.–EC trade than U.S.–Japan trade. Perhaps the genesis of the problem is the fundamentally activist Japanese policymaking that promoted sectors through targeted industrial policy, whereas the EC countries followed freer market policies. GATT may have been effective in mediating such U.S.–EC disputes as the chicken wars but was powerless to affect policymaking within Japan. In order to attack Japanese industrial policy the United States had two choices: conduct industrial policy in the United States or act unilaterally to force Japan to play fair. It chose the latter route, as evidenced by the passage and subsequent use of Super 301.

Sample Disaggregated by Four Industry Groups

The results in Table 3 do not apply equally across all industries, and for a deeper examination we split the sample into four sets by industry groups. Table 4 reports estimates of ϕ and ϕ^* across the groups food processing, resource intensive goods, general manufacturing, and capital intensive goods for the U.S.–Japan and U.S.–EC4 runs.[70] The differing estimates in both magnitude and signs across the four groups justify such a disaggregation. In light of the foregoing discussion about the nature of NTB games, we will presume that NTB outcomes in food processing and capital-intensive goods arise from games of conflict, whereas in resource-intensive goods and general manufacturing they come from bargaining games. Due to the presence of strong, unyielding lobbies, agriculture and food processing traditionally have been protected in Japan, and agriculture and food processing have been protected in the EC. High-tech rivalry exists in capital-intensive goods, and there is not as much intra-industry trade as in general manufacturing. General manufacturing, on the other hand, is characterized by two-way trade, and it is in the best interest of both countries to maximize joint rather than own welfare. Resource-intensive goods (for example, textiles and apparel, printing, and leather goods) are characterized by a lack of strong lobbies, and, again, it is in the best interests of both sides to enter into a bargaining process.

Consider first the Japan columns in Table 4. The food-processing group of industries provides the same inferences about ϕ^* as the full U.S.–Japan runs in Table 3. Retaliation by the United States using overall and price NTBs leads to an escalation of the trade conflict, whereas U.S. retaliation using quantitative NTBs forces compli-

70. We carefully control for comparative advantage by including import and exports (scaled by consumption) in both U.S. and partner equations (plus additional comparative advantage variables in the U.S. equation). Although space precludes us from showing the detailed results, the effect of these controls is measured with a high degree of statistical significance. The controls are meant to remove the effects of comparative advantage from the trade barrier data so that what remains is a comparison of ''similar'' countries. One disadvantage of this disaggregation is that retaliation involving goods that cuts across the four industry groups in Table 4 is not reflected in the data.

TABLE 4. *Estimates of home and foreign retaliation coefficients (ϕ and ϕ*) disaggregated by two trading blocs and four commodity groups. ML estimates from two-equation simultaneous Tobit model.*

Industry group	U.S. NTB type	Japan ϕ	Japan ϕ*	EC4 ϕ	EC4 ϕ*	{k1, k2}
FOOD	*N* (all)	.954	.423**	3.617**	−.864**	{13, 6}
	P (price)	2.140**	.328**	6.501**	−.728**	
	Q (quantitative)	.173	−2.764**	4.540**	−.593**	
RES	*N* (all)	−.974**	.813**	−1.151**	−.858**	{16, 9}
	P (price)	−.058	.233	−.414	−1.092**	
	Q (quantitative)	1.964*	−.751**			
MFG	*N* (all)	−1.508**	−.213	−.457**	.325*	{19, 12}
	P (price)	−.812*	.272	−.232*	−.049	
	Q (quantitative)	−.956**	−.994**	−.684	.657	
CAP	*N* (all)	−.075	−1.355**	.221	−.759**	{14, 7}
	P (price)	.247	.650**	.496	−.713*	
	Q (quantitative)	.478*	−1.064**			
	Obs.: {FOOD, RES, MFG, CAP}	{37, 115, 143, 31}		{148, 460, 572, 124}		
	R^2, FOOD: {*N*, *P*, *Q*}	{.311, .287, .392}		{ .471, .419, .525}		
	R^2, RES: {*N*, *P*, *Q*}	{.598, .457, .707}		{.345, .333, .}		
	R^2, MFG: {*N*, *P*, *Q*}	{.432, .428, .483}		{ .200, .138, .285}		
	R^2, CAP: {*N*, *P*, *Q*}	{.231, .466, .181}		{.271, .333, .}		

Notes: (1) See notes to Table 3. (2) In the runs disaggregated by four commodity groups, the number of dummies depends on how many of the fourteen dummies from the full model apply. The mapping is provided in the appendix. Hence, the number of right-hand-side variables in the $\{N_{pi}, N^*_{pi}\}$ system is as follows: FOOD: {13, 6}; RES: {16, 9}; MFG: {19, 12}; CAP: {14, 7}. (3) The quantitative runs for the RES and CAP blocs in the U.S.–EC4 case did not converge because there were few instances of such NTBs from the U.S. side.

$^{**}p < .026$ ($|t| > 2$).

$^{*}p < .162$ ($2 \geq |t| > 1$), where p is the observed level of significance.

ance.[71] The beef and citrus case described in Bayard and Elliott is probably a good recent example of this. The implicit threat of quantitative NTB retaliation under Super 301 was effective in removing Japanese quotas. A number of other cases in which the United States has tried to force open Japanese agricultural markets, documented in Bayard and Elliott, have met with mixed results.[72] The Japanese tobacco industry, heavily protected until 1986, turned back U.S. attempts to force a liberalization under the old Section 301 rules. But in 1986 the United States successfully

71. Estimates greater than 1 or lower than −1 are to be interpreted as being, respectively, 1 and 1. In the estimation these constraints have not been imposed so that the parameters are free to take any value.

72. Bayard and Elliott 1994, app.

liberalized that market. The Japanese rice and processed rice market, however, remains highly protected and difficult to pry open due to the high political stakes involved. In the resource-intensive goods group, again quantitative NTBs prove to be the more effective instruments for deterring NTBs in Japan, whereas retaliation using price NTBs is ineffective. The wood industry is an interesting recent case. With Super 301 providing the implicit but credible threat of sanctions,[73] in 1990 the United States succeeded in achieving a tariff cut of over 30 percent from the existing rate. That case is illuminating because, unlike other goods, the import penetration by the United States into the Japanese wood and wood products market exceeds 40 percent. Presumably, most of the Japanese consumption of this industry is from imports, since Japan is generally natural-resource poor relative to its GDP. Hence, the resource-intensive goods sectors have little lobbying power. We conjecture that the political costs were bearable to Japanese politicians. McMillan's third and fourth conditions (the smaller the costs within the targeted country of complying and the greater the benefit, the greater the benefit to the United States from the demanded liberalization) seem to have determined the outcome.

In the general manufacturing group it seems that either Japan has the upper hand or that bargaining will lead to mutual cooperation as indicated by the similar negative estimates on ϕ and ϕ^* from the quantitative run.[74] Again, intra-industry trade in this subset of industries is one of the main reasons for laying the grounds for a cooperative outcome. Clearly, the capital-intensive goods group will be an important arena where future U.S.–Japan trade games will be played out. The estimates for the capital-intensive goods group seem to imply that quantitative-NTB retaliation can force Japanese trade barriers down significantly. Like the wood industry, this group has many industries that are net exporters to Japan, and in order to force further liberalization of Japanese markets for telecommunications equipment, satellite equipment, chemicals, and pharmaceuticals, we believe Super 301 will probably be invoked more than once. Already, two cases involving satellites (1989–90) and supercomputers (1989–90) were successfully negotiated by the U.S. side, although the degree of explicit trade liberalization in those markets has been modest. The study of some Super 301 cases by Ellis S. Krauss and Simon Reich puts high-tech industries such as aerospace (FSX fighters, satellites) and computing (supercomputers) in the "high-tech competitive industry" cell of their 2×2 matrix.[75] This cell is characterized by activist trade policy, specifically to ensure "fair trade." Our results using 1983 data therefore succeed in predicting some outcomes under Super 301.

The U.S.–EC4 picture is strikingly different from the U.S.–Japan picture. The EC4 columns in Table 4 indicate that EC4 NTBs on the food processing group of imports

73. Bayard and Elliott 1994, 143: "The most important influence on the outcome was the fact that the Japanese government strongly wanted to strongly avoid being designated for a second time as a super 301 priority country."

74. The prime example, that of VERs on auto imports from Japan, was a defensive response by the United States and does not fit the issue of offensive NTBs in this article.

75. Krauss and Reich 1992.

from the United States will be deterred by U.S. retaliation. This is a surprising result and, given the case evidence in Bayard and Elliott, it seems that this is one EC4 market that will continue to be hard to penetrate, with or without retaliation. The following cases under the old 301 involving agricultural trade indicate, contrary to our estimates, that retaliation by the United States will be met with retaliation from the EC side, leading to escalation: wheat flour (1975–83), canned fruit (1976–80), wheat (1978–80), sugar (1981–82), poultry (1981–84), canned fruit and raisins (1981–1985), beef (1987–89). Further, in many cases where the EC4 acceded to U.S. demands to reduce trade barriers, they made up for the loss in protection by increasing production and export subsidies to those producers. On the other hand, the following cases under Super 301 do indicate some, although modest, degree of success: soybeans (1987–90), canned fruit (1989), corn, sorghum, and oilseeds (1990), and meatpacking (1990–93). Some Super 301 cases thus support the "United States as bully" depiction from the food processing group results, but it is weak.[76]

The results from the resource-intensive goods and general manufacturing groups, on the other hand, indicate the possibility of mutual U.S.–EC4 deterrence if viewed from a bargaining perspective. For the resource-intensive goods group, the estimates of ϕ and ϕ^* are both negative, whereas for the general manufacturing group they are usually insignificant except for all-NTBs (which include threats) and U.S. price NTBs. This is in line with the picture of peaceful and free trade relations regarding these industries. There is much intra-industry trade in manufactures between the United States and the EC countries, which leads to pressures by downstream producers to promote and lobby for free (and cheap) trade in intermediate goods that are inputs into their production processes. Whatever protectionism exists in these industries is usually on final goods. The evidence in Destler and Odell that antiprotectionist forces have weakly succeeded in preventing increases in protectionism in some of these industries (for example, footwear 1984–85 and autos 1982–83) corroborates our U.S.–EC4 results.[77]

The results from the capital-intensive goods group, on the other hand, depict the United States as having an upper hand if it came down to aggressive action. These results may be vindicated in the future by chemical and pharmaceutical firms battling for international market share, but, fortunately, the multinational character of firms in those industries works against that trend. This point is made cogently by Milner in her analysis of antiprotectionism, not due to some external policy, but endogenously by firms as an optimal reaction given the extent of their export dependence and multinationality.[78] Milner fits her cases into a 2×2 matrix, depicted in Figure 7, of

76. This brings out one of the inadequacies of the model specification used here, namely, the absence of political lobbying data on the EC4 side. Presumably, the agriculture-related manufacturers have strong lobbies that lead to large political costs of acceding to U.S. demands (this is certainly true of the French farm lobby), which makes the bargaining game far from the one-sided affair that the estimates make it out to be. The two-digit dummies seem to be inadequate for this task in the U.S.–EC4 models.

77. Destler and Odell 1987, 83–84.

78. Milner 1988.

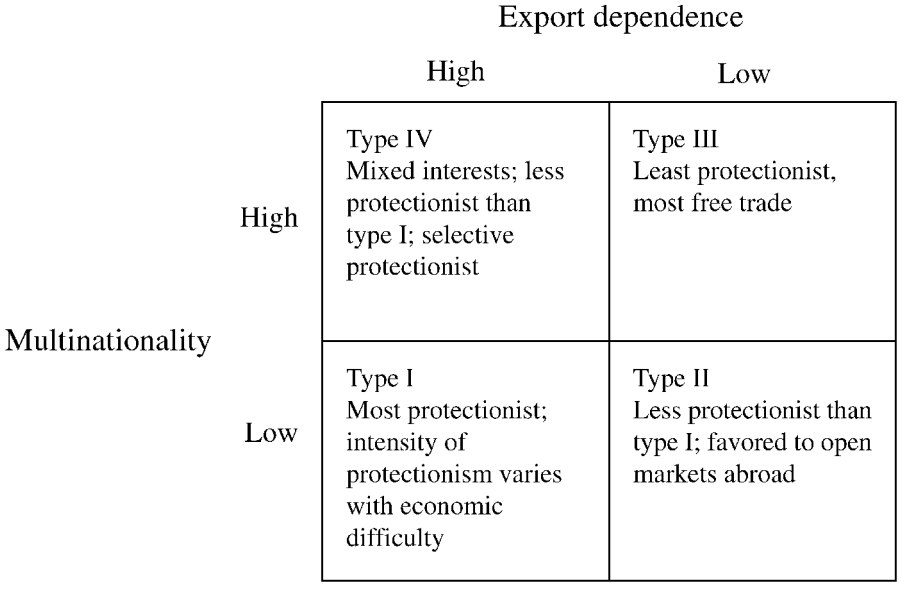


FIGURE 7. *Milner's 2 × 2 matrix*

high and low multinationality and export dependence and argues that firms in the high multinationality–high export dependence cell are least prone to protectionism, whereas those in the low–low cell are most protectionist. Our analysis asks whether the same conclusions would hold were two firms to play strategically. To take a different example, consider rivalry between high-tech firms. The analysis of strategic interaction among high-tech industries is complicated by R&D dynamics and technological leadership, but we can try to put high-tech rivalry into this framework. U.S. personal computer firms, especially firms specializing in sales through mail order, have penetrated the Japanese market. This seems like type II U.S. firms (such as Dell, Compaq, and IBM) fighting for market share against type I Japanese firms (such as the PC-producing arms of Toshiba, Sony, and Hitachi). Milner's analysis indicates that since type I firms are very protectionist, penetrating these markets would be difficult. Our results corroborate this view and indicate that only the use of very restrictive offensive threats, such as quantitative NTBs, would succeed in lowering Japan's NTBs in the capital-intensive sectors.[79] Softer price NTBs would not work.

79. A similar extension of Milner's analysis could explain the mutual deterrence that offensive U.S.–Japan NTBs can enforce in the general manufacturing group of industries. Many firms in this group (which includes autos, machinery, and electronic goods) in both countries fall into Milner's type III category. This suggests that firms on both sides would respond quickly to offensive threats and enter into cooperative bargains. At the same time, it is also true that Super 301 has been invoked in trade disputes involving U.S. firms in these industries. Hence, it is possible that many U.S. firms in the general manufacturing group are type II firms seeking to open markets in which foreign firms of type I, II, and IV operate.

TABLE 5. *Characterization of NTB games based on ML estimates in Table 3*

U.S. NTB type	*Japan*	*EC4*
	Type of game [result]	*Type of game [result]*
N (all)	Japan bully [deterrence by United States]	Chicken [cooperation–mutual deterrence]
P (price)	Japan bully [weak deterrence by United States] or escalation	Chicken [cooperation–mutual deterrence] or United States bully [deterrence by EC4]
Q (quantitative)	United States bully [deterrence by Japan]	Chicken [cooperation–mutual deterrence]

Perhaps cross-national ownership of firms, which is beginning to occur in the telecommunications services and equipment industry (and promises to be the fastest growing industry of the next decade), is the best alternative to protectionism, at least in industries dominated by a few large firms. Milner and Yoffie's study of strategic interactions among high-tech firms in the trade arena suggests such a conclusion.[80]

Conclusions

In this article we examined bilateral NTBs as of 1983 between the United States and five large trading partners (Japan, France, Germany, Italy, and the United Kingdom) to empirically assess the offensive capability of retaliatory U.S. trade barriers. The questions we set out to investigate were (1) whether retaliation can successfully lower partner's trade barriers, (2) whether Japan and the EC countries differed in terms of the effects of retaliation, (3) whether the U.S.–Japan NTB games were fundamentally different from U.S.–EC games, and (4) whether different sets of industries across the two-partner blocs fundamentally differ in terms of the NTB games and the consequences of retaliation. Tables 5 and 6 contain a summary of our findings.

Table 5 brings out the contrast between U.S.–Japan and U.S.–EC4 NTB outcomes. Our results predict that whereas NTB games between the U.S. and Japan will generally be dominated by the stronger player (the "bully"), U.S.–EC4 games will generally lead to the downscaling of NTB coverage on both sides. This difference in responses may be due to the extremely high political costs that Japanese politicians

80. Four kinds of sensitivity analyses of all model estimates are reported in the appendix: (1) exogeneity tests for the simultaneous Tobit runs, (2) sensitivity of estimates to outliers, (3) sensitivity of estimates to heteroskedasticity, and (4) sensitivity to model specification. Our results are shown to be generally robust across all sensitivity tests.

TABLE 6. *Characterization of NTB games (disaggregated by two trading blocs and four commodity groups) based on ML estimates in Table 4 (from a bargaining game perspective)*

		Japan	*EC4*
	U.S. NTB type	*Type of game [result]*	*Type of game*
FOOD	*N* (all)	Escalation	United States bully [deterrence by EC4]
	P (price)	Escalation	United States bully [deterrence by EC4]
	Q (quantitative)	United States bully [deterrence by Japan]	United States bully [deterrence by EC4]
RES	*N* (all)	Japan bully [deterrence by United States]	Chicken [cooperation–mutual deterrence]
	P (price)	Japan bully [weak deterrence by United States]	Chicken [weak cooperation–weak mutual deterrence]
	Q (quantitative)	United States bully [deterrence by Japan]	—
MFG	*N* (all)	Chicken [cooperation–mutual deterrence]	EC4 bully [deterrence by United States]
	P (price)	Japan bully [deterrence by United States]	Chicken [weak cooperation–weak mutual deterrence]
	Q (quantitative)	Chicken [cooperation–mutual deterrence]	United States bully (weak–ineffective)
CAP	*N* (all)	United States bully [deterrence by Japan]	United States bully [deterrence by EC4]
	P (price)	Escalation	United States bully [deterrence by EC4]
	Q (quantitative)	United States bully [deterrence by Japan]	—

face if they accede to U.S. retaliation.[81] An equally important factor is that U.S.–EC4 trade has greater intra-industry trade on average than U.S.–Japan trade and hence counterlobbying by downstream domestic firms. Table 6 provides more detail by industry group. NTB games between the United States and Japan in the food-processing group are characterized by escalation or the United States as bully, depending on the choice of instrument, whereas such games between the United States and

81. Business interest groups in Japan are politically more powerful than in Europe. Business plays a more dominant role in Japan both because of the traditional strong ties between business and the ruling political elite, who depend heavily on business support (see, for example, pt. IV of Okimoto and Rohlen 1988), and because of the relatively weak opposition of labor interest groups. EC countries, on the other hand, have strong representation by labor unions, which often countervails the political influence of business interest groups. European labor unions often draw from heterogeneous industries, so that effectively they represent the voice of consumers at large. See, for example, the comparative study of Japan, EC, and the United States in Knoke, Pappi, Broadbent, and Sujinaka 1996.

the EC4 bloc are dominated by the United States. Games involving the resource-intensive goods group are characterized by Japan as bully unless the United States retaliates using quantitative measures, whereas U.S.–EC4 retaliation games in this group lead to mutual deterrence. In the general manufacturing group a variety of games are played, depending on which instruments are used. U.S. retaliation using price NTBs is ineffective, but if quantitative NTBs are used to retaliate, they lead to a lowering of Japanese (overall) NTBs, whereas retaliation by Japan deters U.S. quantitative NTBs, hence leading to mutual deterrence. Between the United States and EC4 countries, price-NTB retaliation by the United States in this group of industries leads to mutual deterrence, whereas using quantitative NTBs enables the United States to play bully. Retaliation games in the capital-intensive goods group are generally dominated by the United States probably because it has a large stake in reducing protectionism in those industries.

For U.S. offensive NTBs to be effective, foreign governments must perceive such actions to be temporary until the foreign governments acquiesce. We hypothesize that greater unilateral action that is not seen as temporary will lead to attrition of the deterrence coefficients, requiring even larger offensive home NTBs to deter foreign NTBs and eventually leading to heightened trade barriers on both sides. A theoretical examination of this hypothesis is a challenging but rewarding direction for future research. The results in this article are not necessarily arguments in favor of amendments to trade laws such as the Super 301 and Special 301 provisions, since they have the uncomfortable side effect of allowing the heightening defensive use of NTBs as well. Before the results of this article can be used to recommend a policy of retaliation or the threat thereof, they must be held to a higher standard. An enquiry into whether the results validate predictions from more sophisticated models with repeated game playing and asymmetric stakes and information is a useful step in that direction.

Finally, we focus on how the new rules of the World Trade Organization (WTO) may change the picture considerably by providing an effective dispute settlement procedure (including the authority to explicitly retaliate). The effect of the new rules is that a threat of retaliation need not materialize into actual retaliation. The more credible the threat, the more likely the other side will accede without the threat materializing. Bayard and Elliott summarize the new regime as follows:[82] U.S. retaliatory threats are strengthened if the dispute involves issues covered by the WTO and the United States wins the case; U.S. threats are weakened if the dispute involves issues covered by the WTO, but instead of following the dispute settlement procedure the U.S. issues a section 301 determination, or the U.S. retaliates after losing a case; U.S. threats are unchanged if disputes involve issues not covered by the WTO. In this view, to the extent that the WTO can make its rules more encompassing and effectively enforce them, freer and fairer trade may emerge without the need for retaliation.

82. Bayard and Elliott 1994, 344.

Appendix

Data

Aggregation and measurement of NTBs. The data for this study are from an UNCTAD and World Bank project on NTBs to trade. The project inventoried fifty types of tariff and nontariff barriers employed by the United States and other countries (including those discussed in this article) in 1983 that can be broadly classified into price-oriented NTBs (for example, antidumping and countervailing duties), quantitative NTBs (for example, quotas and voluntary export restraints), and threats (for example, price and quality monitoring). The barriers were applied bilaterally at highly disaggregated levels. The following example is for the United States, where the raw data are at the 5,500 product tariff-line (TSUSA). The data consist of a binary indicator, I_{nip}, of the presence or absence of an NTB of type n on tariff-line product i against trading partner p (exporter to the United States). Bilateral imports, M_{ip}, and ad valorem tariffs are available at this level of disaggregation.

Since no industry information is available at the tariff-line level, the aggregation of NTBs is necessary in order to combine NTB data with industry data for the analysis in the article. For this purpose, imports, M_{ip}, are the weights used. To aggregate to four-digit SIC, let G_j be the set of tariff-line products that feed into four-digit SIC product j. A coverage ratio for an NTB of type n on good j against trading partner p, CR_{njk}, is defined as

$$CR_{njk} = \sum_{i \varepsilon G_j} M_{ip} / \sum_{i \varepsilon G_j} M_{ip} \cdot I_{nip}$$

$$= \sum_{i \varepsilon G_j} W_{ip} I_{nip}$$

That is, a coverage ratio is the proportion of imports subject to an NTB.

A question often asked is why not use a tariff equivalent. Quite simply, data on world and domestic prices do not exist at the tariff-line level. With few exceptions they only exist at very high levels of aggregation. In addition, there are two theoretical objections to tariff equivalents. First, a tariff equivalent is an appropriate measure only when commodities are finely enough defined that all the difference between the domestic and the world price is attributable to the NTB. This would be a strained assumption even at the tariff-line level. Second, just as with coverage ratios, one cannot argue that identical tariff equivalents yield identical effects without reference to supply and demand elasticities. Consider two goods, one supply-elastic and the other supply-inelastic. The import effect of a 1 percent tariff equivalent is large for the first good and small for the second. Thus, to the extent that supply and demand elasticities are ignored it is not legitimate to assume that trade policies having identical tariff equivalents yield identical results.

Other variables. The sample accounts for over 98 percent of manufacturing sales. Data sources are abbreviated as follows:[83]

COMTAP = Compatible Trade and Production Database, 1968–86
CM = 1982 Census of Manufactures
ASM = 1983 Annual Survey of Manufactures
CPS = 1983 Current Population Survey

Bilateral trade and production (the latter required to obtain domestic consumption) were constructed using 1983 figures from COMTAP. The data are at the ISIC level, which was concorded into the SITC (r1) level and then into the four-digit SIC level. However, trade data pertaining to the United States that is not bilateral is aggregated up from finely disaggregated tariff-line (TSUSA) data (as is TAR). The data for campaign contributions from political action committees (PACCORP) are from the Federal Election Commission tapes for the election cycles 1977–78, 1979–80, 1981–82, and 1983–84. Since political action committees are associated with individual firms and labor unions, the PACCORP was constructed as follows. Using COMPUSTAT tapes, firms were classified into three- or four-digit SIC industries. Where firm coverage was incomplete in COMPUSTAT, political action committees were classified into two-digit SIC industries using Marvin I. Weinberger and David U. Greevey and replicated at the four-digit level.[84] The problem is that the classification of political action committees to SIC industries is one-to-many, since most firms are multiproduct firms. Where a political action committee maps into n industries, the fraction $(1/n)$ of that committee's spending is apportioned to each industry. These are then summed for each industry and averaged over the four election cycles. Value-added data is from ASM. REPRST is constructed from the county data in the *Geographic Area Series* of the COM. Earnings and employment (for AVEARN, SH_L) is also from ASM, as are capital stock figures. Number of firms (used in SCALE), and CONC4, are taken from CM. Division of workers by skill class (used for P_SCI, P_MAN, P_UNSK) is from CPS. UNION is from E. C. Kokkelenberg and Donna R. Sockell.[85] For the models estimated in Table 3, two-digit industry dummies (twenty in all) are aggregated into fourteen groups to facilitate convergence: 20, 21 + 22 + 23, 24 + 25, 26 + 27, 28, 29 + 30, 31 + 32, 33, 34, 35, 36, 37, 38, 39. For the models distinguishing industry groups in Table 4, the two-digit industry aggregated into four groups (FOOD, RES, MFG, CAP) in the following manner:

FOOD: 20 (food)
RES: 21 (tobacco), 22 (textiles), 23 (apparel), 24 (wood), 25 (furniture), 26 (paper), 27 (printing), 31 (leather), 32 (glass)

83. See U.S. Bureau of Census, various years; U.S. Bureau of Census 1982; U.S. Bureau of Labor Statistics 1983; and OECD 1987.
84. Weinberger and Greevey 1982.
85. Kokkelenberg and Sockell 1985.

MFG: 33 (primary metal), 34 (fabricated metal), 35 (machinery), 36 (electrical), 37 (transport), 38 (instruments), 39 (miscellaneous)
CAP: 28 (chemical), 29 (petroleum refining), 30 (rubber)

The dummies in those runs are then defined by which of the fourteen two-digit categories appear in each of the four groups. For example, the resource-intensive goods runs are done with four dummies, one each for 21 + 22 + 23, 24 + 25, 26 + 27, 31 + 32; the general manufacturing runs have seven dummies, one each for the industries 33–39; the capital-intensive goods runs have two dummies, one each for 28, 29 + 30.

Sensitivity of Estimates to Violations of Model Assumptions

Weak exogeneity of regressors. In theory all four variables—N, N^*, M, and PACCORP (and possibly even M^* in the N^* equation)—are endogenously determined. We estimate a two-equation simultaneous Tobit model, since this is much less costly to estimate than the nonlinear three- or four-equation alternative. For estimates from the two-equation systems to be free of simultaneity bias it needs to be shown that the independent variables that are maintained exogenous are really so. Each run is tested for the weak exogeneity (WE) of the variables {M, PACCORP} in the N equation, and the variables {M^*, PACCORP} in the N^* equation. WE is tested using a modification of the Hausman-type test recommended by Richard J. Smith and Richard W. Blundell.[86] An advantage of this procedure is that it simultaneously provides the corrected estimates when the null hypothesis of WE of any regressor(s) is rejected. For the pooled data, the hypothesis of WE of M^* (in the N^* equation) is unsurprisingly rejected, but the corrected estimates of the deterrence effects are close to those reported in Table 3. When the data are split into the four industry groups, again, the hypotheses of WE of the variables M^*, PACCORP, and M are rejected, but, again, the corrected estimates of the retaliatory coefficients are close in size and sign to the MLEs reported in Table 4. There is no change in the statistical significance of the estimates except for the general manufacturing group where the estimate of ϕ for ALL and the estimate of ϕ^* for PRICE both lose their statistical significance.

Sensitivity to outliers. Sensitivity to outliers is examined using the procedure recommended by David A. Belsley, Edwin Kuh, and Roy E. Welsch for isolating the effects of influential observations by deleting one observation at a time.[87] Since one observation will probably have little influence in a large sample, for each run a block of observations corresponding to a two-digit SIC level of aggregation was deleted. The MLEs of the retaliatory coefficients ϕ and ϕ^* are remarkably robust to outliers. There are few instances where the statistical significance is altered and fewer instances, noted later, where signs change. Estimates from the pooled runs in Table 3

86. Smith and Blundell 1986.
87. Belsley, Kuh, and Welsch 1980.

are robust to outliers. The MLEs from the runs disaggregated by industry-bloc groups are influenced by the deletion of the paper industry (resource-intensive goods–Japan) and leather and ceramic goods (SIC = 31, 32) (resource-intensive goods–EC4).

Heteroskedasticity. It is well known that the violation of homoskedasticity of the error terms can lead to misleading inferences, especially in censored models. The statistical significance of the estimates of the retaliatory coefficients using White's heteroskedasticity-consistent covariance matrix remained unchanged from those reported in the tables.[88] Hence, heteroskedasticity is not seen to be a problem.

Model respecification. Since partner data on political economy variables is absent from the models estimated, we conducted a sensitivity analysis where sparser but symmetric models with the same number and type of variables appeared in both equations, namely imports and exports scaled by consumption, and industry dummies. The results in Table 3 remain qualitatively unaffected except that the estimate on ϕ^* in the U.S.–EC4 runs with quantitative U.S. NTBs becomes positive but is statistically insignificant. Although there are no other sign changes, the estimate on ϕ^* in the U.S.–Japan runs with U.S. all and price NTBs are estimated with larger standard errors and their t-values drop below 1. The results in Table 4 remained quite robust to similar changes in specification. The only results that changed noticeably were the U.S.–EC4 results for the capital-intensive goods group (N model), which reversed signs. It should be noted that there were some convergence problems with the symmetric specifications since some parameters were driven to corner solutions (for example, U.S.–Japan food processing group and U.S.–EC4 general manufacturing group). Also, on the basis of a likelihood ratio test, the models reported in the article had a far better fit than the symmetric models.

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88. White 1980.

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