ABSTRACT

Title of Dissertation:       ESSAYS ON ANTI-DUMPING

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This dissertation studies the use of the US antidumping (AD) legislation. In the first chapter, I use panel data on AD petitions filed by US industries from 1980 to1995 to study the determinants of antidumping filings. The main question I study in chapter 2 is why so few firms petition for import relief. It is common knowledge that at least in the short run, petition itself can restrain imports and lead to higher profits. I use an event study to analyze the impact of petitioning on the market value of a firm to analyze the puzzle. The third chapter evaluates whether the Softwood Lumber Agreement (SLA), signed between US and Canada in May 1996, had a significant economic impact on the industrial users of lumber in the US. Firm's daily stock prices are used in an event study. I then look at the anticompetitive nature of AD in the case of chemical industry.

ESSAYS ON ANTI-DUMPING


by


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# DEDICATION

To My Mum and Dad and to Sumeet

# ACKNOWLEDGEMENTS

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[1]For a more comprehensive description of the US-Canada lumber dispute please see Braudo and Trebilcock (2002).

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# Introduction

This dissertation studies the use of the US antidumping legislation. Over the past decade the number of Antidumping (AD) cases across the world has risen substantially. More and more countries are adopting an AD legislation. In the last few years (1995-1999), 33 countries were reported to have legislated AD law as compared to 9 countries in 1980. The traditional users (US, EU, Australia, and Canada) now account for only 50% of AD cases as compared to 99% from 1980 through 1985. Despite this large entry of new users US still remains the largest user of AD law, accounting for 16.4% of cases between 1990-1998.

The spread of AD legislation among various countries makes it more important to understand the US AD mechanism. AD laws were supposedly designed to support free trade, however they are now considered to be a serious impediment to international trade. All WTO members setting AD policies follow guidelines specified in the GATT/WTO AD code (which is similar to the US code) hence, rendering some similarity to the AD policies across countries. For this reason, studying the US AD law can give us some important insights into this widely spreading trade policy.

A firm or a group of firms in the US can get relief from dumped imports[2] by petitioning to the International trade commission and the International trade administration for an antidumping duty. If dumped imports are found to cause material injury to the US domestic industry an antidumping duty equivalent to

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[2]Dumping is defined as selling a product in the US at a price which is lower than the price for which it is sold in the home market. In case there are no comparable home market sales, sales in a surrogate "third country" may be used. In the absence of sufficient home market and third country sales "constructed value", which uses a cost-plus-profit approach to arrive at normal value is used.

the dumping margin is imposed on unfair imports. There has been a dramatic rise in petitioning by US firms over the past decade which has increased concerns about the abuse of antidumping laws and about rising trade protectionism. The International trade commission received around a thousand antidumping petitions during the fiscal years 1980-98. These cases involved $30 billion in imports form the countries subject to investigations. Out of these thousand cases, thirty five percent of petitions resulted in affirmative final determinations by the International Trade Commission and International Trade Administration, culminating in the issuance of an antidumping duty (US ITC (2001)). Around forty percent of the petitions resulted in a negative determination by the ITC and in the rest of the cases the case was either terminated, suspended or withdrawn.[3] The Antidumping duty, which is an ad-valorem tariff is observed to vary from less then one percent of price to 200%. The rising trend in general can be contributed to rising imports, declining tariffs across countries and modifications of import-relief legislation making it easier for industries to petition. At times increase in petitioning may also reflect efforts by US industries to harass foreign competitors.[4]

The first chapter in this thesis analyses the petitioning behavior at 4 digit SIC (Standard Industrial Classification) level. The chapter looks at various characteristics that separate a petitioner from a non-petitioner. Petitioning industries are relatively larger in size and more capital intensive than non petitioning industries. Both petitioning and the non–petitioning industries are becoming more capital intensive over years and the gap seems to be narrowing. The chapter

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[3]Source: "Antidumping and Countervailing duty handbook" published by USITC.

[4]These theories have been analysed in earlier papers like Finger (1981), Feinberg(1991) and so on.

uses a Negative Binomial regression model to determine the factors that are important in an industry's decision to file for a petition. The chapter finds that ITC's material injury criteria is not as important as is considered in the existing literature. The chapter also finds that larger workforce, lower price cost margin, and capital intensities are important determinants of petitioning decision.

The second chapter carries out an event study analysis. It looks at the petitioning firms stock market response at the time of the petition. This gives us an insight into market's perception of the petitioning decision of a firm. The main aim of this chapter is to try and analyze why we don't see more firms petitioning for import relief. It is well accepted that there are large gains from petitioning, thus more firms should be seeking relief. One possibility can be that petitioning reflects cost inefficiency on the part of a petitioning firm, and this might act as a deterrent for firms to come forward with their complaints. The chapter analyzes whether there is a negative cost signal associated with the decision to petition. Petitioning also implies a potentially protected domestic market in the future. Thus, expected future profits would be revised upwards for the domestic firms. Thus, as a by product the chapter also looks at the benefits of a petition in terms of stock price appreciation for firms in different industries. Event study is used to test between the above hypotheses. The chapter demonstrates that market's perception about the decision to petition varies by industries.

The main aim of third chapter is to evaluate whether the Softwood Lumber Agreement had a significant economic impact on the industrial users of lumber. I find that events leading to the Softwood Lumber Agreement brought about large and statistically significant reductions in the stock values of the firms in my sample. These results imply that the Softwood Lumber Agreement imposes

significant economic costs on the industrial users of lumber. Note that this study only analyzes the major industrial users of lumber, it does not include the final consumers of lumber, for example, homeowners. It is likely that the economic costs of the Softwood Lumber Agreement would be even larger if this group was included.

The fourth chapter is a case study of the chemical industry. Restricting imports by imposing antidumping duties protects domestic firms from predatory pricing by foreign firms. At the same time it reduces competition in the domestic market. In cases where the industry consists only of one or two firms, import restriction can drastically reduce competition faced by domestic firms. This chapter looks at the cases filed by the chemical industry to illustrate this possibility. The chapter highlights the concentration of protection seeking industries. This study shows that import restriction, as a result of imposition of antidumping duty, significantly reduces competition in some of the domestic industries.

# Chapter 1

# Industry Level Analysis of Petitioning for Anti-dumping

## 1.1  Introduction

There is a lot of variation across US industries in their demand for import relief. There are four industries[1] that did not file a single petition during the 16 years (1979-1995), where as Primary Metal industries filed 307 petitions during the same time period. The main purpose of this chapter is to explain the variation in petitioning across industries on the basis of industry level characteristics like level of imports, size of industry, productivity etc.

Although there are earlier articles that explore the importance of industry-specific microeconomic factors influencing the petitioning decision, most of these empirical papers use a very small industry-level database for their analysis. Further, no one has carried out this analysis for recent years, and in some cases the aggregation of industries is at 2-3 digit SIC/SITC grouping. Finger (1981)

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[1] Defined at 2-digit SIC level these are Tobacco products, Lumber and wood products, Petroleum and coal products and Leather and leather products

aggregates data by 3 digit SITC group for the period 1975-1979. Herander and Shwartz (1984) carry out the analysis for 4 digit SIC group for only 5 years (1976-1981). Krupp uses 4 digit SIC grouping over the period 1976-1988, but the analysis is done only for the chemical industry. Thus the results only apply to the chemical industry and cannot be interpreted for petitioning decisions in general. Two important exceptions are Tan and Lichtenberg (1994) who use 4 digit SIC grouping over the period 1958-1985 and Hansen (1990) , who uses 4 digit SIC grouping over the period 1975-1984.

This chapter studies the determinants of antidumping filing in the post 1979 trade regime. The literature lacks a study of the petitioning process for the later years. The regime shift of 1979 coupled with the cumulation amendment may have significantly altered the incentives for filing a case. The dramatic increase in case filing in the 1980s, after the trade agreement act of 1979 makes it important to carry out this analysis for more recent years. This chapter differs from other papers in that it looks at the decision to petition rather than the import coverage of antidumping cases. Earlier papers studying the decision to petitions largely use the Poisson model to explain filing. However, the Poisson model may be inappropriate since it assumes equidispersion and independence of events. These assumptions do not hold for the petitioning count data. This chapter uses a Negative Binomial model, which better fits the petitioning process.

This chapter finds that propensity to petition is influenced by the size of employment, capital intensity and unionization of the labor force. The positive effect of unionization probably reflects the ability of the industry to lobby for import protection. Interestingly the chapter finds total factor productivity to negatively influence the number of petitions suggesting that less efficient industries are more

likely to demand import protection.

Unlike earlier empirical work International trade commission's (ITC) material injury criterion are not found to be significant. If benefits from petitioning itself are large enough, ITC's expected material injury decision may not have much influence on the firm's decision to petition. Prusa(1997) presents evidence of import reduction associated with Antidumping actions. He finds that even if cases are rejected, the act of petitioning still significantly reduces imports from the named country. His results can help explain the insignificance of ITC's decision criterion in the petitioning decision.

In the next section (1.2) I will provide a review of the earlier literature. In section (1.3), I formally discuss the antidumping procedure emphasizing the petitioning process. Section (1.4.1) looks more closely at the industry level characteristic that may influence the petitioning decision which are included in the regression equation. Section (1.4) discusses the data and provides some summary statistics for it. In section (1.4.2) the econometric techniques used in the chapter are discussed and section (1.5) presents the results. Section (1.6) concludes.

## 1.2   Literature Review

Krupp (1994), analyzes the decision to file an antidumping petition for the US chemical industry, for the period 1976-1988. A Poisson model is used to explain the count data that is, the number of antidumping case filings within a 4-digit SIC group . The chapter covers 12 of the 28 SIC groups in the Chemical industry (SIC 28), for which at least one antidumping filing occurred during the period covered. However since, the analysis is carried out only for the petitioning industries the general issue of petitioning by any industry is not addressed in the chapter.

A few papers look at proportion of imports under investigation, that is import coverage of petitions. These papers also consider similar industry level characteristics to papers looking at the incidence of petitions. Finger (1981) tests the "harassment thesis", he analyses the cost of less than fair value (LTFV) cases to the foreign firms in terms of legal and administrative costs, and the anticipated outcome. The chapter also, statistically analyses the industry incidence of LTFV complaints. The OLS regression for incidence ratio (proportion of imports under investigation) shows that prior to 1980, import penetration(imports/domestic shipments), size of the capital stock and employment were significant in determining proportion of imports under investigation across industries. The chapter also looks at the ITC's decision and find product differentiation and value of shipment to be significant. Again concentration ratio and import growth rate are not found to be significant. Like Finger(1981) Herander and Shwartz (1984) also examine the influence of LTFV complaints on the behavior of foreign firms. They also look at the incidence of LTFV complaints (proportion of imports under investigation). They find import penetration ratio (imports/domestic consumption), capital stock and unionization in an industry to be significant. They go on to look at the material injury decision of the ITC and find number of firms in the domestic industry, percentage change in employment, ratio of profits to sale and proportion of skilled workers to be significant. Import penetration is not found to be a significant determinant in ITC's decision.

Hansen (1990) looks at the importance of industry concentration ratios, percentage change in employment, percentage change in market share and tariff rate in the petitioning decision. All except industry concentration ratio are significant determinants. For the ITC's decision various political variables, industry

employment and US trade deficit are found to be significant. Tan and Lichtenberg (1994), carry out a Poisson regression for the count data; number of cases filed by an industry in a given year. This chapter finds most of the industry level characteristics to be significant. However, due to over-dispersion of the count variable, Poisson would not be the appropriate model for the petitioning process. Using Poisson would still give unbiased results but the z statistic gets inflated and it becomes easy to reject the null and find most of the explanatory variables to be significant.

Knetter and Prusa (2000), Feinberg (1989), and Feinberg and Hirsch (1989) also use  the AD data put together by Bruce Blonigen. The first two papers look at macroeconomic variables while the third looks at the industry conditions. Blonigen (2000) uses the same database to look at the effect of retaliation by other countries on the petitioning decision of an industry. Import share (imports/domestic consumption), employment, export share interacted with regional dummies and antidumping dummies[2] are used as regressors in a NB regression of the count variable (number of cases filed). Threat of retaliation is shown to influence the petitioning decision of industries. The chapter also finds Import share to be significant in the petitioning decision.

## 1.3   Antidumping Procedure

I discuss the petitioning process in more detail in this section, emphasizing the kind of information ITC and ITA have access to during the investigation. This discussion also throws light on what factors influence ITC's decision and thus

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[2]Dummy takes the value one if the region has Antidumping law.

might be considered by a firm or an industry when it decides to petition. Under GATT article VI countries can impose duties on imports from a particular country or countries to protect domestic industries against dumped imports. In the US, an antidumping (AD) procedure can be initiated by a firm or an industry by filing an import-relief petition. If a US industry or a firm believes that it is being injured by unfair competition through dumping, it may request imposition of AD duty by filing a petition with the International Trade commission (ITC) and the International Trade Administration (IA). ITA determines whether and to what extent dumping is occurring, and the ITC determines whether the domestic industry is suffering material injury as a result of imports of the dumped products. If both the IA and the ITC make affirmative findings of dumping and injury, an AD duty equivalent to the dumping margin is imposed on imports of that product.

### 1.3.1 Petitioning

The first step towards import relief is awareness of dumping and material injury by a US industry or a firm. The second step is to report dumping to the ITC and ITA in form of a petition. An interested party[3] can file an antidumping duty petition with IA and the ITC alleging that a domestic industry is materially injured or threatened with material injury by dumped imports. In case the petition is accepted by the ITC and ITA, an antidumping investigation is initiated. The petitioner must file on behalf of an industry, and it can only do so if the domestic producers or workers who file the petition account for at least 25 percent of the

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[3]Interested parties include: 1) a manufacturer, producer, or wholesaler in the US of the product; 2) a certified union or group of workers that is representative of the industry; 3) a coalition of firms, unions, or trade associations that represent the industry.

total production of the domestic product. IA sends out questionnaire to the non petitioning producers to determine the extent of support for the petition.

The interested party in its petition has to provide a large amount of information about the domestic industry and about the foreign firm importing into the US. Regarding the domestic industry, the petitioner has to provide some background information describing the extent of their involvement in the industry for example, year in which production began, range of products they produce, extent of investment,. In addition the petitioner has to identifying other non petitioning US producers, and provide information about their size and location of production facilities. In order to show material injury the following information needs to be provided: quantity and value of imports, the price difference between the imported good (in the US) and US produced good, capacity, production, domestic sales and end of period inventories of domestically produced goods and number of production and related workers. Additional requirements of the petition include definition of the imported product, identification of the country or countries from which the merchandise is being imported, contact information of the foreign manufacturers, producers and exporters. They also need to provide evidence of dumping by reporting sales price in the foreign country or the third country market.

## 1.4  Data and Empirical Approach

This chapter uses a panel data set for the Manufacturing industry. The data covers 450 4-digit SIC groups in the manufacturing industry for the period 1979 through 1995. The data for this chapter comes from various sources. Data for antidumping (AD) cases has been generously shared by Bruce Blonigen and

James Devault.[4] Industry level data comes from the NEBR.-CES Manufacturing Industry Database (1958-1996), which contains annual information for the entire manufacturing sector from 1958 to 1996.[5] Data for US Imports and average tariff for 4 digit SIC groups comes from the "NBER Trade database" and from R. Feenstra's earlier work. The import price indexes are published by the Division of International Prices, Bureau of Labor Statistics. A detail description of the variables and their source is given in the Appendix.

Figure 1.1 shows number of petitions at 2-digit SIC level. In the 16 year period from 1979 to 1995 there were four industries that did not petition for antidumping even once. These are Tobacco products (SIC 21), Lumber and wood products (SIC 24), Petroleum and coal products (SIC 29) and Leather and leather products(SIC 31). Primary Metal industries (SIC 33) was the biggest filer of antidumping petitions with 307 petitions in 16 years. Chemical and Allied Products (SIC 28) follow behind with 101 petitions. Within Primary Metal Industries, "Blast Furnaces, Steel Works, and Rolling and Finishing Mills" (SIC 331) filed most of the petitions. They filed 271 antidumping complaints in this time period.

What are the characteristics that separate a petitioner from a non-petitioner in terms of their ability to recognize 'less than fair value' imports as well as injury to the domestic industry as a whole? Table 1.1 provides a cross tabulation of some of the industry level variables to answer the above question. Industries

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[4]They collected the data from Federal register notices of the US International trade commission and the International trade administration.

[5]The primary source for many variables in the MP data set is the Census Bureau's Annual survey of Manufactures and Census of Manufactures. To learn more about the initial version of this database and its revision since then please refer to Bartelsman and Gray (1996).

that petitioned at least once over the entire period(1979-1995) are defined as Petitioning Industries, and all other industries that did not petition even once during this time period are defined as non-petitioning industries. Table 1.1 summarizes means of a few variables for petitioning and non petitioning industries. "t" test is used to check if the difference in mean is significant. The table reports averages over the 16 year period as well as the mean for a some of the years (1983, 1986, and 1993). Petitioning industries are relatively larger in size and more capital intensive than non petitioning industries. Both petitioning and the non–petitioning industries are becoming more capital intensive over years but the gap seems to be narrowing, and the difference in the mean for the year 1993 is not even significant. Import penetration ratio has increased for both petitioning and non petitioning industries over the years. For non petitioning industries it increased from 10% in 1983 to 16 % in 1993. Though import competition measured by import penetration ratio is higher for petitioning industries than for non petitioning industries for the years 1986 and 1993 this difference is not significant. Petitioning industries on average employ more workers and pay higher wages than non petitioning industries.[6]

### 1.4.1 Factors Influencing the Petitioning Decision

An industry would petition for an AD case if it is able to recognize unfair imports, is aware of AD procedures, and makes an effort to complain. An industry would make an effort to petition for protection if the expected benefits from winning

[6]These industries are defined according to the petitionins observed in the 16 years (1979-1995) and this pattern might be different if we consider a different time period or extend the time period.

the AD case are higher than the expected cost of filing the case. The cost is generally fixed, consisting of hiring an attorney, submitting the questionnaires, being present at the hearing etc. Expected benefits on the other hand are a function of the probability of winning the case, and returns from petitioning. Thus, factors determining ITC's material injury decision would be incorporated in an industry's decision to initiate an antidumping complaint which is included in vector $X$. On the whole, factors can be categorized into two groups, group $X$ which is a vector of exogenous variables influencing the ITC's material injury decision. And group $Z$, a vector of exogenous variables (other than X) influencing domestic industry's decision to petition. Factors like unionization of labor in an industry, number of employed workers and capital intensity are other important factors that should be considered and would be included in Vector $Z$. Also, there are some concerns about macroeconomic changes like exchange rate movements or business cycle movements that might lead to higher level of petitioning and should be controlled for. I control for these changes by including year dummies $(t)$.

The following regression examines the decision of the domestic industry to lodge an antidumping complaint.

$$N = f(X, Z, t)$$

The choice of variables in vector X is based on the information considered by the ITC commissioners[7]. This is mainly the information provided by firms in their

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[7]Information reviewed by the commisssioners is spelled out in reports and views of the commissioners on particular cases.

As stated in USITC Publication No. 3266(determinations and views of the commission for the case of "certain Expandabel Polystyrene Resins from Indonesia and Korea")

petition and the questionnaires that are sent out by ITC to other firms in the domestic industry. ITC is more likely to give an affirmative decision if during the period of investigation there was an increase in import penetration, a decline in level of employment, and if the prices are thought to have declined due to increased imports. All these variables depicting injury to the domestic industry are likely to increase the number of petitions since it increases the expected benefits.

I use the following variables in my regression to capture the criteria used by the ITC in its decision process. Percentage change in domestic industry's employment of all workers over the past two year.[8]This variable is expected to have a negative sign. Percentage change in import penetration over the last two years. Reviewing some of the commissioners reports implies that this variable should have a positive sign implying an increase in import competition should increase the number of cases filed. Change in the ratio of price of output to price

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"Commission shall consider whether the volume of imports of the merchandise, or any increse in that volume, either in absolute terms or relative to production or consumption in the US, is significant......In examining the impact of the subject imports on th domestic industry, we consider all relevant economic factors....these factors include output, sales, inventories, capacity utilization, market share, employment , productivity, profits, cash flow, return on investment, ....."

"the decline in domestic net sales and unit raw material prices declined, .. the spread between unit selling prices and unit raw material prices narrowed. this declining margin was an important factor in the decline in domestic industry profitability .. " pg(12)

[8]If the petition was filed in 1995,

empchg=$\frac{emploment1994 - employment1992}{employment1992}$. Number of employees is in thousands.

of material cost over the last two years, log of employment are also considered. lemp measures the number of jobs threatened by import competition and should positively influence petitioning. Employment size would also be important if the ITC agency and the politicians are more receptive to complaints from larger industries and constituents.

The second category, vector Z includes variables that shape the industry's petitioning propensity. Import penetration measures the extent of competition provided by imports to the domestic producers in the US. The higher the competition the easier it is for industries to recognize dumping. The more capital intensive the industry the higher the fixed cost of production and less flexible the production process thus, more difficult it is for a firm to exit and enter the industry. The higher adjustment costs makes it more difficult for industries to respond to increased import competition. Capital intensity thus should positively influence the number of cases filed. There are two theories regarding the influence of tariff on the petitioning process. On the one hand industries which are already protected (level of tariff is higher) are less likely to get protection and are also less likely to request or pressure for more protection than less protected industry. On the other hand a higher level of tariff also proxies for higher level of influence or better lobbying power at the centre. If an industry is more protected because of better lobbying it is also more able to push for an affirmative antidumping decision and thus is more likely to petition. The two theories predict opposite signs for the tariff coefficient.

Another important variable to consider is the productivity or efficiency. Industries which are less efficient are more likely to lose the domestic market to efficient imports thus more likely to complaint. Therefore, petitioners are most

likely to be drawn from older less competitive industries. One would expect the coefficient for total factor productivity to have a negative sign.

I include the following variables in the regression equations: import penetration ratio-ratio of imports to domestic consumption[9] for the industry, average tariff for the industry[10], total factor productivity[11], percentage of employers unionized, lag of average tariff, capital by labor ratio (where labor consists only of production workers), profit[12] by sales ratio, and change in profit by sales ratio over last two years.

### 1.4.2  Regression Analysis

The count data on number of cases filed, which is the dependent variable, is discrete and is dominated by zeros and ones. Thus the Poisson model or the Negative binomial (NB) regression model should be used for the analysis. I will first distinguish the NB model from the poisson and then discuss why the NB model best suits the petitioning process. In the poisson model number of petitions $n_i$ is drawn from a Poisson distribution with parameter $\lambda_i$. $\lambda_i$ is the expected number of times an event has occurred per unit of time. $\lambda_i$ is related to the regressors $x_i$ nonlinearly[13].

The log likelihood function is: $\ln L = \Sigma[n_i\beta'x_i - \lambda_i - \ln n_i!]$. The parameters

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[9]Domestic Consumption=Value of shipment-Exports+Imports

[10]Data availability restricts the number of years, the data is only available for the following period:1958-1988.

[11]Tfp calculations have been explained in more detail in the NBER Technical Working Paper No. 205.

[12]Value added-pay roll is being used as a proxy for profit.

[13]$\Pr(N_i = n_i) = \frac{e^{-\lambda_i}\lambda_i^{n_i}}{n_i!}, n_i = 0, 1...; \quad \lambda_i = \exp(\beta'x_i); \; E(n_i/x_i) = V(n_i/x_i) = \lambda_i$

in this model is computed using maximum likelihood techniques. There are a few assumptions in the poisson model which do not hold for the petitioning data. First, it assumes that the mean and variance of $n_i$ are equal that is, there should be equidispersion. My data contains evidence of both overdispersion (variance larger than the mean) and excess zeros. Table 1.2 gives statistics for the count variable number of cases (nocases). Over 96 % of the counts are zeros and the unconditional variance of the count variable (1.28) is much larger than the mean (.096) highlighting excess zeros and overdispersion in the data. Thus, the Poisson model is not appropriate for this data. Second, a critical assumption of the model is that the events are independent. When an event occurs it does not affect the probability of the event occurring in the future. Every time a firms petitions it gains more knowledge about the petitioning process and thus is able present the case better. It is also able to keep abreast with the changing AD legislature which is constantly making it easier to petition. Thus, the independence assumption is violated in this case which again makes the poisson model unsuitable.

Since the number of petitions have increased after 1980 the dominance of zeros is probably greater for the prior years. Thus, the petitioning data for prior years must also have suffered from overdispersion and zero inflation.[14] However, the petitioning process has mostly been modeled using poisson regression despite the problems of overdispersion and heterogeneity. NB model relaxes the independence assumption by allowing for unobserved heterogeneity. The NB model also allows the conditional variance to be greater than the conditional mean. A random term $\epsilon$ is introduced to capture the unobserved

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[14]I have not been able to get access to the database used by earlier papers, to be able to confirm these problems with the count data.

heterogeneity. $\widetilde{\lambda}_i = \exp(\beta' x_i + \epsilon_i) = \lambda_i \delta_i$ [15]. The distribution for $\lambda_i$ is still poisson and the most common distribution used for $\delta_i$ is the gamma distribution [16].

The NB distribution can be thought of as representing a contagion process. Individuals with a given set of x's initially have the same probability of an event occurring, but this changes as events occur. So, if two firms with same characteristics have the same rate of petitioning but if one firm petitions its rate of petitioning increases as a result of contagion from the initial petition.[17]You can think of this as learning by doing, a firm is able to update its information every time it petitions and is able to develop contacts with the personnels at ITC or ITA, helping them to better represent their case. NB would thus be a better candidate to model the petitioning decision.

## 1.5 Results

Table 1.3 reports regression results for the first set of specifications. The first regression reported is the Poisson, this specification (sp 1) is similar to the earlier empirical work.[18] Most of the industry level variables (group Z) are significant. empchg and imppen are significant suggesting that industries also consider criterion used in ITC's material injury decisions (group X). The second specifica-

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[15]Where, $\widetilde{\lambda}_i = \exp(\beta' x_i) \exp(\epsilon_i)$; $\widetilde{\lambda}_i = \lambda_i \exp(\epsilon_i) = \lambda_i \delta_i$

[16]The Gamma distribution with parameter $\nu_i$ is: $g(\delta_i) = \frac{\nu_i^{\nu_i}}{\Gamma(\nu_i)} \delta_i^{\nu_i - 1} \exp(-\delta_i \nu_i)$ for $\nu_i > 0$. The mean and variance: $E(\delta_i) = 1$, $V(\delta_i) = 1/\nu_i$ . Also $\nu_i = 1/\alpha_i$.The NB probability distribution is given by: $pr(n_i/x_i) = \frac{\Gamma(n_i + \nu_i)}{n_i! \Gamma(\nu_i)} \left(\frac{\nu_i}{\nu_i + \lambda_i}\right)^{\nu_i} \left(\frac{\lambda_i}{\nu_i + \lambda_i}\right)^{n_i}$ ; where $E(n_i/x_i) = \lambda_i$,

[17]Derivation of NB distribution from the contagion process was first suggested by Eggenberger and Poyla.

[18]I also report the results of the Poisson model. As expected the t statistics are higher for the poisson model.

tion (sp 2) corrects for overdispersion using the negative binomial regression, the model is same as in (sp 1). The overdispersion parameter is reported at the base of the table, which is significant, supporting the use of NBRM over the Poisson. Most of the variables in sp 2 have the expected signs, petitioning industries tend to have a higher import penetration ratio, a larger workforce, a lower price cost margin, and are more capital intensive. The results indicate that an increase in import penetration ratio by 0.01 increases filing by 2 %. Profit by sales ratio has a significant negative effect on the petitioning decision. An increase of 0.1 in profit by sales ratio results in 13% decline in petition filing. An interesting result is total factor productivity which is significant and negative. Petitioning industries are less productive than the non petitioning industries. Thus, most of the industry characteristics (group Z) receive empirical support.

Unlike earlier work this chapter does not find ITC's material injury criterion to be important factors in the petitioning decision. Changes in employment, price ratio (price of output/price of material cost), import penetration and profit/sales ratio are not significant.[19]

Specification 3 which also uses the negative binomial model, replaces import penetration with its lag. An affirmative dumping and injury determination negatively influences the level of imports penetration definitionally. Prusa(1997) presents evidence of import restriction associated with AD actions. Even if cases are rejected petitioning still significantly reduces imports from the named coun-

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[19]Instead of two year change (in employment, import penetration ratio, profit/sales ratio and price ratio) one year change was also used and the results did not change much. ITCs injury decision criteria was still not signifincant

try.[20] Thus, one would expect a decline in level of imports after the preliminary decision. Since it only takes 115 days for the ITC to give the preliminary injury decision after the petition has been filed and 160 days for the final determination, using the lag import penetration ratio would be more appropriate. Another school of thought believes that foreign firm would increase its imports as soon as it is aware of domestic producers' intentions to file antidumping petition.[21] The imports would then finally fall after the preliminary decision.

I consider Sp 3 to be the most appropriate specification for the petitioning process in this chapter. Unlike import penetration in Sp 2 lag of import penetration is not significant in the NB regression. The other coefficients do not change much with the inclusion of lag import penetration ratio. Again none of the variables in group Z are significant. It seems ITC's material injury decision is not an important determinant of the petitioning behavior. However, this might also be a failure of the data. The measures of economic injury are subject of measurement error due to aggregation of the data. I discuss this further in the appendix A.2.

Since data on unionization and tariff is available only up to 1986 and 1988 respectively these variables are not included in the first set of regressions. Table 1.4 reports the results (Sp 4) when the above two variables are included and lag value of import penetration is used. The overdispersion parameter is reported with the z statistics, it supports the use of NBREG over the PM. Unionization has a positive influence on petitioning decision the coefficient is significant at 1%.

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[20]This is observed especially during period of investigation.

[21]In order to counter this increase and to prevent it, after a positive preliminary decision importers are required to post a bond or cash to cover an estimated amount for the duties which would be collected in an event that an AD order is issued after the final investigation.

Lag import penetration is now significant but only at 10% and the coefficient is smaller. As in the earlier results only the level variables are significant, variables measuring injury to domestic industry are not found to be significant. Average tariff rate or the change is average tariff are not significant.

## 1.6  Conclusion

The spread of AD legislation across countries makes it even more important to understand the AD mechanism. All WTO members setting AD policies follow guidelines specified in the GATT/WTO AD code hence, rendering some similarity to the AD policies across countries. Studying the US AD law can give us some important insights into this widely spreading trade policy which originally designed to support free trade is considered by many economists to be a serious impediment to international trade.

The findings in this chapter provide some initial insights into petitioning behavior. This chapter attempts to explain petitioning behavior through differences in industry level characteristics. The empirical results suggest that propensity to petition is influenced by size of employment force, capital intensity, and unionization of the labor force. The chapter also finds total factor productivity to negatively influence the number of petitions.

Unlike earlier empirical works I do not find ITC's material injury criteria to be significant in the petitioning process. It can be that benefits from petitioning itself are large enough for firms to petition and firms are not influenced by ITC's expected material injury decision. However, this might also be a failure of the data (of aggregation at the industry level). The measures of economic injury are subject of measurement error due to aggregation of the data this might be

affecting the results.[22]

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[22]I discuss the aggregation problem in more detail in the appendix.

# Chapter 2

# An Event Study Analysis of Antidumping Petitions

## 2.1 Introduction

A number of papers highlight the benefits of an antidumping petition to a firm. Prusa (1997) shows the extent to which antidumping (AD) actions restrict imports and substantially raise import prices. Even when cases are rejected, the chapter shows that AD actions can significantly reduce imports from the named country, especially during the period of investigation. Staiger and Wolak (1994) find that relief from the fall in imports during the investigation phase is sufficient for filing to be a profitable strategy. Also, the Import Administration (IA), a division of the Department of Commerce's International Trade (ITA) Administration that determines incidence of dumping, almost always finds evidence of dumping. Further, Grossman (1986) shows that the International Trade Commission (ITC) is more likely to attribute injury to dumped imports. Thus, given the high benefits, and a relatively high probability of success, why don't more firms file for protection? If a petition itself can restrain imports, lead to higher

prices and hence higher profits (in the short run, unless antidumping duties are imposed), what prevents more firms from filing for protection?

In order to understand petitioning behavior one needs to consider the cost of petitioning. The potential cost to a firm can be broadly categorized into three components. First, there is the administrative and legal cost of filing an AD petition (similar to a fixed cost).[1] Second, there is the cost of potential retaliation. If the petitioning firm exports goods or services to the country named in its AD petition, there is a possibility of retaliatory action. This fear of retaliation would also form a part of the expected cost of petitioning.[2]

A third cost, which I refer to as the signaling cost (SC), arises from the signal a firm sends out when it decides to petition. In general, firms petition when imports constitute an increasing share of the domestic market, and leave the firm unable to compete effectively (in bureaucratic jargon, when the firm is injured or threatened by injury). If an industry consists of many firms and only a few petition for protection, it may be reasonable to assume that petitioning firms have lower profitability relative to their non-petitioning peers. A firm facing an increasing import competition could credibly demonstrate its competitiveness by not initiating an antidumping action. The fact that forgoing action in such a case would be detrimental to the firm lends credibility to the signal that the domestic

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[1]I sent Questionnaires to petitioners (45 firms) to gauge the cost of filing these petitions. Very few firms responded. It seems that these costs can be very substanital and this might prevent smaller firms from making use of the AD legislation. That might explain why petitioners tend to be big firms, or trade associations or coalitions consisting of smaller firms. However, these high costs can still not explain why we don't see more trade associations and larger firms filing for petitions.

[2]For more information on Retaliation see Blonigen (2000).

firm is competitive, efficient and profitable. However, if the expected costs from signalling and other factors are less than the expected benefit of eliminating or restricting imports, then the best strategy would be to apply for an AD duty. Also note that if the ITC gives an affirmative injury decision, it would reiterate the signal that the firm is unable to face competition (or dumping), and has higher costs relative to its other domestic competitors. Hartigan et al. (1986) lends some support to the above hypothesis. They show that an affirmative decision by ITC in cases where actual injury was found did not have any effect on firm's market value; however, in cases where only threat of injury was ruled, the market value of filing firms increased significantly.

There have been many instances where non-petitioners from the same industry have taken a neutral or even opposing stand in a dumping investigation. Given that the administrative and legal costs have been paid by the petitioning firms, the only reason why a non-petitioning firm might take such a stand is if the potential costs from retaliation and signaling are high. This chapter looks at the signaling cost, whether the market perceives a petitioning firm to be inefficient and a non-petitioning firm to have low costs. To and Cassing (2002) present a model of imperfect competition where a low-cost non-petitioning firm can oppose the petition to credibly signal that it is indeed a low-cost firm, at a cost of losing import protection.[3]

Petitioning can also be viewed as a signal for the poor state of the domestic industry rather than for the petitioning firm, which I refer to as market signaling

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[3]In case there is a large opposition to anti-dumping petitions by the non-petitioning firms, ITC often concludes that there is no injury to the domestic industry, implying that opposition to a petition reduces the probability of antidumping relief.

cost (MSC). If a few firms producing flat panel screens seek protection against imports from Japan, the act of petitioning can also be construed as a signal that all domestic producers are inefficient and inept at competing with imports. This perception would tarnish both petitioning as well as non-petitioning firms.

For a declining industry, however, an AD petition can also be a positive signal for the petitioning firm.[4] In a declining industry where a large number of firms are contemplating exit, petitioning could be a signal that the firm expects to remain in the market for the near future. Since the benefits of AD protection accrue in the future (it takes 160 days for ITA's preliminary decision; if positive, importers are required to post a bond or cash to cover the ADD amount; it takes at least 300 days for the final ADD to be imposed) they are of less value to firms that are about to exit, while costs are incurred relatively upfront.

At the same time, the act of petitioning potentially generates higher future profitability by restricting imports and raising prices. The present discounted value of future profits would be revised upwards, which would cause higher stock market returns for the firm. Previous literature has emphasized the benefits of petitioning. I will refer to an increase in the market value of firms in the domestic market as result of future protection as expected protection benefits (EPB).

The impact of petitioning on market value is thus ambiguous at this stage. However, these hypotheses can be tested using an event study methodology. I use a capital market event study to empirically test whether petitioning reveals any information about the firm or the industry. That is, do petitioning firms incur signaling costs compared to non-petitioning firms? In such capital market

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[4]This might be true for the steel industry, where a large number of firms have been exiting the market.

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studies the returns on a firm's stock are predicted assuming a normal relationship with the market. These estimates predict returns to a firm's stock in absence of the event under consideration. Predicted returns are compared with the actual returns at the time of the event to study the effect of the event. I then compare the abnormal returns (actual returns minus predicted returns) for the petitioning and the non-petitioning firms to test the above hypotheses. The underlying assumption for this study is that capital markets are efficient, and can evaluate the impact of new information on expected future profits of the firms.

I examine the difference between the abnormal returns for the non-petitioners and the petitioners (NP-P). If this difference is positive then the results lend support to the theory of signaling cost, however, if the difference is negative this suggests that petitioners are able to signal their plan to stay in the market for the near future. My results so far lend general, if incomplete, support to the notion that the market perceives a petitioning firm to be inefficient, and inept at competing in the domestic market.

However, for one particular ailing industry, the flat panel display industry, the difference (NP-P) is found to be negative. Both the petitioners' and the non-petitioners' abnormal returns significantly declined during this event, but, the non-petitioners were the worst hit. I do not have data on more ailing industries to be able to further test this hypothesis. However, if positive signaling does exist, as it does in the case of flat panel display, this further deepens the puzzle of why we don't see more firms petitioning.

The event study methodology has been previously used in the international trade literature. Hartigan et al. (1986) use an event study to look at the stock market response to ITC and ITA's decisions in antidumping investigations. They

consider three events: the preliminary decision by USITC and final decisions by USITC and ITA.[5] Their emphasis is on the benefits accruing to the domestic industry, with no distinction between petitioners and non-petitioners. Also, they do not analyze the stock market response at the time of initiation. I show that both the filing decision and initiation of the case are significant events, and must be considered when analyzing the impact of antidumping procedure on the market value of firms.

Hughes et al. (1997) look at the stock market response to the US trade dispute in the semiconductor industry with Japan. They do not find much impact from the AD investigations. Other protectionist measures have also been analyzed using the event study methodology. Lenway et al. (1996) examine the direct returns to the steel industry from the trigger price mechanism of 1977 and 1980, and the voluntary export restrictions of 1982 and 1984. Ries (1993) examines the effect of voluntary export restraint agreements (1981) on profits in the Japanese automobile industry. They show that profits for some but not all firms in the Japanese auto industry increased.

The chapter is organized as follows. In section (2.2), I highlight some of the trends in antidumping petitions for the period 1990-1999. In section (2.3), I formally discuss the event study methodology used in this chapter, and the test statistics used. Section (2.4) discusses the data and data sources, and provides some statistics. Section (2.6) presents the results, and section (2.7) concludes.

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[5]They find the filing date to be an insignificant event. This can be explained by the lengthy event period in their analysis. They consider five week event windows which reduces the power of the test. Brown and Warner (1985) have shown that increasing the event window drastically reduces the ability to detect significant market responses.

## 2.2 Trends in Antidumping petitions

In this section, I report a few statistics at the 2-digit SIC level for the period 1990-1999. A case is assigned to a 2-digit SIC on the basis of the SIC associated with the product. There is a lot of variation across US industries in their demand for import relief. Table 2.1 reports the number of cases filed over the past 10 years. 404 antidumping cases were filed by domestic producers from 1990 to 1999.

Table 2.2 breaks down these cases by 2-digit SIC. Primary Metal Industries (SIC 33) have filed the most antidumping petitions, with 188 petitions in 10 years. Within Primary Metal Industries, the 3-digit industry "Blast Furnaces, Steel Works, and Rolling and Finishing Mills" (SIC 331) filed most of the petitions. Chemical and Allied Products (SIC 28) is the second largest user of import relief, it having filed 53 cases. Fabricated Metal Products (SIC 34) have filed 42 cases. Many industries did not file any antidumping petition in this time period, including Agricultural Services (SIC 7); Forestry (SIC 8); Fishing, Hunting and Trapping (SIC 9); Coal Mining (SIC 12); Oil and Gas Extraction (SIC 13); General Building Contractors (SIC 15); Heavy Construction Contractors (SIC 16); Special Trade Contractors (SIC 17); Tobacco Manufacture (SIC 21); Lumber and Wood Products (SIC 24); Furniture and Fixtures (SIC 25); Printing and Publishing (SIC 27); Petroleum and Coal Products (SIC 29) and Leather and Leather Products (SIC 31). Some of these industries are of course non-traded.

Table 2.3 reports the number of products within each 2-digit SIC for which protection was sought. For example, 8 cases were filed by the 2-digit Paper and Allied Product industry, but only for one product, 'Coated groundwood paper'. 8 countries were alleged to be dumping imports and a case was filed against each one of them. It is important to know how many domestic products were

being protected within an industry, to understand the spread of protection within that industry. Though the steel industry filed 188 cases, this was to protect the domestic market of only 41 products within this industry.

Petitions can also be filed as a group; if more then one firm feels that the industry is being injured by unfair imports, they can file the case as co-petitioners. Co-petitioning can potentially reduce administrative costs per firm, as well as overcome the free rider problem that might prevent an individual firm from taking action. Table 2.4 reports a rough estimate of the number of firms that filed petitions within each industry.[6] The pattern is the same as for the number of petitions, with the steel industry having 125 petitioners and chemical industry following with 44 petitioners. The average number of petitioners per product varies by industry. For the steel industry (SIC 33) the average is 3 petitioners per product, for agricultural products (SIC 01) the average is 5.8 petitioners per product, and for the chemical industry (SIC 28) the average is 1.5. In the chemical industry most cases were filed by single firms; in 73% of the cases, the AD petition was filed by a single firm and in most cases these single firms were the sole producers of the product. This is not surprising given that there are huge economies of scale in the chemical industry. For the agricultural industry, meanwhile most cases were filed by groups or associations.[7]

This study excludes cases from the steel industry, consisting of the following

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[6] In some cases, trade groups or coalitions that filed the petition did not list their member firms, and it was also difficult to find the member firms or the number of members from other secondary sources. In those cases a correct number for the petitioners could not be obtained. However, such cases are very few in number.

[7] For example, petitions were filed by the American beekeeping federation inc, the Fresh garlic producers association, the Florida tomato growers exchange and the Floral trade council.

4-digit SIC categories; 3312 (Blast Furnaces and Steel Mills); 3315 (Steel Wire and Related Products); 3316 (Cold Finishing of Steel Shapes); and 3317 (Steel Pipes and Tubes). The steel industry has undergone and is still undergoing many changes. There has been a major technological change in the steel industry. Many steel companies are restructuring and consolidating their production. There has been a movement away from old integrated steel mills towards more efficient mini-mills. A large number of steel companies have filed for bankruptcy, and plants have changed many hands. The steel industry is a special case and needs to be analyzed separately from other industries. Also, it is not reasonable to compare integrated mills with mini-mills, since the different technologies used by these firms have to be accounted for while comparing petitioning and non-petitioning firms. More detailed analysis needs to be carried out for the steel industry. This is beyond the scope of this chapter.

Table 2.6 lists the AD investigations that have been included in this study. The table also lists the number of publicly traded petitioners that I have been able to locate in the CRSP database. Approximately, 30 percent of petitioners are listed in the CRSP database; that is traded either on NYSE, AMEX or NASDAQ.

## 2.3   Event Study Methodology

### 2.3.1   Market Model

This event study is based on the market model, relating the return of an individual firm's stock to the return of a market index and a firm-specific constant.

$$R_{it} = a_i + B_i R_{mt} + e_{it} \tag{2.1}$$

where $R_{it}$ is firm i's return at date t; $R_{mt}$ is the return of the value weighted NYSE/AMEX/NASDAQ index at date t; $a_i$ and $B_i$, are the parameters to be estimated; and $e_{it}$ is a serially uncorrelated error term with mean 0 and constant variance $\sigma_i^2$ for stock i.

The above traditional market model equation can be expanded to include separate dummy variables for each event date. Thus, an event window of N observations requires N dummy variables. The estimated equation is of the following form:

$$R_{it} = a_i + B_i R_{mt} + \sum_{n=t+1}^{T+N} EW_{nt} A_{in} + e_{it} \qquad (2.2)$$
$$(t = 1,..T, \ T+1,....T+N); \ (i = 1, 2, ....., I)$$

where $EW_{nt}$ is a dummy variable that takes the value 1 for the $n^{th}$ day of the event window and 0 otherwise, and the $A_{in}$ are additional parameters to be estimated. Equation 3.2 is estimated using ordinary least squares.

The coefficient of the dummy variable $(EW)$ is the abnormal return $(A)$.

$$\widehat{A}_{it} = R_{it} - (\hat{a}_i + \hat{B}_i R_{mt}) \ \ t = T+1,....T+N$$

There are $I$ set of equations, one for each firm, with $(T+N)$ observations for each i. In the above model, the estimation period for the slope and the intercept is $(t = 1, ..., T)$. These T observations without the dummy variables determine the estimated slope and the intercept, as well as the variance $s_i^2$. The remaining N observations $(t = T+1, ....T+N)$ include the event dummies and do not affect the estimated slope, since the observations in the event window are "dummied out". There are $N$ days in the event window. The $A_{in}$ coefficients for these N

observations are nothing but the prediction errors or the abnormal returns.[8] See Appendix B.2 for further discussion.

The above regression provides an unbiased estimate of $\sigma_i^2$.[9]

$$s_i^2 = \frac{\sum\limits_{t=1}^{T} \hat{e}_{it}}{T-2} \; ; t = 1, 2, 3.....T$$

The dummy variables can be aggregated to obtain cumulative daily abnormal returns ($CA$). Over an interval of two or more trading days beginning with day $T+1$ and ending with day $T+N$ , the average cumulative abnormal return across I firms is

$$ACA = \frac{1}{I} \sum\limits_{i=1}^{I} CA_i$$

where the cumulative abnormal return over the event window (N) for firm i is defined as

$$CA_i = \sum\limits_{t=T+1}^{T+N} \widehat{A}_{it}$$

The estimation period for the market model is 365 days beginning 396 days prior to the event $t_0$ and ending 30 days before the event, as shown in figure 2.1 .

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[8] Also, the variance $s_i^2$ is estimated with the first T observations, since the regression residuals for the event window, last N observations, will be zero.

[9] Refer to the appendix B.3 for more detail on the variance and covariance for abnormal return.

## 2.3.2 Hypothesis Testing

Abnormal returns by design exhibit sampling error. The abnormal return, $\widehat{A}_t$, has an expected mean of zero and covariance matrix given by[10]

$$V(\widehat{A}_i) \;\; = \;\; \sigma_i^2[I_N + X_N(X_T'X_T)^{-1}X_N'];$$

$$T \;\; = \;\; \text{Estimation Period; } N = \text{ Event Window}$$

where $X_T$ is a matrix of explanatory variables over the estimation period and $X_N$ a matrix of explanatory variables over the event window. The covariance matrix, $V(\widehat{A}_i)$, has two parts. The first term in the covariance matrix is the variance due to random disturbances and the second term is the additional variance due to the sampling error in $(\hat{a}, \hat{B})$ (a result of predicting outside the estimation period). Testing for the statistical significance of CA (aggregated abnormal returns over the event window) requires us to account for this sampling error, which further leads to serial correlation of the abnormal returns.[11] Abnormal returns are serially correlated despite the fact that the true disturbances, $e_{it}$, are independent across time.

Furthermore, it is reasonable to believe that there exists cross-sectional contemporaneous correlation between the returns of firms belonging to the same industry; this is referred to as industry clustering. The cross-sectional correlation of shock within an industry cannot be eliminated by controlling for the market return. Since, the correlation within the same industry is generally over and above that of the market. Also, the event windows overlap for some of the firms,

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[10]Refer to the appendix B.3 for more detail on the variance and covariance for estimated abnormal return.

[11]For a firm, all the abnormal returns estimate use the same intercept and slope parameters.

a phenomenon known as event clustering. This leads to additional contemporaneous correlation between the estimated abnormal returns. Such cross-sectional contemporaneous correlation needs to be accounted for while testing for the statistical significance of ACA.

A test statistic introduced by Boehmer, Musumeci and Poulsen (1991) is used to test for statistical significance of cumulated abnormal returns[12]. This test statistic is an extension of the standardized abnormal return test (also known as the Patell test) and corrects for both serial correlation and contemporaneous correlation. Boehmer et al (1991) report that this test is well specified and quite powerful.

While testing for the market signal I also use the generalised sign test, the null hypothesis for the generalised sign test is that the fraction of positive returns in the event period is the same as in the estimation period.

### 2.3.3 Events in an AD Case

Figure 2.2 lists all the important events in an AD case in chronological order, and the second column reports the schedule of these events. The first important event is when a petition is officially filed with the ITC and ITA. The second event is ITA's decision to initiate an investigation; this is usually made within 20 days of filing the petition. ITA has to determine whether the petition has been filed by or on behalf of the domestic industry; if not, the case can be terminated. The petition must be supported by producers and workers representing at least 25 percent of the total production of the product in question. ITA sends out ques-

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[12]Please see the appendix B.4 for more detail on the test statistic used.

tionnaire to the non-petitioning producers to determine the extent of support for the petition. Initiation is an important event to be considered, since at this stage all the producers of this product are completely aware of the petition by their peers and have responded to the ITA office about their support or opposition. In case ITA determines that the industry support criterion is met, it publishes a notice of initiation in the Federal Register and informs the ITC of its determination to initiate the investigation.

The preliminary phase of ITC's investigation consists of institution of the investigation and scheduling of the preliminary phase; questionnaires are sent to domestic producers, foreign producers and importers; there is a staff conference, and a staff report is created, containing analysis of all the data collected. Then there is voting by ITC commissioners. Commissioners then determine (around two business days after the vote) whether the domestic industry is materially injured or is threatened with material injury. News about the final voting decision and the determination is released to the public electronically on ITC's web site.[13] The determination, and if affirmative a notice of commencement of the final phase of the investigation, are subsequently published in the Federal Register, which occurs after the date the news is released on ITC's web site. On an average 24 percent of AD cases were given a negative injury decision by the ITC, and these cases did not go to the next stage. This is an important stage in an AD investigation since the empirical probability of a rejection is quite high.

The fourth event is ITA's preliminary determination of whether merchandise is sold or is likely to be sold at less than fair value.[14] ITA publishes its determination

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[13](www.usitc.gov)

[14]Dumping is defined as selling a product in the US at a price which is lower than the price

in the Federal Register. If ITA's preliminary determination is affirmative, it orders the suspension of liquidation of all entries of the subject imported good on or after the date of publication of the notice of determination in the Federal Register.[15] The preliminary antidumping duty is a signal about how much final protection can be expected for the domestic industry. Since this is the first time the rate of potential AD duty is released to the market by the ITA, the market could revise its expectations about protection benefits. However, the expected protection benefits are first calculated at the time of filing, when the domestic firm calculates the dumping margin and requests an equivalent AD duty.

Within 235 days after the date on which the petition is filed, ITA makes a final determination. If the determination is affirmative, ITA instructs customs to continue the suspension of liquidation of entries, but the AD duty might be revised to reflect the final dumping margin. At this stage, if there is a large difference between the preliminary and final AD duty, the market would revise it's expectations regarding protection benefits. ITA reports its decision to ITC and also publishes its determination in the Federal Register. This is the first time the petition has a direct impact on imports.

The fifth event is ITC's final determination. This is the final and the most important hurdle for firms seeking relief. The probability of a negative decision is highest at this stage. Among the cases that reached this stage 42 percent were

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for which it is sold in the home market. In case there are no comparable home market sales, sales in a surrogate "third country" may be used. In the absence of sufficient home market and third country sales, "constructed value", which uses a cost-plus-profit approach to arrive at normal value, is used.

[15]Importers are then required to post a cash deposit or bond for each entry of the subject good.

handed a negative final injury decision by the ITC. This is another important event in an AD investigation and should be included in the event study analysis. As in the case of preliminary determination, questionnaires are sent to everyone involved in the case; next there is a hearing and briefing session, at which a final staff report is presented to the commissioners, parties give their final comments, and there is a briefing and vote. The final determination and views of the commissioner are reported on ITC's web site and a couple of days later are published in the Federal Register.

## 2.4    Data

I used USITC investigation reports and Federal Register notices to obtain the name of the US domestic firms that were petitioners in AD cases. In some cases petitions were filed by industry groups and trade associations whose membership was difficult to ascertain; in these cases petitioners names were gathered from secondary sources.[16] Names of non-petitioners were again obtained from USITC investigation reports and Federal Register notices. The USITC office sends out questionnaires to all other domestic producers[17] of the named product. Most producers reply to USITC with information regarding the product and whether

[16]Information was obtained from the web sites of these associations or news reports. In some cases, names of firms were ascertained from the attendence of CEOs, directors and other executives present in the case hearings. Firms that these executives were affiliated with were taken to be the petitioners.

[17]Petitioners are required to name other domestic producers in the industry, and many other sources are used by the USITC's industry specialists to find the names of all other potential domestic producers.

they still produce it. The investigation report lists all the domestic firms that are producing the product at the time of the petition.[18] Thus, this is a very accurate source for the names of non petitioning firms that belong to the domestic industry in question. If the domestic firm is a subsidiary, the parent firm was considered for the study. This information was obtained by searching the Hoover's online database, the Business and Company Resource Center of Gale Group database, the FIS online of Mergent database, and the Directory of Corporate Affiliates.

There are approximately 190 firms that filed AD petitions over 9 years, from 1990 to 1999. In this study, I analyze only those AD investigations or products which had at least one petitioning or non petitioning firm listed on either the AMEX, NASDAQ or NYSE and for which CRSP data were available during the time of the petition (a year before and 30 days after the petition).[19]Security price data for these firms and for the market comes from the CRSP database, compiled and maintained by the University of Chicago.

### 2.4.1  Event Date and Event Window

All AD cases have been reported on the ITC's web page, one or two days after the petition is filed with the ITC and ITA (which happens simultaneously). Information about the petitions is made available to the public on its web page under the heading  'Recent petitions and complaints filed with the USITC'. I estimated this lag by monitoring the ITC's site for two months, and my estimate

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[18]Sometimes domestic firms contacted no longer produce the product in question, in which case they respond back with other potential domestic producers of the product, which are then contacted by the USITC.

[19]In other words, only firms listed in the Center for Research in the Security Prices (CRSP) database for the above mentioned period have been included in this study.

was confirmed by an inquiry made at the ITC's docket office.

The date on which ITC reported the filing of petition, in most cases, did not coincide with the date of public media announcements. The Lexis Nexis Academic database and the Business and Company Resource Center of Gale group database were used to find the dates of public media announcements of the petitions[20]. There were some cases in which announcement dates from the two sources did not match. This is possible since different newspapers, journals and reports are covered in these search engines. Dates from both these sources (media announcement and the ITC web page) were compared and the earlier of these dates were chosen for the analysis.

Following the conventional set-up, the event date $t_0$, (t=0), is defined as the date on which the event is declared. The event date is presumed to be the date on which the market becomes aware of the firm's demand for protection or of the important decisions, which I take to be the day of public media announcement obtained from the above two engines. I use a seven day event window around the event date for this study, which includes 3 days before, the event day, and 3 days after the event day. Other event windows are also used to consider the sensitivity of the results to the choice of the event window.

## 2.5 Signaling Cost and Market Signal

### 2.5.1 At the time of Petitioning

If the abnormal returns (actual stock returns minus the predicted value) are found to be significantly negative for the petitioning firms relative to the non-

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[20]Please refer to the appendix B.1 for newspaper and journal coverage of these search engines.

petitioning firms at the time of petitioning, then this would support our signaling cost (SC) hypothesis for the firm. If abnormal returns for both the petitioning and the non-petitioning firms move in the same direction, this would reflect a signal for the industry. If abnormal returns for both the petitioning and non-petitioning firms are negative, this suggests that petitioning signals the poor state of the domestic industry, consistent with our market signaling cost (MSC) hypothesis. If the actual stock returns are greater than the predicted value, these abnormal returns are presumably due to the future gains shareholders expect due to the event, according to the expected protection benefit hypothesis (EPB). If the market receives no additional information about the firm or industry from the petition, the abnormal returns should not significantly differ from zero at the time of petitioning. The impact of petitioning on market returns is ambiguous at this stage. However, these hypotheses can be tested using the event study methodology.

All these hypothesis are listed in figure 2.3 and 2.4. The signaling cost can be measured from petitioners' and non-petitioners' average cumulative abnormal returns ($ACA$) around the time of petitioning. SC can also be negative if signaling reveals good information about the firm, such as survival probability.

$$SC = ACA_{NP} - ACA_P$$

However, it is not possible to distinguish between the MSC and EPB for petitioners or for non-petitioners at any stage, since MSC and EPB should be the same for petitioners and non-petitioners. That is, none of the hypotheses listed are mutually exclusive. These two effects move firms's stock prices in opposite directions. The sign of ACA depends on the net effect of petitioning on firm's

stock prices.

$$ACA_P = (SC + MSC + EB)$$

$$ACA_{NP} = (MSC + EB)$$

One criticism of this approach is the self selection problem. Firms that fear a negative market response would abstain from petitioning, unless the cost of inaction is really high. Thus, firms are more likely to petition if they believe that the market has full information about their state, and that petitioning would thus not invoke a negative reaction from the market. In such a case we might observe a positive shock to the stock prices of these firms, in anticipation of future protection. This positive shock would also be shared by the non-petitioning firms, which would also be protected. In brief, we should observe a positive returns shock for both petitioners and non-petitioners, if the market has full information about the state of the firm and petitioning reflects increased future earnings.

In this chapter, I look only at the petitioning stage, however in principle one could look at other events in the AD process, or aggregate over all events leading to the final ITC injury decision.[21] However, petitioners distinguish themselves

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[21]

$$SC = TACA_{NP} - TACA_P$$

$$\text{where ; } TACA_P = \sum (SC + MSC + EB) event^i$$

$$TACA_{NP} = \sum (MSC + EB) evnet^i$$

where i=petitioning, intitiation, ITC's preliminary decision, ITA's preliminary decision, ITA's final decision, ITC's final decision

from the non-petitioners only at the time of petitioning. All other events mostly influence EPB or provide information about industry wide conditions.

## 2.6 Results

### 2.6.1 Does the Market React to the news of a Petition for AD duty?

The average cumulative abnormal return (ACA) for all the petitioning firms in the sample, is positive and significant for the event period (-3,3), while the ACA for the non-petitioning firms on average does not significantly differ from zero. Thus, petitioning is perceived by the financial market as an important signal and does invoke strong market reactions. I also carry out the analysis at the product level, for all the petitioners and the non-petitioners. The cumulative average abnormal returns are calculated for 2 event periods (-3,3) and (-1,1), and for the day of the event (0,0). Petitioning firms belonging to 12 products and non-petitioning firms belonging to 14 products, from an average of 40 products, reported average cumulative abnormal returns significantly different from zero. These results are reported in the appendix B.6. Thus petitioning per se is a noteworthy event both in case of petitioners and non-petitioners.

### 2.6.2 Signaling Cost-2 digit SIC Level

In Table 2.6 I report the stock price response to petitioning, for both petitioners and non-petitioners aggregated to the 2-digit SIC.[22] I consider the event window

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[22]The classification of a firm into an SIC is on the basis of the product in question and does not necesarily have to be the primary SIC for the firm.

(-3, +3). This cumulates the average return of a firm from 3 days before the news release to 3 days after the news release. The market response to petitioning varies at the industry level. For firms belonging to SIC 20 (food products) and SIC 32 (stone, clay and glass), abnormal returns from petitioning are significant and negative. For firms in other industries like SIC 30 (leather products), and SIC 37 (transportation equipment) abnormal returns from petitioning are significant and positive. A significant appreciation in returns for the petitioners supports the hypothesis that shareholders view protection filings as favorable and upwardly revise their future profit expectations, while a significant depreciation implies a negative cost to petitioning.

I find that the proposed signaling cost theory is supported by some industries. I find that for SIC 20, SIC26, SIC 28, SIC32, SIC 36, SIC 37 and SIC 38, non-petitioning firms fared better than petitioning firms. In these industries the signaling cost is positive for the petitioning firms. However, this is not true for other industries. Petitioning firms have fared better than non-petitioning firms in SIC 14, SIC 22, SIC 30, SIC 33, SIC 34, SIC 35, and SIC 39. A possible explanation for this result could be that in a declining industry, incurring the cost of petitioning can be seen as a signal that the petitioning firm expects to stay in the market to reap the benefits of protection, while the same cannot be inferred for firms that do not petition.[23] As can be seen from Table 2.6, most of the industries did not experience a significant change in the abnormal returns at the time of petitioning. One possible explanation might be that most firms

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[23]For the non-petitioning firms, it is also possible that the market is not aware of other firms producing the product under consideration. In the news regarding the petition, the name of the product is accompanied by the name of the petitioner, but other producers of the product are not mentioned in these news reports.

belonging to these industries (in my sample) are multiproduct firms. If the product in question does not contribute a large proportion of the firm's total revenue, petitioning against imports of that product might not be considered an important event.[24] However, one should not conclude that petitioning as an event is inconsequential. For SIC 20 and SIC 30 the change in abnormal returns is large and significant. Since the petitioners and non-peitioners don't necessarily come from the same cases (products) it is more appropriate to aggregate over products.

### 2.6.3 Signaling Cost-Product Level/Domestic Industry

The next set of results are at the product level with two event periods (-1,1) and (-3,3).[25] In Table 2.7 I report the stock price response to petitioners from their act of petitioning disaggregated by products. Petitioners from two products, Phthalic Anhydride, and Flat Panel Displays both experienced significant losses in market value in the (-1,1) event window. Even with a larger event window (-3,3) petitioners who produced flat panel displays experienced a statistically significant loss in value. For the longer event period petitioners producing Structural Steel

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[24]It might be possible to explain this difference in results by differences in firm characteristics.

[25]Increasing the length of the period increases the liklihood of capturing the event, in case the news was leaked to the market prior to the media announcements. A lengthy event period also captures any delayed market response. However, increasing the length of the event period also reduces the power of the test. Petitioning news for every product was probably handled differently by the market, in some case there might have been news leakage, and in some there might be delayed reactions. It thus becomes difficult to ascertain a general event period for different products. Considering two event periods allows us to cosider differnt possibilites for the timing of market's reaction.

Beams experienced a significant decline in their stock prices when they filed for an antidumping duty.

In Table 2.8 I present the stock market response from petitioning to the non-petitioners. In other words, this table presents the average cumulative abnormal return for firms who belong to the same industry as the petitioner, but who did not petition for antidumping duty. Lets look at the event window (-1,1) first. Brake Drums, Flat Panel Displays, and Grey Portland Cement experienced significant cumulative average abnormal returns. With a slightly larger event window, non petitioners who produced Bicycles, DRAMS one Megabit and above, and Crushed Limestone, gained value, but those who produced Structural Steel Beams, Brake Drums, and Flat Panel Displays all lost value because someone in their industry filed for an antidumping duty. While a clear, and unambiguous pattern does not emerge, one finds that petitioning per se is a noteworthy event both for petitioners and non-petitioners.

In Table 2.9 I present the difference between the ACA for the non-petitioners and the petitioners (NP-P). For some products the non-petitioners fared better than the petitioner (NP-P is positive), and for others petitioning firms fared better at the time of petitioning (NP-P is negative). The difference in ACA between the petitioning and non-petitioning firms varies from 22.01 percent (for bicycles), to -16.31 percent (for static random access memory). Some of these products support the signaling cost theory, while others do not. I now discuss these products and their cases in more detail. In what follows I discuss the results for the (-3,3) event period unless otherwise specified.

Bicycles: the market response for the petitioning firm did not significantly differ from zero, whereas the CA was 21.77 percent and statistically significant

for the non-petitioning firm. The difference in stock price response was 22.01% and statistically significant. In other words, non petitioners did well compared to those who petitoned for the antidumping duty. The non-petitioner for bicycles, GT Bicycles, opposed the petition.[26] There had been earlier AD investigations for bicycles, in 1964 (Hungary), 1971 (West Germany) and 1982-83 (Korea and Taiwan), all of which resulted in a negative determination by the ITC. Given that all prior cases had been rejected, the expected probability of an affirmative decision may have been low. Due to lower expectations of future benefits, a higher proportion of the increase in the non-petitioner's market value can be attributed to a positive signal rather than future expectations. In any case, given that higher future expectations would accrue to both the petitioners and non-petitioners, NP-P captures the cost of signaling. The petitioners in this case did not experience any significant change in stock prices, suggesting that the market might have had complete information about the firm.

The market's response in the case of professional electric cutting/sanding tools is negative for the petitioner, Black and Decker. The response is insignificant for the non-petitioner. In this case the non-petitioning domestic producer is also a big importer of the product and is 20 percent owned by Makita corporation (Japan), a foreign firm alleged to be dumping.[27] A negative impact on the petitioner (CA being -10.84) reflects a downward revision of market's valuation of the firm at the time of the petition. The non-petitioner, a big importer, should have experienced a negative abnormal return, if the probability of protection at this stage was non-

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[26]GT bicycles, is also an importer, but its percentage of imports was so small that the ITC considered it to be a part of the domestic industry.

[27]Non-petitioner was not included in the data used to analyse the overall conditions of the domestic market.

trivial. Given that the non-petitioner did not experience any significant change in CA, a likely explanation is that the petitioner signaled itself to be incompetitive, while the market regarded the probability of a favorable outcome as low.

Crushed Limestone: the market response for the petitioning firm did not significantly differ from zero, whereas the CA was 7.58 percent and statistically significant for the non-petitioning firm. The difference in stock price response was 5.1% but was not statistically significant. Vulcan Materials, a non-petitioner in the crushed limestone case experienced a significant 7.58 percent CA, is a large producer of crushed limestone, and is one of the five largest producers that account for 77 percent of production. Vulcan Materials is the only big importer of the product, and also owns a 50 percent interest in a joint venture with a mexican firm that is the target of the petition. Given that the case ended at the ITC preliminary stage, with a negative decision by the commissioner, it is likely that the market was aware of the low probability of success. Also, given that the non-petitioner is the largest producer of construction aggregates in the United States; Vulcan operates 185 production facilities in 14 states in the US compared to the two operated by the two petitioners, petitioning in this case is likely to signal the uncompetitiveness of the petitioners during the cyclical downturn in the market. Also note that the non-petitioning firm opposed the petition for antidumping duty.

Micron Technology, which petitioned for an AD duty against DRAM imports from Korea (see DRAM one Megabit and Above in Table 2.7), did not experience any significant change in its stock price, whereas the non-petitioners (see Table 2.8) saw a significant increase in their market value.[28] The difference in stock

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[28] The non-petitioning firms in this case are either owned by Japanese firms (Japan is not

price response was positive but not statistically significant. In the case of structural steel beams, none of the non-petitioning firms opposed the petition. The abnormal returns are significantly negative for both the petitioners and the non-petitioners[29], although the petitioners experienced a relatively larger decline. The difference in stock price response between non petitioners and petitioners is positive but is not statistically significant. The difference between Northwestern Steel and Wire, a petitioner, had closed one of its steel mills a year and half before the petition, which suggests that the it was unable to face the market competition. The petitioners and the non-petitioners both experienced a decline in their market value, however, the petitioners had larger negative impact on their value. This case can support the signaling cost theory.

A general inference cannot be drawn from these results. The signaling cost theory is consistent with the evidence for some products (like Bicycles and phthalic anhydride) but not for other products in the sample. At the same time, there is some evidence supporting the other alternative hypothesis of no signaling, and of positive signal by the petitioners (higher survival probability relative to the non-petitioners). While I am not considering the ailing steel industry[30] in this analysis, there are some ailing industries in my sample; flat-panel screen industry experienced substantial exit by firms during my sample period.

The US based flat-panel display makers have faced tough competition and

named in the dumping petition), have joint ventures with japanese firms or have production facilities in japan, while the petitioning firm has production facilities only in the US.

[29] The non-petitioning firms are domestic producers and do not import the product.

[30] In my sample, Northwestern Steel & Wire filed for bankruptcy in December 2000 after having filed a case in August 1999. Ladish filed a petition in February 1994 after filing for Chapter 11 bankruptcy in 1993.

most firms have either shut down or have sold their plants. The corporate mortality rate in the flat-panel display industry has been extremely high. Both the petitioner's and non-petitioner's abnormal returns were negative during this event, but the non-petitioners were the worst hit (ACA being -13.84). In this case a firm may signal its intentions to stay in the market by petitioning for a year long AD investigation.

### 2.6.4   Market Signal

In Tables 2.10 and 2.11 I present the results for the domestic industry as a whole. In these results both petitioners and non-petitioners are included. Note that only those products are considered for which data is available for both petitioners and non-petitioners. In Table 2.10 I present the ACA for all firms producing the product. In Table 2.11 I present the generalised sign test. The generalized sign test tests whether the fraction of positive returns for the event window is the same as in those during the estimation period. The null hypothesis is that the number of positive returns is the same as those during the event window. The second column in Table 2.11 reports the number of firms with positive and negative cumulative abnormal returns in the event period (-3,3) and the fourth column reports the same for the event period (-1,1).

In Table 2.10 we should only be looking at cases where the ACA does not move in statistically significant opposite directions for the petitioners and non-petitioners. For the two event periods considered, the marketing signal theory can not be rejected for Flat Panel Displays, and Structural Steel Beams. In both these products all firms producing the product, petitioners, and non-petitioners experienced statistically significant losses in stock price value when a petition was

filed. The domestic industry for DRAM semiconductor, Professional Electric Cutting/Sanding, Certain Cased Pencils, Grey Portland Cement, products also had significantly negative abnormal returns. There were two exceptions, DRAMS one Megabit and Above and Silicon Metal. These were the only products where all firms jointly experienced a statistically significant increase in their stock price when a firm filed for an antidumping petition. However, in this case petitioners alone did not experience a statistically significant gain in their stock price from petitioning (in fact for DRAM one Megabit and above, the petitioners ACA was -2.42% but was not statistically significant), so the market result might be driven by the non-petitioners.

The results in this chapter contrast with the findings of Hartigan et al. (1986). They do not find filing to be a significant event. This may be due to the lengthy event period in their analysis. They consider five week event windows, which reduces the power of the test. Brown and Warner (1985) have shown that increasing the event window drastically reduces the ability of event studies to detect significant market responses. I do find petitioning to have significant effect on the petitioning as well as non-petitioning firms.

### Petition filed by Groups

Some of these AD cases are filed by groups like an Association, Coalitions or trade group, whereas others are filled by individual firms. I ran a simple cross section regression of the ACA of petitioners at the product level on a dummy variable, which took the value one if the petition for the particular product was filed by a group and zero otherwise. The coefficient on the dummy variable was

not significant.[31]  Also, ACA for petitioners is not found to be effected by the number of non-petitioners in the same industry.  In some cases the petitioners are the sole producers in the domestic industry, the cumulative abnormal returns for these firms at the time of petitioning is not significantly different from other petitioners.

## 2.7    Conclusion

The results so far does not lend support to the notion that the market perceives petitioning firms to be inefficient, and unable to compete in the domestic market. There are some cases which support the proposed signaling cost theory, but since this support is not wide spread one cannot use these results to answer the question of why we don't see more firms petitioning for AD relief.

Although there is another possibility based on the results from the Market Signal section.  If we consider all the firms producing the same product it is fairly common to observe a statistically significant decline in the share value once an antidumping petition is filed.  This could be a deterrent for the firms who wish to file an antidumping petition.

For some industries, it seems that the market has complete knowledge about the financial state of the firm prior to petitioning, and petitioning does not reveal any new information about the petitioning firm.  The results also suggest the possibility of a positive signal associated with petitioning.  For an import competing firm, in a declining industry, petitioning might kill two birds with one

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[31]I ran the same regression for a dummy variable which took the value 1 if the petitioner was the sole petitioner for the complaint, and 0 if the number of petitioners was more than one. Again, this was not significant.

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stone: first, you signal your intentions of staying in the market, and second there is a probability of reducing import competition. In a scenario where this signal is credible, we should observe relatively more petitioning by US domestic firms, deepening the puzzle further.[32]Since, in my sample there is not enough data on firms in the ailing industries filing for protection a formal study can not be carried out. An extension would be to expand the database to include more cases and formally test the positive signaling theory.

## 2.8   Further Research

It would be interesting to extend the above analysis to consider the impact of firm level characteristics like market share, profit, technical efficiency on the above results. Also, a comparison of firm level characteristic for petitioners and non-petitioners would help further understand who asks for protection. If we can estimate an index for efficiency for these firms this can throw light on wether it's the relatively inefficient firms that ask for protection.

Another extension would be to use the Industry level estimates from chapter 1 and estimate which industries would file for protection and compare this with the actual petitions. There is much more work that can be carried out at the firm level.

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[32]It is possible that the fixed cost of filing the petition and of administration is so high that it keeps most of firms out of AD investigations.

# Chapter 3

# The Users of Lumber and the US-Canada Softwood Lumber Agreement: An Event Study

## 3.1   Introduction

The softwood lumber trade dispute between the US and Canada can be traced back to a countervailing duty investigation by US authorities in 1982/83. The US claimed, and still claims, that fees charged for harvesting softwood on public lands by certain Canadian provincial governments are artificially low. It also claims that artificially low fees set by provincial governments constitute counterviable subsidies.

A recent bilateral settlement of this dispute was the Softwood Lumber Agreement (SLA). Signed in May 1996, under the Softwood Lumber Agreement the first 14.7 Billion Board Feet (BBF) of softwood lumber exports from Alberta, British Columbia, Ontario, and Quebec would enter the US market duty free. The first 650 million board feet over 14.7 BBF were subject to a tax of \$50 per thousand board feet. Further exports were subject to a tax of \$100 per thousand board feet.

The question addressed in this chapter is: what is the effect of restricting Canadian exports on industries that use lumber in the US? Restrictions on Canadian lumber exports raise lumber prices in the United States. While this raises profits for US lumber producers, it also raises costs for lumber using (or downstream) industries. Lindsey et. al. (2000) estimate that the fees on additional shipments due to the SLA raise the cost of lumber in an average new home by 800 - 1300 US Dollars. They also estimate that for every $50 increase in the price of 1,000 board feet of framing lumber, 300,000 potential homeowners are priced out of the housing market. When customers can no longer afford to buy homes, suppliers lose business and their employees suffer. Furthermore, less remodeling is done when the cost of key materials, such as lumber, rises. A reduction in the demand for housing and remodeling, affects home builders and manufactured-home builders. Lumber dealers who supply home builders and manufacturers are also hurt by reduced residential construction.

To assess the effect of restricting Canadian exports on industries that use lumber, we use an *event study*.[1] The event study allows us to assess the impact of events leading to the Softwood Lumber Agreement. We assume that capital markets are efficient, and can evaluate the impact of new information on a firm's expected future profits. This implies that 'abnormal' changes in a firm's stock price can be interpreted as the present discounted value of future gains or losses expected due to the agreement.[2]

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[1] An *event study* is an empirical study of prices of an asset just before and after some event, like an announcement, merger, or dividend.

[2] To calculate 'abnormal' returns we first calculate the relationship between the firm's stock price and the stock market in the absence of the event under consideration (in this case the Softwood Lumber Agreement). This relationship generates predicted returns in the absence

We consider three events. The first event date is February 2, 1996. Seeing that negotiations between US and Canadian governments had made little headway, on February 2, 1996 the Council for Fair Lumber Imports (CFLI - a coalition representing US lumber interests) announced its own deadline. It announced its intention to file a petition for a countervailing duty if an agreement between US and Canada was not reached by February 15th, 1996. The second event date is February 15, 1996, this day an agreement between the two countries was reached in principle. The final event date we consider is April 3, 1996, this day Canada finalized the agreement and announced its details. We find that events leading to the Softwood Lumber Agreement had significant negative impacts on the stock prices of industries using softwood lumber. The average reduction of stock prices for our sample of firms was approximately 1.5% for each of the first two events. For the final event (Canada finalizing the agreement) the average reduction in stock prices was significantly higher at approximately 2.5%. Cumulating the losses over all three events, we find that the average reduction in stock prices for the firms in our sample was 5.42%, indicating that the Softwood Lumber Agreement imposed significant economic costs on the users of lumber.[3]

This chapter is not the first to study stock price changes in response to bilateral agreements. In a related study, Begley et al. (1998) assess the impact of export taxes (imposed during the Memorandum of Understanding (1986-91)) on

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of the agreement. These predicted returns are then compared with the actual returns on the event dates (dates specific to the agreement) giving us *abnormal* returns.

[3]Disaggregatin amongst the users of lumber, we find that retailers and wholesalers of lumber and other building materials (Standard Industrial Classification (SIC) 5211) had the largest depreciation in their market value (at -12.99%). Single-family housing construction firms (SIC 1521) were next at -6.19%.

the stock prices of the producers of Canadian Lumber. Lenway et al. (1996) examine the returns to the steel industry from the trigger price mechanism of 1977 and 1980, and the voluntary export restrictions of 1982 and 1984. Ries (1993) examines the effect of voluntary export restraint agreements in 1981 on profits in the Japanese automobile industry. Most of these papers evaluate the industry directly affected by the trade policy (the exporting or the import competing industry). This chapter is one of the few to evaluate the impact of a trade agreement on an indirectly effected industry (in this case the users of the restricted good).

The structure of the chapter is as follows. In Section 3.2 we provide a brief history of the US-Canadian softwood lumber dispute. In Section 3.3 we describe our event study. In Section 3.4 we discuss the data and its sources. We present the results in Section 3.5, and conclude in Section 3.6.

## 3.2 The US-Canada Softwood Lumber Dispute: A Brief History[4]

In Table 3.1 we list the main countervailing duty investigations involving softwood lumber and their outcomes. The first countervailing investigation is commonly termed Softwood Lumber I. Concern over rising Canadian lumber imports resulted in a petition for a Countervailing Duty (CVD) in October 1982. The petition alleged that Canadian Provincial and Federal governments were subsidizing softwood lumber production by selling the right to cut timber on public

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[4]For a more comprehensive description of the US-Canada lumber dispute please see Braudo and Trebilcock (2002).

lands at artificially low prices. In the ensuing investigation the International Trade Administration (ITA), a dispute settlement body in the US Department of Commerce, ruled that Canada's policies regarding allocation and pricing of softwood lumber did not constitute a countervailable subsidy to its softwood lumber industry.[5]

The dispute was revived in May 1986 by US interests grouped under the Coalition for Fair Lumber Imports (CFLI). The Coalition requested US authorities to impose a countervailing duty on Canada's softwood lumber exports to the US. In this new phase (called Softwood Lumber II), the facts of the case as well as the applicable law had not materially changed from the first phase in 1982/83. However, the Canadian share of the US softwood lumber market had risen from 28.5 percent in 1983 to 31.6 percent in 1985 (see Gagné (1999)). This time the International Trade Administration reversed its prior decision. It found Canadian stumpage rates to be countervailable, and imposed a 15 percent provisional duty.[6] In December 1986, US and Canada agreed to a Memorandum of Understanding (MOU) under which Canada imposed a 15 percent tax on its exports to the US.

In Canada there was resentment against the MOU. Further, during this period British Columbia (the single largest exporter of softwood lumber) replaced its export charge by permanently increased stumpage rates. In October 1991, Canada unilaterally terminated the Memorandum of Understanding. This was met almost immediately by interim duties on Canadian lumber. A third coun-

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[5]The 'specificity test' of an export subsidy was not met. This was because this stumpage rate was valid for all producers and did not target exporters specifically.

[6]The difference between stumpage revenues received by provincial governments and applicable government costs was used to determine whether subsidy existed.

tervailing duty investigation (Softwood Lumber III) was initiated. In May 1992, the ITA issued a final determination which set the countevailing duty at 6.51 percent.[7] Subsequently, Canada appealed the ruling at the dispute settlement body of the Canada US Trade Agreement (CUSTA).

A prolonged period of litigation under the CUSTA followed.[8] The duty imposed was disallowed by CUSTA, and finally revoked by the US government in 1994. Following this revocation a period of mostly free trade followed. This was a phase of euphoria in bilateral relations between US and Canada. When President Clinton visited Ottawa (February 1995) after the North American Free Trade Agreement both US and Canadian governments viewed trade disputes such as Softwood Lumber as minor irritants in a phase of increasing integration (as reported by Leo Ryan in a news report for the Journal of Commerce on February 23rd 1995).

Nevertheless, in late 1995 there was renewed pressure on the US government to limit softwood imports. Given that the Canadian softwood lumber industry had incurred large litigation costs to win Softwood Lumber III they were willing to look for a negotiated bilateral solution. Despite ongoing negotiations, on February 2, 1996 the US coalition for fair lumber imports announced its intentions to petition if no pact was reached by February 15th. Under this pressure, the five year SLA , (from April 1, 1996 to March, 31, 2001), was accepted by both the sides. Even these five years of SLA were marred by further disputes. The US

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[7]The methodolgy used to determine the counterviable duty dffered from the one used in the Softwood Lumber II. This time round the finding of subsidy was based on the difference between stumapge rates under the small business program in Canada and rates of major licenses.

[8]The panels overturned ITA's and ITC's findings. The US went on to challenge the panel's decision. After a further investigation the panel upheld its previous decision.

customs, on at least three occasions, reclassified products from tariff codes outside the SLA into codes covered by the agreement. Also, during this period British Columbia's stumpage reduction was challenged by the US under the dispute settlement provisions of the agreement.

## 3.3 An Event Study

### 3.3.1 The Market Model

This event study is based on the market model, relating the return of an individual firm's stock to the return of a market index and a firm-specific constant.

$$R_{it} = a_i + B_i R_{mt} + e_{it}, \tag{3.1}$$

where $R_{it}$ is firm i's return at date t; $R_{mt}$ is the return of the value weighted NYSE/AMEX/NASDAQ index at date t; $a_i$ and $B_i$, are the parameters to be estimated; and $e_{it}$ is a serially uncorrelated error term with mean 0 and constant variance $\sigma_i^2$ for stock i.

The above traditional market model equation can be expanded to include separate dummy variables for each event date. Thus, an event window of N observations requires N dummy variables. The estimated equation is of the following form:

$$
\begin{aligned}
R_{it} &= a_i + B_i R_{mt} + \sum_{n=t+1}^{T+N} EW_{nt} A_{in} + e_{it} \tag{3.2}\\
(t &= 1, ..T, \ \ T+1, ....T+N); \ (i = 1, 2, ....., I),
\end{aligned}
$$

where $EW_{nt}$ is a dummy variable that takes the value 1 for the $n^{th}$ day of the event window and 0 otherwise, and the $A_{in}$ are additional parameters to be estimated. Equation 3.2 is estimated using ordinary least squares.

The coefficient of the dummy variable $(EW)$ is the abnormal return $(A)$.

$$\widehat{A}_{it} = R_{it} - (\hat{a}_i + \hat{B}_i R_{mt}) \ \ t = T + 1, ....T + N.$$

There are $I$ set of equations, one for each firm, with $(T + N)$ observations for each i. In the above model, the estimation period for the slope and the intercept is $(t = 1, ..., T)$. These T observations without the dummy variables determine the estimated slope and the intercept as well as the estimated variance $s_i^2$ . The estimation period for the market model is 365 days, beginning 396 days prior to the event $t_0$ and ending 30 days before the event, as shown in Figure 3.1. The remaining N observations $(t = T + 1, ....T + N)$ include the event dummies and do not affect the estimated slope, since the observations in the event window are "dummied out". There are $N$ days in the event window. The $A_{in}$ coefficients for these N observations are nothing but the prediction errors or the abnormal returns.[9] See Appendix B.2 for further discussion. The above regression provides an unbiased estimate of $\sigma_i^2$.[10]

$$s_i^2 = \frac{\sum\limits_{t=1}^{T} \hat{e}_{it}}{T - 2} \ ; t = 1, 2, 3.....T.$$

The dummy variables can be aggregated to obtain cumulative daily abnormal returns $(CA)$. Over an interval of two or more trading days beginning with day $T+1$ and ending with day $T+N$ , the average cumulative abnormal return across the I firms is

$$ACA = \frac{1}{I} \sum_{i=1}^{I} CA_i$$

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[9] Also, the variance $s_i^2$ is estimated with the first T observations, since the regression residuals for the event window, the last N observations, are zero.

[10] Refer to Appendix B.3 for more detail on the variance and covariance for abnormal return.

where the cumulative abnormal return over the event window (N) for firm i is defined as

$$CA_i = \sum_{t=T+1}^{T+N} \widehat{A}_{it}$$

### 3.3.2 Hypothesis Testing

Abnormal returns by design exhibit sampling error. The abnormal return, $\widehat{A}_i$, has an expected mean of zero and covariance matrix given by[11]

$$V(\widehat{A}_i) = \sigma_i^2[I_N + X_N(X_T'X_T)^{-1}X_N'];$$

$$T = \text{Estimation Period}; N = \text{Event Window}$$

where $X_T$ is a matrix of explanatory variables over the estimation period and $X_N$ a matrix of explanatory variables over the event window. The covariance matrix, $V(\widehat{A}_i)$, has two parts. The first term in the covariance matrix is the variance due to random disturbances and the second term is the additional variance due to the sampling error in $(\hat{a}, \hat{B})$ (prediction outside the estimation period).[12] Testing for the statistical significance of CA (aggregated abnormal returns over the event window) requires us to account for this sampling error, which further leads to serial correlation of the abnormal returns.[13] Abnormal returns are serially correlated despite the fact that the true disturbances, $e_{it}$, are independent across time.

Furthermore, it is reasonable to believe that there exists cross-sectional contemporaneous correlation between the returns of firms belonging to the same

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[11] Refer to Appendix B.3 for more detail on the covariance of abnormal return.

[12] Refer to Appendix B.3 for more detail on the variance and covariance for abnormal return.

[13] For a firm, all the abnormal returns estimate use the same intercept and slope parameters.

industry; this is referred to as industry clustering. The cross-sectional correlation of shocks within an industry cannot be eliminated by controlling for the market return, since the correlation within the same industry is generally over and above that of the market.

A test statistic introduced by Boehmer, Musumeci and Poulsen (1991) is used to test for statistical significance of cumulated abnormal returns[14]. This test statistic is an extension of the standardized abnormal return test (also known as the Patell test) and corrects for both serial correlation and contemporaneous correlation. Boehmer et al. (1991) report that this test is well specified and quite powerful.

## 3.4 Data

### 3.4.1 Consumers of Softwood Lumber

Our sample of lumber using industry (also referred to as *downstream* industry) draws from the membership of the American Consumers for Affordable Homes (ACAH). The ACAH claims that it represents approximately 95 percent of softwood lumber use in the US.[15] However, not all members of this associations are

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[14]Please see the appendix B.4 for more detail on the test statistic used.

[15]The members of ACAH include CHEP USA, Citizens for a Sound Economy, Consumers for World Trade, Free Trade Lumber Council, The Home Depot, International Mass Retail Association, International Sleep Products Association, Leggett & Platt Inc., Manufactured Housing Association for Regulatory Reform, Manufactured Housing Institute, National Association of Home Builders, National Black Chamber of Commerce, National Lumber and Building Material Dealers Association, National Retail Federation, and the United States Hispanic Contractors

direct consumers or users of softwood lumber. In the US, softwood lumber is largely used for constructing new homes and remodeling existing structures. It is also used for building manufactured homes. Accordingly, we shortlist firms from the ACAH that belong to the following four digit Standard Industrial Classification (SIC). These are: SIC 1521 (Single-Family Housing Construction), SIC 1531 (Operative Builders), 2451(Mobile Homes), and 2452 (Prefabricated Wood Buildings). Besides the direct users, we also include suppliers, in other words, the wholesale lumber dealers, their relevant SIC code is 5211 (Lumber and other Building Materials).[16]

Depending on the availability of stock price data we shortened the list further. Our data for stock price data comes from the Centre for Research on Security Prices (CRSP) database. We use firms that were listed either on the American Stock exchange (AMEX) or the New York Stock Exchange (NYSE). We also require the availability of stock price data during the entire time period relevant for the SLA. The relevant time period begins a year before the first news report regarding possible export restrictions in 1995 and ends 40 days after the last news report regarding the SLA. This process of elimination leaves us with data for 37 firms.

In Table 3.5 we list all the firms used in this analysis. The last two columns include their ranking in terms of revenue in the domestic industry.[17] A few large firms can be classified into both Single Family Housing and Operative Builders. We sorted these firms into a single classification depending on their ranking and

Association (source: the website for ACAH).

[16]We further checked the websites of these firms to confirm that they either used softwood lumber as an input or were softwood lumber dealers.

[17] The revenue share data is drawn from Gale Group (2001a, b, and c).

their primary SIC listing in the Compustat Database.[18] However, as most of the industry leaders are being considered, the sample does represent a significant share of the market.[19]

The Single-Family Housing Construction industry is highly fragmented and dispersed.[20] The industry consists of contractors that are primarily engaged in building, remodeling, and repairing houses. Some large contractors in the industry are also listed as operative builders. However, around 75 percent of the establishments engage solely in the construction of single-family housing. In 1997, the five largest contractors accounted for 14 percent of the revenue share in the industry, their total revenue being $11.3 billion. The industry revenue leader, Pulte Corporation, accounted for 2.3 percent of the housing starts. Other large single-family home contractors include Centex Corporation, Kaufman & Broad Home Corporation, D. R Horton and Lennar Corporation.

Operative Builders account for a smaller percentage of construction. Their also undertake site development, real estate management activities, land acquisition, land sales and other miscellaneous operations. Unlike general contractors, operative builders own the structures they erect and act as their own general contractors. The largest operative builder, in 1999, with sales of $5.2 billion was Centex Corporation followed by Pulte Corporation, Ryland Group, Toll Brothers and Beazer homes.

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[18]For example, Centex Corporation (refer to Table 5), which ranked 1 under SIC 1531 and 2 in SIC 1521, was placed under SIC 1521. In case the ranking was not available we placed them under their primary SIC, as specified in the Compustat Database.

[19] The revenue share data is drawn from Gale Group (2001a, b, and c).

[20]Much of the descriptive information below regarding each industry is drawn from Gale Group (2001a, 2001b, and 2001c).

Lindsey et. al. (2000) provide the information that in 1997, 23.8 percent of single-family housing starts, and 30.5 percent of new single-family homes sold were Manufactured Homes.[21] In other words, this too is also an important industry for our analysis. This industry is relatively more concentrated. There are only 88 manufactured home corporations in the US, and in 1998, the top 10 manufactured home producers accounted for 78 percent of total industry shipments. The industry leader was Champion Enterprises, followed by Fleetwood Enterprises, Oakwood Home Corporation, Clayton Homes, and Cavalier Homes.

Several types of establishments fall into the Retail Lumber and Building Materials category. The largest categories, by far, are Lumber Yards, Home Centers and Warehouse Home Centers. The industry leaders are Home Depot, Lowes, Menard Incorporated (a private firm not listed on any stock exchange), and The 84 Lumber Company (also a private firm).

### 3.4.2    Event Dates

To find the dates for public media announcements related to the SLA, we use two databases. These are the Lexis Nexis Academic Database and the Business and Company Resource Center of Gale Group Database. In Table 3.2 we list what we consider to be the three important announcements or events related to the SLA. The second column of the table contains the headline for the news report and the third column lists the news source in which the report was published.

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[21]According to Lindsey et. al. (2000), this figure was calculated at the request of the National Association of Home Builders by the Bureau of the Census. The calculation was based on Census Bureau analysis described in Howard A. Savage, "Who Could Afford to Buy a House in 1995," Current Housing Reports, H121/99-1, August 1999.

The first event date considered is February 2, 1996. On this date the Council for Fair Lumber Imports (CFLI - a coalition representing US lumber interests) announced its intent to file a petition for a countervailing duty if an agreement between US and Canada was not reached by February 15th, 1996. This announcement was probably prompted by the lack of progress made in the negotiations between US and Canadian governments. The second event date considered is February 15, 1996. On this day, under pressure from the CFLI announcement, an agreement between US and Canada was reached and announced in principle. The final event date we consider is April 3, 1996. On this day Canada finalized the Softwood Lumber Agreement and announced its details.

## 3.5 Results

We expect the Softwood Lumber Agreement to have a negative impact on the users of lumber. We also find results consistent with that hypothesis. Protection for the domestic lumber industry in the form of the Softwood Lumber Industry had a significantly negative impact on the market value of firms that use lumber as an input. In Table 3.3 we report the stock price response for the users of lumber to the three events listed above. The Average Cumulative Abnormal returns (ACA) for the event window (-1,+1) (cumulating the average return of firms from one day before the news release to one day after the news release) is reported in the table. The ACA is significantly negative for all events.

For the first event, that is the warning by the CFLI (or US producers), the ACA is significantly negative at the 5 percent level. The second event, the day the agreement was announced in principle, had a relatively smaller, but still statistically significant, effect on the stock prices. There are two possible reasons

for this smaller impact. The first being that the market anticipated this announcement. If the threat by CFLI was seen as credible, the market would have anticipated the announcement of the agreement on the second event date (the earlier threat included this event date as a deadline). The second reason could be that the market did not consider the agreement announced as being credible. Till a few hours before the agreement was announced several Canadian provincial representatives disagreed over the details of the SLA.[22] The disagreement between Provinces was widely known and is likely to have reduced the market's expectation about whether the SLA would be finalized or not. Consistent with the second possible reason above, the final signing of the SLA greatly caused significant depreciation in the market value of our sample of lumber using firms. We find a negative 2.38% abnormal return during this event, significant at the 1 percent level. In the sixth column of Table 3.3 we report the number of firms with positive and negative average abnormal returns for the event window.

For all three events, firms with negative returns outnumber the firms with positive returns. For the final event, when Canada finalized the agreement, the number of firms that lost market value are more than three times those that gained value. In the last column of Table 3.3 we report the test statistic for the generalized sign test. This tests whether the fraction of positive returns for the event window is the same as in those during the estimation period. For each of the events the null hypothesis that the number of positive returns is the same as those during the event window is rejected. In other words, the decrease in the number of firms losing value during each event is statistically significant. For

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[22]There are some details regarding this disagreement in the newsreport regarding the announcement of this agreement.

the final event, when Canada finalized the agreement, 28 of the 37 firms reported negative abnormal returns, and this is significantly different from similar ratios during the estimation period at the 1 percent level.

We add the cumulative abnormal returns for all three events to obtain the Total Cumulative Abnormal Return(TACA). In Table 3.4 we present the TACA for each of the 4 digit SIC industry considered (1521, 1531, 2451 & 2452, 5211 and others). The results suggest that the response to SLA varied across industries. Firms belonging to SIC 5211 (Lumber and Other Building Materials) had the largest depreciation in their market value. Their TACA was -12.99% and is significant at the 1 percent level. The next largest impact occurred in Single-Family Housing Construction. Their TACA was -6.19% and was significant at the 1 percent level. Though TACA for SICs 1531, 2451 and 2452 are negative, they are not statistically significant. This is probably because the consumption of softwood lumber in Mobile Homes and Prefabricated Wood Buildings is relatively small. Also, firms belonging to Operative Builders (SIC 1531) are involved in many other activities like site development work, real estate management activities, land acquisition, and land sales. The impact on these firms is thus likely to be less than for firms belonging to Single-Family Housing Construction, where 75 percent of establishments engage in the same single activity. In the last row of Table 3.4 we present results cumulated for all three events, for all firms in our sample. We find that the market value of all firms in our sample depreciated by 5.42 percent, and this is significant at the 5 percent level.

We test the sensitivity of these results to the definition of the event window by trying other event windows. In Table 3.6, we report TACA for various event windows. Irrespective of the definition of an event window the TACA is negative

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and significant at the 5 percent level, and point estimates are similar across windows. We report the results for an event window of 5 days, (-2,+2) in Tables 3.7 and 3.8. As with the 3 day event window, the last event (Canada's finalizing of the agreement) had the biggest impact, and again this is significant at the 1 percent level. The other events also reduced market value but the reduction is not statistically significant for the first event. Even at the industry level results do not vary much across event windows. We conclude that the SLA was detrimental to the users of lumber. This is especially true for Lumber Dealers and the Single Family Construction Industry.

## 3.6  Conclusion

In this chapter we evaluate whether the Softwood Lumber Agreement had a significant economic impact on the industrial users of lumber. To ascertain the impact of the SLA on users of lumber we study stock price variations of lumber using firms. We find that events leading to the Softwood Lumber Agreement brought about large and statistically significant reductions in the stock values of the firms in our sample. If we assume that the stock market processes information efficiently this reduction in stock value can be interpreted as the economic loss expected from the SLA.

Nevertheless, a few caveats are due. This study analyzes the major industrial users of lumber alone. We do not include the final consumers of lumber, for example, the homeowners. It is likely that the economic costs of the Softwood Lumber Agreement would be even larger if this group were included. Further, we only include firms listed in the major stock exchanges in the US. While we believe that our sample covers a significant share of the relevant industries, it is

important to remember that the sample is not comprehensive.

# Chapter 4

# Is Antidumping Legislation a Threat to Competition: A Case Study of the US Chemical Industry

## 4.1  Introduction

With increasing globalization it has become important for national governments to set policies strategically and help domestic firms achieve a competitive edge in the international market. One such policy is the antidumping legislation of the United States, which is designed to protect domestic industries from dumped[1] imports in the domestic market.

A firm or a group of firms in the US can get relief from dumped imports by petitioning to the International trade commission (ITC) and the International trade administration (IA) for an antidumping duty. If dumped imports are found to

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[1]Dumping is defined as selling a product in the US at a price lower than the price for which it is sold in the home market. In absence of comparable home market sales, sales in a surrogate "third country" may be used. In the absence of sufficient home market and third country sales "constructed value", which uses a cost-plus-profit approach to arrive at normal value is used.

cause material injury to the domestic industry, an antidumping duty equivalent to the dumping margin is imposed on unfair imports. There has been a dramatic rise in petitioning by US firms over the past decade. This has increased concerns about the abuse of antidumping law and rising trade protectionism. The ITC received around a thousand antidumping petitions during the fiscal years 1980-98. These cases involved $30 billion in imports from countries subject to investigations.

The method used to compute whether dumping occurs, especially the use of "constructed value", casts a doubt on the use of antidumping to promote free and fair trade. Also, for almost all complaints the ITC finds occurrence of dumping. The system almost seems biased towards the complaining domestic firms. One needs to question whether the petitioning firms are genuinely facing unfair trade or are just shying away from foreign competition. It is possible that these domestic firms are just not productive enough to compete with imports. In such cases, the Antidumping legislation, by restricting imports, threatens global competition.

Will protecting these industries provide a conducive environment for them to grow? Protection of domestic industries is, to some extent, justified for a developing country, which wants to foster the growth of infant industries. Even in such cases it should be a temporary policy and domestic industries should eventually be exposed to international competition. However, for a developed country the long run efficiency of the policy seems dubious. It is unclear whether shielding a domestic Industry from international competition will help it to attain comparative advantage in the future.

This antidumping (AD) policy, originally designed to support free and fair

trade, if not implemented properly can create an environment that discourages competition and prevents growth. Dumler (2001) highlights the role played by the US AD policy in reducing competition in the high-end supercomputers market. "US Commerce Department operating under rules that virtually guaranteed a hostile ruling, with the end result that overseas competitors have been forced out of the US supercomputer market in the name of defending competition".

This chapter analyzes the antidumping petitions filed by the chemical industry in the past few years. The chemical industry is the second largest user of the antidumping law after the steel industry. It filed 113 antidumping petitions in the period 1980-1999. Most of the petitioners from the chemical industry were sole producers of the product. That is, these petitioners or firms face very little if any competition in the domestic market. A characteristic of the chemical industry is its large scale of production, which renders the fixed cost of entering the market very high. This makes it difficult for potential entrants to compete with the incumbent producer in the domestic market. Hence, the sole producers are not likely to face competition at home. In the absence of foreign competition the sole producers of these chemical products might lose incentives to innovate or to reduce costs.

In the next section 4.2 I briefly discuss the antidumping procedure. Section 4.3 highlights costs and benefits of granting protection to the domestic industries. Section 4.4 lists cases filed by the chemical industry and discusses the competitive nature of the product market whose firms file for import relief and section 4.5 concludes.

## 4.2 Antidumping Procedure

Under article VI of the General Agreement of Tariffs and Trade countries can impose duties on imports from a particular country or countries to protect domestic industries against dumped imports. An interested party[2] can file an antidumping petition with IA and the ITC alleging that a domestic industry is materially injured or threatened with material injury by dumped imports. IA determines whether and to what extent dumping is occurring and ITC determines whether the domestic industry is suffering material injury as a result of dumped imports. In case the petition is accepted by the ITC and IA, an antidumping investigation is initiated.

The petitioner must file on behalf of an industry. IA sends out a questionnaire to the non petitioning producers to determine the extent of support for the petition. The interested party in its petition has to provide a large amount of information about the domestic industry and about the foreign firm importing into the US. The foreign party or the foreign firm named in the dumping allegation is also required to provide large amount of information, and has to be present at various hearings. If both the IA and the ITC make affirmative findings of dumping and injury, an AD duty equivalent to the dumping margin is imposed on imports of that product. The duties remain in effect until an interested party calls an administrative review, and the exporter is found to be no longer dumping.

[2]Interested parties include: 1) a manufacturer, producer, or wholesaler in the US of the product; 2) a certified union or group of workers that is representative of the industry; 3) a coalition of firms, unions, or trade associations that represent the industry

## 4.3  Protection - Cost and Benefit

Foreign firms can engage in a form of predatory pricing in which they set very low prices in the export market in order to drive domestic producers out of business. This ensures unimpeded entry for these foreign firms in the future in these domestic markets. It becomes essential to regulate such behavior especially in a developing country. Surplus production in a foreign country can be dumped into developing markets where a new industry is being established. If such dumping is not regulated it can hinder industry's development. The new industry, without the size of an established firm may not survive a price reduction and might collapse altogether. The chemical industry being highly capital intensive in nature has a very high fixed cost compared to the variable cost. This makes it difficult for new firms to compete with already established big firms.

The optimum scale of production in the chemical industry is usually very large. A US chemical producer may not be able to operate at the optimum scale if the demand faced in the domestic market is small. Subsequently such a producer will not be competitive enough to sell in the international market. The domestic producer in such circumstances would find it difficult to compete with bigger foreign exporters. It would not be able to match the lower prices offered by bigger foreign firms importing into the US. In this case it might be wise to protect the industry till it is better able to compete in the international market. Once the domestic producer has access to a bigger international market it would be able to produce at an efficient scale of production and compete at lower prices.

However, the above argument assumes a certain pattern of behavior for the protected domestic firm. It assumes that domestic firms would innovate in the absence of import competition. The positive correlation between competition and

innovation is widely accepted. In absence of competition there is little incentive to innovate and grow. Thus, an industry that is promised protection from international competition has the potential to degrade rather than grow. Another assumption inherent in the above argument is that the domestic industry would grow enough to gain comparative advantage in the future. However, the industry might not be able to compete internationally even in the long run, due to lack of natural resources, higher labor cost etc. The industry might just remain in a state of permanent infancy.

Protection does not guarantee optimal behavior from the domestic industry. As an example take the case of the highly protected Australian chemical industry. The firms in the industry undertook investment to diversify to small chemical production units rather than a large-scale production unit. This lead to under-utilized plants and high costs of production. Quoting from an article published by Acted Consultants. "Sadly, the Altona complex, though very profitable for many years, would have grown substantially more competitive were it not for negotiated deferral of tariff reviews in 1979 by ICI that led to the building of a high cost naphtha cracker at Botany New South Wales that served to divide the small petrochemical industry. A tariff reduction would actually have helped Altona in discouraging that unfortunate investment".[3]

Another point against the antidumping legislation is the cost incurred by consumers as a result of higher prices for the protected good. Chemicals which serve as intermediate goods raise the cost of production of the final product. The higher cost depending on the demand and supply elasticities of demand and supply, trickle down to the consumers in the form of higher prices. Consumer

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[3] "Import Tariffs and Protectionism (history)",URL: www.chemlink.com.au, 1997.

welfare however, does not play any role in the decision to restrict imports.

## 4.4   Chemical Industry

The main purpose of this chapter is to look at the competitive nature of the chemical industry

especially for these firms that file for import relief. The chapter tries to shed light on the competitive nature of the domestic product market. I look at antidumping cases filed by firms in the chemical industry. The data used in this essay comes from two sources. Antidumping data on petitioning for the period 1990-1995 is provided by Bruce Blonigen, and for the period 1995-1999 the data has been gathered from ITC reports published by ITC.

Table 4.1, summarizes the antidumping petitions filed with the ITC and ITA. Column 1, lists the products for which the petitions were filed by the US chemical firms. The second column reports the number of AD cases filed against foreign countries for the import of that particular product.[4] Petitions can also be filed as a group, if more then one firm feels that the industry is being injured by unfair imports. Thus a few firms get together and file a case it reduces the cost of petitioning and also overcomes the free rider issue that might prevent an individual firm from taking action. Table 4.1 also lists the number of firms that asked for import restriction in a petition. As is evident from the data single firms filed most cases. In 73% of the cases the AD petition was filed by only one petitioner, that is, by a single firm. This characteristic hints at a lack of competition in the domestic market.

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[4]For example, if a US firms files antidumping cases against three countries for the import of 'rice', these would be considered as three cases.

From available ITC reports data on the number of firms producing the product in each case was gathered for 40% of the cases. A summary of this data is listed in Table 4.2. The table illustrates how most of the petitions were filed by highly concentrated industries.

In most cases the single firms filing the petition were the sole producers of the product. Data was available for 21 cases. Of these 21 cases in 9 cases the petitioner was the single producer of the good. In such cases an affirmative decision from the ITC and ITA would eliminate or reduce import competition and subsequently, these firms would face none or very little competition.

Table 4.3, lists the ITC's final decision for the cases filed. Example: In 1995 four cases were filed (against four different countries) for 'Polyvinyl Alcohol'. Air Products & Chemicals Inc. filed a petition with ITC and ITA requesting that antidumping duties be imposed against producers of polyvinyl alcohol from Taiwan, the People's Republic of China, the Republic of Korea and Japan. Cases against China, Japan and Taiwan got an affirmative decision. The case against Korea was given a negative decision, ITC decided that the Korean product had a negligible impact on the US industry. Thus, import of Polyvinyl Alcohol from China, Japan and Taiwan would pay antidumping (a 77.4% antidumping duty is to be imposed on Japanese products). 1994 saw an increase in the world supply of polyvinyl alcohol, which pushed the prices down. To what extent the injury to the domestic industry was a result of an increase in overall world supply, or from imports from the above four countries is a hanging question. In late 1991, Air products had added a 75-million-pound facility at Pasadena, Texas that might have contributed to the excess supply. In cases such as these, restricting import competition can be interpreted as a bail out for a misinformed investment decision

by a domestic industry.

Another case where ITC and ITA granted an affirmative decision is that of (PPD-T ) Aramid Fibre. The sole domestic producer of Aramid fiber was the petitioner itself, E.I.DuPont. By imposing an AD duty on imports from Netherlands (foreign firm-Akzo/Teijin Twaron) ITC succeeded in discouraging competition in the US market. The world market for Aramid fiber consists only of two producers giving it a duopolistic structure. Thus, Bertrand competition (price competition) would be expected between the two firms where they would gather market share by lowering prices. The affirmative dumping decision was based on such a competitive price cut by Akzo/Teijin Twaron.

In latter years the demand for Aramid fibre rose significantly, exceeding supply. Now both firms are investing in expanding their plant capacities.[5] Restricting the US market[6] to Twaron has resulted in a division of the international market between the two firms, giving them monopoly power in their own markets. The ITC report supports the above hypothesis. "Strong demand has caused both producers to allocate aramid fiber among various customers." "Both DuPont and Twaron negotiate with customers individually to price their products based on value-in-use".[7]

US ITC also made an affirmative final determination in the Coumarin case

[5]Twaron announced plans to raise capacity at its plant in Delfzijl, Netherlands, by 7,500 tons per year to 18,500 tons per year (operational by 2003). DuPont is investing USD 50 mil to increase production capacity at its plant in Richmond, VA (operational by end-2002).

[6]The United States is the largest market worldwide for PPD-T aramid fiber, although Europe and other markets are significant.

[7]The quotes are from "DETERMINATION AND VIEWS OF THE COMMISSION" , USITC Publication No. 3394, February 2001

filed by Rhone-Poulenc. It is the only Coumarin producer in Europe and the US, and has also won an AD decision against China under European antidumping laws. China had garnered over 48 percent of the European market while the production of Rhone-Poulenc fell by nearly 60 percent. After the decision imports from china fell significantly, giving Rhone-Poulenc most of the US market.

## 4.5   Conclusion

The main aim of the chapter is to highlight the anti-competitive nature of the US antidumping legislation. By granting import protection to domestic markets with single firms, ITC and ITA might be promoting monopolies at the cost of consumer welfare. This chapter raises the following questions. In face of dumped imports should national governments adopt protectionist strategies? Would this protection provide conducive environment for domestic industries to grow or would it discourage competition and distort market conditions? These questions need to be further researched for a better understanding of this issue.

Over the past decade there has been a substantial upsurge in the number of antidumping cases across the world as more and more countries adopt AD legislation. 33 countries were reported to have legislated AD law as compared to 9 countries in 1980. The traditional users (US, EU, Australia, and Canada) now account for only 50% of AD cases as compared to 99% from 1980 through 1985. The spread of AD legislation among various countries makes it even more important to understand the AD mechanism and its threat to international competition.

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# Appendix A

# Appendix to Chapter 1

## A.1  Data

The import price indexes that are published by the Division of International Prices, Bureau of Labor Statistics is reported only at 3 digit sic industries. There are some 3 digit sic industries for which data is not reported at all. Where I could not get the data at 3 digit sic I took the data reported at 2 digit SIC industry. The import price index data was for the period 1975-1992, I further extra polated the data for the years 1993 and 1994. Average tariff data is again from 1975-1988. The average tariff in each 4 digit sic industry is equal to 100*(total duties collected (in 1982 $) on imports/total customs value of imports(in 1982 $) ). The average tariff is only available for the years 1974-1988. NBER Trade and Immigration Database reports data on unionization of workers from 1958 to 1984, I have further extrapolated the data for the years 1985 and1986. The data originally comes from Census Population Surveys carried out by the Census. NOCASE is a count variable, it lists the number of AD petitions filed by an industry in a particular year. The industries were reported on 1987 SIC basis, I have converted them into 1972 basis using the SIC industry concordances provided at

Jon Haveman's web site. Most of the industries had the same SIC code, In cases where 1987 sic industry was to be converted into two or more 1972 sic industry, I used the name of the product to classify the case into a 1972 code.

## A.2  Further Work

1. To check if there is any structural break in the regression model prior to 1984. If cumulation has had any influence on the petitioning decision

2. To identify the industries that are under trade agreements, like the multi-fiber agreement, and to use a dummy variable for these industries. These industries (for example textile industry) would not be seen petitioning, however, that would be a result of the trade agreements and should not be clubbed with the non petitioning industries.

### Industry level aggregation

ITC' decision regarding a material injury is based on the information provided by all these producers of the "like product". This group is defined as the Domestic industry which is very different from an industry defined on the basis of SIC 4 digit.[1] The product is defined at a very disaggregated level; at 10 digit HTS number. While working with 4 digit SIC level, we are aggregating the above variables over all the producers in that particular industry. Putting it differently we are aggregating over all the 10 digit HTS products. Aggregation in cases where a 4 digit SIC industry comprises of many 10 digit HTS products can be misleading as an indicator for the condition of US producers of that particular

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[1]The Domestic Industry is the US producers as a whole of the Domestic Like Product, of those producers whose collectiv eoutput of the domestic like product constitutes a major proportion of the total domestic production of the product.

HTS product.

As an example let's take the petition against imports of Barium Carbonate from Germany. ITC's decision is based on the US domestic industry producing like products. The Commission defined the Domestic industry in this case as all the producers of Precipitated barium carbonate which was considered to be the like product. The 8 digit HTS number for Barium Carbonate is 28366000 and it falls under SIC 2819. when I run the industry level regression, I am considering variables for sic 2819, which itself consists of 200, 8 digit HTS products. Such aggregation does not promise robust results for my regression.

# Appendix B

# Appendix to Chapter 2 & Chapter 3

## B.1   Search Engines / Resources

Gale Group Database[1], Business and Company Resource Center was used to locate all the firms, it is a fully integrated resource bringing together company profiles, brand information, ranking, investment reports, company histories, chronologies and periodicals. Search this database to find detailed company and industry news and information. Also, Lexis Nexis Academic was used to double check the dates and to locate news related to petitions that was not reported in the above database. It is a full-text database that offers a wide range of news, political, legal, business, and reference information in full-text format. Primary source of newspaper articles, including those from the Washington Post and the New York Times. Federal code, regulations, and case law, plus state codes and case law are also included. Covers the gamut of business and related topics, including SEC filings, and key accounting sources. (Formerly called Academic Universe). The third database that was referred to is the General Business Index

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[1]Gale Group is a Thomson Corporation Company.

ASAP: 1995-present; 1980-94 back file. Covers over 1000 national business journals and magazines, local business newspapers and some trade literature. Good source for local company news. subscription to Chemical week starts 1995, so this source should be used for recent filing. Wall Street Journal; Eastern edition ( 1984 - current )

Some of these firms petitioned more than once during this time period, in different years. For example, Raritan River Steel company filed an AD petition three times in this time period, in 1993, 1994 and 1997. I consider each case as a separate event[2].

## B.2    Methodology

For each firm the equation is :

$$R = XZ + e$$

where $R$ is a $[(T + N) * 1]$ vector; $X$ is $[(T + N) * (2 + N)]$ matrix; $Z$ is a $[(2 + N) * 1]$ vector of coefficients; and $e$ is a $[(T + N) * 1]$ vector.

The partitioned X matrix can be written as:

$$X = \begin{bmatrix} X_T & 0 \\ X_N & I_N \end{bmatrix}$$

Where $X_T$ is a $[T * 2]$ matrix and $X_N$ is a $[N * 2]$ matrix. The upper right hand corner is a $[T * N]$ matrix of zeros, and the lower right hand corner is a $[N * N]$ identity matrix. The estimated coefficient matrix is:

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[2]Thus, Rco that filed a complaint in 1993 is considered a different firm from Rco. in 1994.

$$\widehat{Z} = [X\prime X]^{-1}[X'Y]$$

Inverting the above X matrix and solving for $\widehat{Z}$

$$[X\prime X]^{-1} = \begin{bmatrix} (X_T'X_T)^{-1} & -(X_T'X_T)^{-1}X_N' \\ -X_N(X_T'X_T)^{-1} & I + X_N(X_T'X_T)^{-1}X_N' \end{bmatrix}$$

$$[X\prime X]^{-1}X'R = \begin{bmatrix} (X_T'X_T)^{-1}X_T'R_T \\ -X_N(X_T'X_T)^{-1}(X_T'R_T) + RN \end{bmatrix} = \begin{bmatrix} \widehat{Z}_T \\ \widehat{Z}_N \end{bmatrix}$$

Since there is a dummy variable for each day in the event window that takes the value 1 on the nth day and 0 otherwise. Only the first T observations without the dummies are used to estimate the slope and the parameters $\widehat{Z}_T' = \hat{a}_i, \hat{B}$, as is in the traditional market model. $\widehat{A}$ are the abnormal returns which are estimated using the estimates of $\hat{a}_i, \hat{B}$ from the first T observations and is reduced to $R_N - X_N\widehat{Z}_T$.[3]

## B.3   Covariance

In order to design a statistic to test the significance of ACA, characteristics of abnormal returns needs to be studied in a little more detail. Abnormal return by design exhibit sampling error. Abnormal return, $\widehat{A}_i$, has an expected mean of zero and the covariance matrix is given by

$$V(\widehat{A}_i) = \sigma_i^2[I + X_N(X_T'X_T)^{-1}X_N']^4;$$

$$T = \text{Estimation Period}; N = \text{Event Window}$$

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[3]For more details, see Karafiath (1988).

where $X_T$ is the matrix of explanatory variables over the estimation period and $X_N$ is the matrix of explanatory variables over the event window. The covariance matrix, $V(\widehat{A}_i)$, has two parts. The first term in the covariance matrix is the variance due to random disturbances and the second term is the additional variance due to the sampling error.[5] The maximum likelihood estimate of the variance $cov(A_{ip}, A_{is}), \ for \ p = s$ is

$$S^2(\widehat{A}_i) = s_i^2 \left[ 1 + \frac{1}{T} + \frac{(R_{mt} - \overline{R}_m)^2}{\sum\limits_{t=1}^{T}(R_{mt} - \overline{R}_m)^2} \right]$$

$$where, \overline{R}_m = \frac{1}{T}\sum\limits_{t=1}^{T} R_{mt}.$$

$$and, s_i^2 = \widehat{e}'\widehat{e}/T - (N+2)$$

Testing for the statistical significance of CA (aggregated abnormal returns over the event window) is complicated due to serial correlation of the abnormal returns.[6] Abnormal returns are serially correlated despite the fact that the true disturbances, $e_{it}$, are independent through time. The variance of the cumulative abnormal return, given serial correlation in the series of abnormal return, is equal to the sum of the variances of the individual abnormal returns plus twice the sum of the their covariances.[7]

For an event window that extends from t=1 to t=N the estimate of covariance is

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[5] Due to prediction outside the estimation period.

[6] For a firm, all the abnormal returns estimate use the same intercept and slope parameters.

[7] $var(CA) = var(A_t) + 2((T+N) - (T+1) - 1)cov(A_t, A_{t+1})$

$$S^2(\widehat{CA_i}) = (N+1)s_i^2 \left[ \left( 1 + \frac{N+1}{T} + \frac{(\sum\limits_{t=p}^{s} R_{mt} - 2\overline{R}_m)^2}{\sum\limits_{t=1}^{T}(R_{mt} - \overline{R}_m)^2} \right) \right]$$

## B.4   Test Statistic

The standardized cumulative abnormal return for firm i is

$$Z(CA_i) = \frac{CA_i}{S(CA_i)}$$

The following Z statistics is used to test for the statistical significance of cumulated average abnormal return for an event

$$Z(ACA) = \frac{\sum\limits_{i=1}^{I} Z(CA_i)}{I^{1/2} \left[ \frac{1}{I-1} \sum\limits_{i=1}^{I} \left( Z(CA_i) - \frac{1}{I} \sum\limits_{i=1}^{I} Z(CA_i) \right) \right]}$$

The following Z statistic is used to test for the statistical significance of the total cumulated average abnormal return for all the events considered.

$$Z(TACA) = \frac{\sum\limits_{e=1}^{E} \sum ACA_e / [V(ACA_e)]^{1/2}}{N^{1/2}}$$

The market response for each event should be independent of the others, since each event releases different information to the market.

## B.5   Cases

The following case were dropped from the analysis. ITC case number 731-484 and 731-515, since petitioning firm in one case was the non-petitioner in the other

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case (Smith Corona and Brother Industries (US). Even after the ITC gave its preliminary decision ITA dismissed 731-484 case claiming that Brother Industries (USA) did not qualify as a US firm. Also, this litigation had been going on for fourteen years. Case 731-623 was terminated before the case was even initiated, and no news reports were found for ITC case number 731-758.

## B.6 Petitioning and Non-Petitioning Firms' ACA: Product Level

### B.6.1 Share Price Response to Petitioning for Antidumping Duty (1990-1999)

| Event Window | Petitioners | | Non Petitioners | | Petitioners & Non-petitioners | |
|---|---|---|---|---|---|---|
| | ACA | Z stat | ACA | Z Stat | ACA | Z stat |
| Event Date: t=0 | 0.01% | 0.07 | -0.36% | -1.02 | -0.18% | -0.50 |
| (-1,+1) | 0.25% | 0.09 | -0.04 | 0.33 | 0.08% | 0.37 |
| (-3,+3) | 1.09% | 1.84* | 0.45% | 0.80 | 0.76% | 1.83* |

* significant at 5 % confidence interval level; ** significant at 1 % confidence interval level; Number of Petitioning Firms used for the analysis-69; Number of Non petitioning firms -72

## B.6.2 Petitioning Firms

| (-3,3) | | (-1,+1) | | (0,0) | |
|---|---|---|---|---|---|
| ACA | Z | ACA | Z | ACA | Z |
| 2.06 | 0.19 | 0.14 | 0.02 | 4.71 | 1.12 |
| 2.05 | 0.56 | 0.16 | 0.07 | -1.06 | -0.77 |
| -0.20 | -0.05 | -6.21 | -2.16* | -1.75 | -1.06 |
| -3.21 | -0.42 | 1.07 | 0.21 | -0.95 | -0.33 |
| -1.26 | -0.27 | -2.04 | -0.68 | -0.68 | -0.4 |
| -0.23 | -0.06 | -1.69 | -0.63 | 0.80 | 0.52 |
| 2.86 | 1.05 | 0.18 | 0.1 | -1.23 | -1.21 |
| 8.55 | 0.97 | 9.23 | 1.61 | 2.65 | 0.8 |
| 3.85 | 0.74 | -4.33 | -1.29 | -1.70 | -0.88 |
| -0.64 | -0.09 | 0.54 | 0.12 | 1.60 | 0.62 |
| 3.72 | 1.05 | -0.58 | -0.25 | -1.49 | -1.11 |
| 2.39 | 0.6 | 1.98 | 0.76 | 1.63 | 1.08 |
| -2.39 | -0.92 | -0.48 | -0.28 | 1.46 | 1.49$ |
| 0.90 | 0.23 | -1.19 | -0.46 | 0.43 | 0.29 |
| 1.51 | 0.77 | 1.82 | 1.42 | 0.89 | 1.21 |
| 3.41 | 0.92 | 1.67 | 0.69 | -0.79 | -0.57 |
| -3.85 | -0.99 | -3.26 | -1.28 | -0.47 | -0.32 |
| -1.57 | -0.47 | -0.35 | -0.16 | 0.77 | 0.61 |
| -9.58 | -0.94 | -0.37 | -0.06 | 0.08 | 0.02 |
| -1.82 | -0.41 | -0.78 | -0.27 | -1.09 | -0.65 |
| 2.48 | 0.46 | 1.99 | 0.56 | 1.45 | 0.71 |
| -1.50 | -0.28 | -0.70 | -0.2 | 0.52 | 0.25 |
| -2.42 | -0.26 | -5.22 | -0.85 | -4.40 | -1.24 |
| 1.28 | 0.52 | 0.51 | 0.32 | -0.39 | -0.41 |
| -11.82 | -1.19 | -1.91 | -0.29 | -0.77 | -0.2 |
| 8.06 | 1.98* | 2.06 | 0.77 | -0.83 | -0.54 |
| 8.64 | 1.33 | 3.21 | 0.76 | 0.99 | 0.4 |
| -5.33 | -1.15 | -3.85 | -1.26 | -3.64 | -2.06* |
| 6.29 | 1.72* | 2.80 | 1.17 | 1.01 | 0.73 |
| -11.60 | -1.22 | -6.97 | -1.12 | -7.83 | -2.18* |
| -5.23 | -1.40 | 1.24 | 0.51 | 0.40 | 0.29 |
| 2.81 | 0.57 | -0.58 | -0.18 | 2.56 | 1.38$ |
| -1.25 | -0.36 | 0.07 | 0.03 | -0.24 | -0.19 |
| 6.61 | 1.77* | 1.08 | 0.44 | 2.42 | 1.71* |
| -1.32 | -0.55 | 0.78 | 0.49 | 2.52 | 2.76** |
| -1.15 | -0.23 | -1.43 | -0.44 | 1.78 | 0.95 |
| -2.23 | -0.41 | 1.15 | 0.32 | -0.52 | -0.25 |
| -2.23 | -0.41 | 1.15 | 0.32 | -0.52 | -0.25 |

All the petitioners that I have data on

## B.6.3 Non-Petitioning Firms

| (-3.3) | | (-1,1) | | (0,0) | |
|---|---|---|---|---|---|
| ACA | Z | ACA | Z | ACA | Z |
| 21.77% | 1.98* | 4.88% | 0.68 | -0.52% | -0.13 |
| -3.00% | -1.06 | -3.21% | -1.73* | -1.06% | -0.98 |
| -1.04% | -0.36 | -0.46% | -0.24 | -0.25% | -0.23 |
| -0.73% | -0.17 | 1.67% | 0.59 | -1.72% | -1.05 |
| -5.30% | -1.41$ | -5.09% | -2.07* | -1.81% | -1.28 |
| -2.52% | -0.25 | -0.32% | -0.05 | 1.85% | 0.49 |
| -1.28% | -0.3 | 2.79% | 1.01 | 1.01% | 0.64 |
| -4.14% | -0.23 | -7.10% | -0.59 | -6.96% | -1 |
| -3.59% | -0.62 | 3.86% | 1.02 | 0.65% | 0.3 |
| 1.65% | 0.39 | 5.47% | 1.96* | 3.25% | 2.02* |
| -4.03% | -0.92 | -1.66% | -0.58 | 1.28% | 0.77 |
| 7.58% | 2.34** | 1.65% | 0.78 | -0.19% | -0.16 |
| -4.15% | -1.50$ | -2.70% | -1.49$ | -1.04% | -0.99 |
| 3.18% | 1.06 | 0.92% | 0.47 | -0.26% | -0.24 |
| -1.54% | -0.34 | -2.54% | -0.86 | -0.82% | -0.48 |
| -3.82% | -1.24 | 0.90% | 0.45 | -1.75% | -1.50$ |
| -13.84% | -2.84** | -9.84% | -3.09*** | 4.63% | 2.44** |
| 0.19% | 0.09 | 3.33% | 2.36** | 1.10% | 1.35$ |
| -4.59% | -1.61$ | -3.74% | -2.01* | -1.45% | -1.35$ |
| -1.34% | -0.51 | -0.75% | -0.44 | -1.71% | -1.73* |
| -3.80% | -0.55 | -1.82% | -0.4 | 0.01% | 0 |
| 0.94% | 0.22 | 2.88% | 1.02 | 2.68% | 1.65* |
| -0.76% | -0.26 | 0.18% | 0.1 | -1.01% | -0.92 |
| 1.39% | 0.57 | -0.66% | -0.42 | 0.56% | 0.62 |
| -4.62% | -0.79 | -4.78% | -1.25 | -1.72% | -0.78 |
| -1.72% | -0.64 | -0.98% | -0.55 | -1.12% | -1.1 |
| 1.64% | 0.37 | 1.51% | 0.52 | 0.98% | 0.58 |
| -2.74% | -0.71 | -2.22% | -0.88 | -2.43% | -1.66* |
| 3.83% | 1.04 | 4.52% | 1.89* | -0.40% | -0.29 |
| -4.30% | -0.99 | -0.86% | -0.31 | -0.50% | -0.31 |
| -4.00% | -1.38$ | -2.24% | -1.18 | -3.59% | -3.28*** |
| 4.50% | 1.57$ | 4.16% | 2.22* | 1.61% | 1.49$ |
| 2.96% | 0.63 | 0.17% | 0.06 | -2.14% | -1.2 |
| -2.47% | -0.45 | -2.58% | -0.73 | -0.35% | -0.17 |
| 7.95% | 2.80** | 2.08% | 1.12 | 0.62% | 0.58 |
| -4.96% | -1.60$ | -0.27% | -0.13 | 0.40% | 0.35 |
| 4.11% | 1.03 | -0.96% | -0.37 | 2.32% | 1.53$ |
| -1.65% | -0.27 | -0.83% | -0.21 | 1.23% | 0.53 |

# Table 1.1: Differences in Mean for Petitioning Vs. Non Petitioning Industries

| | NP | P | DIF | NP | P | DIF | NP | P | DIF | NP | P | DIF |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Variables | Average | Average | Average | 1983 | 1983 | 1983 | 1988 | 1988 | 1988 | 1993 | 1993 | 1993 |
| Import Penetration | .13 | 0.16 | 0.19*** | 0.10 | 0.12 | 0.17 | 0.15 | 0.18 | 0.17 | 0.16 | 0.18 | 0.11 |
| Average Wage | 19.05 | 21.48 | 0.11*** | 16.33 | 18.63 | 0.12*** | 20.07 | 22.45 | 0.11*** | 23.53 | 26.43 | 0.11*** |
| Employment | 32.69 | 62.08 | 0.47*** | 31.95 | 61.68 | 0.48*** | 33.41 | 61.24 | 0.45*** | 31.58 | 57.96 | 0.46*** |
| Value added | 1976.00 | 4545.00 | 0.57*** | 1519.25 | 3419.53 | 0.56*** | 2149.05 | 4975.81 | 0.57*** | 2526.71 | 5838.84 | 0.57*** |
| Capital | 1798.98 | 5338.03 | 0.66*** | 1691.73 | 5076.30 | 0.67*** | 1814.34 | 5332.30 | 0.66*** | 1972.14 | 5793.65 | 0.66*** |
| Total factor productivity | 0.99 | 1.00 | -0.005 | 0.97 | 0.95 | -0.02 | 1.01 | 1.01 | 0 | 1.01 | 1.04 | 0.03** |
| Export | 348.61 | 1187.16 | 0.71*** | 231.51 | 742.30 | 0.69*** | 350.05 | 1237.89 | 0.72*** | 537.86 | 1942.96 | 0.72*** |
| Change in imports | 0.27 | 0.14 | -1.01 | 0.21 | 0.23 | 0.06 | 0.23 | 0.14 | -0.64 | 0.13 | 0.10 | -0.32 |
| Import | 421.13 | 1766.55 | 0.76*** | 263.27 | 1062.27 | 0.75*** | 485.42 | 2136.97 | 0.77*** | 644.00 | 2691.09 | 0.76*** |
| Unionization | 25.46 | 27.15 | 0.06*** | 26.35 | 28.21 | 0.07* | 18.25 | 18.55 | 0.02 | | | |
| Capital/Labor | 103.08 | 147.76 | 0.3*** | 92.13 | 139.10 | 0.34*** | 109.47 | 157.91 | 0.31** | 127.77 | 166.98 | 0.23 |
| Tariff rate | 6.03 | 5.29 | -0.14*** | 6.15 | 5.45 | -0.13 | 4.83 | 4.19 | -0.15 | | | |

Columns report mean value for all the variables; Dif: Percentage difference between petitioning and non petitioning Industries [(P-NP)/P]
Average: Average of means over the entire period 1979-1995
"t" test is used to check for differences in mean
 ***significant at 1%, ** significant at 5%, * significant at 10%
Total Factor Productivity --is significant at 5 % for years 93, 94, 95 ;
Import Penetration (Imports/Domestic Consumption)  is significant at 10 % for the year 94

**Table 1.2: Frequency of Number of Cases**

| Nocases | Frequency | Percent |
|---------|-----------|---------|
| 0 | 7386 | 96.95 |
| 1 | 112 | 1.47 |
| 2 | 51 | 0.67 |
| 3 | 26 | 0.34 |
| 4 | 8 | 0.11 |
| 5 | 4 | 0.05 |
| 6 | 7 | 0.09 |
| 7 | 4 | 0.05 |
| 8 | 6 | 0.08 |
| 9 | 3 | 0.04 |
| 10 | 1 | 0.01 |
| 11 | 3 | 0.04 |
| 14 | 1 | 0.01 |
| 16 | 1 | 0.01 |
| 18 | 1 | 0.01 |
| 25 | 1 | 0.01 |
| 26 | 1 | 0.01 |
| 48 | 1 | 0.01 |
| 56 | 1 | 0.01 |
| Total | 7618 | 100 |

# Table 1.3: Regression Results

| | POISSON 1 | NBREG 2 | NBREG 3 |
|---|---|---|---|
| | nocases | nocases | nocases |
| Import penetration | 1.544 | 1.972 | |
| | (10.02)*** | (2.76)*** | |
| Profit by sales ratio | -3.272 | -1.392 | -1.300 |
| | (19.17)*** | (5.36)*** | (5.19)*** |
| Capital by labor ratio | 0.001 | 0.002 | 0.002 |
| | (8.17)*** | (3.15)*** | (3.19)*** |
| Log employment | 0.907 | 0.819 | 0.738 |
| | (29.85)*** | (8.77)*** | (8.51)*** |
| Total factor productivity | -3.573 | -4.293 | -3.813 |
| | (18.83)*** | (8.83)*** | (8.43)*** |
| Change in employment | -0.697 | 1.534 | 1.261 |
| | (2.11)** | (1.79)* | (1.53) |
| Change in price ratio | 0.797 | 0.922 | 1.124 |
| | (1.46) | (0.60) | (0.74) |
| Change in import penetration | -0.119 | -0.097 | -0.265 |
| | (1.73)* | (0.67) | (1.44) |
| Change in profit/sales ratio | -0.075 | -0.450 | -0.438 |
| | (1.36) | (1.40) | (1.38) |
| Lag import penetration | | | 0.509 |
| | | | (1.11) |
| Year Dummy | YES | YES | YES |
| | | | |
| | | | |
| Log alpha | | 3.39*** s.e= .10 | 3.35 s.e=.10 |
| Observations | 6900 | 6900 | 7325 |

Absolute value of z statistics in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%

# Table 1.4: Regression Results (unionization)

|  | NBREG 5 |
|---|---|
|  | nocases |
| Lag of Import penetration | 1.794 |
|  | (1.66)* |
| Profit by sales ratio | -1.287 |
|  | (2.95)*** |
| Capital by labor ratio | 0.004 |
|  | (3.53)*** |
| Log employment | 0.828 |
|  | (6.34)*** |
| Total factor productivity | -1.737 |
|  | (1.42) |
| Lag average tariff rate | 0.007 |
|  | (0.28) |
| Change in employment | 1.287 |
|  | (1.27) |
| Change in price ratio | 0.618 |
|  | (0.36) |
| Change in import penetration | -0.154 |
|  | (0.52) |
| Change in profit/sales ratio | -0.293 |
|  | (0.79) |
| Change in average tariff | -0.217 |
|  | (1.02) |
| Unionization | 0.036 |
|  | (4.03)*** |
| Year dummy | YES |
| Log Alpha | 2.93*** |
|  | s.e.=.16 |
| Observations | 3388 |

Absolute value of z-statistics in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%

# Table 1.5: Regression Results (Logit)

|  | NBREG 5 | LOGIT 6 |
|---|---|---|
|  | nocases | Bvcase |
| Lag of Import penetration | 1.794 | 1.259 |
|  | (1.66)* | (2.00)** |
| Profit by sales ratio | -1.287 | -1.435 |
|  | (2.95)*** | (3.47)*** |
| Capital by labor ratio | 0.004 | 0.002 |
|  | (3.53)*** | (3.33)*** |
| Log employment | 0.828 | 0.689 |
|  | (6.34)*** | (7.64)*** |
| Total factor productivity | -1.737 | -1.634 |
|  | (1.42) | (1.56) |
| Lag average tariff rate | 0.007 | 0.022 |
|  | (0.28) | (1.17) |
| Change in employment | 1.287 | 0.116 |
|  | (1.27) | (0.14) |
| Change in price ratio | 0.618 | 0.969 |
|  | (0.36) | (0.77) |
| Change in import penetration | -0.154 | -0.254 |
|  | (0.52) | (0.98) |
| Change in profit/sales ratio | -0.293 | -0.119 |
|  | (0.79) | (0.88) |
| Change in average tariff | -0.217 | -0.170 |
|  | (1.02) | (1.03) |
| Unionization | 0.036 | 0.019 |
|  | (4.03)*** | (2.53)** |
| Year dummy | YES | YES |
| Log Alpha | 2.93*** s.e.=.16 |  |
| Adjusted R square |  | .139 |
| Observations | 3388 |  |

Absolute value of z-statistics in parentheses; * significant at 10%; ** significant at 5%; *** significant at 1%

# Table 1.6: Regression results (Bvcase)

|  | LOGIT (7) |
| --- | --- |
|  | Bvcase |
| Lag import penetration | 1.010 |
|  | (2.51)** |
| Profit by sales ratio | -1.220 |
|  | (5.65)*** |
| Capital by labor ratio | 0.001 |
|  | (4.95)*** |
| Log employment | 0.652 |
|  | (11.00)*** |
| Total factor productivity | -1.163 |
|  | (1.72)* |
| Change in employment | -0.027 |
|  | (0.05) |
| Change in price ratio | 0.990 |
|  | (1.04) |
| Change in import penetration | -0.089 |
|  | (0.73) |
| Change in profit/sales ratio | -0.063 |
|  | (0.68) |
| Cumulation ammendment | 0.799 |
|  | (2.06)** |
| Year dummy | Yes |
|  |  |
| Observations | 7325 |

(same RHS variables as model 4);   Absolute value of z statistics in parentheses ;
* significant at 10%; ** significant at 5%; *** significant at 1%

## Table 2.1: Number of Cases (1990-1999)

| Year | No. of Cases |
|------|--------------|
| **Windows Media Player.lnk** | |
| 1990 | 42 |
| 1991 | 47 |
| 1992 | 98 |
| 1993 | 42 |
| 1994 | 44 |
| 1995 | 12 |
| 1996 | 21 |
| 1997 | 16 |
| 1998 | 36 |
| 1999 | 46 |
| Total | 404 |

# Table 2.2: Number of Cases by Industry (1990-1999)

| SIC 87 | Industry Description | No. of Cases |
|--------|----------------------|--------------|
| 1 | Agricultural products-crops | 5 |
| 2 | Livestock and livestock products | 5 |
| 10 | Metallic ores and concentrates | 2 |
| 14 | Nonmetallic minerals, except fuels | 2 |
| 20 | Food and kindred products | 13 |
| 22 | Textile mill products | 15 |
| 23 | Apparel and other textile products | 1 |
| 26 | Paper and allied products | 8 |
| 28 | Chemicals and allied products | 53 |
| 30 | Rubber and miscellaneous plastics products | 7 |
| 32 | Stone, clay, glass, and concrete products | 7 |
| 33 | Primary metal products | 188 |
| 34 | Fabricated metal products, except machinery and transportation equipment | 42 |
| 35 | Industrial machinery and equipment, except electrical | 24 |
| 36 | Electrical machinery, equipment, and supplies | 8 |
| 37 | Transportation equipment | 6 |
| 38 | Scientific and professional instruments; photographic and optical goods; watches and clocks | 9 |
| 39 | Miscellaneous manufactured commodities | 9 |
| Total | | 404 |

# Table 2.3: Number of Products for which protection is sought by Industry (1990-1999)

| SIC 87 | Industry Description | No. of Products |
|---|---|---|
| 1 | Agricultural products-crops | 4 |
| 2 | Livestock and livestock products | 4 |
| 10 | Metallic ores and concentrates | 2 |
| 14 | Nonmetallic minerals, except fuels | 2 |
| 20 | Food and kindred products | 8 |
| 22 | Textile mill products | 3 |
| 23 | Apparel and other textile products | 1 |
| 26 | Paper and allied products | 1 |
| 28 | Chemicals and allied products | 29 |
| 30 | Rubber and miscellaneous plastics products | 5 |
| 32 | Stone, clay, glass, and concrete products | 5 |
| 33 | Primary metal products | 41 |
| 34 | Fabricated metal products, except machinery and transportation equipment | 15 |
| 35 | Industrial machinery and equipment, except electrical | 9 |
| 36 | Electrical machinery, equipment, and supplies | 7 |
| 37 | Transportation equipment | 5 |
| 38 | Scientific and professional instruments; photographic and optical goods; watches and clocks | 7 |
| 39 | Miscellaneous manufactured commodities | 6 |
| Total | | 154 |

# Table 2.4: Number of Petitioners by Industry* (1990-1999)

| SIC 87 | Industry Description | Total Numbers of Firms | No. of Firms Found in CRSP |
|---|---|---|---|
| 1 | Agricultural products-crops | 23 | |
| 2 | Livestock and livestock products | 16 | |
| 10 | Metallic ores and concentrates | 1 | 1 |
| 14 | Nonmetallic minerals, except fuels | 4 | 1 |
| 20 | Food and kindred products | 18 | 2 |
| 22 | Textile mill products | 9 | 3 |
| 23 | Apparel and other textile products | 1 | |
| 26 | Paper and allied products | 9 | 5 |
| 28 | Chemicals and allied products | 43 | 18 |
| 30 | Rubber and miscellaneous plastics products | 5 | 2 |
| 32 | Stone, clay, glass, and concrete products | 10 | 1 |
| 33 | Primary metal products | 14* | 2 |
| 34 | Fabricated metal products, except machinery and transportation equipment | 36 | 8 |
| 35 | Industrial machinery and equipment, except electrical | 16 | 7 |
| 36 | Electrical machinery, equipment, and supplies | 5 | 4 |
| 37 | Transportation equipment | 11 | 6 |
| 38 | Scientific and professional instruments; photographic and optical goods; watches and clocks | 9 | 5 |
| 39 | Miscellaneous manufactured commodities | 16 | 4 |
| Total | | 246 | 69 |

* This excludes the steel industry, consisting of the following 4 digit SIC categories: 3312 (Blast Furnaces and Steel Mills); 3315 (Steel Wire and Related Products); 3316 (Cold Finishing of Steel Shapes); and 3317 (Steel Pipes and Tubes).

# Table 2.5: Products for which both petitioning and non-petitioning firms are listed in the CRSP data base

| Product/Domestic Industry | SIC | Non Petitioners | | Petitioners | |
|---|---|---|---|---|---|
| | | No. of firms listed in CRSP | Total no. of firms | No. of firms listed in CRSP | Total no. of firms |
| BICYCLES | 37 | 1 | 5 | 1 | 3 |
| *BRAKE DRUMS[a] | 37 | 2 | 2 | 2 | 4 |
| *CERTAIN CASED PENCILS[b] | 39 | 1 | 1 | 1 | 8 |
| *COATED GROUNDWOOD PAPER[c] | 26 | 1 | 4 | 5 | 9 |
| COLLATED ROOFING NAILS | 34 | 1 | 2 | 1 | 1 |
| CRUSHED LIMESTONE | 14 | 1 | 14 | 1 | 3 |
| DRAMS ONE MEGABIT AND ABOVE | 36 | 4 | 8 | 1 | 1 |
| DRY FILM PHOTORESIST | 38 | 1 | 3 | 3 | 3 |
| DYNAMIC RANDOM ACCESS MEMORY SEMICONDUCTOR | 36 | 4 | 13 | 1 | 1 |
| **FLAT PANEL DISPLAYS[d] | 35 | 1 | 2 | 3 | 8 |
| **GREY PORTLAND CEMENT AND CEMENT CLINKER[e] | 32 | 3 | 7 | 1 | 3 |
| *OPEN-END SPUN RAYON SINGLES YARN[f] | 22 | 1 | 6 | 1 | 5 |
| PHTHALIC ANHYDRIDE | 28 | 1 | 1 | 1 | 4 |
| POLYVINYL ALCOHOL | 28 | 2 | 2 | 1 | 1 |
| PROFESSIONAL ELECTRIC CUTTING/SANDING | 35 | 2 | 8 | 1 | 1 |
| *REFINED ANTIMONY TRIOXIDE[g] | 28 | 1 | 3 | 1 | 3 |
| SILICON METAL | 33 | 2 | 2 | 1 | 8 |
| STATIC RANDOM ACCESS MEMORY | 36 | 6 | 8 | 1 | 1 |
| STRUCTURAL STEEL BEAMS | 34 | 3 | 6 | 3 | 3 |
| Total | | 38 | 97 | 30 | 70 |

* Cases were filed by coalitions, all the firms in the coalition were reported in the ITC reports.

**For these cases I could not get names of all the firms belonging to these coalitions, names of only the larger firms were reported in the ITC reports.; [a] Coalition for the preservation of America; [b] Pencil Makers Association; [c] Committee Of American Paper Institute To Safeguard Us Industry; [d] Advanced Display Manufacturers; [e] So.California Producers of Grey Portland Cement; [f] Ad Hoc Committee Of Open-End Spun Rayon Yarn Producers/American Yarn Spinners Association; [g] Coalition For Fair Trade In Antimony Trioxide.

# Table 2.6: Share Price Response to Petitioning for Antidumping Duty; Event = Date News of Filing was Released; Event Window (-3, 3); 2 digit SIC Industry

| 2 Digit SIC | PETITIONER | | NON PETITIONER | | Difference NP-P |
|---|---|---|---|---|---|
| | ACA | Z stat | ACA | Z stat | ACA |
| 2 | | | 0.15% | 0.07 | |
| 10 | 5.03% | 0.51 | | | |
| 14 | 2.61% | 0.48 | 0.91% | 0.67 | -1.70% |
| 20 | -2.39% | -52.39*** | -1.94% | -1.46 | 0.45% |
| 22 | 2.41% | 1.19 | -3.67% | -0.52 | -6.08% |
| 26 | 1.51% | 0.89 | 1.55% | 0.36 | 0.04% |
| 28 | 0.55% | 0.18 | 2.21% | 1.22 | 1.66% |
| 30 | 3.34% | 8.41*** | -1.56% | -0.25 | -4.90% |
| 32 | -5.23% | -1.4 | -4.44% | -2.24* | 0.79% |
| 33 | 3.66% | 0.44 | 0.42% | 0.69 | -3.24% |
| 34 | -1.73% | 0.19 | -3.57% | -0.98 | -1.84% |
| 35 | 1.53% | 0.2 | -3.81% | -1.87* | -5.34% |
| 36 | -0.94% | -0.56 | 0.50% | 0.08 | 1.44% |
| 37 | 4.22% | 2.22** | 5.38% | 0.38 | 1.16% |
| 38 | 0.41% | 0.09 | 1.28% | 0.5 | 0.87% |
| 39 | -0.76% | -0.66 | -2.49% | -0.24 | -1.73% |

* significant at 10% confidence interval level; ** significant at 5 % confidence interval level; *** significant at 1 % confidence interval level

## Table 2.7: Share Price Response to Petitioning for AD at the Product Level - Petitioners

| Product/Domestic Industry<br>Event Window | Petitioner<br>(-3,3) | | Petitioner<br>(-1,1) | |
|---|---|---|---|---|
| | ACA | Z stat | ACA | Z stat |
| BICYCLES | -0.23% | -0.06 | -1.69% | -0.63 |
| PROFESSIONAL ELECTRIC CUTTING/SANDING | -10.84% | -1.49 | -5.52% | -1.16 |
| DYNAMIC RANDOM ACCESS MEMORY SEMICONDUCTOR | -11.82% | -1.16 | -1.91% | -0.29 |
| CRUSHED LIMESTONE | 2.48% | 0.46 | 1.99% | 0.56 |
| DRAMS ONE MEGABIT AND ABOVE | -2.42% | -0.25 | -5.22% | -0.85 |
| PHTHALIC ANHYDRIDE | -3.91% | -0.91 | -6.65% | -2.37** |
| STRUCTURAL STEEL BEAMS | -4.90% | -1.73* | 1.97% | 0.37 |
| POLYVINYL ALCOHOL | 0.41% | 0.12 | 0.18% | 0.09 |
| GREY PORTLAND CEMENT AND CEMENT CLINKER | -5.23% | -1.39 | 1.24% | 0.51 |
| COATED GROUNDWOOD PAPER | 1.51% | 0.89 | 1.82% | 1.51 |
| CERTAIN CASED PENCILS | -0.64% | -0.09 | 0.54% | 0.12 |
| DRY FILM PHOTORESIST | 1.28% | 0.97 | 0.51% | 0.92 |
| OPEN-END SPUN RAYON SINGLES YARN | -1.15% | -0.23 | -1.43% | -0.44 |
| SILICON METAL | 8.58% | 0.92 | 3.08% | 0.51 |
| BRAKE DRUMS | 2.86% | 0.71 | 0.18% | -0.02 |
| COLLATED ROOFING NAILS | 3.41% | 0.91 | 1.67% | 0.69 |
| FLAT PANEL DISPLAYS | -5.33% | -2.82*** | -3.85% | -12.46*** |
| STATIC RANDOM ACCESS MEMORY | 19.27% | 1.77* | 2.96% | 0.41 |

* significant at 10% confidence interval level; ** significant at 5 % confidence interval level;
*** significant at 1 % confidence interval level

## Table 2.8: Share Price Response to Petitioning for AD at the Product Level: Non-Petitioners

| Product/Domestic Industry Event Window | Non-Petitioner (-3,3) | | Non-Petitioner (-1,1) | |
|---|---|---|---|---|
| | ACA | Z stat | ACA | Z stat |
| BICYCLES | 21.77% | 1.93* | 4.88% | 0.68 |
| PROFESSIONAL ELECTRIC CUTTING/SANDING | -2.74% | -0.9 | -2.22% | -0.68 |
| DYNAMIC RANDOM ACCESS MEMORY SEMICONDUCTOR | -3.82% | -1.4 | 0.90% | 0.32 |
| CRUSHED LIMESTONE | 7.58% | 2.33** | 1.65% | 0.78 |
| DRAMS ONE MEGABIT AND ABOVE | 3.18% | 2.20* | 0.92% | 1.12 |
| PHTHALIC ANHYDRIDE | -0.76% | -0.26 | 0.18% | 0.1 |
| STRUCTURAL STEEL BEAMS | -2.47% | -1.78* | -2.58% | -0.72 |
| POLYVINYL ALCOHOL | 1.39% | 0.36 | -0.66% | -0.36 |
| GREY PORTLAND CEMENT AND CEMENT CLINKER | -4.59% | -1.43 | -3.74% | -2.25* |
| COATED GROUNDWOOD PAPER | 1.65% | 0.38 | 5.47% | 1.96* |
| CERTAIN CASED PENCILS | -2.52% | -0.25 | -0.32% | -0.05 |
| DRY FILM PHOTORESIST | -1.54% | -0.34 | -2.54% | -0.86 |
| OPEN-END SPUN RAYON SINGLES YARN | -3.80% | -0.54 | -1.82% | -0.4 |
| SILICON METAL | 4.50% | 1.17 | 4.16% | 19.39*** |
| BRAKE DRUMS | -3.00% | -3.16** | -3.21% | -5.72*** |
| COLLATED ROOFING NAILS | -4.03% | -0.91 | -1.66% | -0.58 |
| FLAT PANEL DISPLAYS | -13.84% | -2.79** | -9.84% | -3.03** |
| STATIC RANDOM ACCESS MEMORY | 2.96% | 0.83 | 0.17% | -0.7 |

* significant at 10% confidence interval level; **  significant at 5 % confidence interval level; *** significant at 1 % confidence interval level

# Table 2.9: Share Price Response to Petitioning for AD at the Product Level: Difference between Non-petitioners and Petitioners

| Product/Domestic Industry | Difference NP-P | | Difference NP-P | |
|---|---|---|---|---|
| Event Window | (-3,3) | | (-1,1) | |
| | ACA | t stat | ACA | t stat |
| BICYCLES | 22.01% | 1.84* | 6.57% | 0.87 |
| PROFESSIONAL ELECTRIC CUTTING/SANDING | 11.22% | 1.49 | 3.30% | 0.57 |
| DYNAMIC RANDOM ACCESS MEMORY SEMICONDUCTOR | 8% | 0.76 | 2.81% | 0.39 |
| CRUSHED LIMESTONE | 5.1% | 0.82 | -0.34% | -0.08 |
| DRAMS ONE MEGABIT AND ABOVE | 5.6% | 0.57 | 6.14% | 0.99 |
| PHTHALIC ANHYDRIDE | 3.15% | 0.62 | 6.83% | 2.05** |
| STRUCTURAL STEEL BEAMS | 2.43% | 0.77 | -4.55% | -0.71 |
| POLYVINYL ALCOHOL | 0.98% | 0.2 | -0.84% | -0.31 |
| GREY PORTLAND CEMENT AND CEMENT CLINKER | 0.64% | 0.13 | -4.98% | -1.69* |
| COATED GROUNDWOOD PAPER | 0.14% | 0.03 | 3.65% | 1.2 |
| CERTAIN CASED PENCILS | -1.88% | -0.15 | -0.86% | -0.11 |
| DRY FILM PHOTORESIST | -2.82% | -0.6 | -3.05% | -1.01 |
| OPEN-END SPUN RAYON SINGLES YARN | -2.65% | -0.31 | -0.39% | -0.07 |
| SILICON METAL | -4.08% | -0.42 | 1.08% | 0.18 |
| BRAKE DRUMS | -5.86% | -1.43 | -3.39% | -0.38 |
| COLLATED ROOFING NAILS | -7.44% | -1.28 | -3.33% | -0.89 |
| FLAT PANEL DISPLAYS | -8.51% | -1.65* | -5.99% | -1.84* |
| STATIC RANDOM ACCESS MEMORY | -16.31% | -1.42 | -2.79% | -0.39 |

* significant at 10% confidence interval level; **  significant at 5 % confidence interval level;
*** significant at 1 % confidence interval level

## Table 2.10: Share Price Response to Petitioning for AD; Domestic Industry (Petitioners and Non-Petitioners)

| Product/Domestic Industry | P+NP | | P+NP | |
|---|---|---|---|---|
| Event Window | (-3,3) | | (-1,1) | |
| | ACA | t stat | ACA | t stat |
| BICYCLES | 10.77% | 0.94 | 1.59% | 0.03 |
| PROFESSIONAL ELECTRIC CUTTING/SANDING | -5.44% | -1.82* | -3.32% | -1.4 |
| DYNAMIC RANDOM ACCESS MEMORY SEMICONDUCTOR | -5.42% | -1.99** | 0.33% | 0.25 |
| CRUSHED LIMESTONE | 5.03% | 1.49 | 1.82% | 6.19*** |
| DRAMS ONE MEGABIT AND ABOVE | 2.06% | 1.65* | -0.30% | 0.36 |
| PHTHALIC ANHYDRIDE | -2.33% | -1.79* | -3.23% | -0.92 |
| STRUCTURAL STEEL BEAMS | -4.42% | -2.81*** | -0.69% | -0.66 |
| POLYVINYL ALCOHOL | 1.06% | 0.47 | -0.38% | -0.34 |
| GREY PORTLAND CEMENT AND CEMENT CLINKER | -4.75% | -2.24** | -2.49% | -1.35 |
| COATED GROUNDWOOD PAPER | 1.53% | 1.06 | 2.43% | 2.08** |
| CERTAIN CASED PENCILS | -1.58% | -2.21** | 0.10% | 0.42 |
| DRY FILM PHOTORESIST | 0.58% | 0.53 | -0.24% | -0.23 |
| OPEN-END SPUN RAYON SINGLES YARN | -2.48% | -2.48** | -1.62% | -21.65*** |
| SILICON METAL | 5.86% | 1.76* | 3.80% | 3.22*** |
| BRAKE DRUMS | -0.07% | -0.08 | -1.51% | -1.16 |
| COLLATED ROOFING NAILS | -0.30% | 0 | 0.00% | 0.08 |
| FLAT PANEL DISPLAYS | -7.46% | -2.43** | -5.35% | -2.44** |
| STATIC RANDOM ACCESS MEMORY | 5.29% | 1.39 | 0.57% | -0.46 |

* significant at 10% confidence interval level; ** significant at 5 % confidence interval level; *** significant at 1 % confidence interval level

## Table 2.11: Share Price Response to Petitioning for AD; Domestic Industry (Petitioners and Non-Petitioners)

| Product/Domestic Industry | P+NP | | P+NP | |
|---|---|---|---|---|
| Event Window | (-3,3) | | (-1,1) | |
| | Postive:Negative | Z stat | Postive:Negative | t stat |
| BICYCLES | 1:1 | 0.15 | 1:1 | 0.15 |
| PROFESSIONAL ELECTRIC CUTTING/SANDING | 1:2 | -0.49 | 1:2 | -0.49 |
| DYNAMIC RANDOM ACCESS MEMORY SEMICONDUCTOR | 1:4 | -1.25 | 2:3 | -0.35 |
| CRUSHED LIMESTONE | 2:0 | 1.43 | 2:0 | 1.43 |
| DRAMS ONE MEGABIT AND ABOVE | 3:2 | 0.54 | 3:2 | 0.54 |
| PHTHALIC ANHYDRIDE | 0:2 | -1.37 | 1:1 | 0.05 |
| STRUCTURAL STEEL BEAMS | 0:5 | -2.13** | 2:3 | -0.34 |
| POLYVINYL ALCOHOL | 2:1 | 0.65 | 2:1 | 0.65 |
| GREY PORTLAND CEMENT AND CEMENT CLINKER | 0:4 | -1.84* | 1:3 | -0.84 |
| COATED GROUNDWOOD PAPER | 4:2 | 0.94 | 5:1 | 1.76* |
| CERTAIN CASED PENCILS | 0:2 | -1.27 | 1:1 | 0.15 |
| DRY FILM PHOTORESIST | 2:2 | 0.03 | 2:2 | 0.03 |
| OPEN-END SPUN RAYON SINGLES YARN | 0:2 | -1.3 | 0:2 | -1.3 |
| SILICON METAL | 3:0 | 1.81* | 3:0 | 1.81* |
| BRAKE DRUMS | 1:3 | -0.89 | 1:3 | -0.89 |
| COLLATED ROOFING NAILS | 1:1 | 0.07 | 1:1 | 0.07 |
| FLAT PANEL DISPLAYS | 0:4 | -1.73* | 0:4 | -1.73* |
| STATIC RANDOM ACCESS MEMORY | 5:2 | 1.37 | 3:4 | -0.15 |

* significant at 10% confidence interval level; ** significant at 5 % confidence interval level;
*** significant at 1 % confidence interval level

# Table 3.1: History of the Softwood Lumber Agreement

| Countervailing Duty Investigations | Outcome |
|---|---|
| Softwood Lumber I: 1982 | US authorities decided no subsidy |
| Softwood Lumber II: 1986 | 15% provisional duty. <br><br> Replaced by 15% export tax in MOU |
| Softwood Lumber III: 1991 | After Canada unilaterally terminates MOU <br><br> Countervailing case filed: Interim bonding requirement <br><br> Canada wins appeal against countervailing duty in CUSTA (1993 and 1994) <br><br> US revokes duties against Canadian lumber (Aug 1994) <br><br> Bilateral consultation process for softwood established |
| Threat of a Countervailing Duty Investigation : 1996 | Softwood Lumber Agreement is signed: The first 650 million board feet over 14.7 BBF was subject to a tax of $50 per thousand board feet, and any further exports were subject to a tax of $100 per thousand board feet. |

# Table 3.2: Chronology of Events

| Important Events | Headlines | Article |
|---|---|---|
| Event 1: February 2, 1996 (Warning by US Producers) | Trade Reprisals Loom For Canada US Group Sets Feb. 15th Deadline for Lumber Pact | The Journal of Commerce Inc. |
| Event 2: February 15, 1996 (Agreement Reached in Principle) | US Lumber Industry Welcomes Agreement in Principle over Subsidized Canadian Imports | PR Newswire Association Inc. |
| Event 3: April 3, 1996 (Canada Finalizes the Agreement) | Canada Agrees to Tax Softwood Exports to US. Ottowa-Washington Deal Averts another Trade War over Lumber | The Journal of Commerce Inc. |

Search Engine: LexisNexis Academic

**Table 3.3: Stock Price Response to SLA; Event Window (-1,+1)**

| EVENT | News | No. of firms | ACA | Z STAT | Positive: Negative | Z Stat |
|---|---|---|---|---|---|---|
| event 1 | Warning by US Producers | 37 | -1.50% | -2.61** | 13:24 | -1.42* |
| event 2 | Agreement Reached in Principle | 37 | -1.45% | -2.63** | 11:26 | -2.08** |
| event 3 | Canada Finalizes the Agreement | 37 | -2.47% | -3.18*** | 9:28 | -2.74*** |

\* significant at 10% confidence interval level; \*\*  significant at 5 % confidence interval level;
\*\*\* significant at 1 % confidence interval level

**Table 3.4: Stock Price Response, Cumulated over all events[a] , by 4-Digit SIC,
Event Window (-1, +1)**

| SIC 3-digit | Industries | No. of firms | TACA | Z STAT |
|---|---|---|---|---|
| 1521 | Single-family Housing Construction & Residential Construction, Nec | 9 | -6.19% | -2.90*** |
| 1531 | Operative Builders | 11 | -4.22% | -0.88 |
| 2451 & 2452 | Mobile Homes & Prefabricated Wood Buildings | 11 | -1.88% | 0.04 |
| 5211 | Lumber and Other Building Materials | 6 | -12.99% | -2.08** |
| ALL | ALL | 37 | -5.42% | -1.84** |

\* significant at 10% confidence interval level; \*\*  significant at 5 % confidence interval level;
\*\*\* significant at 1 % confidence interval level
[a]event 1 : US producers warn they will petition if no pact by feb15th; event 2 : Agreement in principle reached; event 3 : Canada finalizes the SLA agreement
[b] Others consists of 4-digit SICs: **2515-**Mattresses and Bedsprings; **5031-**Lumber, Plywood, and Millwork; **5271-M**obile Home Dealers

# Table 3. 5: Names of Firms Used in the Analysis and their Classifications

| Names | 4-Digit SIC | Ranking* For 1521 | Ranking* for 1531 |
|---|---|---|---|
| B M C WEST CORP | 5211 | | |
| BEAZER HOMES USA | 1531 | | 7 |
| CALPROP CORP | 1521 | | |
| CAPITAL PACIFIC H | 1521 | | |
| CAVALIER HOMES IN | 1531 | | |
| CENTEX CORP | 1531 | 2 | 1 |
| CHAMPION ENTERPRI | 2451 | | |
| CLAYTON HOMES INC | 2451 | | |
| D R HORTON INC | 1521 | 4 | |
| DYNAMIC HOMES INC | 2451 | | |
| ENGLE HOMES INC | 1531 | | 6 |
| FLEETWOOD ENTERPR | 2451 | | |
| GROSSMANS INC | 5211 | | |
| HOME DEPOT INC | 5211 | | |
| HOVNANIAN ENTER A | 1531 | | 8 |
| KAUFMAN & BROAD H | 1521 | 3 | |
| LENNAR CORP | 1531 | 6 | |
| LIBERTY HOMES I B | 2452 | | |
| LOWES COMPANIES I | 5211 | | |
| M D C HOLDINGS IN | 1531 | | |
| M I SCHOTTENSTEIN | 1531 | | |
| MANUFACTURED HOME | 1521 | | |
| N V R INC | 1531 | | |
| NOBILITY HOMES IN | 2451 | | |
| OAKWOOD HOMES COR | 2451 | | |
| PULTE CORP | 1521 | 1 | 2 |
| RYLAND GROUP INC | 1531 | 7 | 3 |
| SKYLINE CORP | 2451 | | |
| SOUTHERN ENERGY H | 2452 | | |
| STANDARD PACIFIC | 1531 | | |
| STARRETT HOUSING | 1521 | | |
| TOLL BROTHERS INC | 1531 | | |
| U S HOME CORP | 1521 | 8 | 4 |
| UNITED MOBILE HOM | 2451 | | |
| WEITZER HOMEBUI A | 1521 | | |
| WICKES LUMBER CO | 5211 | | |
| WOLOHAN LUMBER CO | 5211 | | |

- Ranking in terms of level of revenue.; Source: Encyclopedia of American Industries, 3rd ed, Gale Group, 2001

**Table 3.6: Stock Price Response for all the events[a];**
**Various Event Windows**

| Event Window | No. of firms | TACA | Z STAT |
|---|---|---|---|
| (-1,+1) | 37 | -5.42% | -1.84** |
| (-2,+2) | 37 | -5.11% | -2.03** |
| (-3,+3) | 37 | -3.55% | -2.27** |
| (-5,+5) | 37 | -5.10% | -2.19** |

\* significant at 10% confidence interval level; ** significant at 5 % confidence interval level;
\*** significant at 1 % confidence interval level
[a]event 1 : US producers warn they will petition if no pact by feb15th; event 2 : Agreement in principle reached; event 3 : Canada finalizes the SLA agreement

**Table 3.7: Stock Price Response to SLA; Event Window (-2, +2)**

| EVENT | News | No. of firms | ACA | Z STAT | Positive: Negative | Z Stat |
|---|---|---|---|---|---|---|
| event 1 | Warning by US Producers | 37 | -1.14% | -1.94* | 14:23 | -1.09 |
| event 2 | Agreement Reached in Principle | 37 | -1.01% | -2.13* | 10:27 | -2.41*** |
| event 3 | Canada Finalizes the Agreement | 37 | -2.96% | -3.52*** | 12:25 | -1.75** |

\* significant at 10% confidence interval level; ** significant at 5 % confidence interval level;
\*** significant at 1 % confidence interval level

**Table 3.8: Stock Price Response for the all the events[a] at 4-Digit SIC;
Event Window (-2, +2)**

| SIC 4-digit | Industries | Event Window | No. of firms | TACA | Z STAT |
|---|---|---|---|---|---|
| 1521 | Single-family Housing Construction & Residential Construction, Nec | (-2,+2) | 9 | -5.98% | -2.74*** |
| 1531 | Operative Builders | (-2,+2) | 11 | -7.20% | -0.92 |
| 2451 & 2452 | Mobile Homes & Prefabricated Wood Buildings | (-2,+2) | 11 | -0.84% | 0.01 |
| 5211 | Lumber and Other Building Materials | (-2,+2) | 6 | -7.79% | -1.76** |
| ALL | ALL | (-2,+2) | 37 | -5.11% | -2.03** |

* significant at 10% confidence interval level; ** significant at 5 % confidence interval level;
*** significant at 1 % confidence interval level
[a]event 1 : US producers warn they will petition if no pact by feb15th; event 2 : Agreement in principle reached; event 3 : Canada finalizes the SLA agreement
[b] Others consists of 4-digit SICs: **2515-**Mattresses and Bedsprings; **5031-**Lumber, Plywood, and Millwork; **5271-M**obile Home Dealers

**TABLE 4.1: Products for which petitions were filed**

| Product | Number of cases | year | Number of petitioners |
|---|---|---|---|
| BENZYL PARABEN | 2 | 1990 | 1 |
| SODIUM THIOSULFATE | 4 | 1990 | 1 |
| SPARKLERS | 1 | 1990 | 2 |
| ANTIMONY TRIOXIDE | 1 | 1991 | 4 |
| HIGH-TENACITY RAYON FILAMENT YARN | 2 | 1991 | 1 |
| IBUPROFIN | 1 | 1991 | 1 |
| SULFANILIC ACID | 1 | 1991 | 1 |
| POTASSIUM HYDROXIDE | 3 | 1992 | 1 |
| SULFANILIC ACID | 2 | 1992 | 1 |
| SULFUR DYES | 4 | 1992 | 1 |
| ARAMID FIBER | 1 | 1993 | 1 |
| NITROMETHANE | 1 | 1993 | 1 |
| PHTHALIC ANHYDRIDE | 5 | 1993 | 4 |
| SACCHARIN | 2 | 1993 | 1 |
| SEBACIC ACID | 1 | 1993 | 1 |
| COUMARIN | 1 | 1994 | 1 |
| FURFURYL ALCOHOL | 3 | 1994 | 1 |
| GLYCINE | 1 | 1994 | 2 |
| MANGANESE SULFATE | 1 | 1994 | 1 |
| POLYVINYL ALCOHOL | 4 | 1995 | 1 |
| OPEN-END SPUN RAYON SINGLES YARN | 1 | 1996 | 1 |
| PERSULFATES | 1 | 1996 | 1 |
| SODIUM AZIDE | 1 | 1996 | 1 |
| EMULSION STYRENE-BUTADIENE RUBBER | 3 | 1998 | 2 |
| ACRYLONITRILE BUTADIENE RUBBER | 1 | 1999 | 2 |
| BULK ASPIRIN | 1 | 1999 | 1 |
| EXPANDABLE POLYSTYRENE RESINS | 2 | 1999 | 4 |
| POLYESTER STAPLE FIBER, CERTAIN | 2 | 1999 | 1 |
| SOLID FERTILIZER GRADE AMMONIUM NITRATE | 1 | 1999 | 1 |
| SYNTHETIC INDIGO | 1 | 1999 | 3 |

**TABLE 4.2: Number of Producers of the named product**

| Product | year | Number of producers |
|---|---|---|
| HIGH-TENACITY RAYON FILAMENT YARN | 1991 | 8 |
| SULFANILIC ACID | 1991 | 1 |
| POTASSIUM HYDROXIDE | 1992 | 3 |
| ARAMID FIBER | 1993 | 1 |
| NITROMETHANE | 1993 | 2 |
| SACCHARIN | 1993 | 1 |
| SEBACIC ACID | 1993 | 1 |
| COUMARIN | 1994 | 1 |
| FURFURYL ALCOHOL | 1994 | 1 |
| GLYCINE | 1994 | 2 |
| MANGANESE SULFATE | 1994 | 2 |
| POLYVINYL ALCOHOL | 1995 | 3 |

**TABLE 4.3: Number of cases filed for each product and the decision**

| Product | year | Number of cases | DECISION |
|---|---|---|---|
| HIGH-TENACITY RAYON FILAMENT YARN | 1991 | 2 | A, T |
| SULFANILIC ACID | 1991 | 1 | A |
| POTASSIUM HYDROXIDE | 1992 | 3 | N, N, N |
| ARAMID FIBER | 1993 | 1 | A |
| NITROMETHANE | 1993 | 1 | N |
| SACCHARIN | 1993 | 2 | N, N |
| SEBACIC ACID | 1993 | 1 | A |
| COUMARIN | 1994 | 1 | A |
| FURFURYL ALCOHOL | 1994 | 3 | A, A, A |
| GLYCINE | 1994 | 1 | A |
| MANGANESE SULFATE | 1994 | 1 | N |
| POLYVINYL ALCOHOL | 1995 | 4 | A, A, A, N |

**Figure 1.1**



Number of Petitions by Industries (1979-1995)

33-Primary Metal Industries
331-Blast Furnaces, Steel Works, and Rolling and Finishing Mills(273)
34-Fabricated Metal Products
35-Industrial machinery and equipment
28-Chemicals and allied products
21:Tobacco products
24:Lumber and wood products
29:Petroleum and coal products
31:Leather and leather products
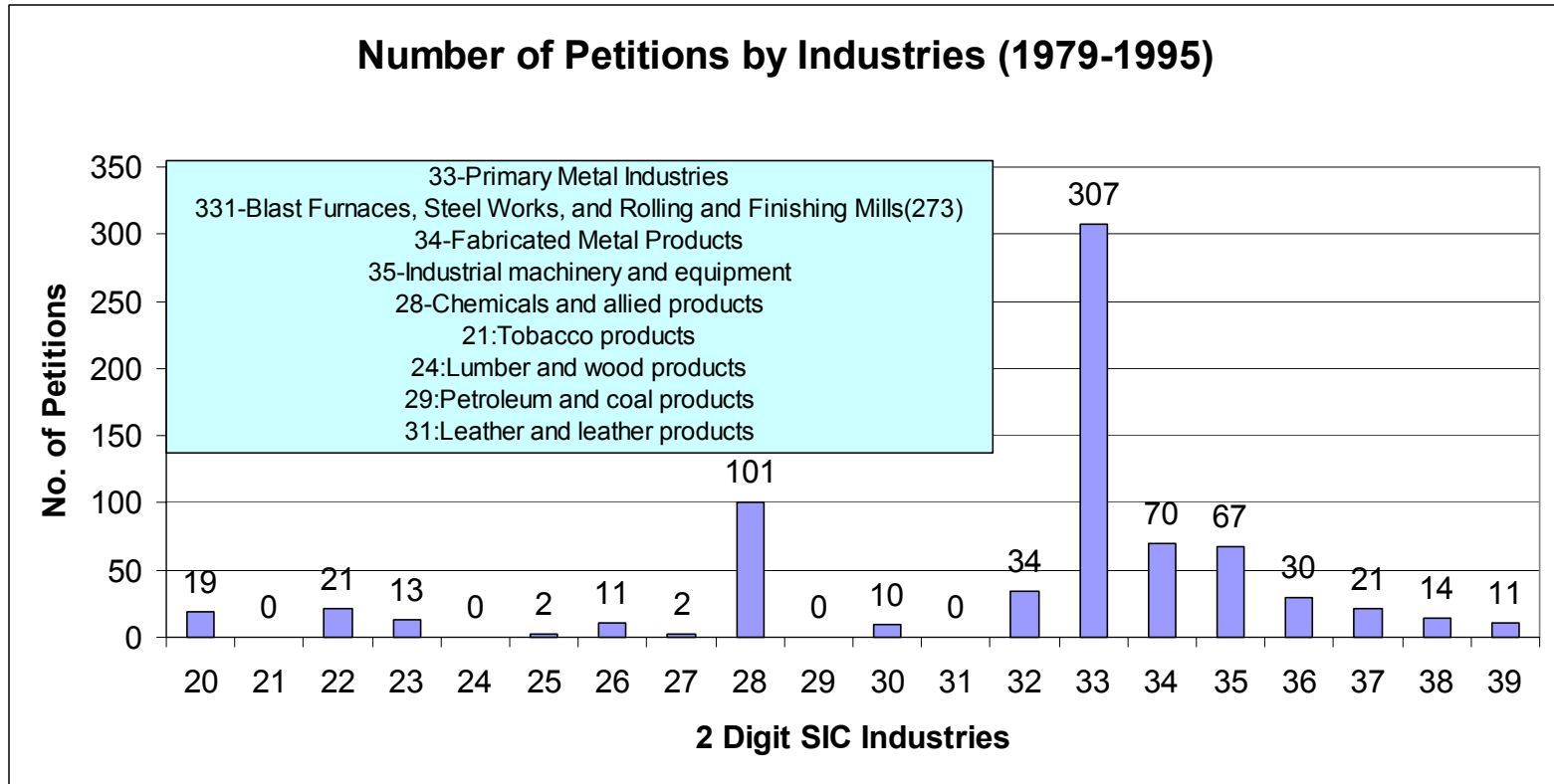
# Figure 2.1: The Estimation Period

t=-396                    t=-31                    t=0

Estimation Period                    Event Window
(365 days)                           (-3, +3)
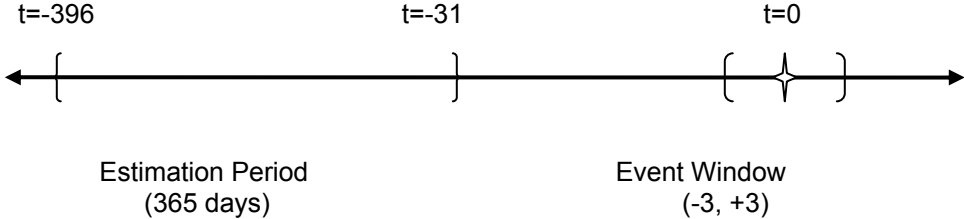
# Figure 2.2: The Event Schedule

| *Important Events* | *Normal Schedule* |
|---|:---:|
| Petition Filed | 0 |
| Initiation of the investigation by (ITA) DOC | 20 |
| ITC Preliminary Determination | 45 |
| (ITA) DOC Preliminary Determination | 160 |
| (ITA) DOC Final Determination | 235 |
| ITC Final Determination | 280 |

**Figure 2.3: Hypotheses – Signal about petitioners' relative to non-petitioners'**

| *Hypothesis* | *Market's Reaction to Petition* | |
|:---:|---|:---:|
| A | Signal about high costs of the petitioner relative to the non-petitioner | $(ACA_{NP} - ACA_P) > 0$ |
| B | Signal about the petitioner- petitioner has a higher likelihood of staying in the market for the near future, relative to the non-petitioner. | $(ACA_{NP} - ACA_P) < 0$ |
| C | No additional information about the firms' relative costs or viability | $(ACA_{NP} - ACA_P) \cong 0$ |

# Figure 2.4: Hypotheses – Signal about the domestic industry

| Hypothesis | Market's Reaction to Petition* | |
|:---:|:---|:---:|
| A | Market believes protection will help domestic industry | $ACA_{NP}, ACA_P > 0$ |
| B | Signal of poor conditions in Industry | $ACA_{NP}, ACA_P < 0$ |

*In case SC =0 then A implies (EPB) > (MSC) and B implies (MSC) > (EPB)
If SC≠0 then A implies (EPB) > (MSC+SC) and B implies (MSC + SC) > (EPB); where SC can be positive or negative.
EPB-Expected Protection Benefit
MSC-Market Signaling Cost
SC-Signaling Cost

# Figure 3.1: The Estimation Period