

**ANTIDUMPING INVESTIGATION IN AGRICULTURE:
ISSUES OF TRADE DIVERSION-NAMED VS NON-NAMED COUNTRIES**

A Thesis

**Submitted to the Graduate Faculty of the
Louisiana State University and
Agricultural and Mechanical College
in partial fulfillment of the
requirements for the degree of
Master of Science**

in

The Department of Agricultural Economics and Agribusiness

**by
Nandini Bandyopadhyay
B.Sc.(Economics), University of Calcutta, India,1997
MSc(Economics), University of Calcutta, India,1999
Mphil, Jawaharlal Neheru University, India, 2004
August, 2008**

ACKNOWLEDGEMENTS

I would like to dedicate this thesis to my advisor, Dr Walter Keithly. Without his endless support and able guidance I would not been able to finish this challenge and research. Working with him I learned the critical aspects of academic research. I am especially thankful to Dr Richard Kazmierczak for his unconditional support in this project. I will be ever grateful to Dr Caffey for his help and support he has provided me as a member of my graduate committee.

In addition to this I would like to thank Dr Thomas J Prusa for providing me with all the background information I needed in this project. I would also like to thank all my LSU friends. I am also thankful to Dr B.N Goldar, my colleague and advisor in India for developing my critical thinking in econometric modeling and in the issue of international trade.

I am also thankful to my in laws and mother in India who silently encouraged me to finish this research. From them I learned how to overcome difficult situations and fight to achieve the ultimate goal.

Finally, I express my sincere gratitude to my husband Sandeep. Without his mental support, care and love, I would have been pondering in the dark to finish this research. He was always there beside me to provide me support whenever and wherever required to finish this research. Any word of gratitude is not enough to accommodate his involvement and unending encouragement which has made me stride forward especially at times of crisis.

TABLE OF CONTENTS

ACKNOWLEDGEMENTS	ii
LIST OF TABLES	v
LIST OF FIGURES	vi
ABSTRACT	vii
CHAPTER 1 INTRODUCTION	1
1.1 Goals and Objectives	3
1.2 Background Information on US Antidumping Mechanisms	3
1.2.1 Preliminary Phase of the Commission’s Investigation	4
1.3. Institution of the Investigation and Scheduling of the Preliminary Phase	5
1.3.1 Questionnaires.....	6
1.3.2 Different Parts of the Questionnaires.....	7
1.4 Summary of Antidumping Law	8
1.5 Antidumping Cases Filed During 1990-2006	10
1.6 Antidumping Literature	12
CHAPTER 2. LITERATURE REVIEW AND MODEL SPECIFICATION.....	17
2.1 Theoretical Model of Trade Diversion	17
2.2 Different Models and Estimation.....	19
2.2.1. Konnings , VandenBussche and Springael Model(2001)	20
2.2.2 Prusa Model (1997).....	22
2.2.3 Ganguli Model (2005).....	23
2.2.4 Carter & Gunning Model (2008)	24
2.2.5 Malhotra, Rus and Kassam Model (2008)	25
2.3 Econometric Theory.....	26
2.4 Modeling and Data Issue Related to Proposed Research.....	28
2.4.1 Modeling Issues	28
2.4.2 Timeframe Analysis and Data Considerations	30
CHAPTER 3 RESULTS AND DISCUSSIONS	32
3.1 Konnings , VandenBussche and Springael Model.....	32
3.2 Prusa Model	36
3.3 Malhotra, Rus and Kassam Model.....	42
3.4 Expanded Model Based on Previous Studies.....	48
CHAPTER 4: SUMMARY AND CONCLUSION	52
REFERENCES	54

APPENDIX A: TOTAL IMPORTS AND NAMED COUNTRIES' IMPORTS FOR
AFFIRMATIVE OUTCOMES..... 56

APPENDIX B: TOTAL IMPORTS AND NAMED COUNTRIES' IMPORTS FOR NEGATIVE
OUTCOMES 67

VITA..... .77

LIST OF TABLES

Table1.1- Anti Dumping Investigation Cases (731).....	11
Table 1.2 - Countries Most Frequently Named in Antidumping Investigations of Agricultural Products: 1990-2004.....	12
Table 3.1-Effects of Antidumping Actions on Imports.....	33
Table 3.2-Effects of Antidumping Actions on Imports (Named vs. Non-named).....	35
Table 3.3- OLS Estimates for Overall Import.....	39
Table3.4-OLS Estimates for Named Imports.....	40
Table3.5- OLS Estimates for Non-named imports.....	41
Table 3.6-Antidumping action and value of overall imports.....	44
Table3.7- Antidumping action and value of Named Country imports.....	46
Table3.8- Antidumping action and value of Non-named Country imports.....	47
Table 3.9- OLS Estimate Result.....	49
Table3.10- Feasible Generalized Least Square Estimate Result.....	50

LIST OF FIGURES

Figure 1.1 Yearly Filings of US AD cases, 1994-2005.	2
Figure 1.2 Flow chart depicting Process and Time duration of AD ruling.....	9
Figure 2.1: Theoretical Background of Trade Diversion	18

ABSTRACT

This study addresses the issue of antidumping investigations and their effect on trade of agricultural products. The question which this study addresses is whether antidumping is helping domestic industries or is simply diverting trade away from the named countries to the non-named countries (countries not mentioned in the antidumping petition).

Antidumping has emerged as an important tool in the hands of importing countries over the last two decades. The World Trade Organization (WTO) has defined dumping as a situation of international price discrimination. Dumping occurs when exporting countries are selling the product in the international market at a price lower than the prices in the domestic market. By the implementation of the Article VI of the General Agreement on Tariffs and Trade 1994 (The Antidumping Agreement), dumping is considered as an introduction of any product in the commerce of another country at less than its normal value. According to that article, WTO members can impose antidumping measures if after investigation, the following facts are proved: (i) that dumping is occurring, (ii) that the domestic industry producing the same product in the importing country is affected by material injury, and (iii) that there is causal link between the two. In 2001, at Doha, Qatar the WTO initiated a new round of global trade talks and an agenda was been signed declaring the new trade-remedy laws. The trade-remedy laws, though being in compliance with the WTO, have been viewed by the developing nations as a form of hidden protection for the developed world.

This study focuses on the U.S. antidumping investigation cases of agricultural products. which were filed during the time period 1994-2004 is considered. The study results suggest that there is no significant trade diversion from the named countries to the non-named countries but that total imports decline as a result of a decline in imports from named countries

CHAPTER 1

INTRODUCTION

Antidumping has emerged as an important tool in the hands of importing countries over the last two decades and has been utilized as an instrument of trade policy by both the developed and the developing nations. In general terms, dumping is said to occur when an exporting country sells its product in the international market at a price lower than the price of that good in the domestic market. The World Trade Organization (WTO) has defined dumping as a situation of international price discrimination.

The implementation of the Article VI of the General Agreement on Tariffs and Trade (GATT) 1994¹ (The Antidumping Agreement), considered dumping as an introduction of any product in the business of another country at less than its normal value. According to that article, WTO members can impose antidumping measures if, after investigation, the following conditions are found.; (i) that dumping is occurring, (ii) that the importing country's (domestic) industry producing a 'like' product is being materially injured, and (iii) that there is causal link between the two.

In 2001, at Doha, Qatar the WTO initiated a new round of global trade talks. An agenda was signed which, among other issues, declares the new trade remedy laws. The trade remedy laws, though in compliance with the WTO, have been viewed by the developing nations as a form of hidden protection for the developed world.² There is also the perception among developing countries that these laws have been amended over time to make it easier for the domestic industries in the developed countries to receive protection.

¹ www.wto.org

² Historically, trade was restricted via the implementation of high duty rates. Such a procedure was highly transparent.

Economists have also argued that policy makers protect their domestic industries under the guise of antidumping law. Specifically some economists have argued that “antidumping” or “countervailing” measures are used simply as an alternative to traditional import barriers (i.e., tariffs). During the period of 1995 to 2004, WTO members initiated a total of 2,626 cases in total, out of which 1656 cases resulted in an affirmative outcome favoring the restrictions³ Antidumping cases filed in the U.S. during the 1994-2005 period is illustrated in Figure 1.1 (source: [http://people.brandeis.edu/~cbohn/global_ad/.](http://people.brandeis.edu/~cbohn/global_ad/)) During this period, a total of 426 AD cases were filed, out of which 293 cases resulted in affirmative decision.

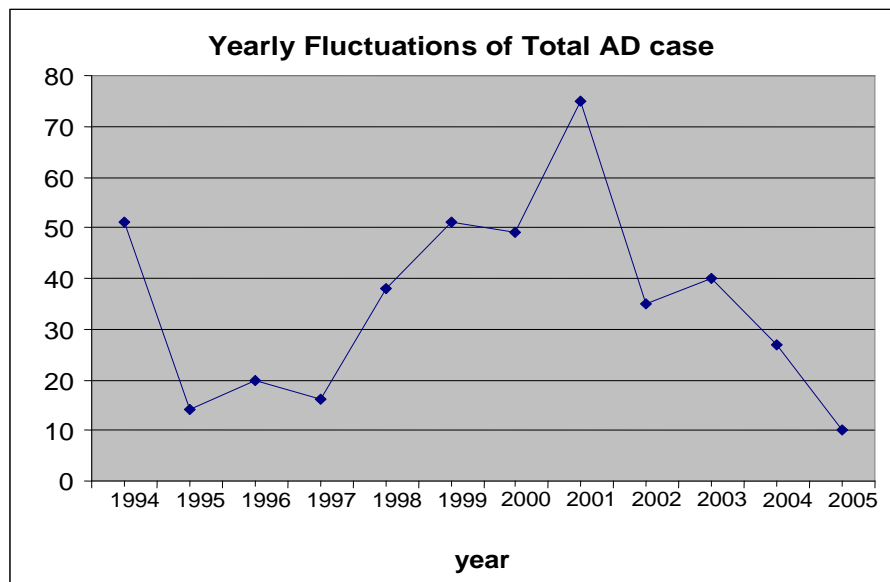


Figure1.1 Yearly Filings of US AD cases, 1994-2005.

As suggested by the information in the Figure 1.1, peak yearly filings, which exceeded 70, occurred in 2001 and the number has fallen sharply since that year. The U.S. entered a recession in March 2001, and, as noted by Feinberg (2004), industry has become adept in the timing of petitions.⁴ By filing when there is a ‘downturn’ in the economy, specifically, the

³ Ganguli. B. (2005), “The Trade Effects of Indian Antidumping Actions”, *The State University of New Jersey, Rutgers*

⁴ Feinberg, R. M. 2004. “U.S. antidumping enforcement and macroeconomic indicators: What do petitioners expect, and are they correct?” Unpublished manuscript (American University).

ability to show ‘material harm’ is enhanced. The abnormally large number of petitions filed in 2001 likely is the result of the recession and the decline thereafter, at least in part, likely reflects a strengthening of the U.S. economy.

1.1 Goals and Objectives

The overall goal of this study is to examine whether antidumping duties on agricultural products (a) limit imports from targeted countries, and (b) result in trade diversion among non-named countries. To accomplish this goal, alternative econometric models that have been proposed by previous researchers are first considered in Chapter II.

This chapter provides the background information of the procedure of antidumping investigation and also a brief discussion of the conceptual models that are additionally considered for this study. In Chapter III, the models outlined in Chapter II are tested and the results are explained accordingly. Conclusions and issues for further research are presented in the chapter IV, the last chapter.

1.2 Background Information on U.S. Antidumping Mechanisms⁵

The overall investigation process for antidumping and countervailing duty cases are divided into five stages.⁶ Each of these stages end with a determination either by the United States Department of Commerce (USDOC) or by the United States International Trade Commission (USITC): (i) initiation of the investigation by USDOC, (ii) the preliminary phase of the USITC investigation, (iii) the preliminary phase of the USDOC investigation, (iv) the final phase of the USDOC investigation, and (v) the final phase of the USITC investigation. There is a partial overlap in some of these stages with the exception of Commerce’s preliminary

⁵ A flowchart of the U.S. antidumping mechanism is presented in Figure 1.2

⁶ This section relates only to the U.S. investigation phase. The specifics of an investigation will vary from one country to another.

determination (stage 3). A negative determination by either Commerce or the Commission results in a termination of proceedings at both agencies.⁷

The statutory deadlines relating to the five stages are as follows: (i) initiation (20 days after the filing of the petition), (ii) preliminary determination by the USITC (45 days after the filing of the petition), (iii) preliminary determination by the USDOC (115 days after the Commission's preliminary determination in antidumping cases or 40 days in countervailing duty cases), (iv) final determination by the USDOC (75 days after Commerce's preliminary determination), and (v) final determination by the USITC (120 days after Commerce's preliminary determination or 45 days after its final determination, whichever is later)

An interested party is required to file an antidumping or countervailing duty petition simultaneously (i.e., on the same day) with both the USDOC and the USITC. The USDOC determines whether the petition alleges the elements necessary for the imposition of a duty and contains information reasonably available to the petitioner supporting the allegations within 20 days after the date on which the petition is filed. If the determination is affirmative, the USDOC initiates an investigation to determine whether dumping exist the investigation finds no proof, then a negative determination is declared by the USITC at which point the petition is dismissed resulting in the termination of the proceedings.

1.2.1 Preliminary Phase of the USITC Investigation

The USITC makes a determination within 45 days after the date on which the petition is filed. This determination, based upon the best information available to it at the time, considers whether there is a reasonable indication that an industry in the United States is materially injured or is threatened with material injury, or the establishment of an industry in the United States is

⁷ United States International Trade Commission(2007), “*Antidumping and Countervailing Duty Handbook*”, 12th Edition pp 13-130

materially retarded, by reason of imports of the merchandise which is the subject of the investigation. The preliminary phase of the Commission's investigation can be broken down into six stages: (i) initiation of the investigation and scheduling of the preliminary phase, (ii) questionnaires, (iii) staff conference and briefs, (iv) staff report and memoranda, (v) briefing and vote, and (vi) determination and views of the Commission.⁸

1.3 Institution of the Investigation and Scheduling of the Preliminary Phase

When a properly filed petition is received by the USITC, a six-person team consisting of an investigator, an economist, an accountant/auditor, an industry analyst, an attorney, and a supervisory investigator is assigned to the investigation. The staff develops a work schedule for conducting the preliminary phase of the investigation and prepares a notice of intention of investigation for publication in the Federal Register. The purpose of the notice is to provide information to the public concerning the subject matter of the investigation and the schedule to be followed.

Any person other than the petitioner who wishes to appear before the Commission as a party in the investigation must file an "entry of appearance" with the Secretary of the Commission⁹. A person who is found by the Secretary to have a proper reason for participating in the investigation will be permitted to appear in the investigation as a party; acceptance of that person's entry of appearance is signified by the Secretary's inclusion of the person on a document referred to as the public service list. Entries of appearance submitted during the

⁸ United States International Trade Commission(2007), "*Antidumping and Countervailing Duty Handbook*", 12th Edition pp 13-130

⁹ An entry of appearance is a letter or document that states briefly the nature of the person's reason for participating in the investigation and the person's intent to file briefs with the Commission regarding the subject matter of the investigation (United States International Trade Commission(2007), "*Antidumping and Countervailing Duty Handbook*", 12th Edition pp 13-130)

preliminary phase of the investigation must be filed with the Secretary not later than seven days after publication of the Commission's notice of initiation in the Federal Register.

1.3.1 Questionnaires

Once the petition is reviewed, the staff drafts questionnaires to solicit relevant information from U.S. producers, U.S. importers, and foreign producers. The requested information is a function of that needed by the USITC in order to make its determination. Questionnaires are sent to all U.S. producers except in cases involving an unusually large number of firms (in such cases, they may be sent to the largest producers in the industry or to a representative sample of firms). Similarly, questionnaires generally are mailed to all importers of the product in question, particularly those importing from the country (countries) subject to investigation. If the number of importers is unusually large, questionnaires may be sent only to the largest importers or to a representative sample. Foreign producer questionnaires are sent only to producers from the subject countries. Foreign producer questionnaires typically are sent to the firms through counsel as soon as counsels are identified to staff or, if the firms are not represented, the questionnaires are mailed directly. U.S. producers and importers are required to respond to questionnaires; failure to reply as directed can result in a subpoena or other order to compel a response. Foreign producers are not required to respond to questionnaires. Failure to respond, however, may result in an adverse inference by the Commission.

In drafting questionnaires, the key issue that must be resolved is the identification of the product or products with respect to which data will be collected. In making its determination, the USITC must assess injury to a U.S. "industry" producing a product that is "like" the imported product subject to investigation. The statute defines "industry" as the producers as a whole of a domestic like product, or those producers whose collective output of a domestic like product

constitutes a major proportion of the total domestic production of the product. The law defines “domestic like product” as a product which is like, or in the absence of like, most similar in characteristics and uses with, the article subject to an investigation¹⁰.

1.3.2 Different Parts of the Questionnaires

Producer questionnaires generally consist of four parts. The first part asks a number of general questions relating to the organization and activities of the firm and the reason for its supporting or opposing the petition. The second part requests data on capacity, production, inventories, commercial shipments, export shipments, internal consumption, company transfers, employment, hours worked, wages paid, and purchases. Part three of the questionnaire involves financial data, including income-and-loss data on the product in question; data on capital expenditures, research and development expenses, and asset valuation; and questions regarding the impact of imports on capital and investment. The fourth and final part of the producer questionnaire requests sales prices and other price-related information and solicits allegations of lost revenues and lost sales attributable to the subject imports (petitioners are required to provide this information in the petition rather than the questionnaire).

Importer questionnaires generally consist of three parts. The first part relates to the organization and activities of the firm. The second part requests data on imports of the product in question; the quantity and value of commercial shipments, export shipments, internal consumption, and company transfers of such imports; and inventories of imports. The third part of the importer questionnaire solicits data on sales prices for subject imported merchandise and other price-related information similar to that requested in the producer questionnaire.

¹⁰ United States International Trade Commission(2007), “*Antidumping and Countervailing Duty Handbook*”, 12th Edition pp 13-130

Foreign producer questionnaires are composed of three parts. The first two parts consist of general questions about the firm's operations in the country in question and in the United States. The third part requests data on the firm's capacity, production, home-market shipments, exports to the United States and other markets, and inventories of the subject merchandise.

1.4 Summary of Antidumping Law:

In a nutshell, U.S antidumping cases can be summarized in to several steps from the initiation period to the final phase of determination and assessment duties.¹¹ After filing of the antidumping petition, the International Trade Administration¹² (ITA) has 20 days to determine the validity of the petition. Once the validity is determined the investigation phase is initiated. If the determination is affirmative then a course of action is taken unless the petitioner terminates or suspends the case.¹³ If the preliminary determination by the USITC is negative then the investigation is terminated (though there may still be negotiations among countries).¹⁴

The ITA determines the final "less than fair value" (LTFV) in situations where the cases are neither terminated nor suspended. Within 75 days of the preliminary determination, the ITA makes this final determination. When both the preliminary and final determination of ITA is affirmative, then the USITC must make its final determination of injury within 120 days of preliminary determination or 45 days of final determination. If the final determination by the USITC is also affirmative, the ITA has 7 days to implement the antidumping duties. When final determination of injury is affirmative, dumping margins are calculated for assessing the duties.

¹¹ Staiger, R. W., Wolak, F. A., Litan E. Robert, Katz, L. Michael and Leonard (1994), "Measuring industry specific protection: antidumping in the United States." *Brookings Paper on Economic Activity. Microeconomics*, 1: 51-118

¹² The ITA is a unit within the USDOC.

¹³ At any point of time after the preliminary determination by the ITA and before the final determination by the USITC, the investigation may be terminated or suspended at the request of petitioners. Termination is generally the result of some price agreement between the exporter named in the petition and the domestic industry.

¹⁴ Prusa, Thomas J.(1992), "Why are so many antidumping petitions withdrawn?," *Journal of International Economics*, 33(1/2)

The calculations of the antidumping duties are based on the prices of the imports. The final duties are assessed only if the preliminary LTFV determination is affirmative. Once the final determination is affirmative, antidumping duties apply to three possible ranges of imports. In case of negative preliminary LTFV determination, duties equal to the actual dumping margins will be imposed on the relevant imports entering the United States after the date of final determination. If, alternatively, the preliminary investigation is affirmative then duties are imposed after the preliminary investigation or in critical circumstances ninety days before the date of the preliminary determination.

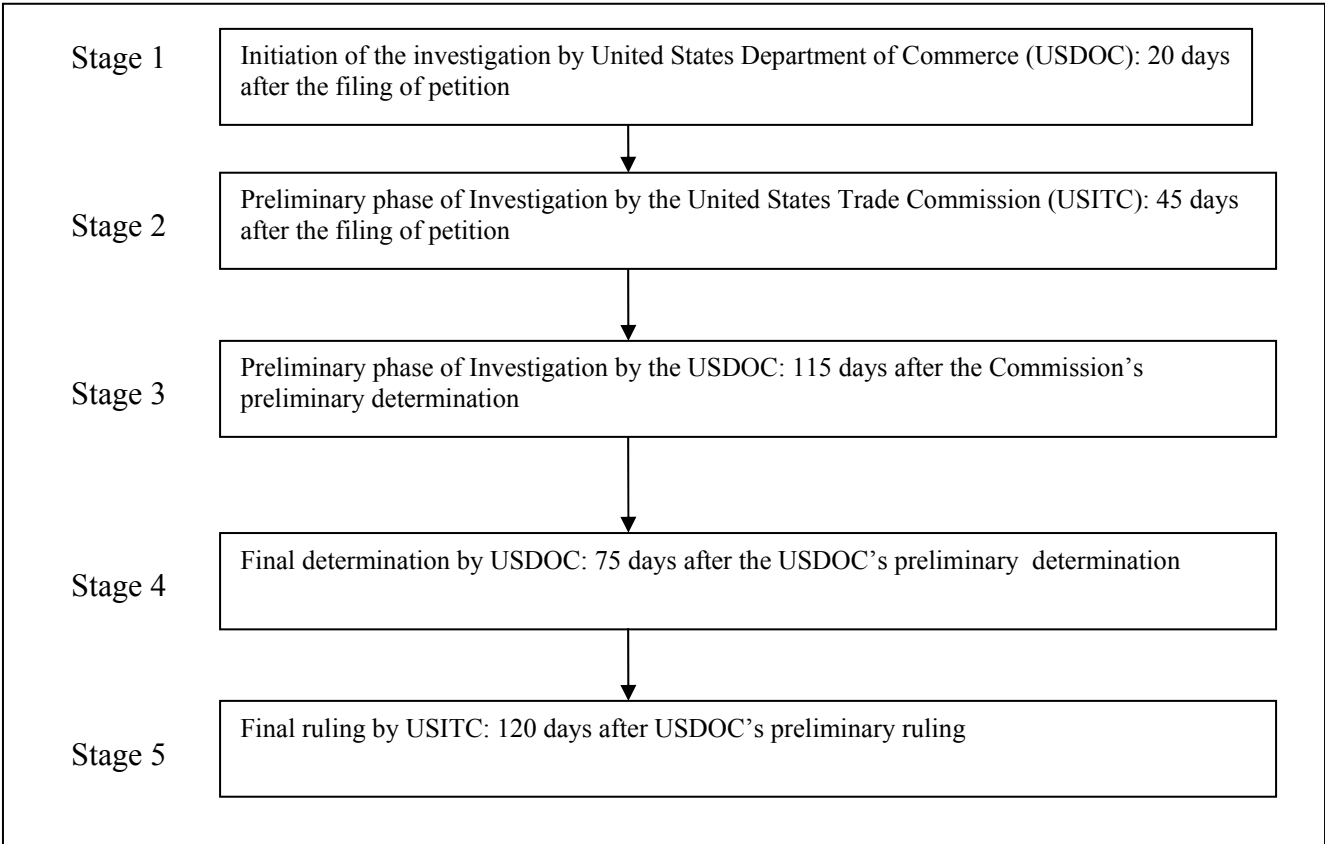


Figure 1.2: Flowchart depicting Process and Time Duration of AD Ruling

1. 5 Antidumping Cases filed during 1990-2006

Table 1.1 provides a detailed summary of the US antidumping cases filed during the period 1990-2006. The first column in the table reports the year of filing and the case number for each category.¹⁵ The second column in the table has the product against which antidumping investigation has been filed. The next two column reports the final disposition and the total number of antidumping cases filed in the year corresponding to the first column. From this table it is found that almost in every year an antidumping investigation case was filed against agricultural products. In the year 2001, there were a total of 92 petitions filed of which 7 involved agricultural products. In 2004, there were 8 petitions filed against agricultural products out of a total of 34 petitions. In 2006 there are 2 petitions involved agricultural products, or one-quarter of the total number of petitions filed¹⁶.

The countries which were subject to antidumping investigations of the agricultural sectors during this the period 1990-2006 is given in Table 1.2. As indicated, Canada is the most frequently targeted country (seven petitions), closely followed by China (six petitions). Such a finding is to be expected given that both of these countries are large trading partners with the United States. Petitions against countries that export only a limited amount of products to the United States (or whose exports of any given product to the U.S. tend to be limited), such as Turkey, are infrequently targeted by U.S. industries for antidumping duties.

¹⁵ The case number is assigned to each of the product and country. In other words each product and each country is categorized to a single case.

¹⁶ The analysis is table 1.1 is based on different data base than the data base used for figure 1.1. In figure 1.1 the cases are all combined together.

Table1.1: Anti Dumping Investigation Cases (731)

Fiscal Year/Case No	Product	Country	Final Disposition	Total number of AD cases
2006/1105	Lemon Juice	Argentina	N/A	8
2006/1106	Lemon Juice	Mexico	N/A	
2005/1089	Certain Orange Juice	Brazil	Affirmative	10
2004/1057	Processed Hazelnuts	Turkey	Terminated	34
2004/1062	Kosher Chicken	Canada	Negative	
2004/1063	Frozen or canned warm water shrimp	Brazil	Affirmative	
2004/1064	Frozen or canned warm water shrimp	China	Affirmative	
2004/1065	Frozen or canned warm water shrimp	Ecuador	Affirmative	
2004/1066	Frozen or canned warm water shrimp	India	Affirmative	
2004/1067	Frozen or canned warm water shrimp	Thailand	Affirmative	
2004/1068	Frozen or canned warm water shrimp	Vietnam	Affirmative	
2004/1076	Live Swine	Canada	Negative	
2002/1012	Frozen Fish Fillet	Vietnam	Affirmative	35
2002/1019	Durum and Hard Red Spring Wheat	Canada	Affirmative	
2001/923	Oleoresin paprika	India	Negative	92
2001/924	Mussels	Canada	Terminated	
2001/925	Green House Tomatoes	Canada	Negative	
2001/926	Spring Table Grapes	Chile	Negative	
2001/927	Spring table Grapes	Mexico	Negative	
2001/928	Softwood Lumber	Canada	Affirmative	
2001/948	Red Raspberries	Chile	Affirmative	
2000/892	Honey	Argentina	Affirmative	35
2000/893	Honey	China	Affirmative	
1999/812	Live Cattle	Canada	Negative	50
1999/813	Live Cattle	Mexico	Negative	
1998/776	Certain preserved mushrooms	Chile	Affirmative	33
1998/777	Certain preserved mushrooms	China	Affirmative	
1998/778	Certain preserved mushrooms	India	Affirmative	
1998/779	Certain preserved mushrooms	Indonesia	Affirmative	
1998/780	Butter Cookies	Denmark	Affirmative	
1997/768	Fresh Atlantic Salmon	Chile	Affirmative	23
1996/ 747	Fresh Tomatoes	Mexico	Suspended	13
1996/ 752	Craw Fish Tail Meat	China	Affirmative	
1995/722	Honey	China	Suspended	18
1995/734	Pasta	Italy	Affirmative	
1995/735	Pasta	Turkey	Affirmative	
1994/683	Fresh Garlic	China	Affirmative	59
1994/706	Canned Pineapple	Thailand	Affirmative	
1991/516	Kiwi Fruit	New Zealand	Affirmative	65
1990/454	Atlantic Salmon	Norway	Affirmative	21

Source: Import Injury Investigations Case Statistics (FY 1980-2005): USITC office of investigations, Jan 2008

Table 1.2: Countries Most Frequently Named in Antidumping Investigations of Agricultural Products: 1990-2004

Country Name	No of Cases Named
Argentina	1
Canada	7
Brazil	1
China	6
Chile	4
Ecuador	1
India	3
Mexico	3
Thailand	2
Indonesia	1
Vietnam	2
New-Zealand	1
Turkey	1

Source: Import Injury Investigations Case Statistics (FY 1980-2005); USITC office of investigations, Jan 2008

1.6 Antidumping Literature

While a large body of literature, both theoretical and empirical, has attempted to explain and show the strategic and incentive effects of antidumping (henceforth AD) duties, few studies have focused specifically on the issue of trade diversion and AD duties. An earlier research effort by Baldwin (1985) primarily focused on the determinants of administrative protection associated with AD¹⁷. More recently, much of the research effort associated with analysis of AD has attempted to determine the effects of the initial investigation and subsequent AD (if any) on imports by domestic countries.¹⁸ In these more recent efforts, researchers emphasize the construction of empirical models which provide quantitative estimates of AD related effects.

¹⁷ Baldwin, Robert E.(1985), “ The Political economy of U.S import policy”, *Cambridge Mass: MIT Press*

¹⁸ Thomas J. Prusa (1997)in Feenstra edited book, “ The Effects of U.S Trade Protection and Promotion Policies”

Both the earlier and more recent research efforts highlight the effects of AD measures; though from two different perspectives.¹⁹ One of the perspectives relates to addressing AD measures at micro level. The other perspective addresses AD measures from the macro perspective. For example, Krupp and Pollard (1992) explored the issue of import diversion by looking into the trade pattern of single industry but were unable to address the general issue of trade diversion from a wider perspective.²⁰ Staiger and Wolak (1994), however, estimated the trade effects of antidumping investigation with a particular emphasis on investigation or filing effects on the countries against which antidumping petition has been filed. They found some evidence of import diversion. Analysis by Prusa (1997) represents the first attempt to incorporate the issue of trade diversion into the research arena of antidumping trade investigation cases at the macro level. In this seminal research effort, Prusa used time series data for the period of 1978-1993 to examine the impact of an antidumping (AD) investigation on trade. The lined item²¹ tariff codes for each of the antidumping petitions filed between the years 1980-1988 were used in the analysis of both the manufacturing and non-manufacturing sectors.²² His analysis found trade diversion; i.e., that trade is diverted from the countries named in the petition to the countries not named in the petition.²³ If accurate, this would suggest that U.S. antidumping laws have the peculiar side effect of benefiting countries and firms that were not named in the investigation

¹⁹ Shortcomings associated with these efforts, however, are found with respect to data aggregation used in empirical analyses. Specifically, even though AD measures are officially taken at highly disaggregated levels of traded products (10 digit classifications), extant research has primarily been based on some form of aggregated data (e.g., 8 digit classifications) rather than the disaggregated classification associated with the petition and subsequent duties.

²⁰ Thomas J. Prusa (1997) in Feenstra edited book, "The Effects of U.S Trade Protection and Promotion Policies"

²¹ The lined item is generally defined as the Harmonized Tariff Schedule (HTS) items. The codes according to the HTS classification were obtained in either a 10-digit level, 8-digit level or at 4 digit level.

²² Prusa (1997) in his study has used both the manufacturing sector and the non-manufacturing sector data to examine the overall impact of antidumping investigation in trade.

²³ In other words, though imports from the named countries are restricted by means of the antidumping duty, imports from other countries are not restricted and increase to partially or totally mitigate the reduction in imports among named countries.

Konnings et al. (2001) examined the effects of European antidumping measures on import flows. The empirical analysis estimated the effects of European antidumping cases on import diversion from the subject country (the country named in the petition) to the non-subject country (the country not named in the petition). The results suggest that, in contrast to the United States, trade diversion is limited in the European economy. Hence, if accurate, the results by Konnings et al. (2001) would imply that the European antidumping mechanisms are effective in limiting imports; hence, likely benefiting domestic producers of like product.²⁴

In contrast to the analysis by Konnings et al. (2001), Ganguli (2005) examined the trade effects of Indian antidumping actions and found that antidumping actions (i.e., the imposition of duties) result in trade diversion in the Indian economy. These findings would suggest that Indian antidumping mechanisms work in a similar manner to those in the U.S. (based upon Prusa 2001)) but unlike those in Europe (based on analysis by Konnings et al. (2001)).

Niels (2003), found that antidumping measures in Mexico exhibited a significant trade destruction effect on the named countries—both in terms of import volume and import value. The effect is particularly strong for cases against non-US imports (including developing countries and the processed food, textile and rubber industries). Though this study does not find evidence of trade diversion (i.e., imports from the non-named countries have no statistical relationship with the imposition of antidumping measures) there is some evidence of reputation effect (this effect mainly measures the reputation of a country when an antidumping duty is imposed) on antidumping in Mexico.²⁵

²⁴ Konings, Vandenbussche and Springael (2001), “Import Diversion under European Antidumping Policy”, *Journal of Industry, Competition and Trade* 1(3): 283-299

²⁵ Niels Gunnar (2003), “Trade Diversion and Destruction Effects of Antidumping Policy: Empirical Evidence from Mexico”, *Erasmus University, Rotterdam*

In a 2001 study, Prusa (2001) documented two of the key costs of antidumping. First, once a country adopts the ideology of imposition of antidumping duty, it becomes difficult for the country to restrain its use. Second, the filing of a petition reduces trade among those countries named in the petition. This occurs regardless of whether the findings are affirmative or negative or rejected.²⁶ This implies the presence of investigation or “harassment effect” of the antidumping cases. In other words even if the final disposition for antidumping investigation is negative, trade from that country declines as result of the investigation.

The majority of research efforts in the area of antidumping have attempted to measure the effectiveness of antidumping legislation by aggregating over all commodities (manufacturing and agricultural). The seminal work on the effect of antidumping duties in the agricultural sector starts with Malhotra and Kassam (2006). Their study includes the agricultural AD investigation petitions filed with USITC during the period 1990-2002. They constructed an econometric model creating affirmative and negative dummy variables to explore the issue of trade diversion resulting from U.S. antidumping investigations of agricultural products. Shortly thereafter, Malhotra et al. (2008) expanded their earlier analysis and concluded that AD is an effective tool in restricting trade of agricultural products to the U.S. market. Their results, based on imports from both named and non-named countries imports, indicated that, unlike the manufacturing sector in the US, trade diversion towards countries not named in the petition is limited in the agricultural sector²⁷. Antidumping duties, however, were successful in restricting imports for agricultural products from the named countries.

²⁶ Prusa Thomas. J., (2001), “On the spread and impact of Antidumping”, *Canadian Journal of Economics*, 34(3): 591-611

²⁷ Malhotra, Rus and Kassam (2008), “ Antidumping Duties in Agricultural Sector: Trade Restricting or Trade Deflecting?”, *Global Economy Journal*, Vol 8(2)

Carter and Gunning (2008) also attempted to examine the degree to which U.S. agricultural imports targeted in AD and CVD cases are affected by an import duty. Their analysis also considers how imports from third countries, not named in the AD/CVD case, react to the imposition of an import duty levied on their competitors. In addition, they looked into the investigation effect of antidumping investigation. The data set used in this study is on the agricultural antidumping cases filed between the time period 1980-2005. Their results suggest that: (a) duties result in a negative trade diversion of agricultural products among the targeted countries, and (b) that the imposition of AD/CVD duties does not result in trade diversion among countries not named in the petition.²⁸

²⁸ In an alternative framework, researchers have claimed that foreign firms exercise market power. In most analyses, however, the empirical models have been based on the concept that the product market exhibits perfect competition. To introduce imperfect competition, Bown and Crowley (2007) assumed oligopolistic market power in a game theoretic perspective to demonstrate the effect of an AD duty on world trade flows. Bown and Crowley's three country model was used to illustrate that the imposition of an import duty by a country alters the trade pattern between the three countries. The theoretical model developed by the authors predicts an exporting firm's reaction to the imposition of import duty either against itself or else against the foreign firm.

CHAPTER 2

LITERATURE REVIEW AND MODEL SPECIFICATION

The concept of trade diversion has been widely used to examine the effectiveness of antidumping investigation cases. Importing countries, in general, claim that foreign firms (or a single firm) are dumping their product in the domestic market in an attempt to capture a larger market share. Following this argument, an antidumping petition is filed against the exporting country. In the process, the domestic industry must provide evidence of material injury to the USITC. If dumping is found to be occurring and if the USITC determines that dumping is resulting in material injury to the domestic industry, then an antidumping duty is imposed on the foreign firm(s).

2.1 Theoretical Model of Trade Diversion:

In the international trade literature, trade diversion reflects a situation where trade is diverted from a more efficient exporter towards a less efficient one due to a free trade agreement. In general, when an economy engages in trade it will try to import from the nation which is most efficient. Likewise, when a country imposes a tariff on imports from all nations, it will import the product from the country which is most efficient. But in the situation of a free trade agreement, if the agreement is signed with a less efficient producer, then there is the potential for trade to be diverted from a more efficient producer to a less efficient one. The concept of trade diversion is illustrated in Figure 2.1. For illustrative purposes, assume that there are three countries denoted as country A country B and country C and that trade between the countries is occurring. Country A is the importer while country B and country C are exporters.

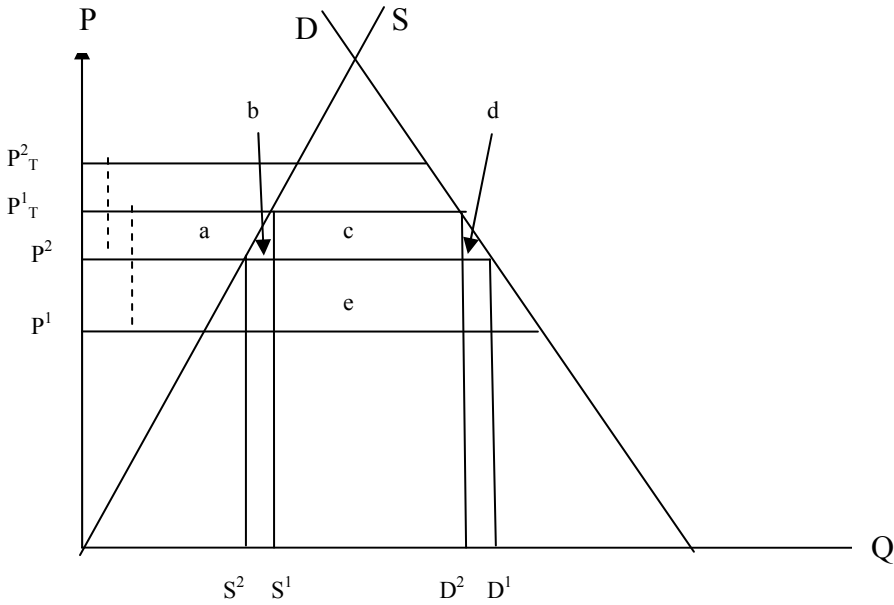


Figure 2.1: Theoretical Background of Trade Diversion

The demand and supply schedules for country A are given by the lines D and S, respectively. Free trade prices are given as P^1 and P^2 for country B and country C respectively. (Note: Country B is capable of supplying the product at a lower price than country C)²⁹. Now assume that tariff is imposed on both country B and country C. As a result their respective prices will increase to P^1_t and P^2_t . The size of the tariff is given by the dotted line. Since with the imposition of tariff results in the product price from country B being less than that for country C, country A will import from country B and will not trade initially with country C. Initial tariff revenue is given by the area (c+e).

Now assume, that country A is entering a free trade agreement with country C so $P^2_t=0$ but the prevailing tariff rate for country B remains at P^1_t . The domestic prices for country B and country C are given by P^1_t and P^2 . Since $P^2 < P^1_t$ country A will import the entire product from country C and there will be no trade with country B. Though the non-distorted (i.e., free trade)

²⁹ In order for this to be possible country C must have tariffs or other trade restrictions on imports from country B, or else all of C's market would be supplied by B

price in country B is less than the price in country C , trade is said to be diverted from a more efficient supplier to a less efficient supplier.

The theoretical background associated with international trade theory on trade diversion was discussed in the previous paragraph. The emphasis of this study relates to the issue of whether (a) antidumping duties influence the level of imports from named countries and (b) whether antidumping duties divert trade from countries named in the antidumping petition to countries not named in the petition. Hence we are focusing on the economic aspects of antidumping in the agricultural sector of the United States. One of the reasons may be attributed to the difference in cost of production in the two countries. Due to this cost differential, the country with a lower cost of production will be able to produce the good more efficiently and, hence offer a low selling price in the market compared to countries with higher costs of production. Additionally, there could be the pricing strategy followed by the exporting countries in the two different markets. Specifically, it is possible that an exporting country is acting as a monopolist in the domestic economy whereas it is behaving as a perfectly competitor in the international market. If so, then under certain conditions, the exporting country could sell the same product in the domestic market at a higher price than it is selling the product for in the international market.

2.2 Different Models and Estimation

A number of models have been considered in an attempt to evaluate the effect of antidumping cases and/or subsequent duties on trade in countries named in the petition (i.e., named countries) as well as countries not named in the petition (i.e., non-named countries). As would be expected, these models have gradually evolved over time. The evolution in these models reflects a number of factors. First, data sources have become “richer” which has allowed

for the development of more detailed models. Second, some of the initial models can be considered as “crude” by today’s standards and the newer models naturally build upon the theoretical construct and findings associated with the earlier models. Finally, questions being asked (i.e., hypothesis to be tested based on a given model specification) have expanded requiring alternative model specifications. The purpose of this section is to review some of the major research efforts in the arena of trade diversion. Since the empirical analysis conducted in this thesis relates to products produced by the agricultural sector, particular attention to studies that have considered trade diversion of agricultural products is given at the end of this section.

2.2.1 Konnings VandenBussche & Springael Model (2001)

The model considered by Konnings et al. (2001) analyzes the effects of antidumping investigations in the European Union. The model, which builds upon the work conducted by Prusa (1997), is given as follows:

$$\begin{aligned} \ln imports_{it}^j &= \alpha_0 + \alpha_1 \ln imports_{i,t_0-1}^j + \alpha_2 Duty_{it} + \alpha_3 Undertaking_{it} + \alpha_4 Termi_{it} \\ &+ \alpha_5 Duty_{it} \times Named_i + \alpha_6 Undertaking_{it} \times Named_i + \alpha_7 Termi_{it} \times Named_i + \alpha_8 Number_i \\ &+ \alpha_9 Number_i \times Named_i + \alpha_{10} Number_i + \varepsilon_{it}^j \end{aligned}$$

For this model, $\ln imports_{it}^j$ represents the natural log of imports for case i ($i=1, \dots, 246$) at time t ($t=0, \dots, 6$) for country group j (named, non-named). The variable $\ln imports_{it_0-1}^j$ is included in the model to control for initial import size effects and the evolution of imports prior to the antidumping investigation. Konnings et al. (2001) argue that this variable is relevant since the average total import value for named countries is smaller than the one for the non-named countries. The variable $duty_{it}$ is equal to 1 if there is a duty for the case i at time t . Similarly, the

dummy variable $Undertaking_{it}$ is equal to 1, if there is a price undertaking for case i at time t .³⁰ The discrete variable $termi_{it}$ (termination) takes on a value of 1 when there is termination for case i at time t . In addition the dummy variable $Named_t$ is equal to 1 if the country is named in the investigation (i.e., subject to a duty if found to be dumping). This dummy is also used to interact with the policy variables to capture the effects of antidumping actions on the named countries. The variable $number_t$ represents the log number of countries that are named in the petition. The data used in the analysis by Konnings et al. (2001) in their analysis is based on the 8-digit product based on Harmonized Tariff Schedule (HTS) and the period of investigation transcends the years 1985 to 1990.

The findings reported by Konnings et al (2001) indicate that trade diversion as a result of antidumping investigations (and possible duties) in the European Union is lower than in the United States (as found by Prusa, 1997). Two of the most relevant reasons for this finding, as given by the authors, are as follows. First, one of the differences is between the European Union antidumping policy and that of the United States reflects the level of dumping protection. In the United States, the duty is based on the estimated dumping margin whereas it is based on injury margin in the European Union (provided it is of lesser value than the dumping margin). This being the case, Konnings et al. (2001) argues that the lower level of protection offered European Union countries in antidumping cases limits the potential benefits that would otherwise be forthcoming from trade diversion among non-named countries.

A second argument proffered by Konnings et al. (2001) for the lower trade diversion in the European Union vis-à-vis the United States relates to "...the greater extent of uncertainty and

³⁰ A price undertaking is a commitment by the foreign importer to eliminate injury by pulling up its price in the European market. This commitment is imposed and closely monitored by the Commission and in case of violation heavily penalized (See Konnings et al. 2001)

information asymmetries surrounding the EU decision making process (p. 294).” Specifically, the authors argue that antidumping duties in the United States are more of a “technical nature” and, hence, not subject to a great deal of political influence. By comparison, antidumping decisions in the European Union are subject to a substantial political influence. Lower transparency and predictability in the European Union vis-à-vis the United States, according to the authors, potentially results in more prudent reaction among non-named countries when considering whether to increase imports following the European Union imposition of antidumping duties.

2.2.2 Prusa Model (1997)

The pioneering research of Prusa (1997) remains the most important and relevant research effort in the context of antidumping analysis. To analyze the effects of a duty on named countries, non-named countries and overall imports, the following model was considered by Prusa (1997)³¹:

$$\ln x_{i,tj} = \alpha + \beta_0 \ln x_{i,t-1} + \beta_1 \ln\left(\frac{x_{i,t-1}}{x_{i,t-2}}\right) + \beta_2 \text{NumNamed}_i + \beta_3 \text{LnDuty}_i + \beta_4 (\text{Dec.LnDuty}_i) + \beta_5 t_j + \beta_6 (t_j \text{Dec}_i) + \beta_7 \text{year}_{t_j}, \text{ where } j = 0, \dots, 5$$

The variable $\ln x_{i,tj}$ denotes the log of imports for case i at time t , where t_0 corresponds to the year petition was filed, t_1 to the period of investigation and $t_2 \dots t_5$ are the years following the outcome. The variable LnDuty_i denotes the size of the final duty (in log form). The variable Numnamed_i is discrete in nature and takes a value of 1 when the number of countries named in the petition is equal to or greater than three. The variable Dec_i is a decision dummy, equal to 1, if duties are imposed. Calendar year dummies are included as year_{t_j} to control for short-run effects arising in that year (and not specifically modeled in the equation) which might influence level of imports

³¹ The model was estimated using ordinary least squares.

(e.g., disruptions in supply from an exporting region). Finally, t_j is a trend variable which is included in the analysis in an attempt to “capture” long-run, structural macroeconomic changes.

Based on this model, Prusa (1997) was able to examine trade diversion. Results indicated a significant amount of trade diversion from the named countries to the non-named countries. In a later study (Prusa, 2001), the author used a different model to analyze the effect of an antidumping investigation and found evidence of an “investigation effect.” Specifically, he observed that even if the cases are rejected (i.e., no duties were imposed), imports from the named countries declined as a result of the investigation.

2.2.3 Ganguli Model (2005)

Analysis by Ganguli (2005) examined the trade effects of Indian antidumping actions. The model, which is a variant of that originally proposed by Prusa (2001), is given as follows:

$$\ln x_{i,t_k}^j = \alpha + \beta_0 \ln x_{i,t-1}^j + \beta_1 \ln x_{i,t-2}^j + \beta_2 (\ln FinalDuty_i \times t_0) + \beta_3 (\ln FinalDuty_i \times t_1) + \beta_4 (\ln FinalDuty_i \times t_2) + \beta_5 (\ln FinalDuty_i \times t_3) + \beta_6 (\ln FinalDuty_i \times t_4) + \beta_7 year_{t_k} + \varepsilon_{i,t_k}$$

The variable x_{i,t_k}^j denotes value of imports at time period t_k ($k=0\dots9$) for country group j (named, non-named). The time subscript t_0 refers to the period of initiation of the given case, t_1 denotes the period of investigation and t_2 through t_4 represent calendar year dummy variables subsequent to outcome of the investigation.³² The first two explanatory variables represent the value of imports in the two immediate periods prior to the case being initiated. These variables were included in the analysis to account for the size effect of earlier imports before the AD legislation sets in. The interaction term of $duty_i$ and time periods (in the form of $FinalDuty_i \times t_k$)

³² Ganguli. B. (2005), “The Trade Effects of Indian Antidumping Actions”, *The State University of New Jersey, Rutgers*

are introduced in the analysis to account for the “staggered effects” of the duty in the subsequent years following the time period of initiation. Finally the year term ($year_{tk}$) is included in the model in an attempt to “capture” any trend effect on imports due to changing macroeconomic conditions. The analysis conducted by Ganguli (2005) indicated a significant amount of trade diversion in the Indian economy as a result of antidumping investigation.

2.2.4 Carter & Gunning Model (2008)

The model developed by Carter and Gunning (2008) analyzes the agricultural AD investigation cases during the period 1980-2004. In a departure from the estimation techniques used by earlier researchers, the model presented by the authors uses Feasible Generalized Least Squares (FGLS) estimation to allow for AR(1) autocorrelation within panels and heteroscedasticity across panels by utilizing a consistent estimator for the variance matrix. Unlike the standard random effect estimation, this methodology uses robust standard errors to correct for heteroscedasticity across panels and AR(1) autocorrelation structure to capture serial correlation within a specific time period for each case. When data sets exhibit a large number of panels relative to the lesser number of time periods within each panel, this methodology generally provides a better fit to the data. The model considered by the authors is given as follows:

$$\ln(imports_{itj}) = \alpha + \sum_{j=0}^3 \beta_t \ln(duty_i) * D_j + \beta_4 \ln(foreignag_{itj}) + \beta_5 \ln(exchrates_{itj}) + \beta_6 \ln(domesticprod_{itj}) + \beta_7 \ln(imports_{it-1}) + \beta_8 Trend_{itj} + \beta_9 Year_{itj} + u_{itj}$$

where $u_{itj} = v_i + \varepsilon_{itj}$ and $j = -2...3$

The variable $\ln(duty_i)$ denotes the weighted average final tariff³³. The value of foreign agriculture, depicted as $\ln(foreignag_{ij})$, is introduced as a proxy for agriculture sector growth of the named country (operating as an export-supply shifter). The variable $\ln(exchrates_{ij})$ refers the change in exchange rate between the named country currency and US dollar. The third control variable $\ln(domesticprod_{ij})$ represents the quantity of U.S. agricultural production of commodity i (working as an import demand shifter). Another control variable, $\ln(imports_{it-1})$, denotes the value of U.S. imports of product i in period $t-1$. The variable is introduced into the analysis in an attempt to “capture” the import size effect and the effects of all other imports prior to the period of investigation. Two trend variables $trend_{ij}$ and $year_{ij}$ refers to the annualized index based on a month a case is initiated and to the actual years surrounding each case.

2.2.5 Malhotra, Rus and Kassam Model (2008)

Like that of Carter and Gunning (2008), the analysis by Malhotra et al. (2008) focuses on the effects of the antidumping investigations specific to the agricultural sector. Three separate set of equations were considered (OLS, fixed effect estimator and GMM estimator) to analyze the effect of antidumping investigations associated with agricultural products. Furthermore, separate analyses were conducted for the named country imports and the non-named country imports. The specification for the model considered by Malhotra et al. (2008) can be expressed as:

$$\ln imports_{it}^j = \beta_0 + \beta_1 \ln m_{it_0} - 1 + \beta_2 affirmative_i + \beta_3 negative_i + \beta_4 t_j + \beta_5 (affirmative_i * t_j) + \beta_6 (negative_i * t_j) + \phi_t year_t$$

The dependent variable ($\ln imports_{it}^j$) denotes imports of product i in t^{th} year for subject and non-subject countries. The explanatory variables $affirmative_t$ and $negative_t$ are decision dummies

³³ While the authors refer to a weighted average final duty in this paper, it is unclear how weights were assigned to each company since quantity data are not provided in the Federal Register

for affirmative and negative cases. The variable *affirmative* takes the value of 1 for a case if the decision was affirmative and if duties were subsequently imposed and the variable *negative* takes the value 1 if the decision was negative and no duties were imposed. The authors interacted ‘affirmative’ and ‘negative’ dummies with the ‘year’ dummy in order to capture the time trend of imports for affirmative and negative cases. This has been done both for named and non-named countries. In estimating the above equation, the authors control for macroeconomic influences, such as exchange rate changes and business cycles, by including calendar year dummies. In this paper, the researchers estimated the effect of antidumping duties on the named countries and the non-named countries.³⁴

2.3 Econometric Issues

The empirical models considered in the previous sections are largely based on dynamic panel data. A generalized method of moments (GMM) estimator proposed by Arellano and Bond is used in two of these studies (Ganguli, 2005 and Malhotra et al, 2008). This method is used to capture both the cross country aspects as well as the temporal aspects of changing patterns in import flows. The basic model used in these studies is:

$$y_{i,t} = \alpha + \partial_1 y_{i,t-1} + \partial_2 y_{i,t-2} + x_{i,t} \beta + u_{it} \text{-----} (1)$$

In this model $y_{i,t}$ is used to measure the dollar value of imports and which depends on its own lag. ∂_1 and ∂_2 are scalars, $x_{i,t}$ is the $I \times K$ vector of explanatory variables and β is $K \times I$ vector. In this model it is assumed that the error term follows a one way error component model.

$$u_{it} = \mu_i + v_{it}, \text{-----} (2)$$

³⁴ Malhotra, Rus and Kassam (2008), “Antidumping Duties in the Agricultural Sector : Trade Restricting or Trade Deflecting”, Global Economy Journal, Vol 8(2)

where $\mu_i \sim IID (0, \sigma_u^2)$ and $v_{it} \sim IID (0, \sigma_v^2)$ independent of each other. μ_i denotes the individual specific residual, differing across cases but constant for a given case. For example, a country with comparative advantage in wheat is likely to have large imports in subsequent years and hence have a large value of μ_i . Time is also normalized so that $t=0$ denotes the year the petition was filed ; hence $t=-1$ refers to the year prior to the year prior to the filing, $t=-2$ refers to the year prior to that, $t=+1$ refers to the year after the filing, $t=+2$ refers to the year second year after filing and so on. Thus, the cross section is identified by the cases whereas the time series variation is driven by annual observation on import trade before and after the AD petition.

The standard method for estimating equation (1) is given by the fixed- effects estimator since it eliminates μ_i but the estimator will be biased and inconsistent since $y_{i,t-1}$ will be correlated with FE estimator residual by construction. A similar problem will be there in case of $y_{i,t-2}$. The extent of inconsistency will vary from application to application but in general the problem decreases as the longer the time series considered in the analysis increases.³⁵

To resolve this problem, the first differences of equation (1) can be taken. A two step GMM estimator is suggested by Arellano and Bond (1991) which yields a consistent estimator provided that there is no second order serial correlation among the errors. Therefore in order to take the consistent estimator of ∂_1, ∂_2 and β the first difference of equation one is taken. This eliminates the individual country specific effect μ_i .

³⁵ Prusa Thomas. J., (2001), "On the spread and impact of Antidumping", *Canadian Journal of Economics*, 34(3): 591-611

The following equation is derived:

$$y_{i,t} - y_{i,t-1} = \alpha + \hat{\delta}_1(y_{i,t-1} - y_{i,t-2}) + \hat{\delta}_2(y_{i,t-2} - y_{i,t-3}) + (x_{i,t} - x_{i,t-1})\beta + (v_{i,t} - v_{i,t-1}) \quad \text{-----} \quad (3)$$

By construction $y_{i,t-1}$ and $y_{i,t-2}$ will be correlated with the transformed residual $(v_{i,t} - v_{i,t-1})$, so there is a need to estimate the equation (3) by means of instrumental variables. Both $y_{i,t-3}$ and lagged values of $x_{i,t}$ are valid instruments. According to Arellano and Bond (1991), additional valid instruments can be obtained if one utilizes the orthogonality condition that exists between the lagged values of $y_{i,t}$ and the disturbances $v_{i,t}$. For time periods $t=0,1,2,3$ one can use additional lags of $y_{i,t}$; for instance, for the period $t=0$, $y_{i,t-3}$ can be used as an additional instrument. Additional lags can be added for each forward period.³⁶

2.4 Modeling and Data Issue Related to Proposed Research

2.4.1 Modeling Issues

Models that have been used to examine the effects of antidumping investigations in the United States and other parts of the world were considered in the previous section. While some of these models were used to evaluate the effect of antidumping investigations on total imports, other models considered only agricultural products. With few exceptions, the previously discussed models made no attempt to incorporate the “spread out” of antidumping duty (Ganguli, 2005 being the primary exception) nor did they attempt to incorporate the effect of changing exchange rates on imports due to antidumping investigation (Carter and Gunning being the primary exception). In the context of agricultural sector it is worthwhile to note both the spread

³⁶ See Baltagi, Baldi. H(1995). “Econometric Analysis of Panel Data”, *Wiley Press* for the discussion of panel data analysis and its application.

2) Prusa (1997) model, which is discussed in Section 2.2.2³⁹

3) Malhotra et al. (2008) model which is discussed in Section 2.2.5⁴⁰

2.4.2 Timeframe of Analysis and Data Considerations

This study concentrates on the antidumping cases filed during the period 1994-2004 and is based on a subset of the cases reported in Table 1.1.⁴¹ To examine the effect of antidumping investigation time series data for the period of 1992 to 2007 has been constructed from data available on the USITC and USDA websites⁴². The following steps were used to create the data set: (a) the monthly data at 10-digit disaggregated level for the antidumping cases mentioned in the Federal Reserve notice was downloaded from the USDA website; (b) to obtain a meaningful idea of the overall product category and to obtain a higher level of precision for the econometric results, relevant data were aggregated from a 10-digit to an 8-digit product code level; (c) relevant data were aggregated from a monthly level to a yearly level to remain for the purpose of consistency with the models discussed in Section 2.2; (d) consideration is given to each product category for a range of six-years with two years preceding the year of initiation, the third year corresponding to the year of initiation of the case, and the subsequent two years following the year of initiation. (e) all exporting countries are included in the analysis even if any given

³⁹ The actual model used by Prusa(1997) considered the effect of antidumping on overall US economy with agricultural as well as non agricultural products. However such analysis might ignore sector specific impacts which get abstracted at a broad level of aggregation. To get a better insight for agricultural sector in specific I have looked into much more details of each product category.

⁴⁰ The same model is compared extending the time period of 1992-2007. The primary objective for such extension was to investigate for any possible trade diversion of agricultural products which are filed during the time period 1994-2004 and provide a wider coverage of products. The cases which are terminated are excluded in this study.

⁴¹ The cases which are filed in either 2005 or 2006 are not taken into account since, as discussed in a subsequent chapter, analysis requires two to three years of data post investigation. Similarly the cases filed prior 1994 are not considered since the Harmonized Tariff Schedule (HTS) classification changed in 1988. In order to keep this study as accurate as possible the HTS classification of the recent version has been used.

⁴² <http://www.fas.usda.gov/ustrade/>

country accounts for a small share of U.S. total imports for that product category.⁴³ Overall imports and imports from named countries for each investigation are graphically illustrated in Appendix A (affirmative outcomes) and Appendix B (negative and terminated outcomes) .

The data for average duty is constructed from the Federal Register. In the Register for each product category, the actual weighted margin of antidumping duty for each firm for that product category is given. The value of those weighted margin is used to construct the average duty. For example antidumping duty has been imposed on each of the 10 firms who are exporting frozen fish fillet to United States. The total value AD duty of the exporting firms for that product is taken and then it has been divided by the number of firms to get the average duty for that product. To the extent that this simple average may not reflect the weighted average, results may be misleading. Since the quantities exported by each company are not provided in the Federal Register, however, an average weighted duty by product and country cannot be constructed.

⁴³ The investigations reports and results are obtained from the USITC website. In addition to this, Federal Register Notice has been studied extensively to obtain the code of the products which are named in the petition. The import injury investigation case statistics (1980-2005) published by United States International Trade Commission has been used for the cases.

CHAPTER 3

RESULTS AND DISCUSSION

This section contains the analysis of the results of the effect of antidumping investigation on trade diversion. The agricultural antidumping investigations filed during the period 1994-2004 are taken into consideration. The models discussed in the previous chapters are tested on the data set of agricultural imports for the period 1992-2007

3.1 Konnings Vandebussche, and Springael Model

$$\begin{aligned} \ln imports_{it}^j = & \alpha_0 + \alpha_1 \ln imports_{i,t_0-1}^j + \alpha_2 Duty_{it} + \alpha_3 Negative_{it} + \alpha_4 Termi_{it} \\ & + \alpha_5 Duty_{it} \times Named_i + \alpha_6 Negative_{it} \times Named_i + \alpha_7 Termi_{it} \times Named_i + \alpha_8 Number_i \\ & + \alpha_9 Number_i \times Named_i + \alpha_{10} Named_i + \varepsilon_{it}^j \dots\dots\dots(3.1) \end{aligned}$$

In this equation, the dependent variable ($\ln imports_{it}^j$) represents the natural log of imports for case i (i=1.....,38) at time t for country group j (named, non-named). The variable $\ln imports_{i,t_0-1}^j$ is used to control for initial import size effects and the evolution of imports prior to the antidumping investigation. Other explanatory variables including $Duty_{it}$, $Negative_{it}$ ⁴⁴, $Termi_{it}$ (termination) and $Named_{it}$ are included in this equation to see the effect of these variables on imports. The variable $duty_{it}$ is equal to 1 if there is a duty for the case i at time t and 0 otherwise. Similarly, the variable $Negative_{it}$ is discrete in nature which takes on a value of 1 if there is a negative decision for case i at time t. Similarly, the variable $termi_{it}$ (termination) is discrete in nature which takes a value equal to 1 when there is termination for case i at time t. The dummy variable $named_{it}$ is equal to 1 if the country is named in the petition for case i. The variable defined as $Number_t$ represents the number of named countries in an antidumping case. As argued by Prusa (1997), trade diversion effects should decline as the number of countries named in the petition increases. Following the model suggested by Konnings et al. (2001), interactions

⁴⁴ This model has replaced the undertaking variable given in by Konnings et al. (2001) with the negative variable.

of the discrete variables with the policy variable (*Named*) are included in the analysis to capture the effect of AD actions on named countries.⁴⁵

The estimates associated with the European model (i.e, Konnings et al.) are provided in Table 3.1. OLS estimates are reported in the first column whereas the robust estimates are given in the next column. The robust estimates are used to correct for heteroscedasticity in the data (i.e., within group observations over time are not independent while the observations across groups are)

Table 3.1: Effects of Antidumping actions on imports by Named and Non-named Countries.

	(1) OLS	(2) Robust
Constant (α_0)	.71209*** (.0664)	.71209*** (.0770)
Log of imports (t-1) (α_1)	.904766*** (.0097)	.904766*** (.0095)
Duty (D) (α_2)	.419571 (1.132)	.419571*** (.1168)
Termination(T) (α_3)	.39689 (.7907)	.39689*** (.0512)
Negative(N) (α_4)	.30343 (1.667)	.30343 (.1798)
Duty× Named (α_5)	-.59864 (1.130)	-.59864*** (.0656)
Termination ×Named (α_6)	-.58909 (.8835)	-.58909*** (.1269)
Negative ×Named (α_7)	-.17206 (1.62)	-.17206 (.1364)
Number (Num) (α_8)	-.01286 (.0163)	-.01286 (.0146)
Number × Named (α_9)	.01520 (.0536)	.01520 (.0270)
Named (α_{10})	.34090 (.2134)	.34090*** (.0958)
Year Dummies	Yes	yes
R-Sqaure	0.86	0.86
Number of Observations	1830	1830

⁴⁵ Year dummies are also included but not reported to control for aggregate macroeconomic shocks

The effects of imports or trade diversion can be analyzed by comparing the effects of duties, negative decision, and termination with the same variables interacted with the discrete variable $Named_i$. To illustrate the interpretation of the above equation, the effect of duties on the import values of the non-named countries is measured by the coefficient of α_2 and on the named countries is measured by the sum of α_2 and α_5 .⁴⁶ Based on the information presented in Table 3.1, the imposition of duties was found to result in a decline in imports from named countries of about 18% (i.e., $\alpha_2 + \alpha_5 = -0.18$) while imports from non-named countries were found to increase by 41% (i.e., $\alpha_2 = 0.419$)⁴⁷. For terminated cases, imports from non-named countries were found to increase by 39% while imports among named countries were found to decline by 19% (i.e., $\alpha_4 + \alpha_7 = -0.19$). For negative cases, finally, imports from non-named countries were found to increase by 30 % (i.e., $\alpha_3 = 0.303$) while imports from the named countries were found to increase by 13% (i.e., $\alpha_3 + \alpha_5 = 0.13$)

In addition to the overall import model, separate analyses were conducted for the named countries and non-named countries (Table 3.2).⁴⁸ As indicated, the analysis specific to named countries suggests that imposition of duties result in an import reduction among named countries equal to 13% which is only marginally different from the 18% that was estimated for the overall import model (i.e., Table 3.1). Cases that are terminated were found to result in an import reduction among named countries equal to 16% which is similar to that found with the overall import model (19%). Imports among named countries were found to increase by almost 10% in

⁴⁶ Konnings, et al. (2001), "Import Diversion under European Antidumping Policy", *Journal of Industry, Competition and Trade* 1(3): 283-299

⁴⁷ This value is calculated based on what Konnings et al.(2001) have mentioned in their model.

⁴⁸ As noted by Konnings et al. (2001), estimation of the overall import equation imposes a restriction that the initial import levels among named and non-named countries are the same. Given that this restriction is likely not valid, the authors argue for analysis of split samples (i.e., named versus non-named countries). Such a split sample analysis is conducted in most instances in this study.

cases with a negative finding. Terminated cases were found to result in about a 40% increase in imports among non-named countries.

Table 3.2: Effects of Antidumping Actions on Imports (Named vs Non-named)

	(1) Named		(2) Non-named	
	OLS	Robust	OLS	Robust
Constant	.52428** (.2735)	.52428* (.3123)	.72163*** (.0693)	.72163*** (.0782)
Log of imports (t-1)	.95702*** (.0243)	.95702*** (.0302)	.90579*** (.0102)	.90579*** (.0098)
Duty (D)	-.13478 (.1169)	-.13478 (.1169)		
Termination(T)	-.16082 (.2041)	-.16082 (.1231)	.40298 (.8143)	.40298 (.0513)
Negative(N)	.09583 (.1399)	.09583 (.0731)		
Number (Num)	-.01335 (.0283)	-.01335 (.0272)	-.012205 (.0168)	-.012205 (.0146)
Year Dummies	Yes	Yes	Yes	Yes
R-Square	.093	.093	0.83	0.83
Number of Observations	149	149	1681	1681

3.2 Prusa Model

The basic model of Prusa (1997), as discussed in Chapter 2, is as follows:

$$\ln x_{i,tj} = \alpha + \beta_0 \ln x_{i,t-1} + \beta_1 \ln\left(\frac{x_{i,t-1}}{x_{i,t-2}}\right) + \beta_2 \text{NumNamed}_i + \beta_3 \text{LnDuty}_i + \beta_4 (\text{Dec.LnDuty}_i) + \beta_5 t_j + \beta_6 (t_j \text{Dec}_i) + \beta_7 \text{year}_{tj} \dots \dots \dots (3.3)$$

The variable Duty_i denotes the size of the final duty. The variable Numnamed_i denotes a dummy variable equal to 1 when two or more countries are named in the petition.⁴⁹ The variable Dec_i is a discrete variable taking on a value of 1 if duties are imposed. Calendar year dummies, denoted as year_{tj} , are introduced into the model in an attempt to capture macroeconomic effects arising in that year (and not specifically modeled in the equation) which might influence level of imports. Finally, the variable t_j represents a trend variable ranging from -3 to +3 with the value of 0 representing the year in which the case was filed.

Estimates associated with overall imports are presented in Table 3.6. Variables t1-t3 in the table refers to the post-investigation years. With canned mushrooms, for example, the case was initiated in 1997 with a decision rendered in 1998. The variables t1 through t3 denote the years from 1998 through 2000. Two separate set of regression⁵⁰ estimates associated with equation 3.3 are calculated for overall imports. The first regression corresponds with the actual unweighted duties associated with each product. Rather than using the actual duty levels, the second regression uses two dummy variables to isolate the effects of duties on imports (the first dummy variable includes those products for which low duties are imposed while the second

⁴⁹ A modification from the original model is used in this study. Specifically, whereas Prusa (1997) used three or more countries to define *Numnamed*, this study uses two or more countries.

⁵⁰ OLS estimates with robust standard error are used in this model. It alleviates the problem of heteroskedasticity associated with the estimates.

dummy variable includes those products for which high duties are imposed).⁵¹ These two dummy variables are constructed relative to moderate level of duties. In this model, moderate duties are used as the reference (for purposes of analysis, the values of duties in excess of 10% are considered as high duties while those duties less than 9 % are considered as low duties).⁵²

The results in Table 3.3 suggest that there was no initial effect on overall imports from the imposition of antidumping duties (i.e., there is no decrease in imports during the one-year investigation phase, even though duties are collected during this phase). The estimated duty effect was not only insignificant but positive; suggesting a negligible amount of increased imports (approximately 3%).⁵³ Overall, imports increased (after the first and second year following the decision) for cases where no duties were imposed⁵⁴. However, overall imports for the product categories that resulted in affirmative decisions were found to decline in the year following the initiation of antidumping investigation cases. Specifically, a decline in imports of about 24% to 26% (depending upon whether actual unweighted duties are used in the analysis or whether high and low dummy duties are included) was found⁵⁵. But in the consecutive years, no such decline was found.

Apart from analyzing the overall imports, named and non-named countries were considered separately. The effect of duties on named countries imports is presented in Table

⁵¹ These two dummy variables are constructed relative to moderate level of duties. In this model, the reference level for moderate duties

⁵² Even if a case is rejected a duty level is estimated by the USDOC. Until the final injury determination, duties are collected as a bond pending the final outcome of the decision (Prusa (1997)). We do not have cases within the duty range 9% to 10%.

⁵³ $3\% = (0.027 = 0.0211 + 0.006)$

⁵⁴ The time trend variables are positive in those years. The estimates of these variables help to determine the effect on overall imports if cases are not affirmative. The corresponding regression results are mentioned in the second column.

⁵⁵ The values are calculated as $[\exp(-.28)-1]=.24$ and $[\exp(-.31)-1]=.26$

3.4⁵⁶. The estimated initial duty effect was found to be negative and statistically significant and indicated a decline in imports of about 5% ($-0.05 = .01701 - .06840$)⁵⁷ among named countries (i.e., there is decrease in imports during the one-year investigation phase when estimated duties are collected but would be returned if a negative finding was forthcoming). Results from the dummy variable specification indicated that high duties had a somewhat higher impact (11% based on the parameter estimate of high duty, affirmative) on imports from the named countries than did low duties (10% based on low duty, affirmative). Though the results were not statistically significant, there was an estimated decline in imports of about 35% in the year following an affirmative decision (the time -decision cross- effect helps to determine this)⁵⁸. By the second year following an affirmative decision, imports from named countries were estimated to be only 6% below pre-decision imports, *ceteris paribus*.

The results for non-named countries are given in Table 3.5. These results can be used to characterize the extent of trade diversion. The results, though not statistically significant, show that there was an estimated increase in imports from the non-named countries equal to approximately 4% ($0.0379 = .0242 + .0137$) during the investigation phase of the proceedings. From the results it can be concluded that low duty dummies had a significant effect on the values of imports from the non-named countries during the investigation phase.⁵⁹ There was also a decline in imports by 26% in the year after the final affirmative decision is made.⁶⁰

⁵⁶ The results from Table 3.7 shows that antidumping duty has no significant effect on overall imports but the number of countries named in the petition is highly significant in determining the value of imports. The duty dummies though significant has negative impact on import. The time effect dummies are all positive except the third year dummy following the investigation. However overall import fall in the first year following the decision for cases where duties are imposed.

⁵⁷ This calculation is based on as given in Prusa(1997)

⁵⁸ The values are calculated as $[\exp(-.12)-1]=.11$, $[\exp(-.11)-1]=.10$ and $[\exp(-.44)-1]=.35$

⁵⁹ In this analysis average duty for both the named countries and non-named countries is imposed to see what would be the effect on import if duty is imposed on the non-named countries import

Table 3.3: OLS estimates for Overall imports

<i>Variable</i>	<i>Overall Imports</i>	
	<i>Actual Duty(1)</i>	<i>Duty Dummy(2)</i>
Constant (α)	.33252*** (.1465)	.48695*** (.2130)
Log imports(t-1) (β_0)	.94203*** (.0096)	.93995*** (.0096)
Ln growth (β_1)	-.15201*** (.0381)	-.14991*** (.0381)
Number \geq 2 (dummy) (β_2)	.13777*** (.0609)	.14083*** (.0664)
<i>Size of Duty (β_3)</i>		
Log Duty	.02110 (.0320)	
Low Duty(dummy)		-.19606 (.2150)
High Duty(dummy)		-.09117 (.1900)
<i>Cross Effect: (Duty* Decision)(β_4)</i>		
Log Duty (affirmative)	.00621 (.0320)	
Low duty (affirmative)		.15676 (.1782)
High duty (affirmative)		.05598 (.1370)
<i>Years Following Antidumping Petition (dummies) (β_5)</i>		
T1	.35111*** (.1326)	.37793*** (.1359)
T2	-.01267 (.1289)	.02615 (.1348)
T3	-.23651 (.1734)	-.19677 (.1743)
<i>Cross Effect Years* decision (β_6)</i>		
T1* affirmative	-.28174** (.1552)	-.32249** (.1635)
T2 *affirmative	.11828 (.1534)	.06681 (.1625)
T3* affirmative	.19957 (.1950)	.14664 (.1983)
R-Square	0.88	0.88
Number of Observations	1299	1304

Note: Absolute value of standard errors in parentheses; * significant at 10%, ** significant at 5% *** significant at 1 % (the years t1, t2 and t3 are the post investigation years

⁶⁰ Interestingly, one can also conclude from the result that the variable number has statistically significant effect on overall imports and the imports from the non-named countries. The result is significant at 5 percent level.

Table 3.4: OLS estimates for Named Countries

<i>Variable</i>	<i>Named Imports</i>	
	<i>Actual Duty(1)</i>	<i>Duty Dummy(2)</i>
Constant (α)	.48067 (.4311)	.04195 (.3957)
Log imports(t-1) (β_0)	.96016*** (.0278)	.96925*** (.0272)
Ln growth (β_1)	-.21849 (.2440)	-.22998 (.2387)
Number \geq 2 (dummy) (β_2)	.04268 (.1123)	.02691 (.1153)
<i>Size of Duty (β_3)</i>		
Log Duty	.01701 (.0484)	
Low Duty(dummy)		.45514* (.2493)
High Duty(dummy)		.32099 (.2441)
<i>Cross Effect: (Duty* Decision) (β_4)</i>		
Log Duty (affirmative)	-.068400* (.0416)	
Low duty (affirmative)		-.11100 (.1703)
High duty (affirmative)		-.12324 (.1548)
<i>Years Following Antidumping Petition (dummies) (β_5)</i>		
T1	.01897 (.1132)	.06897 (.1178)
T2	-.02478 (.1162)	.04591 (.1233)
T3	-.25382 (.1421)	-.16863 (.1460)
<i>Cross Effect Years* decision (β_6)</i>		
T1* Affirmative	-.35772 (.2396)	-.44472 (.2959)
T2 Affirmative	.04058 (.2328)	-.07010 (.2222)
T3 Affirmative	.34748 (.2341)	.22390 (.2319)
R-Sqaure	0.92	0.92
Number of Observations	112	116

Note: Absolute value of standard errors in parentheses; * significant at 10%, ** significant at 5% *** significant at 1%(the years t1, t2 and t3 are the post investigation years

Table 3.5: OLS Estimates for Non-Named Countries

<i>Variable</i>	<i>Non-named Imports</i>	
	<i>Actual Duty(1)</i>	<i>Duty Dummy(2)</i>
Constant (α)	.31799*** (.1543)	65767*** (.2514)
Log imports(t-1) (β_0)	.93731*** (.0112)	.93112*** (.0118)
Ln growth (β_1)	-.14975*** (.0389)	-.14547*** (.0279)
Number \geq 2 (dummy) (β_2)	.14143*** (.0666)	.140299** (.0791)
<i>Size of Duty (β_3)</i>		
Log Duty	.02428 (.0371)	
Low Duty(dummy)		-.50197** (.2720)
High Duty(dummy)		-.22720 (.2190)
<i>Cross Effect: (Duty* Decision) (β_4)</i>		
Log Duty (affirmative)	.01371 (.0355)	
Low duty (affirmative)		.31711 (.2277)
High duty (affirmative)		.06629 (.1602)
<i>Years Following Antidumping Petition (dummies)(β_5)</i>		
T1	.38801*** (.1544)	.41257** (.1781)
T2	-.01611 (.1482)	.00769 (.1730)
T3	-.23654 (.1769)	-.21171 (.1703)
<i>Cross Effect Years* decision (β_6)</i>		
T1* Affirmative	-.28236 (.1769)	-.31035 (.2071)
T2 Affirmative	.13135 (.1727)	.10609 (.2022)
T3 Affirmative	.19640 (.2204)	.16871 (.2004)
R-Sqaure	0.85	0.85
Number of Observations	1187	1188

Note: Absolute value of standard errors in parentheses; * significant at 10%, ** significant at 5% *** significant at 1%(the years t1, t2 and t3 are the post investigation years

3.3 Malhotra, Rus, and Kassam Model

As discussed in the previous chapter, the Malhotra et al (2008) model was defined as⁶¹:

$$\ln imports_{it}^j = \beta_0 + \beta_1 \ln m_{it0-1} + \beta_2 affirmative_i + \beta_3 negative_i + \beta_4 t_j + \beta_5 (affirmative_i * t_j) + \beta_6 (negative_i * t_j) + \phi_t year_t \dots \dots \dots (3.2)$$

where $\ln imports_{it}^j$ represents the natural log of imports for case i ($i=1 \dots \dots \dots 35$) at time $t = (-1, -2, 0, 1, 2, 3)$ for country group j (named and non-named). The variable $\ln m_{it0-1}$ refers to the one-period lags of imports (in log form) prior to the initiation of the case. This variable is included in an attempt to control for the size effect of imports (i.e., that imports will vary by case) and for the evolution of imports prior to the antidumping investigation. The variable $affirmative_i$ takes the value of 1 for a case if the decision was affirmative (implying that duties were subsequently imposed). Similarly the variable $negative_i$ takes the value 1 if the decision was negative (implying that no duties were subsequently imposed). The interaction of $affirmative_i$ and $negative_i$ dummies with the $year$ dummy is included in the analysis in an attempt to ‘capture’ the time trend of imports for affirmative and negative cases.⁶² The variable t_j is a trend variable which takes a value of zero for years prior to when a decision is made, a value of one for the first year after the investigation, a value of two for the second year after the investigation, etc. This trend variable is included in an attempt to ‘capture’ import trends for the control group (which consists of the non-affirmative cases). In estimating the above equation, finally, control for macroeconomic influences such as exchange rate changes and business cycles are taken into account by including calendar year dummies, denoted by the variable $year_t$.

⁶¹ Following the procedure outlined by Malhotra et al. (2008), terminated cases are not included in the analysis. Hence, the number of observations in this analysis are less than in the
⁶² This is done for both the named and non-named countries.

The analysis conducted by Malhotra et al (2008) included separate regressions for named and non-named countries imports. The current study extends this analysis by also analyzing overall imports. In addition, the analyses conducted by Malhotra et al (2008) employed OLS and the Generalized Method of Moments model (GMM). The first differencing of equation 3.2 yields a first regressor which is correlated with the remaining time dependent part of the differenced residual. The GMM estimator is used to eliminate this problem. Here the Arellano Bond (AB) method is used as a GMM estimator. The Arellano Bond method estimates a dynamic panel by first differencing it in order to eliminate the individual error component and then estimating it by employing as instruments higher lags of the dependent and the independent variables as well as the differences of the regressors.⁶³

The OLS estimates presented in Table 3.6 suggest that overall imports decline in the first year subsequent to an affirmative decision but caution should be used in interpreting this variable since it is statistically insignificant. Based on the method given by Malhotra et al. (2008), the results for overall imports are calculated for the affirmative variable [$\exp(-.0238)-1 = -0.023$] and suggest a decrease in imports of approximately two percent. The results from the Arellano Bond GMM estimation method suggest negligible decline in imports the year following an affirmative decision ($[\exp(.0046)-1 = -0.0004]$). Like the OLS model, the Arellano Bond indicated no statistically significant change in imports in the first year following an affirmative decision.

⁶³ Malhotra, Rus and Kassam(2008), “ Antidumping Duties in Agricultural Sector: Trade Restricting or Trade Deflecting?”, Global Economy Journal, Vol 8(2)

Table 3.6: Antidumping action and Value of Overall Imports

<i>Dependent Variable</i> <i>Log Value of Imports</i>	<i>OLS</i>	<i>Arellano Bond</i>
log value of imports in t-1 (β_1)	.91920*** (.0088)	.45172*** (.0894)
dummy - affirmative decision (β_2)	.11836 (.1251)	.02863 (.1566)
dummy - negative decision(β_3)	-.09565 (.1643)	-.25187 (.2253)
Affirmative*t1(β_5)	-.02384 (.1322)	.00460 (.1565)
Affirmative*t2	.054012 (.1304)	.03710 (.2082)
Affirmative*t3	-.12097 (.1284)	-.10985 (.2937)
Negative*t1(β_6)	.42517** (.1962)	.33460 (.2072)
Negative*t2	.080081 (.1982)	.04844 (.2376)
Negative*t3	.255157 (.2314)	.15990 (.3748)
Year Dummies (β_4)	Yes	Yes
Constant(β_0)	.583836*** (.0945)	.02725 (.3748)
No of Observations	1558	1103
R-Square	0.87	

Note: Absolute value of standard errors in parentheses; * significant at 10%, ** significant at 5%

*** significant at 1%(the years t1, t2 and t3 are the post investigation years, the four terminated cases are not taken into account: These are fresh tomato, honey, mussels, hazelnut) AB method does not report R-square

The results for the named and non-named countries are presented separately in Tables 3.7 and 3.8, respectively. The coefficient for lagged import value is found to be positive and significant for all regression estimates suggesting a positive relationship between lagged and current imports, *ceteris paribus*. The results from the named country imports (Table 3.7) suggest a decline in imports in the first year after an affirmative decision is made. The OLS estimates found that in the year following an AD investigation, imports from the named countries for affirmative cases declined to 26%, *ceteris paribus*. The Arellano Bond method suggests a 23%

decline in imports in first year following the AD⁶⁴ While the statistical insignificance of the parameters used in making these estimates suggest some caution, the results tend to “mirror” those found in the analysis of the Konnings et al. (2001) model specification.

The OLS results associated with equation 3.2 indicate negative decisions result in a negligible decline in imports in the first year following the decision. This finding is in contrast to Prusa (2001) but, in general, is consistent with the results of Malhotra (2008)⁶⁵. Due to statistical insignificance associated with the relevant parameter estimates, it cannot be concluded that there is strong investigation/ harassment effect but there is an indication of harassment effect in case of the named countries.

From the OLS results of the non-named countries (Table 3.8), one can note that there is a statistically significant increase in imports among non-named countries in the first year after a negative decision. The results associated with the Arellano Bond estimator also suggest a large increase, though the parameter estimate in this model is only marginally significant. The rationale for the large increase in imports among non-named countries in the first year after a negative decision is not apparent. With respect to named countries (Table 3.7), the expected impacts on imports in the year following a negative determination vary considerably depending upon whether the OLS or Arellano Bond estimates are considered. Specifically, while the OLS estimates suggest only minimal disruption by named countries (-2.0%) the Arellano Bond estimates indicate increased imports of about 50% in the year following a negative determination and this percentage increases rapidly in subsequent years.

⁶⁴ The calculation is based on the value $[\exp(-.3059)-1]=-0.26$ for OLS and $[\exp(-.2744)-1]=-0.23$.

⁶⁵ Prusa(2001) has tried to measure investigation effect/ harassment effect. Malhotra etc(2008) had tried to test that effect in their paper. Since this model is based on Malhotra etc (2008), I have replicated that here.

Table3.7: Antidumping action and Value of Named Countries Imports

<i>Dependent Variable</i>	<i>OLS</i>	<i>Arellano Bond</i>
<i>Log Value of Imports</i>		
log value of imports in t-1 (β_1)	.95059*** (.0304)	.34450** (.1357)
dummy - affirmative decision (β_2)	-.11923 (.1039)	.41216 (.2995)
dummy - negative decision(β_3)	.13205 (.1091)	.450635** (.1762)
Affirmative*t1(β_5)	-.30597 (.2840)	-.274402 (.3240)
Affirmative*t2	.09862 (.2273)	.24163 (.1631)
Affirmative*t3	.05626 (.1633)	.52044** (.2650)
Negative*t1(β_6)	-.020404 (.1138)	.40687** (.1570)
Negative*t2	.014564 (.1223)	.856522*** (.2991)
Negative*t3	-.11231 (.1125)	1.1935** (.4445)
Year Dummies (β_4)	Yes	Yes
Constant(β_0)	.57645*** (.3555)	-.35097** (.1372)
No of Observations	129	100
R-Square	0.92	

Note: Absolute value of standard errors in parentheses; * significant at 10%, ** significant at 5% *** significant at 1% (the years t1, t2 and t3 are the post investigation years, the four terminated cases are not taken into account: These are fresh tomato, honey, mussels, hazelnut) AB method does not report R-square
Fixed effect helps to capture the product level differences

Table 3.8: Antidumping action and Value of Non-Named Countries Imports

<i>Dependent Variable</i>	<i>OLS</i>	<i>Arellano Bond</i>
<i>Log Value of Imports</i>		
log value of imports in t-1 (β_1)	.90397*** (.0104)	.39828*** (.0920)
dummy - affirmative decision (β_2)	.121251 (.1370)	-.033366 (.1636)
dummy - negative decision(β_3)	-.17947 (.1878)	-.35173 (.2557)
Affirmative*t1(β_5)	.017823 (.1430)	.031432 (.1651)
Affirmative*t2	.07325 (.1417)	.008475 (.2233)
Affirmative*t3	-.110394 (.1395)	-.18162 (.3140)
Negative*t1(β_6)	.50392** (.2268)	.34299 (.2344)
Negative*t2	.09469 (.2250)	-.04728 (.2626)
Negative*t3	.31310 (.2711)	.03863 (.4160)
Year Dummies (β_4)	Yes	Yes
Constant(β_0)	.64971*** (.1024)	.08190 (.0961)
No of Observations	1429	1003
R-Square	0.83	

Note: Absolute value of standard errors in parentheses; * significant at 10%, ** significant at 5% *** significant at 1% (the years t1, t2 and t3 are the post investigation years, the four terminated cases are not taken into account: These are fresh tomato, honey, mussels, hazelnut)

Fixed effect helps to capture the product level differences

3.4 Expanded Model Based on Previous Studies

As discussed in Section 2.4, an extension of the models proposed by previous researchers is considered in this thesis. The specification of the model is repeated herein as:

$$\begin{aligned} \ln imports_{it}^j = & \alpha + \beta_0 \ln imports_{it-1}^j + \beta_1 \ln imports_{it-2}^j + \beta_2 (\ln FinalDuty_{it}^j \times t_0) \\ & + \beta_3 (\ln FinalDuty_{it}^j \times t_1) + \beta_4 (\ln FinalDuty_{it}^j \times t_2) + \beta_5 (\ln FinalDuty_{it}^j \times t_3) \\ & + \beta_6 \ln(exchrates_{itj}) + \beta_7 year_t + \varepsilon_{i,t} \dots\dots\dots (3.4) \end{aligned}$$

In this model, $\ln imports_{it}^j$ denoted the import of case i ($i=1\dots\dots\dots38$) at t^{th} period for country group j (named and non-named). The first variable $\ln imports_{it-1}^j$ denotes the one period lag of imports and the variable $\ln imports_{it-2}^j$ denotes the two period lagged imports. The interaction term $\ln (FinalDuty_{it}^j \times t_j)$ (final duty and time) denotes the spread out effect of antidumping duty where $j=0, 1, 2, 3$ ⁶⁶. The variable $\ln(exchrates_{itj})$ denotes the log vale of exchange rate between the United States and the importing countries. Since the period of observation for each case is six years, data for the post investigation period for each case is collected through the third year of post investigation.⁶⁷ Two separate regression estimates including overall imports, imports from named countries and imports from non-named countries are considered. OLS estimates, and feasible generalized least square estimates (FGLS)⁶⁸ are considered. FGLS allows estimation in the presence of AR (1) autocorrelation within panels and cross-sectional correlation and heteroscedasticity across panels.⁶⁹ The results for OLS estimates and FGLS are given in Table 3.9, Table 3.10. The OLS estimates suggest that there is a significant amount (results are

⁶⁶ This is explained in detail in chapter II. t_0 is the period when investigation has been filed, t_1-t_3 denotes the post investigation period.
⁶⁷ Note: This study has included the cases through 2004. Post investigation data for cases are available through 2007.
⁶⁸ The feasible generalized least squares (FGLS) method is used to estimate the variance structure when the covariance matrix is not known. The value of the coefficient does not change in OLS and FGLS. FGLS is more efficient than the OLS method.
⁶⁹ Baltagi, Baldi. H(1995). “ Econometric Analysis of Panel Data”, *Wiley Press* for the discussion of panel data analysis and its application

significant at 5%) of spread out effect associated with AD actions on overall imports and named country imports at t1, the year following the investigation. Among named countries

Table 3.9: OLS Estimate Result

<i>Dependent Variable : Log Value of Imports</i>	<i>Overall Imports(1)</i>	<i>Named-Imports(2)</i>	<i>Non-named Imports(3)</i>
Log value of imports in t-1	.791225*** (.0390)	.780856*** (.2249)	.788242*** (.0396)
Log value of imports in t-2	.154253*** (.0385)	.185437 (.2262)	.152557*** (.0393)
Ln Final Duty (t0)	.009643 (.0284)	-.002334 (.0283)	.021329 (.0333)
Ln Final Duty (t1)	-.059216** (.0283)	-.074777 (.0795)	.081371** (.0315)
Ln Final Duty (t2)	.040360 (.0265)	.01729 (.0274)	.053297* (.0305)
Ln Final Duty (t3)	-.020680 (.0278)	-.000384 (.0334)	-.010746 (.0320)
Ln (Exchange Rate)	-.004183 (.0106)	.012783 (.0128)	-.007287 (.0119)
Constant	.409151*** (.1358)	.295001 (.3399)	.392425** (.1503)
No of observations	1296	112	1184
R-Square	0.87	0.92	0.84

Note: Absolute value of standard errors in parentheses; * significant at 10%, ** significant at 5% *** significant at 1% (the years t1, t2 and t3 are the post investigation years). This OLS model with robust option which takes care of the problem of heteroscedasticity within the model

Imports were found to decline by 7% in the first year following the investigation.⁷⁰ Among non-named countries, imports were observed to increase by about 8%⁷¹ in the first year following the antidumping investigation. The FGLS estimates yield similar results. The results derived in this section suggest that there is significant amount of spread-out of antidumping duty among the non-named countries. Though the imports from the named countries show a declining trend, the results are not statistically significant. Hence, trade diversion appears not to be significant.

⁷⁰ Results for the named country imports are not statistically significant.

⁷¹ The results are significant at 5%.

Table 3.10: Feasible Generalized Least Square Estimate Result

<i>Dependent Variable : Log Value of Imports</i>	<i>Overall Imports(1)</i>	<i>Named-Imports(2)</i>	<i>Non-named Imports(3)</i>
Log value of imports in t-1	.791225*** (.0272)	.780856*** (.0999)	.788242*** (.0284)
Log value of imports in t-2	.154253*** (.0265)	.185437** (.1015)	.152557*** (.0278)
Ln Final Duty (t0)	.009643 (.0285)	-.002334 (.0474)	.021329 (.0325)
Ln Final Duty (t1)	-.059216** (.0274)	-.074777 (.0468)	.081371** (.0311)
Ln Final Duty (t2)	.040360 (.0266)	.01729 (.0481)	.053297* (.0302)
Ln Final Duty (t3)	-.020680 (.0265)	-.000384 (.0472)	-.010746 (.0301)
Ln (Exchange Rate)	-.004183 (.0108)	.012783 (.0197)	-.007287 (.0119)
Constant	.409151 (.1211)	.295001 (.4436)	.392425*** (.1359)
No of observations	1296	112	1184

Note: Absolute value of standard errors in parentheses; * significant at 10%, ** significant at 5% *** significant at 1% (the years t1, t2 and t3 are the post investigation years. The FGLS is least square method which takes care of the both the problem of autocorrelation and heteroscedasticity within the panel and across the panel. There is no change in the coefficient but the standard errors changes in this model.

The analysis also suggests that exchange rates do not have a statistically significant effect on imports from the named and non-named countries. This implies that exchange rate in this model is not an essential variable to determine the impact of antidumping actions on the level of import.

The models which were discussed in the previous sections take into account either the actual level of duty or else a duty dummy variable is constructed to assess the effect antidumping action on overall imports. In this context, it is interesting to note the results derived from the Prusa (1997) model. The model, as noted, is specified in such a manner that the effect of antidumping actions both in the initial phase of investigation and after the investigation period is considered. It is observed from the OLS estimates that there is a decline of overall imports in the first period following the antidumping investigation. But the results for the named and non-named countries derived in the Malhotra et al (2008) model are in line with the results of the proposed study. Both

the model confirms to the fact that there is decline in named countries imports in the first year following the investigation. As far as the non-named countries import is concerned we could see that there is an increase in the imports among the non-named countries in the years after the investigation. The increase in imports is significant in the proposed model.

In the Konnings et al (2001) model we could see that the separate results derived from overall imports and named country imports confirm the fact that there is a decline in imports from the named countries if the cases are affirmative or terminated⁷². However negative decision outcomes after imposing duties show an increase in imports from the named countries. Terminated cases from non named countries show a larger increase in imports. The results derived are statistically significant.

⁷² The terminates cases mostly result in some kind of negotiation between the exporting and importing countries and as a result there is a decline in imports.

CHAPTER 4

SUMMARY AND CONCLUSIONS

The debate of trade diversion has been explored from different perspectives. Several studies showed that trade diversion are indeed a reality while other studies have concluded otherwise. Such differences call for careful investigation and demands attention regarding the intricate issues involved in producing such difference. One such factor is the level of aggregation of products considered in these studies. Import data is available at a more disaggregated level than data available for antidumping duties levied. Any aggregation scheme downplays the actual impact on specific products. In order to get a more accurate picture of the impact antidumping duty concordance of the import data and data for duty needs to be done. Such effort captures the diversifying impact of duties on trade in more accurate terms. Another commonly appearing reason is the difference in econometric modeling being used to estimate the impact of duties.

In this study different econometric models are used to compare the impact of AD investigation on cases filed against agricultural products during the period 1994-2004. The data range, based on 8 digit HTS classification, is for a span of six years for each of these product categories. The different econometric models considered in this study are compared for total imports, imports from named countries imports and imports from non-named countries. Analysis of these alternative models indicates that the imposition of antidumping duties has been successful in reducing the overall imports of targeted products (i.e., products from named countries in the various petitions). The analysis also indicates that trade diversion from named countries to the non-named countries is not significant.

The further scope of research which stems from this research is in the area of product diversion. Instead of looking separately into the HTS trade classification of the cases which are

filed, a future potential for research would be to look into each of these product categories separately and to investigate whether there is product diversion due to antidumping investigation within these product categories. While results of the current analysis suggests that there is a reduction in imports from named countries for products which are investigated, there is a possibility that those named countries are switching to different category of the same product and concentrating their imports on those categories.

REFERENCES

- Anania, Giovanni.(2005), “The negotiations on agriculture in Development Agenda Round: current status and future prospects” *European Review of Agricultural Economics* 32 (4): 539–574
- Blonigen, Bruce A. and Prusa, Thomas J. (2001) “Antidumping” Working Paper 8398, *National Bureau of Economic Research, Cambridge*.
- Baltagi, Baldi. H (1995), “Econometric Analysis of Panel Data”, *Wiley Press*
- Carter and Gunning (2008), “U.S. Trade Remedy Law and Agriculture: Trade Diversion and Investigation Effects”, *University of California, Davis (Unpublished manuscript)*
- Ganguli. B. (2005), “The Trade Effects of Indian Antidumping Actions”, *The State University of New Jersey, Rutgers (Unpublished manuscript)*
- Herander, Mark G. and Schwartz J. Brad. (1984), "An Empirical Test of the Impact of the Threat of US Trade Policy: The Case of Antidumping Duties" *Southern Economic Journal* 51: 59-79.
- Feinberg, R. M. (2004) “U.S. antidumping enforcement and macroeconomic indicators: What do petitioners expect, and are they correct?” *American University (Unpublished manuscript)*
- Konings, J., Vandenbussche, H.and Springael, L, (2001), “Import Diversion under European Antidumping Policy”, *Journal of Industry, Competition and Trade* 1(3): 283-299
- Malhotra, Rus and Kassam(2008), “ Antidumping Duties in Agricultural Sector: Trade Restricting or Trade Deflecting?”, *Global Economy Journal*, Vol 8(2)
- Prusa Thomas. J., (2001), “On the spread and impact of Antidumping”, *Canadian Journal of Economics*, 34(3): 591-611
- Prusa, Thomas. J (1998). "Cumulation and Antidumping: A challenge to competition." *World Economy* 21(8): 1021-1033.
- Prusa, Thomas. J.(2005). "Anti-dumping: A growing problem in international trade." *World Economy* 28(5): 683-700.
- Prusa, Thomas. J., (1997), “The Trade Effects of US Antidumping Actions”, in Robert Feenstra ed. *The effects of U.S Trade and Protection and Promotion Policies*. Chicago: University of Chicago Press, 191-213
- Staiger, R. W., Wolak, F. A., Litan E. Robert, Katz, L. Michael and Leonard (1994), “Measuring industry specific protection: antidumping in the United States.” *Brookings Paper on Economic Activity, Microeconomics*, 1: 51

Stata Manual Version 10(2007), “Longitudinal Panel Data [XT]” *Stata Press*

United States International Trade Commission (2008) “Import Injury Investigations Case Statistics (FY 1980-2005)” *USITC office of investigations*

United States International Trade Commission (2007), “*Antidumping and Countervailing Duty Handbook*”, 12th Edition pp 13-130

APPENDIX A: TOTAL IMPORTS AND NAMED COUNTRIES' IMPORTS FOR AFFIRMATIVE OUTCOMES

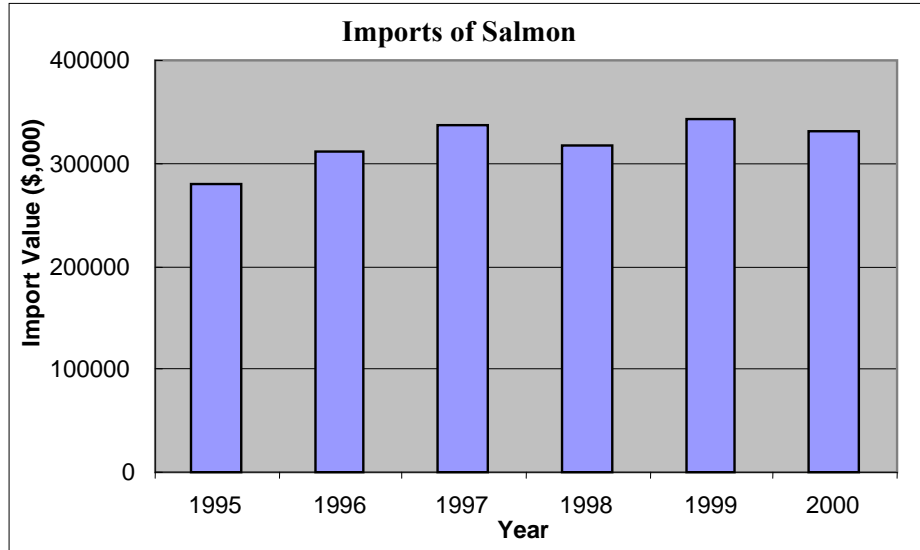


Figure A.1: Imports of Salmon

Figure A.1 depicts the total US imports of Atlantic salmon over a period of six year. The case was filed in 1997 against Chile (i.e., the named country). An antidumping duty was imposed on product from Chile in 1998. In Figure A.2, the named country imports of salmon for the period of study are depicted.

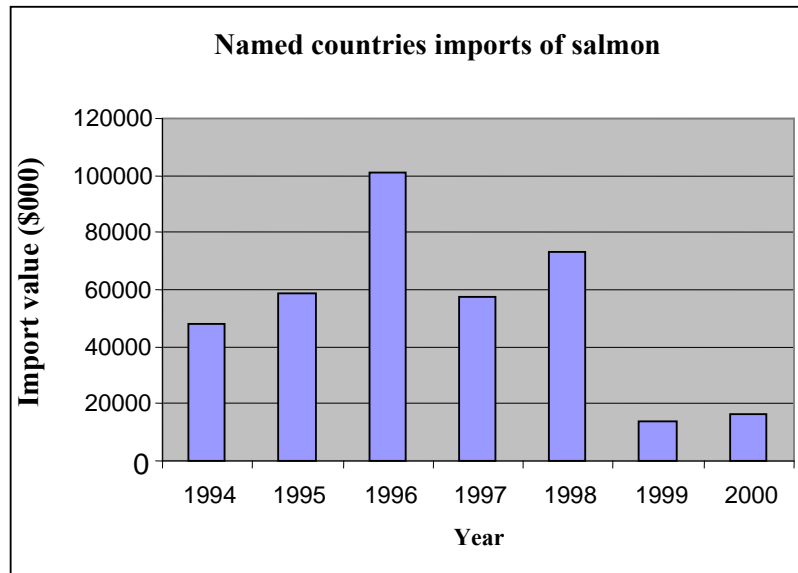


Figure A.2: Named Countries Imports of Salmon

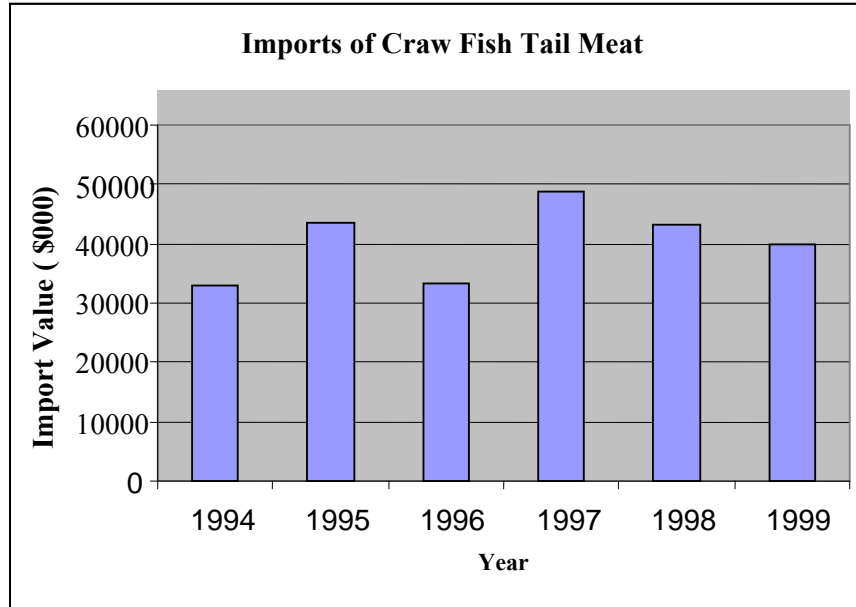


Figure A.3: Imports of Crawfish Tailmeat

Figure A.3 depicts the total US imports of crawfish tail meat over a period of six year. The case was filed against China in 1996. An antidumping duty was subsequently imposed on China in 1997. In the Figure A.4, imports of crawfish tail meat from China (i.e., the named country) during the period of study is depicted.

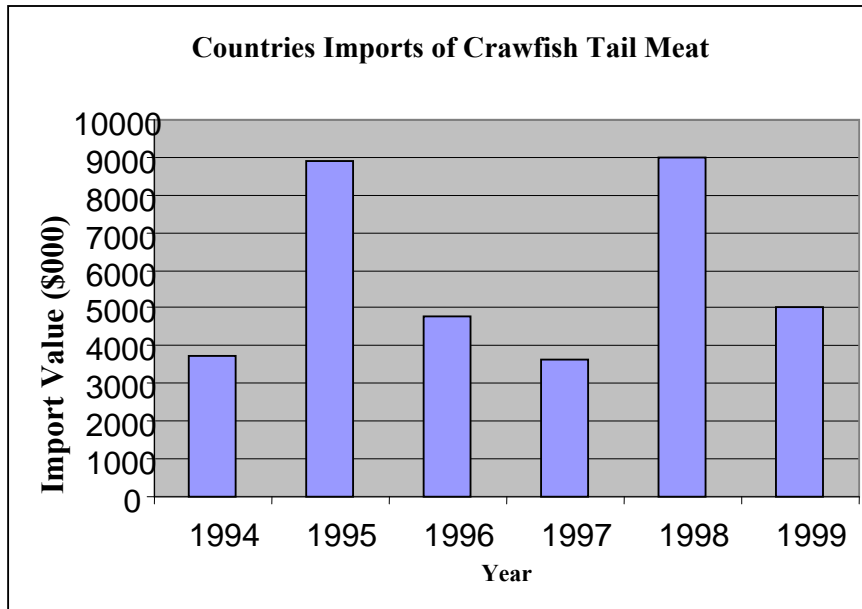


Figure A.4: Named Countries Imports of Crawfish Tailmeat

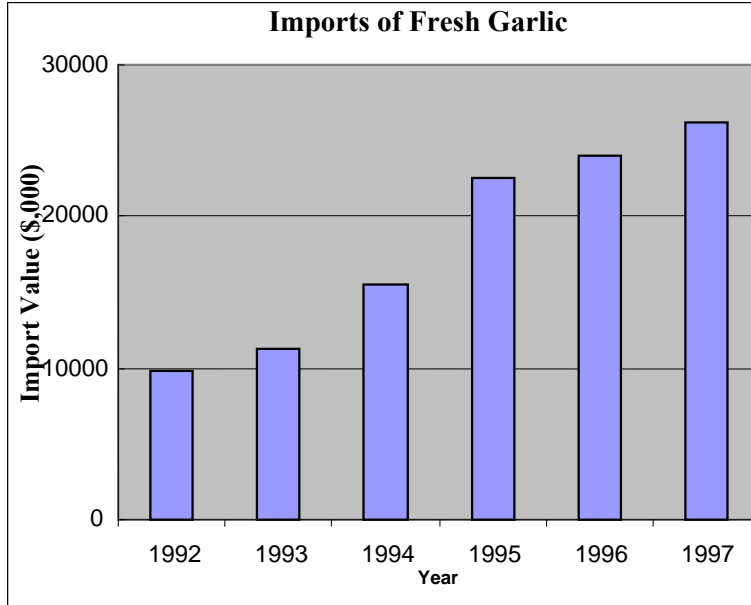


Figure A.5: Imports of Fresh Garlic

Figure A.5 depicts the total US import of Fresh Garlic over a period of six year. The case has been filed in 1994 against China. An antidumping duty has been imposed on China in the year 1995. In figure A.6 named countries imports of Fresh Garlic for the period of study is depicted.

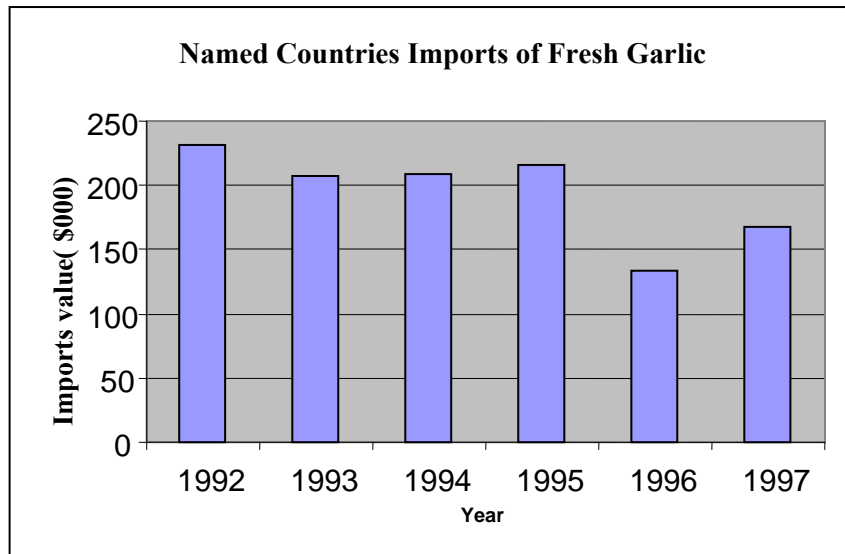


Figure A.6: Named Countries Imports of Fresh Garlic

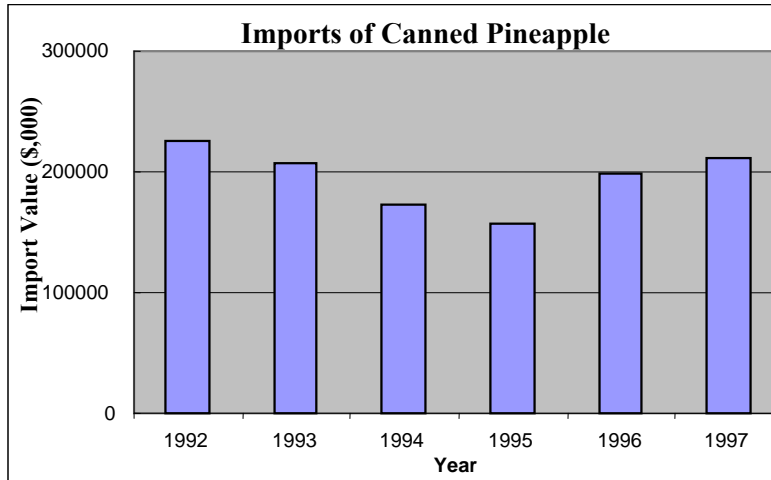


Figure A.7: Imports of Canned Pineapple

Figure A.7 depicts the total US import of Canned Pineapple over a period of six year. The case has been filed against Thailand in 1994. An antidumping duty has been imposed on Thailand in the year 1995. In figure A.8 the named countries imports of Canned Pineapple for the period of study is depicted.

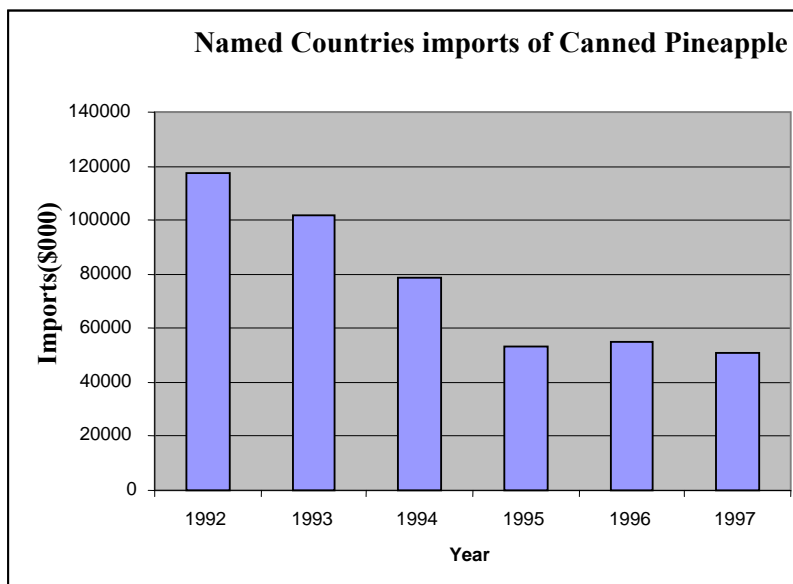


Figure A.8: Named Countries Imports of Canned Pineapple

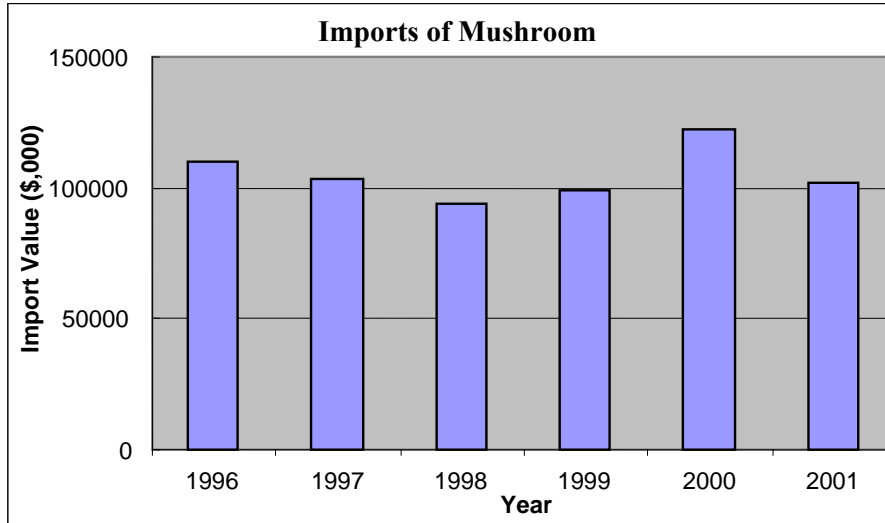


Figure A.9: Imports of Mushroom

Figure A.9 graph depicts the total US import of Certain Preserved Mushroom over a period of six year. The case has been filed in the year 1998 against Chile, China, India and Indonesia. An antidumping duty has been imposed on these countries in 1998. In figure A.10 the named country imports of Certain Preserved Mushroom for the period of study is depicted.

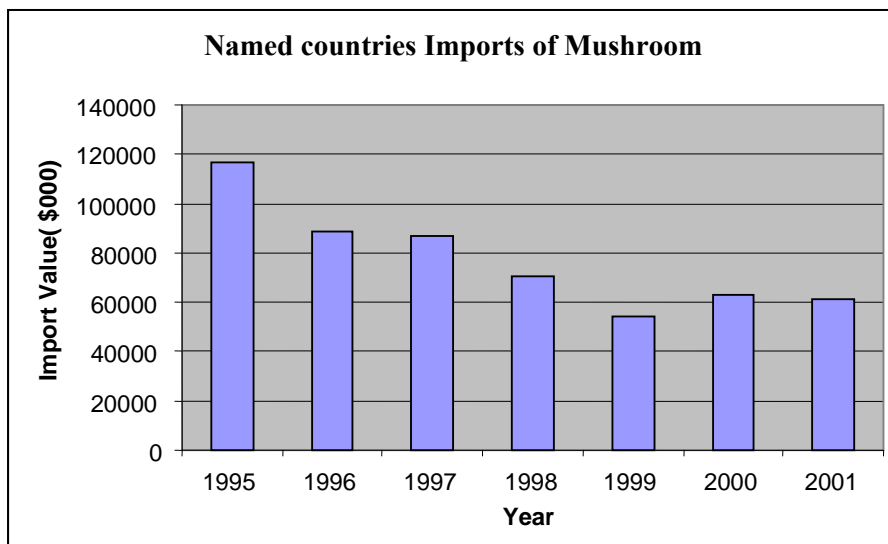


Figure A.10: Named Countries Imports of Mushroom

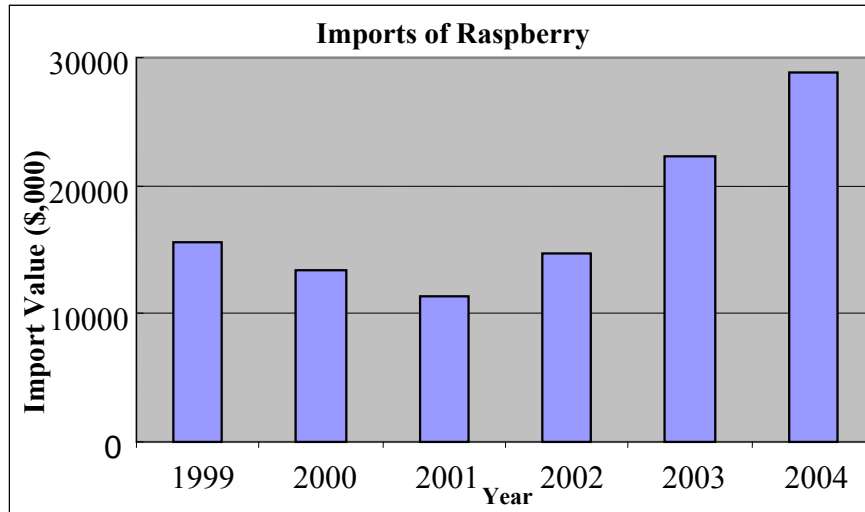


Figure A.11: Imports of Raspberry

Figure A.11 depicts the total US import of Raspberry over a period of six year. The case has been filed in 2001 against Chile. An antidumping duty has been imposed on Chile in the year 2002. In figure A.12 the named countries imports of Raspberry for the period of study is depicted.

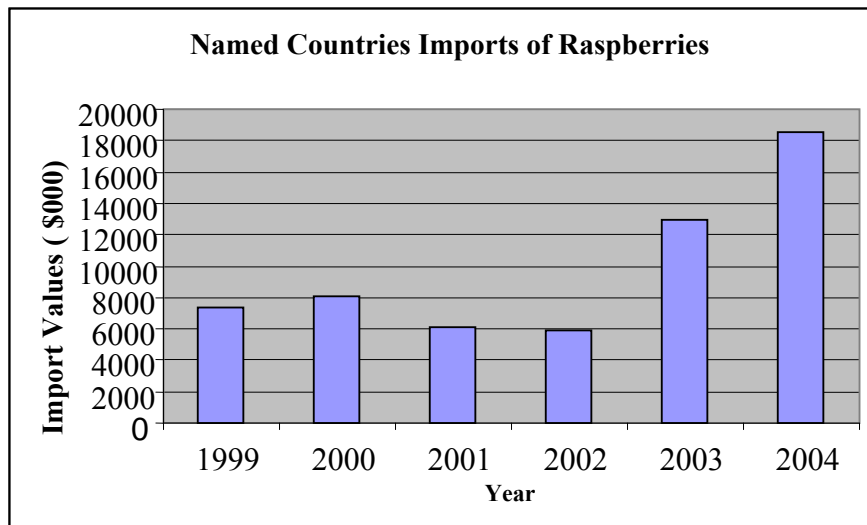


Figure A.12: Named Countries Imports of Raspberry

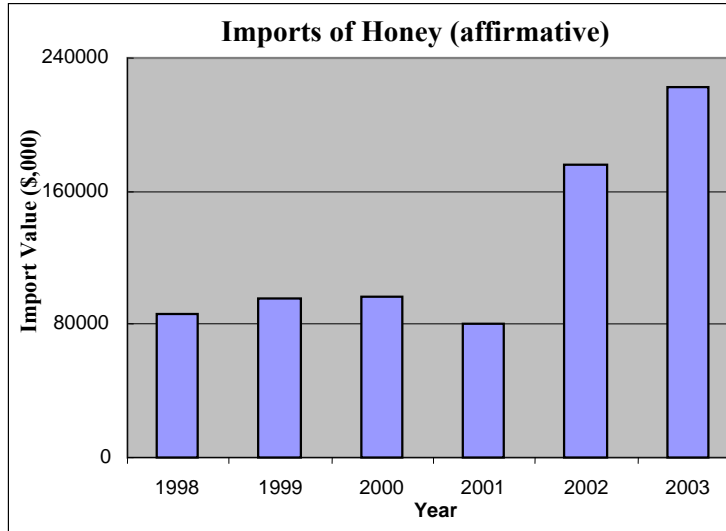


Figure A.13: Imports of Honey

Figure A.13 depicts the total US import of Honey over a period of six year. The case has been filed in 2000 against China and Argentina. An antidumping duty is imposed on these countries in 2001. In figure A.14 the named countries imports of Honey for the period of study is depicted

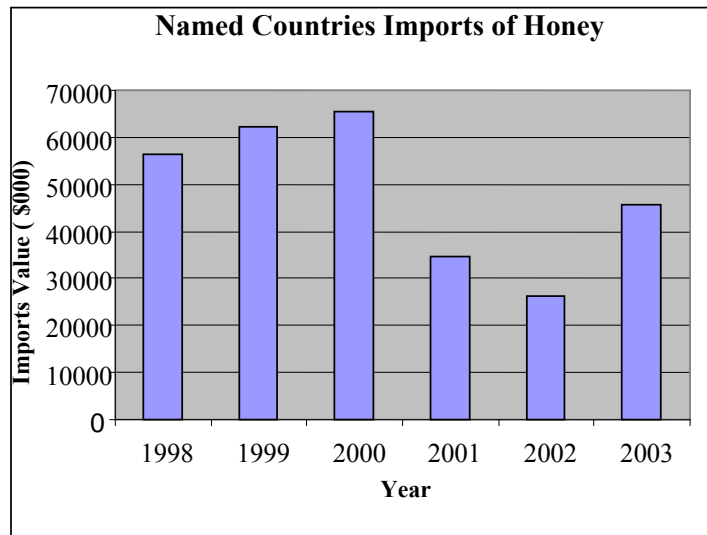


Figure A.14: Named Countries Imports of Honey

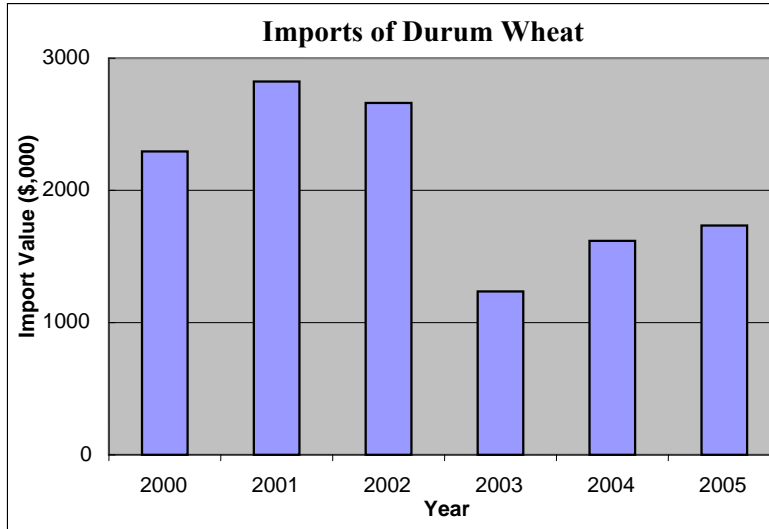


Figure A.15: Imports of Durum Wheat

Figure A.15 depicts the total US import of Durum Wheat over a period of six year. The case is filed in 2002 against Canada. An antidumping duty is imposed on these countries in the year 2003. In figure A.16 the named countries import of Durum Wheat for the period of study is depicted

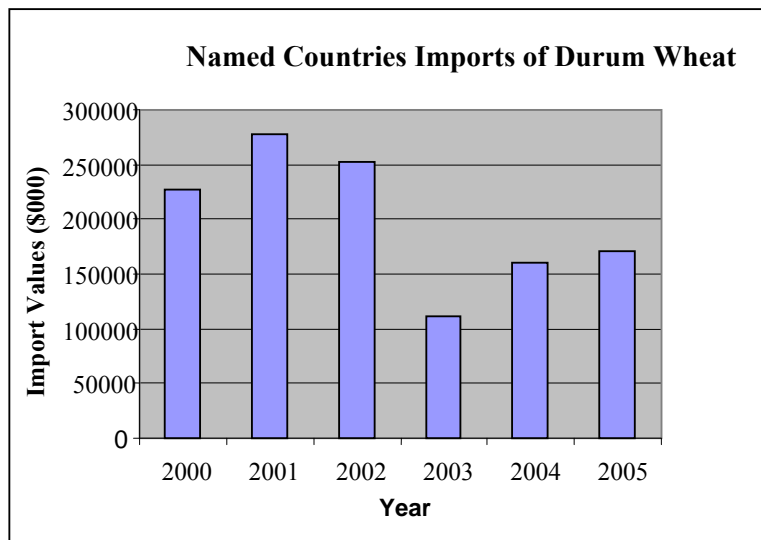


Figure A.16: Named Countries Imports of Durum Wheat

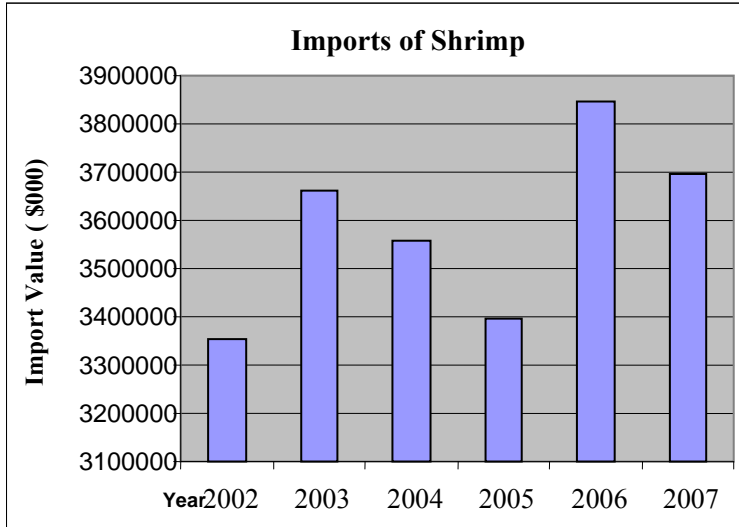


Figure A.17: Imports of Shrimp

Figure A.17 depicts the total US import of Shrimp over a period of six year. The case has been filed in the year 2004 against Brazil, China, India, Ecuador, Thailand and Vietnam. An antidumping duty has been imposed on these countries in the year 2005. In Figure A.18 the named countries import of Shrimp for the period of study is depicted.

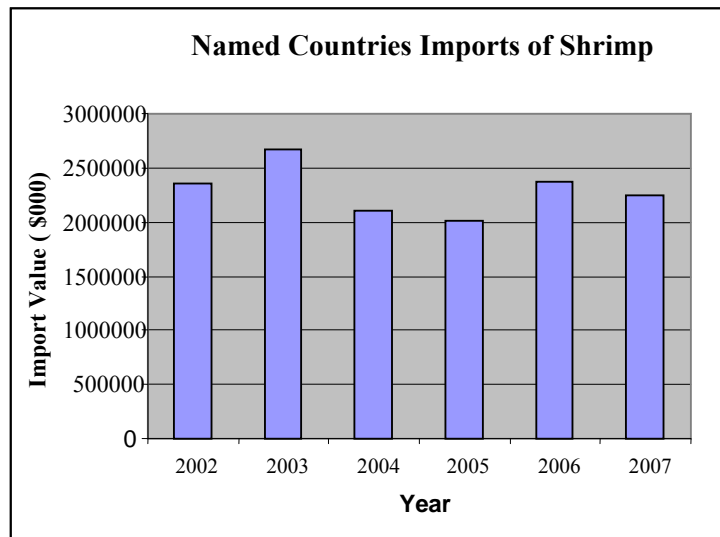


Figure A.18: Named Countries Imports of Shrimp



Figure A.19: Imports of Softwood Lumber

Figure A.19 depicts the total US import of Softwood Lumber over a period of six year. The case is filed against Canada in 2001. An antidumping duty has been imposed on these countries in the year 2002. In figure A.20 the named countries imports of Softwood Lumber for the period of study is depicted.

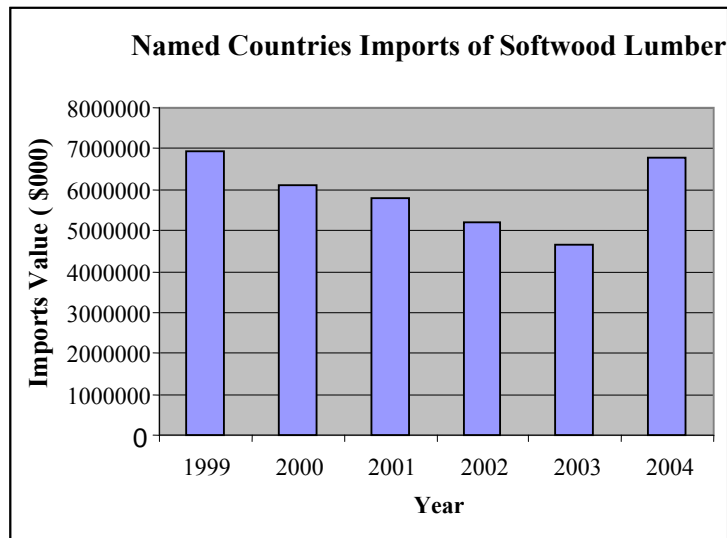


Figure A.20: Named Countries Imports of Softwood Lumber

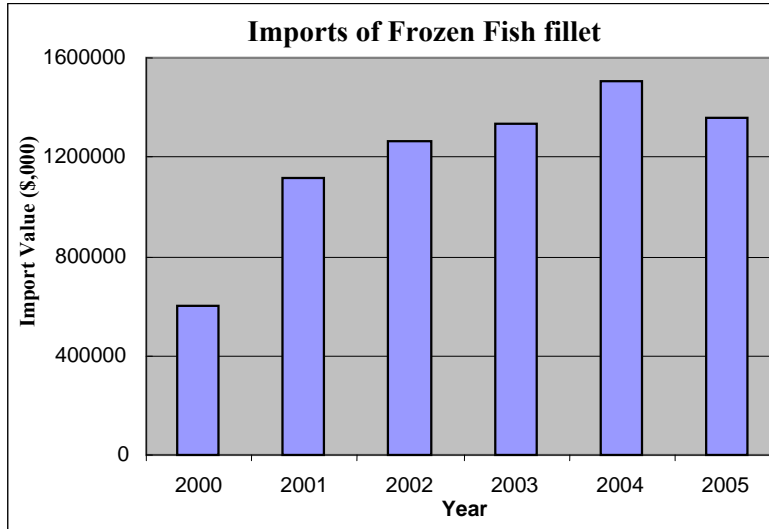


Figure A.21: Imports of Frozen Fish Fillet

Figure A.21 depicts the total US import of Frozen Fish Fillet over a period of six year. The case is filed in 2002 against Vietnam. An antidumping duty is imposed on Vietnam in 2003. In figure A.22 the named countries imports of Frozen Fish Fillet for the period of study is depicted.

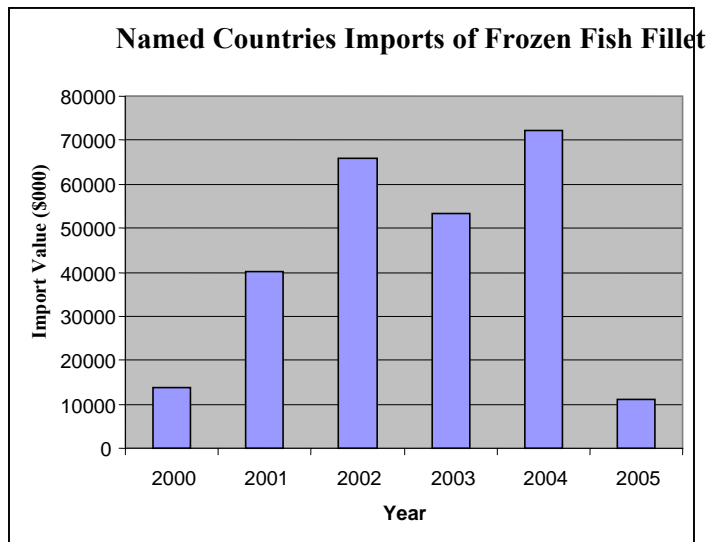


Figure A.22: Named Countries Imports of Frozen Fish Fillet

**APPENDIX B: TOTAL IMPORTS AND NAMED COUNTRIES' IMPORTS
FOR NEGATIVE OUTCOMES**

The Graphs given below are for the antidumping cases which have either negative outcome or else terminated

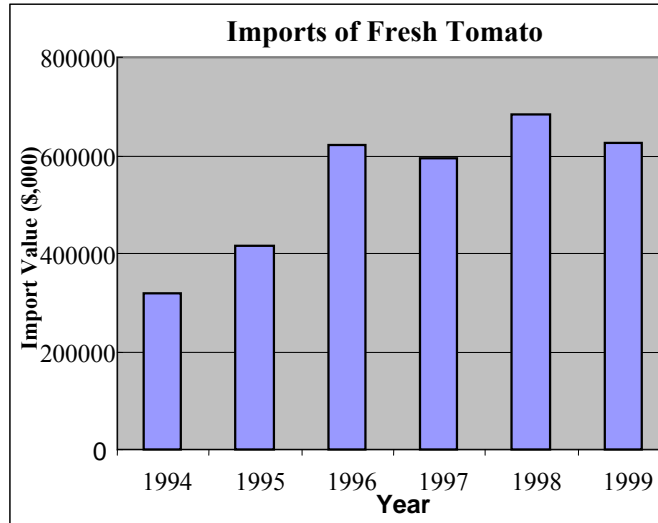


Figure B.1: Imports of Fresh Tomato

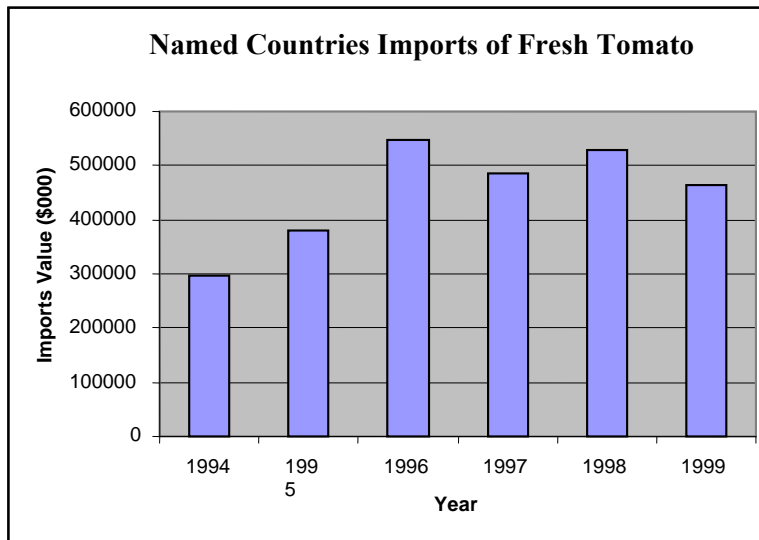


Figure B.2: Named Countries Imports of Fresh Tomato

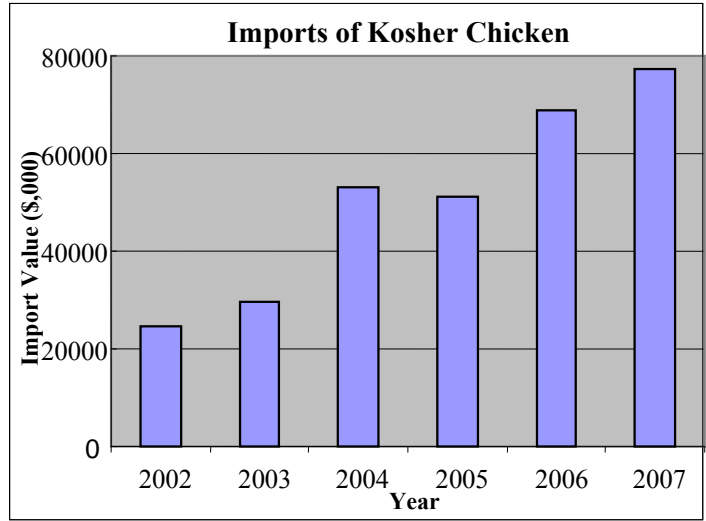


Figure B.3: Imports of Kosher Chicken

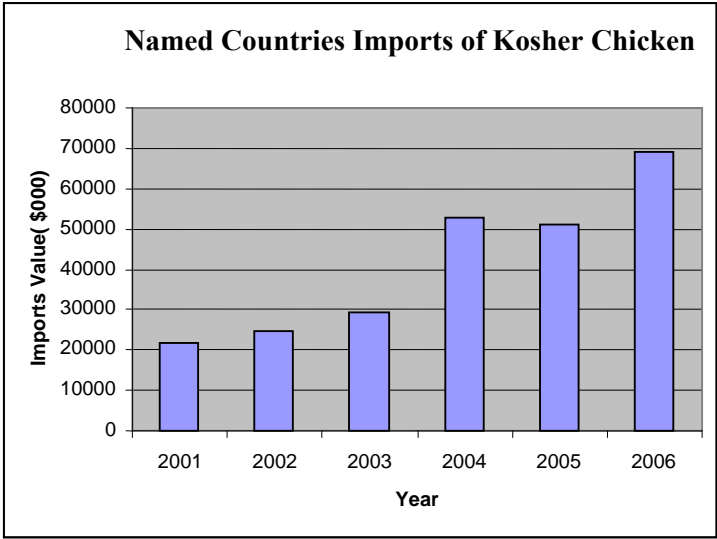


Figure B.4: Named Countries Imports of Kosher Chicken

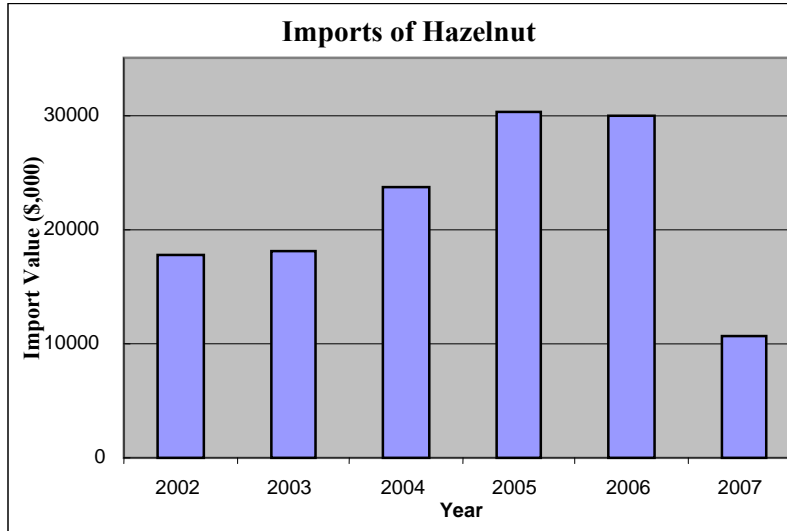


Figure B.5: Imports of Hazelnut

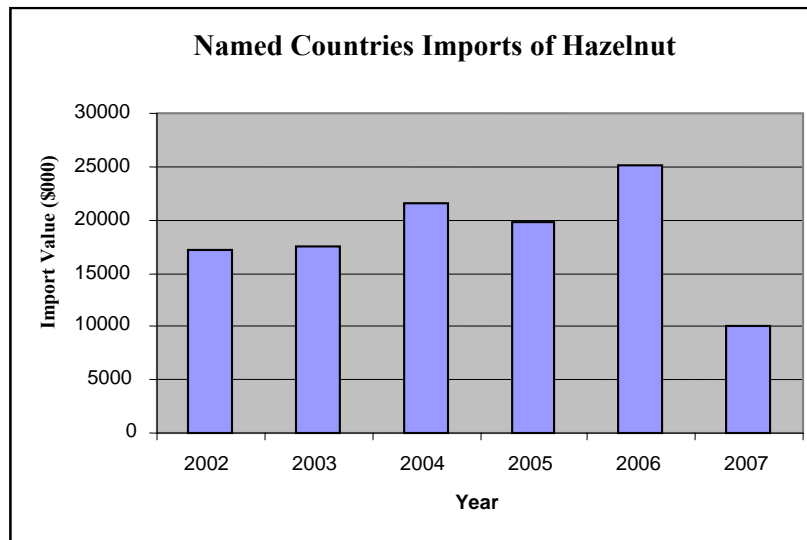


Figure B.6: Named Countries Imports of Hazelnut

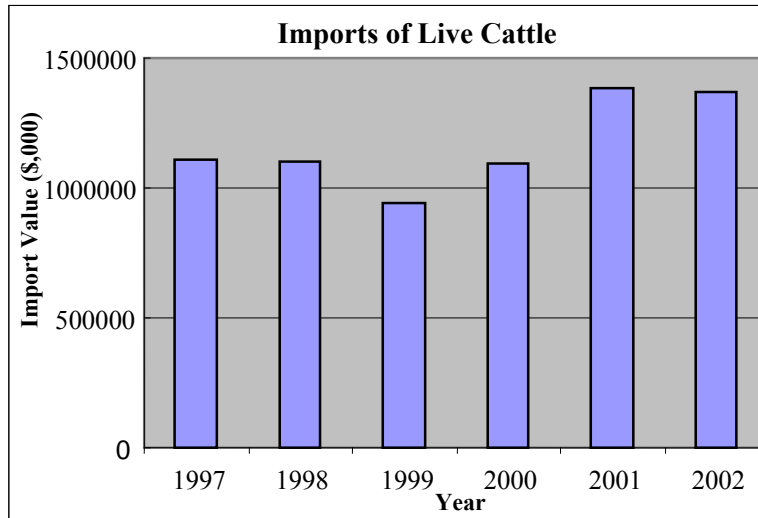


Figure B.7: Imports of Live Cattle

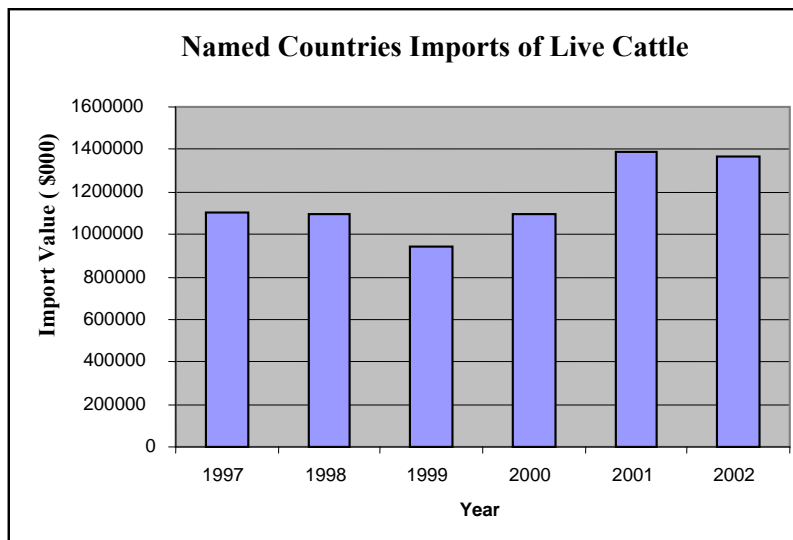


Figure B.8: Named Countries Imports of Live Cattle

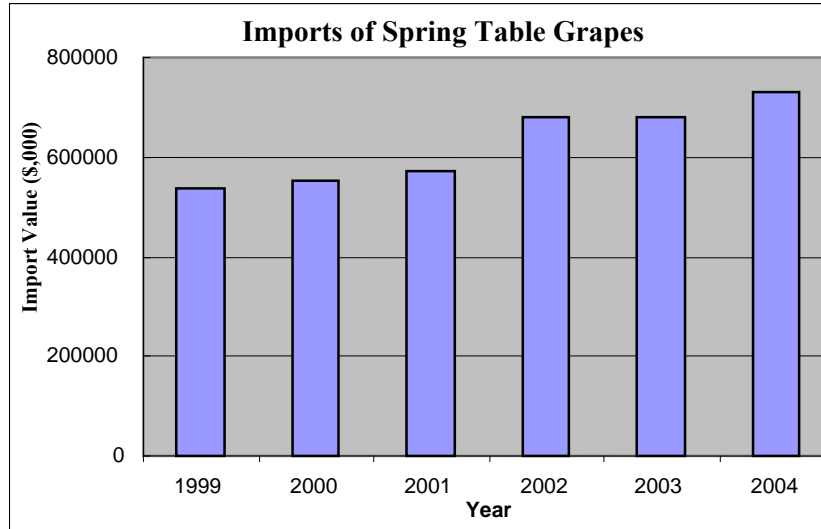


Figure B.9: Imports of Spring Table Grapes

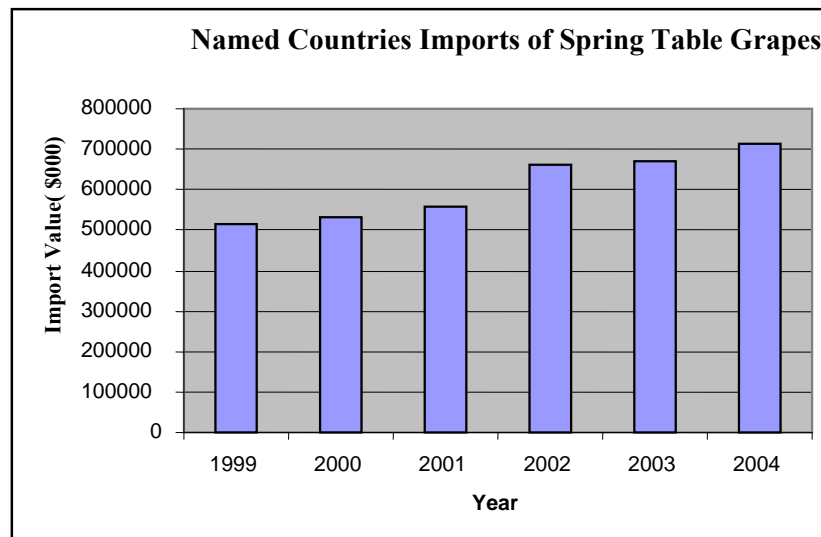


Figure B.10: Named Countries Imports of Spring Table Grapes

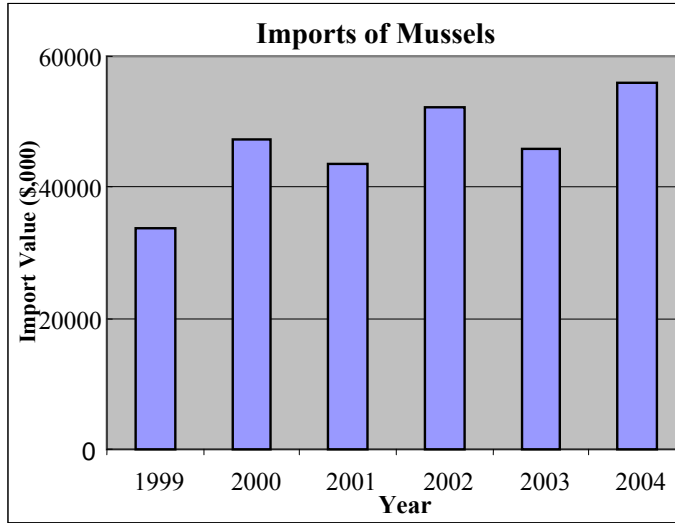


Figure B.11: Imports of Mussels

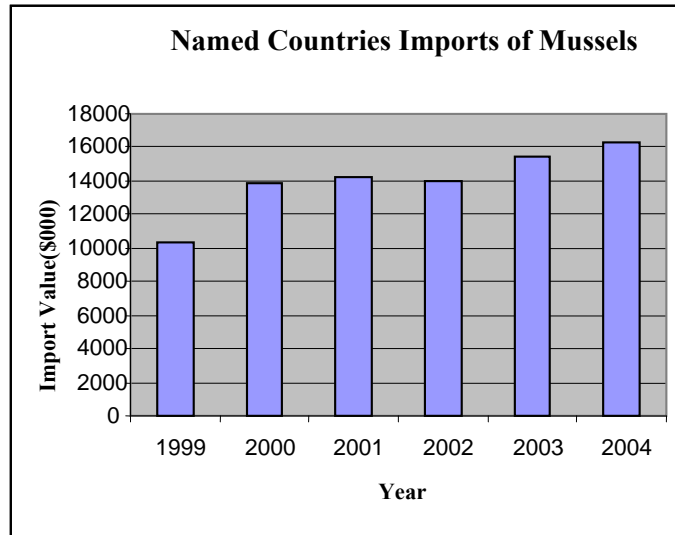


Figure B.12: Named Countries Imports of Mussels

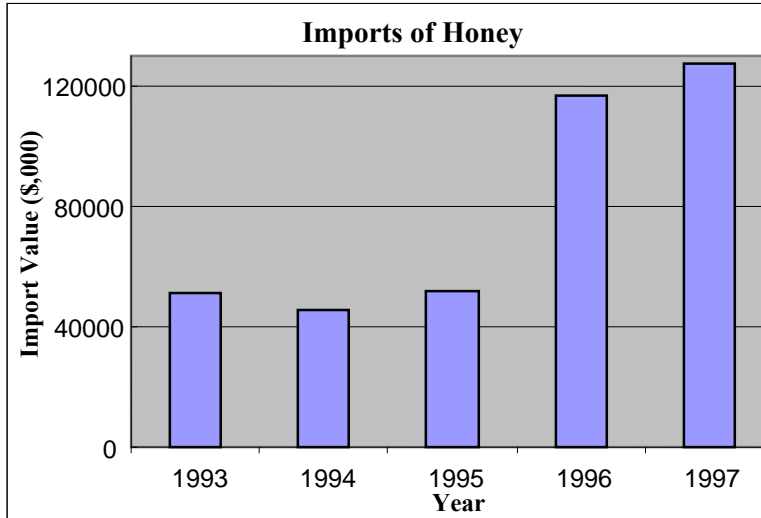


Figure B.13: Imports of Honey

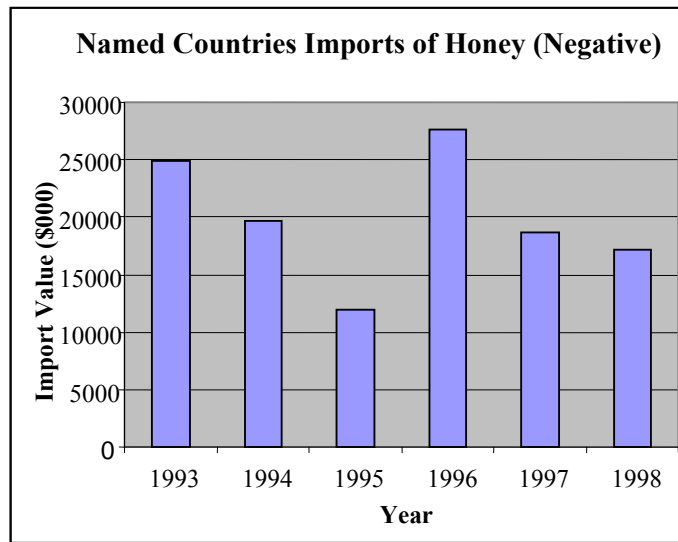


Figure B.14: Named Countries Imports of Honey

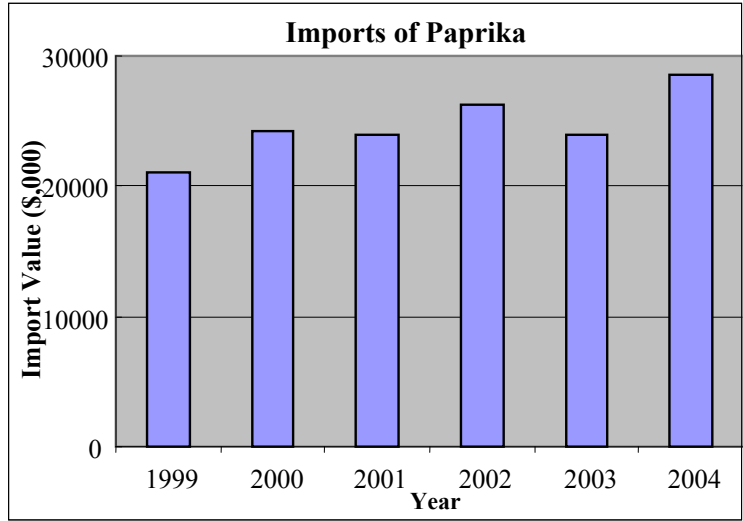


Figure B.15: Imports of Paprika

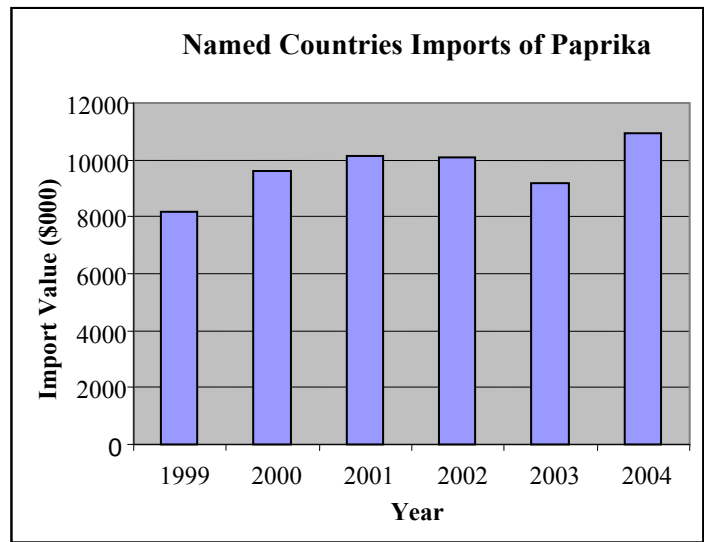


Figure B.16: Named Countries Imports of Paprika

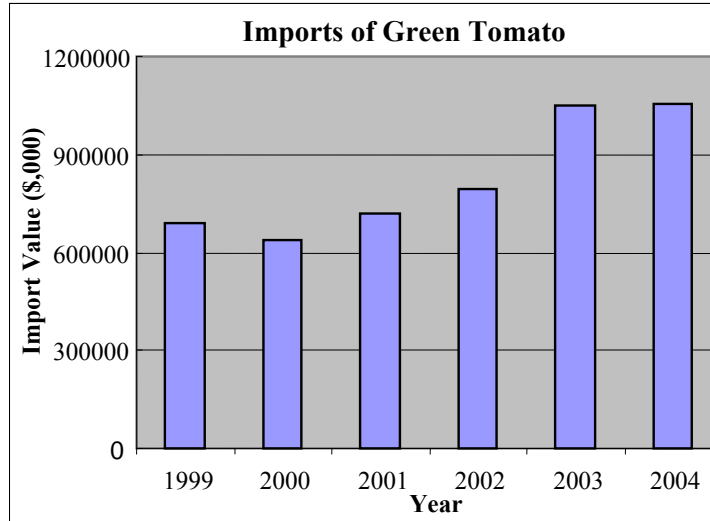


Figure B.17: Imports of Green Tomato

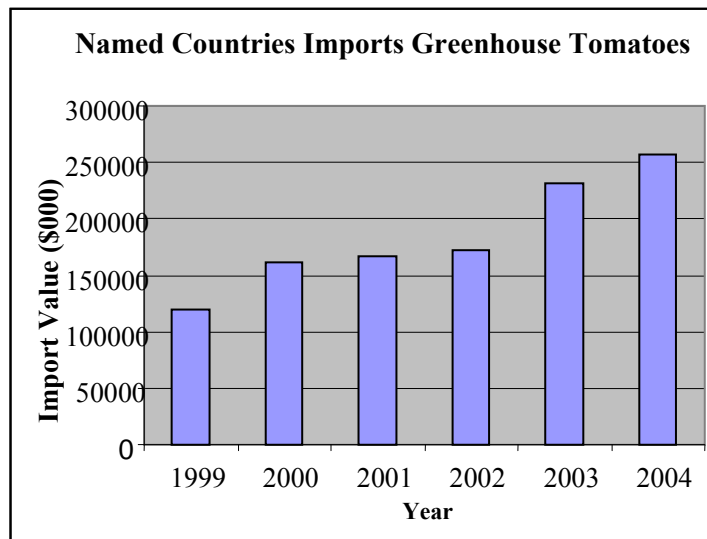


Figure B.18: Named Countries Imports of Green Tomato

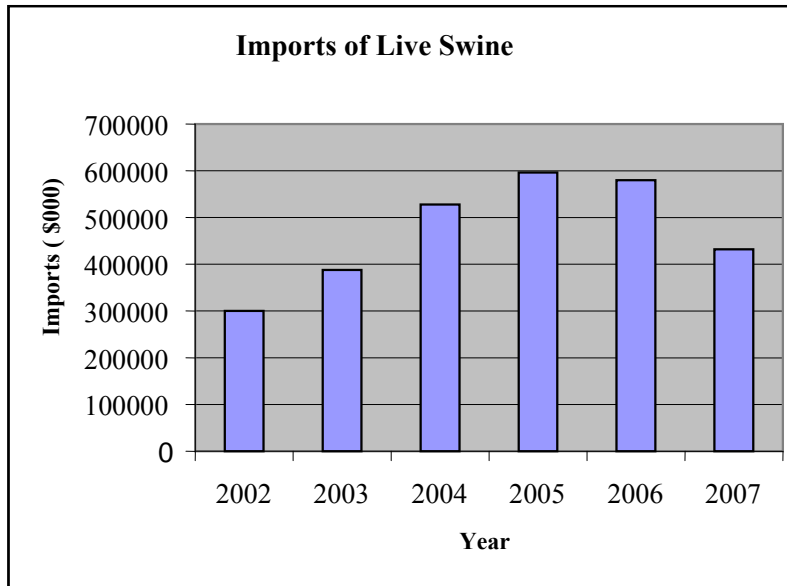


Figure B.19: Imports of Live Swine

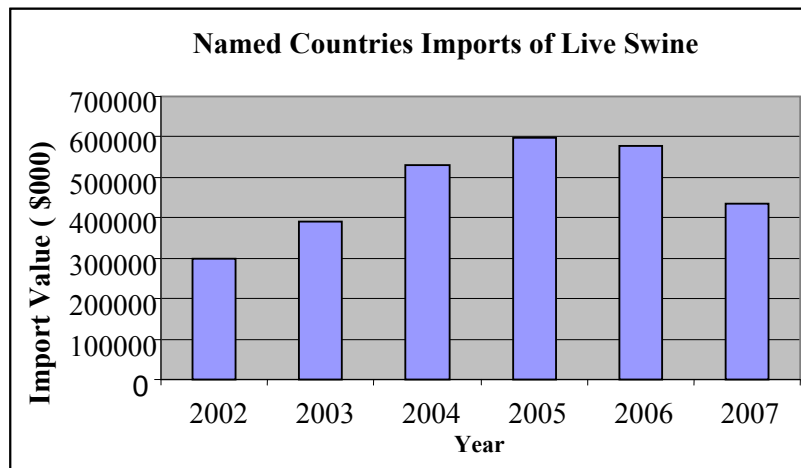


Figure B.20: Named Countries Imports of Live Swine

VITA

Nandini Bandyopadhyay was born and raised in Calcutta, India. She did her Bachelor and Master degrees in Economics from the University of Calcutta and later she pursued her MPhil degree from Jawaharlal Nehru University, New Delhi, India. After completion of her studies she worked as a consultant to a reputed research organization in India and published papers in internationally reputed journals. She joined the Department of Agricultural Economics and Agribusiness, Louisiana State University, Baton Rouge, Louisiana, in 2005. After completion of her masters she has planned join research institute and work for some years before she pursues her doctoral degree.