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Tariffs Eliminations and Exchange Rate Fluctuations Relationships to Trade Elasticity

Folly Kuevey Kuevey
Walden University

Walden University

College of Management and Technology

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Folly Kuevey

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Dr. Robert Haussmann, University Reviewer, Management Faculty

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Eric Riedel, Ph.D.

Walden University
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Abstract

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Folly Mathias Kuevey

MA, University of Maryland University College, 2004

BS, Strayer University, 2001

Dissertation Submitted in Partial Fulfillment

of the Requirements for the Degree of

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Abstract

The enactment of the North America Free Trade Agreement (NAFTA) was intended to reduce tariffs on most goods by 2008 among Canada, the United States, and Mexico, and to create the largest regional market outside the European Union. Early research conducted to investigate the relationships between tariffs elimination and trade volume focused mainly on macrolevel effects with mixed results, without acknowledging the possible influence from exchange rate fluctuations. After 20 years, NAFTA has provided the opportunity to observe a significant reduction in tariffs between 1994 and 2013. Skepticism regarding the relationship between trade liberalization and the regional economy, and the controversy still surrounding NAFTA, suggests that other factors might influence trade, making the current study relevant. The purpose of this study was to investigate possible relationships between exchange rate fluctuations and trade volume during a period when tariffs were eliminated. This study focused on 2 basic theories of preferential trade and the exchange rate, and data were collected on imports-exports between Mexico and the United States. Regression analyses showed a relationship between exchange rate fluctuation and trade volume when tariffs are eliminated. The findings may help exporters and unions understand the implications of other factors affecting trade. The findings may also help union leaders understand how other economic factors may have implication on global economy rather than focusing solely on trade agreements, and to better strategize in addressing social issues of concern related to globalization.

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Dedication

The efforts I made here to accomplish this difficult journey were to show how hard work pays to my wonderful two boys, and encourage them to go beyond a master's degree. This is especially a dedication to my older son, Adonis Ekue Kuevey, for his hunger to know and his curiosity to know more about the world. This is for you buddy, and I look forward to seeing you getting here one day.

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Chapter 1: Introduction to the Study

Introduction

North America Free Trade Agreement (NAFTA) was intended to reduce tariffs among Canada, United States and Mexico and to facilitate cross-border trade (Datta & Kouliavtsev, 2009) by creating the biggest regional market outside of the European Union (Romalis, 2007). Although much research has been conducted to investigate the relationships between NAFTA and regional market behavior, it still unclear whether the real effects of tariff elimination will ever be known, and whether the envisioned objectives were really achieved (Depken & Ford, 1999). The discussion on trade is not complete without considering the relationships to currency fluctuations, especially when examining international trade. Thus, the purpose of this study was to investigate the real effects of tariff elimination and the relationships between the real exchange rate and trade elasticity between Mexico and the United States. I focused on the automobile and auto parts manufacturing industry from 1989 through 2013, including data 5 years prior to NAFTA and 5 years after the Act was supposedly fully implemented.

After 20 years of existence, NAFTA has provided the opportunity to observe a significant decrease in the tariffs from 1994 through 2013 (Kitaoka, 2011). During the same period, conflicting viewpoints have been expressed on the effects of trade liberalization (Kitaoka, 2011). Some studies find NAFTA benefited the region (Gould, 1994; Romalis, 2007), whereas others have expressed skepticism regarding the relationships and have argued that "NAFTA has made no significant trade contribution to

the United States, Canada or Mexico" (Hartman, 2011, p. 6). Others have had mixed opinions on its influence on economic welfare (Fleischer, Maller, & Muller, 2011). Although many regional integration agreements have been enacted in Europe, Asia, and Latin America, for Waldkirch (2010), the particularity of NAFTA sets an example for other developing countries for future agreement negotiations.

The long history of trade shows that any trade theory is a narrative of the past strategies designed to exploit the weaknesses of the rivals (Juergensmeyer & Anheier, 2011). Trading systems are a competitive environment where diverse forces compete in the market for domination using appropriate strategies (Juergensmeyer & Anheier, 2011). When multinationals around the world employ strategies to achieve leadership on the international market, they use innovations in technology and anticipate the market needs both domestically and abroad (Bartlett & Ghoshal, 2000).

These strategies continue into the early modern ages and well into the present age, as dominant practices that had and continue to have serious relationships on some developing countries today and one could argue that these strategies hampered the real growth of the developing countries (Juergensmeyer & Anheier, 2011). In addition, most international conflicts rise from conflicting and competing economic interests, and the imbalance in the competing forces in the international markets create unnecessary wars that are ravaging countries around the world (Juergensmeyer & Anheier, 2011). Empirical studies on international trade have revealed that tariffs (levels of imposition

that may cause disturbance in trade) and non-tariffs (quota and subsidies) have been major preoccupations for international trade theorists.

The General Agreement on Tariffs and Trade (GATT), signed in 1947, took effect in 1948, and lasted until 1994. It was replaced by the World Trade Organization (WTO) in 1995 (wto.org). GATT went through eight rounds of intense negotiations and different stages of transformation before it was signed in April 1994 in Marrakesh, Morocco. What is evident according to Liu (2009) is that "GATT/WTO may have played different roles over different time periods" (p. 442).

The original objective of GATT was to address three major areas of concern: (a) measures for expanding trade of developing counties to further economic development, (b) reduction or elimination of tariffs and other barriers to trade, and (c) measures for access to markets for agricultural and other primary products (wto.org). As the world is becoming increasingly interdependent, the protectionism that might have worked well in the past to generate revenue now seems to create more impediments for economic development than one would have thought a generation earlier. Thus, as asserted by Liu (2009), the push for tariff reductions and elimination of nontariff barriers became necessary to allow international trade to yield any meaningful results for true economic development.

The legal framework as established in GATT, according to Liu (2009), is the foundation for promoting international trade. Liu strongly argued that the groundwork of GATT led to the WTO; however, noted that although GATT promoted international

trade, developed countries mostly shared trade gains due to the lack of transparency in the existing trade system under the agreement. Moreover, according to Jackson (1997), "Accession to WTO requires acceptance of all of the multilateral agreements" (p. 59). In that requirement Jackson argued, "there were some added complexities in the WTO as an institution compared to the GATT" (p .59).

The rise of nationalism in the 19th century has continued and has shaped the "modern trading system" (Juergensmeyer & Anheier, 2011). In the early 20th century, trading levels grew significantly; this was followed by the runaway inflation that led to 1929 market crash in the United States. This forced U.S. Congress to curb the trend with Smoot-Hawley Tariff Act of 1930 that was seen by most economists as an Act of protectionism and counterproductive (Eichengreen, 1989). Studies of the irregularities that were inherent in the GATT postwar strategy, were directed only by the developed countries as participants in reciprocal tariff bargaining, privileged only industrial products (Bennett & Sharpe, 2001; Gowa, 2010; Liu, 2009). This explains, according to Liu (2009), why GATT negotiations were difficult for developing countries to accept; thus, it was necessary to find another format that would expend the conceptual framework, the WTO.

GATT's successor, the WTO, is still facing some of the GATT challenges regarding tariff harmonization and protectionist trade politics that are often seen in developed countries (Cho, 2006). The first decade of WTO's existence can be viewed by some as disappointing, due to the inability of developed countries to make concessions on

agriculture subsidies that were considered protectionist by developing countries and vital to economic developments; thus, regional bilateral or multilateral arrangements are preferred to avoid endless negotiation through WTO (Cho, 2006; Gandolfo, 1998). During the first 2 decades of WTO, more than 250 regional agreements were enacted, breaking away from the multilateralism to preferential trade arrangements. This opened the flood gate for many bilateral and multilateral agreements that have considerable influence on the integration of world's economies (Cho, 2006; Pitigala, 2009).

The North America Free Trade Agreement (NAFTA) was introduced to promote regional integration that would eliminate, or extensively reduce, tariffs on exports–imports on most agricultural and industrial goods and services among the United States, Canada, and Mexico (Congressional Digest of November, 1993; Romalis, 2007). NAFTA is regarded as the most comprehensive trade agreement in the region, and the second largest of such agreements in North America (Fleischer et al., 2011; Romalis, 2007). Several competing theories and findings questioned whether the agreement achieves its purpose, and whether NAFTA lives up to its expectations as regional economic integration mechanism (Romalis, 2007). Many studies regarding the effect of trade liberalization through tariff reduction have had great difficulty in measuring the effects of NAFTA on the regional economy (Depken & Ford, 1999; Romalis, 2007). The implementation of the agreement according to the study created additional costs for businesses and ended up increasing transaction costs that hampered small businesses capability to compete adequately in the regional market as intended.

Because of the political implications of NAFTA, it is difficult to find an unbiased opinion regarding whether NAFTA lives up to its original intended purpose. It is also difficult to determine whether NAFTA deserves all the denunciation or if the economic environment that would have enabled the achievement of the expected growth were too much of illusions (Depken & Ford, 1999). My study focused on how tariff elimination and real exchange rate influences imports and export between the United State and Mexico. The main objective was to analyze the correlation, if any, between tariff eliminations and trade elasticity, and I also simultaneously investigated the relationship between exchange rate volatilities and trade volume when tariffs are eliminated at the same time. I then evaluated whether the exchange rate dynamic has any greater relationships than tariff eliminations. My findings may help fill the gaps that exist in the literature, especially regarding NAFTA's influence on the automobile and auto parts industry as a result of the Act. My study may also clarify the ongoing debate on the real relationships s from NAFTA. To achieve this, I formulated hypotheses and conducted analysis to determine whether any correlations exist among these variables.

I assumed that when tariffs are eliminated, an increase in the automobile and auto parts trade volume between both countries should occur. At the same time, I assumed that whether or not the currencies in both countries fluctuate, no change should be observed in the imports of the same in both economies. Thus, if the exchange rate fluctuation has no relationship with the automobile and auto manufacturing trade, no relationships resulting from the tariffs eliminations should be observed. From these assumptions, no benefits on

these nations' economies as the result of tariffs eliminations should occur; therefore, trade policies would have to be re-evaluated, reoriented, and refocused on factors that could have real relationships on these nations' economies.

Background

I this chapter, I discuss the nature of the study and its purpose. I provide a theoretical foundation by reviewing selected theories that contribute to the challenging questions of trade liberalization with regard to NAFTA. I also discuss the problems of concern that led me to choose the research topic and its relevance to existing literature in a time when NAFTA is debated. I also address the study purpose, the theories on which I drew my conceptual framework to formulate assumptions, the research question, and the hypothesis that I tested using analysis of variance (ANOVA).

The preferential trade theory, originated from Viner (1950); the exchange rate theory from Cassel (1918); and the commercial policy theory were derived from GATT, and they are the essence of international trade policies. These major theories inspired my study. I investigated whether tariff elimination has any influence on the automobile and auto parts trade and whether exchange rate dynamics could influence these effects. I also provide information on data I collected and the methodology I used to analyze the data and draw inferences.

International trade can promote industrial performance through increased specialization and efficiency only if with a transparent trading system (Zhang, 2010). The effects of tariff reduction and the real exchange rate factor on the international capital

market are still points of disagreement among most economists, and existing literature is confusing at best, especially when it comes to NAFTA (Zhang, 2010). The dominant issue in the regional trade agreement debate focuses on whether NAFTA creates trade or trade diversions in the region, argument (Krugman, 1991) debated extensively in his presentation at Federal Reserve Bank at Kansas City, and echoed by (Zhang, 2010) research on whether some NAFTA blames should be offset by the role real exchange may have played in the regional trading market.

The conceptualized thinking behind the enactment of NAFTA as for most trade agreements is the same of a better macroeconomic environment that facilitates capital movements, and the potential economic growth that should be expected. Ongoing debates exist in literature about the benefits of regional trade arrangements and how these arrangements might be the preferred approach to regional economic integration (Data & Kouliavtsev, 2009). According to Rahman, Charles, and Mustafa (2010), in the real world, the practicality of free trade agreements may embody some myths that, through time, create illusions among participants.

Globalization is becoming more intensified as the trade barriers are shrinking. Still many questions remain unanswered and the debate continues regarding whether trade agreements help developing countries grow their economies (Fuentes & Ibarrarán, 2012; Gandolfo, 1998; Jackson, 1997; Romalis, 2007; Zhang, 2010) and others. The concerns expressed are contradictory and create more confusion regarding the influence NAFTA has on the U.S and Mexican economies; however, the confusion may have

originated from the fact that most of the studies focused on the macrolevel relationships, which are difficult to measure (Depken & Ford, 1999; Fuentes & Ibarrarán, 2012). According to Fuentes and Ibarrarán (2012), "Previous researches on the impacts of NAFTA focused on the traditional questions brought by the trade liberalization" (p. 411). The role played by NAFTA, if any, in the manufacturing sector should be measured by the sensibility of exports to changes in tariffs and real exchange rates (Fuentes & Ibarrarán, 2012).

My aim in this study was to cover the gaps in existing literature, which has focused mainly on the macrolevel relationships related to NAFTA. Furthermore, existing literature does not adequately address the real implication of NAFTA, and the role of fluctuations in the real exchange rates. Existing studies on NAFTA have overlooked the real influence of exchange rate dynamics that plays an important role in assessing any trade policy real relationships. The relevance of currency exchange in multinational operations is of such importance that, discussing trade policy relationships without associating it with possible shocks from changes in real exchange rate may obscure the full picture that should be presented when analyzing NAFTA. This is especially important when studying possible effects this may have on major sectors of the economy such as the automobile and auto parts manufacturing. This gap makes my study relevant. My study contributes to the body of knowledge especially regarding the relationships between NAFTA and the automobile and auto parts manufacturing sector of the United

States and Mexico's economies. The ongoing debate on NAFTA, trade deficit with China and its currency manipulation, make this study more relevant and timely.

Problem Statement

Although many studies have examined the fundamentals of trade barriers and tariff eliminations, most of these studies focused only on the relationship between exports and economic growth and failed to demonstrate if real exchange rates volatility had any relationships to trade volume or whether or not other factors may affect trade elasticity when tariffs are eliminated (Kalsoom & Rukhsana, 2012). The trade deficit between the United States and Mexico is blamed on NAFTA as if the purpose of tariff elimination is to avoid trade deficits (Francis, 2011). Kongsted (2012) argued that trade policy analysis ought to extend beyond the traditional exports that focus only on tariffs and tax considerations to incorporate the dynamic of exchange rate in the manufacturing sectors of the economy.

Although the world's economic and political events have improved, the understanding of the fundamentals of regional economic integration such as NAFTA, the effects of exchange rate fluctuations on regional trade and regional economies are still unclear (Frieden, 2014). Regional trade agreements and exchange rate policies may present conflicting interests; however, the problem is that existing researches lack clarity in revealing if any possible correlations exist between tariff eliminations, exchange rate, and trade elasticity (Kongsted, 2012; Pomfret & Pontines, 2013). The debate on the Trans-Pacific Partnership (TPP) intensifies, and concerns of currency manipulation are

raised. The importance of exchange rate policy implications for an exporter, and the lack of empirical research presenting the relationships of exchange rate volatility to trade volume in the existing body of knowledge, clearly show meaningful gaps in the current literature that need to be filled. An empirical study that examines the relationship between exchange rate dynamic and trade volume when tariffs are eliminated between the United States and Mexico is needed, especially in the automobile and auto parts industry. This research achieves that goal.

Purpose of the Study

The purpose of this quantitative correlational study was to test the theories of preferential trade (tariff elimination), the exchange rate dynamic as independent variables, and correlates them to trade volumes as dependent variable in the context of NAFTA, and evaluate if they have any relationships to the automobile and auto parts sector. The results of this study are needed is to explain the real influence that exchange rate fluctuations could have on trade volume within NAFTA. I collected data on the automobile and auto parts trade volume between Mexico and the United States. I then conducted a regression analysis that tested tariff eliminations and exchange rates as independent variables to correlate the variations to those of export and import volumes (trade elasticity) as dependent variables.

Research Question and Hypotheses

The research question was: How can tariff eliminations and real exchange rate contribute to the rise in import-exports in the automobile and auto parts manufacturing sectors in both Mexico and the United States?

H_{01a}: There is no statistically significant correlation between tariff elimination, real exchange rate, and import volumes between Mexico and the United States automobile and auto parts industries.

H_{a1a}: There is a statistically significant correlation between tariff elimination, real exchange rate, and import volumes between Mexico and the United States automobile and auto parts industries.

H_{01b}: There is no statistically significant correlation between tariff elimination, real exchange rate, and exports volumes between M*ex*ico and the United States automobile and auto parts industries.

H_{a1b}: There is a statistically significant correlation between tariff elimination, real exchange rate, and exports volumes between Mexico and the United States automobile and auto parts industries.

Tariff elimination and exchange rates were the independent variables, and import volume and export volume were the dependent variables. The tariffs in concern in this study were those related to automobile and auto parts implicated in the imports and exports between both United States and Mexico as result of NAFTA for the period indicated. To perform the statistical analysis and make inference with confidence, I

collected data on tariff elimination, exchange rate, and trade volume from 1989 through 2013.

Theoretical Basis of the Study

The research is based on two main theoretical views: the preferential trade theory and the exchange rate theory. However, the commercial theory is added as an elaborative theory due its implication and relation with the other main two dominant theories in this research. The origin of these theories is discussed to give some perspective.

The preferential Trade Theory. This originated from Viner (1950), who advanced the idea and at the same time depicted in trade creation and trade diversion in a static welfare analysis (Panagariya, 1995; Panagariya, 2000; Panagariya & Bhagwati,1996;).Viner (1950), developed the theory, and he argued that when preferential trade arrangement through custom unions are formed, it increases trade between members; it also creates the possibility that a country outside the union could leverage its comparative cost advance to export goods produced at lower to the union and import those goods it may needs from the Union; therefore, argued that preferential trade is good for members in a union by creating more trade but may also create trade diversion from non-members (economicsonline.co.uk).Thus, Panagariya and Bhagwati (1996), analyzing Viner's idea of preferential trade arrangements deducted from Viner's reasoning that its theory could also harm the welfare of countries involved as well as the World's welfare; thus, provided theoretical nuances arguing that this policy approach could actually be detrimental to its members if not properly structured. Wignaraja (2013)

also discussed trade creation and trade diversion under preferential theory as coined by Viner (1950) and argued that: "Since Viner (1950) coined the terms 'trade diversion' and 'trade creation', economists and policymakers have been ambivalent about the welfare implications of customs unions and RTAs" (p. 3). The principal thinking of this theory focused on two distinctive approaches: one that envisioned a trade mechanism that creates free trade areas by lowering tariffs on members, and the other that imposes tariffs on outsiders through forming customs unions (Panagariya, 1995; Panagariya & Bhagwati, 1996; Panagariya, 2000).

Beside the most favored nation provision in GATT, the multilateral concept in GATT and WTO was influenced by the preferential trade theory and consequently the enactment of NAFTA was also inspired by this theory (Panagariya, 2000). Proponents of this theory such as Krugman (1991) and Summer (1991) argued that because countries in the same geographical areas are already neighbors and therefore natural trading partners, preferential trade agreements are good for them, and this proximity of one another creates trades that outweighs any perceived trade diversions one could imagine. However, the problem with this theory is that it may give rise to the debate on trade diversions, and the relationship between the initial partners' import shares with non-members and direct "static welfare relationships to a PTA is theoretically ambiguous" (Konan & Maskus, 2012, p. 884*)*, and it gives rise to arguments that welfare losses are induced by decrease in tariff that are directly linked to losses of revenues on trade with non-member countries (Konan & Maskus, 2012*)*.

According to economists who hold this view, preferential trade arrangements with geographical neighbors often involve diverse economic policies beyond tariff barriers, and the question that needs to be answered is: "Is preferential trading arrangements trade liberalization or protectionism?" (Krueger, 1999). This research evolves around two key concepts: tariffs reduction and real exchange rate on one hand, and the concept of trade elasticity on the other hand; however, other theories are summarized as they are implicated in trade or associated with tariffs and exchange rate concepts.

The exchange rate theory. This theory dated back to the sixteen and early seven centuries with the inquisitive mind of the Swedish economist Cassel (1918). The theory of exchange is directly related to monetary policy of country that determines the supply of a given currency; the demand of the money and its supplies is what determine the exchange rates" (www.adbi.org). However, the fluctuation of a monetary unit is function of the expectations of future behavior of the supply and the demand of a currency (www.adbi.org).

It has been argued in the literature that currencies play major role in trade volume (Kanamori & Zhao, 2006), and when a country's currency is devaluated or appreciated as taught in economic class, the relationship is reflected in its trade volume, mainly in the balance of payment between trading partners (Bergsten, 1991; Kanamori & Zhao, 2006; Krugman, 1991). Monetary policy crisis can alter trade responsiveness of the manufacturing sector of the economy to change in the real exchange rates (Fuentes & Ibarrarán, 2012). For Fuentes and Ibarrarán (2012), the extent to which changes in real

exchange rates might affect trade reform in Mexico is not really known and suggested that "further understanding of the dynamics of adjustment of the export sector to changes in real exchange rate is also an interesting topic for future study" (p. 449). According to Kanamori and Zhao (2006), exchange rates theory starts with the purchasing power reasoning, and is directly linked to the general equilibrium concepts modeled by Mundell-Fleming which deals with many aspects of the economic sectors, including the balance of payment, trade deficits at the macro level (pp. 30-31). The contradictions in the literature concerning the relationships of exchange rates fluctuations to trade, and the lack of empirical studies at the micro level according to Kanamori and Zhao (2006), make the inquiry into the relationships of exchange rate at the micro level more interesting.

For that specific reason, the NAFTA's real relationships to trade elasticity may be difficult to assess without taking into account the effect of exchange rates at time or during a period of time, and how the fluctuation in exchange rates during a period of time might had influenced trade, especially in a recession time (Datta & Kouliavtsev, 2009). Some aspect of Datta and Kouliavtsev's (2009) study investigated changing pattern of U.S. textile trade, and appropriately addressed this concern. For the economic efficiency to be achieved a close relationship must exist between market structure and the economic factors that induce the achievement of optimum quantities that actors on the markets wish to trade (Harvey,1996). However, any trade policy that ignores the exchange rate could have inefficient relationships to the manufacturing sector of an economy (Bennett &

Sharpe, 2001). Because of the importance of currency and monetary policy implication in the trade, exchange rate concerns will dominate the trade debate in decades to come (Bergsten, 1991; Krugman, 1991). For this study, exchange rate theory was considered in association with tariffs eliminations and simultaneously studied as independent variables.

Assumptions

It is presumed that the data available in the bureau of economic administration (BEA), United States International Trade Commission (USITC), and Census, agencies within the United States Department of Commerce contain no discernable inaccuracies. It is further assumed that the data collected from period from 1989 through 2013 (covering five-year period prior and five-year after implementation) on trade volume and fluctuations in exchange rates (from the Treasury) represent the actual and unbiased measures. Thus, these sources are deemed very reliable and trustworthy of information that are used in an ANOVA analysis, and were relied upon for this research.

Nature of the Study

The nature of this research is quantitative. Quantitative research is more suitable to investigate and analyze tariff elimination effects on trade volume and how exchange rate volatility can correlate with import-export elasticity, which is the primary focus of this dissertation. Data for this study were collected from secondary sources to test the hypotheses regression analysis. Using the quantitative approach, the theories of tariff elimination and exchange rate are viewed as economic variables that helped conceptualize these theories into hypotheses that are tested to show if possible

relationships exist among the variables. To test the hypotheses, data on manufacturing goods (automobiles and auto parts) traded between 1989 and 2013 were collected along with the tariff rates and exchange rates during the same period. The ANOVA statistical analysis was conducted to measure the variables to determine whether or not any significant relationships exist among them.

Operational Definition of Terms

Tariffs: is an imposition of duties that is a form of commercial policy that can cause rise in the price of domestic imported goods usually the differentiated ones (Gandolfo, 1998). Established in 1947 after the second war, it was designed to international forum for tariff reductions negotiations (Gandolfo, 1998).

Free trade agreement: is one of many forms of economic integration in bilateral and multilateral arrangements that involve a formal agreement between two or more countries in a particular region (Congressional Digest, November 1993). The essence of free trade is to create a common market that eliminates all tariff and trade restrictions between member countries in a region (Congressional Digest, November 1993). However, according to Congressional Digest, NAFTA reached far to include cross-border investment, and some level of flexibility for business people.

Rules of origin: are designed to provide guidelines for eliminating trade barriers, and ensure that goods that are receiving preferential treatments originated from the NAFTA free trade zone (Congressional Digest, November 1993). Goods must satisfy a

minimum of 60% of transaction values or 50% of the net costs (Congressional Digest, November 1993).

Exports duties: are customs duties on exports (Gandolfo, 1998).

Trade policy: can be defined as a set of regulations that determine the framework in which international trade may be conducted. As such, it depends on the objectives and goals set by a country, group of countries or by the World Trade Organization.

Quotas: is a quantitative restriction imposed by a government on the importation of certain products or commodities as controlling measures of international trade (Gandolfo, 1998).

Non-tariff barriers: are other forms of government actions such as export and production subsidies, tied aid that generally take various overt and covert forms to the exporters (usually is proportion to the volume of exports). They can also take the form of embargo—imposed by government decrees restricting the importation or exportation of certain commodities as foreign policy to put political pressures on unfriendly countries by economic means (Gandolfo, 1998).

Trade volume: is the total trade transaction that takes place between countries in a given period whether monthly, quarterly, or yearly.

Exchange rate—is defined as the value that is assigned to a currency in comparison to another country's money, and this value can be fixed or flexible (www.merriam-webster.com, n.d.). The rate is maintained fixed through countries' mutual agreement when determining countries' respective monetary policies

(www.merriam-webster.com, n.d.). According to Webster.com, the gold standards the first known historical fixed exchange rate used in determining the value of gold when converting it into currencies. An exchange rate according to (Webster.com, n.d.) is flexible, or "floating," when two, countries agree to let international market forces determine the rate through supply and demand. The rate will fluctuate with a country's exports and imports (Webster.com, n.d.). Most world trade currently takes place with flexible exchange rates that fluctuate within relatively fixed limits (Webster.com, n.d.). The exchange rate plays integral role in determining the balance of payment of countries in the international markets, according to Sommariva and Tullio (1988), and the analysis emphasized on the importance of the exchange rate on the financial markets and the country's monetary policies.

Real exchange rate—is an important player in the growth of the economy as it may lead to higher export by stabilizing currency value at any specific level, and plays a vital role in country's trade elasticity (Bashir & Luqman, 2014). The real exchange rate has to do with the purchasing power by comparing a basket of goods sold by one country against a basket of goods purchased that can be purchased be another country (Catao, 2007). It set to measure whether or not a currency is overvalued; helps determine a trade deficit between two countries or between a group of countries and the rest of the World (Catoa, 2007). According to Catao (2007) the contentious debate on trade deficits between the U.S. and China is a result of misalignment of exchange rate and has become

both political and economic issue. When designing monetary policy, lawmakers are more interested in the real exchange rate (Catao, 2007).

Exchange rate fluctuation—is an appreciation or depreciation of currency with flexible exchange rate that is allowed to float with the market forces of supply and demand (financialdictonary.com).

Trade elasticity—is defined as a measure of a variable's sensitivity to a change in another variable (www.investopedia.com). In the context of this research it can be assumed that a change in variables import and exports is sensible to change in tariff elimination and exchange rates. In economics, elasticity refers the degree to which individuals (consumers/producers) change the demands or amounts supplied in response to price or income change (www.investopedia.com).

Regionalism—is defined as preferential trading arrangements for a geographical region (Griffiths, Sapsford, & Balasubramanyam, 2002).

Scope, Limitation, and Delimitation

The sample used in this study was drawn from available secondary data collected from the US Custom Services on US and foreign automakers doing business in in both United States and Mexico companies. These manufacturers' products form the population of this research. The data on exchange rates from the period of 1989 to 2013 were collected from the Bureau of Fiscal Service in the Treasury Department. The main limitation is the access to information on the real effects of tariff elimination on the trade

as available empirical evidence, and the lack of consensus on the best way to measure its relationships.

Significance of the Study

This research fills the gaps in understanding the role exchange rates fluctuation could play in trade liberalization by specially focusing on the micro level and industry specific of the relationships to preferential trade arrangements to clarify the literature by contributing to the body of knowledge that exists on the relationships of trade agreements to trade elasticity. The results of this study provide much-needed insight to add a great deal of clarity in the literature to whether or not NAFTA affected regional economies through its tariff eliminations when a study is focused on a specific industry. The positive social change I expect to see is to change the debate on trade from the normally unchallenged and generally accepted trade agreement structure to introduce the concept of structured exchange rate that would allow exporters to have a clear understanding of what should be expected from other economic factors and to strategize to change a country's monetary policies. Understanding these factors helps maximize trade benefits that lead to an increase in employment and a positive change in social conditions.

Summary

The goal of this research documents, evaluates, and investigates the relationships of trade tariffs eliminations and the effect of exchange rates to the volume of import-export in the automobile and auto parts manufacturing sectors between the United States and Mexico as an example based on the NAFTA. The belief is if these trade

arrangements have direct effects on imports-exports as suggested then they should have measurable consequences on the manufacturing sectors of the economy. The degree to which tariffs reductions might contribute to trade volume fluctuations was examined and accessed along with the effects on trade volume if any from the currency exchange rate fluctuations.

The source of the data collected was the Department of Commerce Census Bureau, on trade volume on imports and export between the United States and Mexico covering the period between 1989 and 2013. Although tariff eliminations would have ended in 2008, the study analyzes information five-years after the elimination occurred for an accurate assessment of NAFTA relationships on the selected industry. This enables me to perform the statistics tests and infer on the results with confidence. My expectations to demonstrate that tariff eliminations may have no significant relationships to the automobile trade between the two countries was rejected; however, trade policies would have to be re-evaluated, reoriented, to focus on factors that could have real relationships to the respective nations' economy.

Chapter 2: Literature Review

Introduction

The North American Free Trade Agreement (NAFTA) was signed in 1993. The agreement eliminated tariffs on most industrial goods traded between Mexico and the United States. NAFTA has been blamed for the trade deficit between the United States and Mexico (Robinson & Thierfelder, 2002). Most of the studies that have examined the fundamentals of trade barriers and tariff eliminations have focused only on the relationships between exports and economic growth and failed to demonstrate whether other factors, such as the real exchange rates volatility, had any relationships to trade volume or elasticity when tariffs are eliminated.

The purpose of this quantitative correlational study was to test the theories of preferential trade (tariff elimination) and the exchange rate dynamic as independent variables, correlate them to trade volumes as a dependent variable within the context of NAFTA, and evaluate whether they have any relationships on the automobile and auto parts sector. This study fills the research gap by examining the role that exchange rates play in trade liberalization by specifically focusing on the microlevel relationships to preferential trade arrangements. Addressing this gap contributes to advancing knowledge in the topic by providing insight, through a study focused on a specific industry, into whether or not NAFTA affected regional economies through its tariff eliminations.

For this literature review, I used the following online databases and search engines: Wiley Online Library, Taylor & Francis Online, Oxford Journals Online,

Cambridge Journals Online, Project Muse, Science Direct, Directory of Open Access Journals, Business Source Complete (Ebsco), Springer, De Gruyter, ERIC and Google Scholar. The key search terms that I used to search these databases alone and in combination included the following: *automobile and auto parts industry, currency manipulation, exchange rates, exchange rate policy, exchange rate volatility, external adjustment, firm-level evidence of effects of RER shocks, Mexico, NAFTA, preferential trade, productivity growth, RER shocks, tariff elimination, trade deficit, trade elasticity, trade policy analysis, trade volume, Trans Pacific Partnership,* and *United States.*

To ensure that the most recent reports and studies were included, 71 works (95%) of the literature in the review were published between 2012 and 2015. The results were expanded to include 4 (5%) works not older than 1973 in the theoretical framework section of the study, which were seminal studies of preferential trade theory and exchange rate theory. In the current review of the literature, I provide a detailed background to the research problem discussed in the previous chapter. In the first section, I discuss the theoretical framework of the study, which is preferential trade theory and exchange rate theory. In the next section, I review the literature on the relationships between exchange rate volatility and trade. In the following section, I examine the relationships of tariffs and tariff elimination to trade and welfare. In the next section, I discuss studies of regional integration and trade agreements, which examine the incentives to form PTAs, the advantages and disadvantages, and some existing and proposed trade agreements. In the final section, I look at the relationships between

NAFTA and the Mexican economy and auto industry. The chapter ends with a summary and the conclusions of the literature review.

Theoretical Framework

The theoretical framework for this study is preferential trade theory and exchange rate theory. Preferential trade theory is based on Viner's *The Customs Union Issue* (2014), a pioneering work on the static analysis of Preferential Trade Agreements (PTA), originally published in 1950. Preferential theory was the fundamental trading system basis for GATT and the WTO. According to Bhagwati and Panagariya (1996), the essential message of Viner's work was that, unlike non-discriminatory trade liberalization, PTAs could be harmful to both a member country and to global welfare. Preferential trade agreements are a form of economic integration in which tariffs for certain products are reduced or eliminated for countries signatory to the agreement. The concepts of "trade creation" and "trade diversion" resulting from PTAs are closely associated with Viner's approach. Trade creation is the result of the removal of barriers by union members, while trade diversion is the process whereby efficient producers who are not union members lose out to less efficient producers. It is generally considered that Viner's work has often been misunderstood by subsequent practitioners (Bhagwati & Panagaritya, 1996; Oslington, 2013), for example, in the proposition that trade-creation effects will outweigh trade-diversion effects when the countries of the PTA are natural trading partners. Bhagwati and Pangariya (1996) presented a contradictory view, stating that plausible models may, in fact, be constructed.

An integrated model of exchange rate behavior, developed by Mussa (1984), synthesized older contributions to the theory of exchange rate determination. The purpose of exchange rate theory, according to Mussa, is to explain behavior observed in the real world. He presents a schematic asset price model of exchange rate as dependent upon a sum of economic factors with the expectation that they will affect the present and future foreign exchange market. This model offers an explanation for the random and unexpected component of exchange rate change, which dominates actual exchange rate movements. Auboin and Ruta (2013) argue that the relative prices of tradable to non-tradable products, referred to as real exchange rates (RER), are a measure of real competitiveness, and can potentially have relationships to incentives for resource allocation between sectors producing those goods. The end of the Bretton-Woods system of monetary management in the 1970s resulted in increased volatility of exchange rates and a lively debate on the affect such volatility could have on the real economy.

Review of the Relevant Literature

Exchange Rate Volatility and Trade

In the review of the literature on the relationships between exchange rates and international trade, Auboin and Ruta (2013) generally found that the theoretical and empirical literature on the subject is somewhat ambiguous. However, they identify two key issues, which stand out in the evolution of the policy debate: exchange rate volatility and, more recently, currency misalignments or exchange rates above or below the equilibrium exchange rate. An early seminal study of the effect of exchange rates on

trading firms by Clark (1973) uses the example of a hypothetical firm producing a single product, which has no imported input and is sold in export markets. As the firm receives payment in foreign currency only, the proceeds from the exported product in domestic currency depend on the exchange rate level, which is unpredictable. As an additional factor, the output of the firm does not change in reaction to the effect of exchange rate changes on its profitability. The firm has to incorporate exchange rage uncertainty into the determination of its level of exports. Overall, Clark's model indicates that the relationships between international trade and exchange rate volatility is negative. Serenis (2013), studying exchange rate volatility and export flows in South American countries also concluded that significant negative relationships exist between exchange rate volatility and aggregate exports.

Recent studies have emphasized the importance of using disaggregated, rather than aggregated, industrial data for a more accurate picture of the relationships of exchange rate volatility. Bahmani-Oskooee and Bolhassani (2012) found that earlier studies investigating the relationships of exchange rate uncertainty to Canadian trade suffered from aggregation bias. When they used trade, data disaggregated by commodity to study the relationships of exchange rate uncertainty to trade flows between Canada and the United States, they were able to identify which industries were affected in both the short and long run. Bahmani-Oskooee and Satawatananon (2012) also departed methodologically from previous studies of trade between the United States and Thailand by disaggregating the trade flows between the two countries by industry and considering

118 industries exporting from the United States to Thailand and 41 exporting from Thailand to the United States.

In the study of exchange rate volatility on trade within the context of exports from South Africa to China, Wesseh and Niu (2012) found that studying disaggregated data had relationships to the results. At an aggregate level, the results indicated that exports to China from South Africa are generally income inelastic. However, the demand for exports from South Africa tends to be income elastic when the data are disaggregated by sector.

When studying how Swiss exporters would respond to exchange rate changes, Wermelinger (2012), also chose to use disaggregated trade. Results indicated that highly disaggregated unit values reflected prices more accurately than was found in most of the earlier studies. The author considered the use of relatively aggregated data in the matching of imported input prices faced by each exporting industry as a possible constraint on the identification of the cost-adjustment effect.

In the same line of reasoning, Chipili (2013) emphasized the necessity of disaggregating trade data due to the varied sensitivity exhibited by export commodities to exchange rate risk. Broz and Werfel (2014) disaggregated exchange rates and protectionist demands to the industry level in the study of exchange rates and demands for trade protection, but they suggest that the precision of the estimates could be improved by further disaggregation of the data. Drawing from earlier studies, Aftab, Ahmad, Ismail, and Ahmed (2015) suggested that the aggregation bias of previous

research focused on aggregated data led to over-generalized findings. They chose to consider industry level disaggregated data in the study of the role of exchange rate uncertainty within the context of bilateral trade between Malaysia and the European Union.

Regional studies. Disaggregation of data is one factor, which has been shown to have an effect on the results of studies of international trade. Geography and development level may also play a role. A number of regional studies examining the relationships of international trade to exchange rate volatility in specific regions and among developing and developed countries drew a variety of conclusions. Many recent studies have focused on trade among nations in Africa, Asia and the Indian subcontinent, while others have looked at the European Union and the United States.

As a result, concerned about the devastating consequences that exchange rate has had on some economies, Adam (2012) identified two challenges arising from the radical change exchange rate policy had undergone in Africa in the previous decade. Controls and management of exchange rates had been progressively dismantled and replaced by floating-exchange rate regimes, which used money as the preferred anchor for inflation. The first challenge was the surge in private capital flows into African countries, which exposed the weaknesses in small domestic markets, triggering volatility in exchange and interest rates. This has given rise to reluctance on the part of some countries to commit to full exchange rate flexibility and renewed discussions of monetary union. The second challenge flows from the partial retreat from full exchange rate flexibility. Some African

countries are considering adopting inflation targeting as the monetary framework. For Adam, this raises the question of the degree to which the conduct of macroeconomic policy can accommodate exchange rate objectives.

In a study of exchange rate volatility and trade flows in Zambia, Chipili (2013) used the Johanson cointegration method to analyze import and export demand equations for the period 1980 to 2007, with an emphasis on exchange rate volatility. The results led to the conclusion that a stable exchange rate was inevitable for trade promotion as exchange rate volatility is an essential part of the formulation of exchange rate and trade policy. A volatile exchange rate could influence the allocation of resources in Zambia between tradable and non-tradable sectors.

On the other hand, Musila and Al-Zyoud (2012) argued that following a policy of exchange rate stability would not be enough to increase the volume of bilateral trade significantly in sub-Saharan Africa (SSA). Using a gravity model approach to analyze data from 1989 to 2007, they found that the flow of exports and imports in SSA countries is adversely affected by exchange rate volatility. However, they suggest that the negative relationships can be partly attributed to the lack of hedging possibilities and the inability of firms to alter inputs to make optimal adjustments that would take into account the movement of exchange rates. With regard to policy, they found that due to the small size of the estimated elasticities of the variable for exchange rates volatility, eliminating the volatility would result in only small increases in exports. They concluded that pursuing a

common currency and regional trade agreement might be more likely to help promote export growth and economic development in the region.

In a study of the implications of RER misalignment in developing countries, Ndhlela (2012) undertook an empirical analysis of the relationships between real exchange rate misalignment and real GDP growth in Zimbabwe. Evidence was found to support the hypothesis that RER misalignment was a major factor in the growth slowdown in Zimbabwe after 2000. The results indicated that growth is hindered by an increase in RER overvaluation and promoted by RER undervaluation, and that keeping RER levels close to, or below, equilibrium will promote economic growth.

Using ARDL bounds testing procedure to cointegration and a dataset disaggregated by market of destination and sector type, Wesseh and Niu (2012) investigate the relationships of exchange rate volatility to South African exports to China for the periods 1992M1 to 2010M7 and 1995Q1 to 2010Q3. The study was undertaken within a framework, which explains export volume as a function of foreign income, relative prices, and a measure of short-term exchange rate volatility. The authors found that, when the data are disaggregated, the demand for South African exports tends to become income elastic and that some significant relationships exist between exchange rate volatility and exports, that relationship is either positive or negative. They do note that throughout most of the sample period, the Chinese Yuan is closely linked to the U.S. dollar, and, largely, the volatility of the South African Rand reflects the volatility of the Rand to the U.S. dollar.

One last study of trade policy in Africa (Omolo, 2013) looked at the relationships of trade policy reforms to household welfare in Kenya. Trade liberalization began in Kenya in the early 1980s and continued under the framework of the WTO. During the same period poverty and levels of inequality within the country increased. Omolo chose not to begin her study with the assumption that a relationship exists between trade liberalization and poverty. Using a multi-method approach, she tested whether a statistically significant relationship exists between trade liberalization and poverty. Overall findings were that trade liberalization had the greatest relationships to household welfare when it was accompanied by foreign direct investment (FDI), and that the relationships were positive, with increased household incomes and consumption. The incidence of poverty was found to have reduced for all households, although urban households experienced higher decreases. However, income inequality was found to be much higher in urban areas than in rural ones.

In the study of the effect of RER on India's trade balance, Kumar and Maurya (2012) used Fully Modified Ordinary Least Square (FMOLS) method to examine the long-run effects of bilateral RER on India's bilateral trade balance with 89 trading partner countries. The results show that a long-run relationship exists between RER and India's trade balance, which would improve with the real depreciation of the exchange rate. They found that, in the long run, real depreciation of a currency is effective in correcting an adverse trade balance through increased competitiveness.

Another study of the subcontinent looks at the dynamic association in Pakistan between the exchange rate and the set of seven macroeconomic variables: exports, imports, stock price index, foreign reserve less gold, industrial production, wholesale price index and money supply. The study analyses the variables from 1998Q1 to 2012Q4 to test the hypothesis that these seven variables are affected by the exchange rate and that, because of this relationship, a stable exchange rate is required for survival in a competitive economy. The study found that an inverse relationship exists between exchange rates and exports, which is statistically significant.

In a study of trading partners within Asia, Soleymani and Chua (2014) investigated the relationships of exchange rate volatility between the ringgit and the yuan to Malaysian trade with China. A bound testing approach to cointegration analysis and bilateral trade data disaggregated by industry were used to estimate relationships over the period of 1985 to 2010. The authors suggest that the effect of exchange rate volatility on trade volume is a relatively more important issue for emerging economies such as Malaysia due to its dependence on international trade to achieve economic development. Of the 151 importing and 24 exporting industries considered, the findings indicated that 94 or the Malaysian import industries and 16 of the Malaysian export industries models were cointegrated and that exchange rate volatility had effects on the majority of both models in the short-run. The study found that most of the effects of exchange rate volatility on trade volume are positive in import models, but in export models, the effect of the volatility is more negative than positive. The authors concluded that, in this case,

exchange rate volatility has significant effects on both durable and non-durable goods industries.

Concerned about the effect of volatility, Sabri, Peeters, and Abulaben (2012) examined the relationships of exchange rates on the South-North trade flow among Mediterranean countries. They argue that the volatility of exchange rates leads to reduced international trade volume, and that most of this reduction takes place in the emerging economies of the Mediterranean South countries. They point out the existence of an increased volatility between the currencies of the Arab nations and the Euro in recent years and that, following the 2008 financial crisis, a sharp reduction in trading between the North and South could be observed. The study looked at three sample South Arab countries - Egypt, Jordan, and Morocco - and used a Vector-Autoregressive Regression model with exogenous variables (VARX) to examine the relationships of currencies to North-South trade volume through the reactions of exports and imports. The results showed that goods exported from Egypt and Jordan to the European Union decreased as they became more expensive, while imports from the EU increased as they became cheaper, especially in the case of Morocco. The authors point out that trading flow in common markets is improved by using a common currency and that having various national currencies in the South countries and a common currency in the North may be a critical issue with regard to trade in the region.

Using bilateral exports from euro zone countries to the United States, Verheyen's (2012) study begins with the assertion that the financial and debt crises in Europe led to

pronounced volatility in the exchange rate and that the influence of this exchange rate uncertainty on exports is unambiguous. The study investigates what effect the exchange rate volatility had on exports from eleven-euro zone countries to the U.S. Verheyen points out that no consensus in economic theory exists as to whether the connection should be positive or negative, and that case studies in other areas have variously found positive, negative or no significant relationships between exchange rate volatility and exports. Using the ARDL bounds testing approach for cointegration, the study looked at disaggregated Standard International Trade Classification (SITC) export categories and found evidence of cointegration in 75% of the cases. The study found that RER reduces exports but U.S. demand stimulates them and exports react more than proportionally to rising U.S. demand. In looking at the elasticities of exchange rate volatility, the results of the study were mixed, but the author concluded that the results indicated that exchange rate variability is likely to depress exports. Further, as exchange rate volatility is of more importance for some countries, this may result in differences of opinion and disagreement with regard to the extent to which political authorities should intervene with regard to the exchange rate.

The extent to which some European exporters may respond to exchange rate changes was studied by Wermelinger (2012) using disaggregated trade data for Switzerland from 2004 to 2011. The purpose of the study was to investigate whether Swiss exporters systematically responded to changes in the exchange rate by adjusting the prices. Particular attention was paid to imported intermediate inputs, which have a

high share of total intermediate inputs in Swiss manufacturing. Wermelinger questioned the assumption in recent literature that contended that full exchange rate pass-through (ERPT) into imported input prices. The study used self-constructed indices of intermediate input prices to examine the effect of exchange rate fluctuations. The findings indicated high ERPT into imported input prices in all sectors and strong sectoral ERPT heterogeneity among exporters, but no evidence was found of full pass-through for all sectors. The findings also suggested that natural hedging was used as an effective strategy to reduce the risks of exchange rate variability and that Swiss exporter may not have adjusted the practices with regard to export pricing and natural hedging in response to the strength of the Swiss franc (CHF) following the Euro crisis.

The various regional studies tend to confirm Auboin and Ruta's finding that the literature on the subject of exchange rate volatility and trade is ambiguous. Factors such as geographical location, the level of economic development, the (in) equality of trading partners and the use of common currencies appear to elicit differing conclusions among the studies. One constant theme that does emerge, however, is the recognition of the importance of using disaggregated data to produce a more accurate picture of the effects of exchange rate changes on international trade. By disaggregating the data by industry, researchers have recognized the significance of industry type, size, and efficiency in the ability to deal with and react to exchange rate volatility.

Importance of industry size, type, and efficiency. Frieden (2015) focused on identifying the distributionally-motivated currency policy preferences of firms, industries,

and groups participating in the economy. He suggests that an industry's preference of exchange rate policy is determined by its characteristics, which include exposure to exchange rate risk and the effects of exchange rate movements on relative price. He argues that those which rely heavily on international trade and investment prefer a stable exchange rate, while those who produce tradable goods will prefer a depreciated exchange rate. These preferences are influenced by the degree to which movements in the exchange rate are passed through to domestic prices. Where pass-through is limited, and the relationships to prices is small, concerns about exchange rate volatility increase and support for a depreciated currency lessens.

In this regard, a study by Bahmani-Oskooee and Bolhassani (2012) of the relationships of exchange rate uncertainty to the flow of trade between the United States and Canada looked at trade data for 152 industries from 1962 to 2006, using a bounds-testing approach to cointegration. To avoid the aggregation bias found in earlier studies, they disaggregated the trade data by commodity, which allowed them to identify which industries were affected. Focusing on the long run, it was found that 12 US exporting industries and 35 US importing industries were negatively affected by exchange rate uncertainty. In contrast, results showed that 23 US exporting industries and 18 US importing industries were positively affected. Measured by each industry's market share, the authors found that almost all the industries that were affected, either negatively or positively, by exchange rate uncertainty were small; however, one notable exception existed to this finding. The road motor vehicles industry, which has the largest market

share (20%) of trade between the two nations, was found to be adversely affected by uncertainty of exchange rates. The study concludes that, among the large industries trading between Canada and the United States, only the very largest industry is negatively affected by exchange rate volatility.

Curious about what would the exporters reactions would be to changes in RER, Berman, Martin, and Mayer (2012) conducted a study using a very rich French firm-level data set for the period of 1995 to 2005, with export values and volumes that were destination specific. The purpose of the study was to analyze how firms reacted to movements of exchange rates when choosing prices, quantities, exit, and entry. The findings showed a very heterogeneous reaction to exchange rate movements among French exporters, which can help explain the low aggregate elasticity of exports to movements of exchange rate. It was found that most exports are made by high-performance firms that tend to react to depreciation in currency by increasing markup rather than decreasing export volume. The study also found that firms that enter the export market following the exchange rate movement tend to be smaller and less productive than those already in the market.

In the study of exchange rate misalignments and trade policy, Broz and Werfel (2014) found that such misalignments do tend to spill over into trade policy. Noting that previous studies showed aggregate protectionist activity to have a positive relation to levels of real exchange rate, the authors chose to investigate the relationship at the industry level. They presented a framework for identifying the positions and sensitivities

of industries to fluctuations in the exchange rate and used industry-specific measures of the demand for protection. They also modeled variation in the elasticity of demand by exploiting such industry -level characteristics as exchange rate pass-through, import penetration, and the share of imported intermediate inputs in total industry inputs. The evidence suggested that some industries demand more trade protection than others do. They found that the effect of currency appreciation on the number of antidumping petitions coming from industry is significant and positive only for industries, which have high pass-through. They conclude that demands for trade barriers in response to exchange rates only come from industries where currency appreciation directly harms competitiveness, citing as an example the primary metals manufacturing industry in the United States, which is responsible for almost half of the antidumping petitions, filed over the previous thirty years. The authors acknowledge that the broadness of categories of industry used in the study introduces a considerable amount of measurement error in the data and that further disaggregation of the data would improve the precision of the estimates.

In the study of commodity prices as a determinant of RER in developing countries, Bodart, Candelon, and Carpantier (2012) focused on countries which specialize in the export of one leading commodity and used non-stationary panel techniques to investigate the extent to which RER is sensitive to price fluctuations of the dominant commodity. They found that, in the long run, where exports of the dominant commodity are at least 20 percent of the total merchandise exports of the country, the price of that

commodity has some significant relationships to the RER. The larger the share of the main commodity, the greater relationships it has to RER. The results suggest the vulnerability of small developing countries, which heavily specialize in the export of one commodity and recommend the easing of monetary policy in response to long-lasting commodity price changes to mitigate the negative effects.

Examining the effect of RER volatility on imports of intermediate inputs at the micro level, López and Nguyen's (2015) study using plant-level data from the Chilean manufacturing sector for 1995 to 2007 shows that RER volatility can have significant negative relationships to the importing activity of individual firms. An increase in the level and volatility of RER lead to significant decreases in the percentage of intermediate inputs imported, although it does not affect the probability of intermediate inputs being imported. It was also found that plants with high levels of liquidity are less affected by volatility of the RER. The authors concluded that fluctuations in the RER affect the intensive margin of inputs, but not the extensive margin. They stress the importance of producing measures of RER relevant to decisions regarding input import, which take into account the vertical relationships between industries.

Using a plant level data to investigate relationships to RER, Baldwin and Yan (2012) examined the relationships of changes in the trading environment, such as tariff and RER changes, and efficiency level of plants on entry into and exit from trading markets. They looked at the experiences of manufacturing firms in Canada over three separate periods, in which different combinations of tariff rate changes and RER trends

occurred. They found a marked difference in entry and exit responses and productivity outcomes in the three periods. The findings indicated that plants that are more efficient were more likely to enter and remain in export markets. It was also found that those plants that export markets were likely to improve the productivities relative to the populations from which they originated and to have higher productivity growths than those that had not entered the export markets. Plants that exited export markets exhibited slower growth than similar firms remaining in the markets did. The authors suggest that this results from the better plants choosing to participate in export markets, that they may be more adept at learning, and that the more competitive environment requires that they make more progress to avoid being eliminated from the markets. These advantages are reinforced by macroeconomic events such as fluctuations in the exchange rate. Those who participate in export markets gain more productivity growth from currency depreciation than those who do not. In the Canadian context, exporters gained and advantage when the Canadian dollar depreciated from 1990 to 1996, but that advantage was lost when the dollar appreciated in 1984 to 1990 and again from 2000 to 2006, when advantages enjoyed by participants in the export market were almost completely offset by the value of the Canadian currency. Reductions in tariffs and depreciation of the currency increase the probability that more efficient non-exporting firms will enter export markets and that less efficient exporting firms will choose to exit export markets.

In the same approach, Li, Ma, and Xu (2015) used Chinese firm-level data for the period of 2000 to 2006 to study the effects of movements of exchange rates on the export

behavior of firms. Since July 2005, China's RMB has appreciated by nearly 25 percent in nominal terms against the U.S. dollar. The authors identify the need for an empirical study of the true relationships to RMB revaluation but point out that the few extant studies focus on the national or industrial level and are subject to aggregation bias. Using a rich firm-level dataset to examine the effect on both intensive and extensive margins, they found that firms have heterogeneous responses to changes in exchange rate. For the intensive margin, they found that the effect of exchange rate on the quantity of firm export was small and insignificant, suggesting that an appreciation of RMB would not result to a significant reduction in Chinese exports. They did find a small but significant effect on export prices denominated in RMB, which indicated a large pass-through of exchange rate to export price in the destination currency. At the extensive margin, the effects of exchange rate appreciation on the likelihood of a firm entering and remaining in the export market were found to be significantly negative. Firm level productivity was found to be a factor at both margins. Firms having high productivity adjusted the price but not the quantity of the exports, but firms with low productivity did just the opposite, adjusting quantity but not price. Li, et al. suggested that these differences would not have been apparent if using aggregate data. Finally, they found that, although processing exporters export at higher quantity and prices than other exporters, the responses to exchange rate changes are the same as for other firms.

In a single-industry study, a recent substantial depreciation in the U.S. dollar motivated Wu, Chung, and Chang (2012) to explore the dependence structure between

the price of oil and the exchange rate of the U.S. dollar. The primary currency used in international crude oil trading is the U.S. dollar and, the significant depreciation resulted in a corresponding increase in crude oil prices. The authors proposed dynamic copula-based GARCH models to explore this structure and an asset allocation strategy to evaluate economic value and confirm the efficiency of the models. They suggest that the high fluctuations of both oil prices and the U.S. currency, which let to significantly opposite trends for each, enabled them to be used as tools for strategic asset allocation and risk management. They found that, unlike the pattern of the preceding years, after 2003 the dependence structure between crude oil and exchange-rate returns of the U.S. dollar became negative and decreased continuously. The study showed that a dynamic strategy based on the CGARCH model with Student-t copula showed more economic benefits than static strategies. Within the oil market, the positive feedback trading activities were statistically significant, but, from an asset-allocation decision perspective, the economic benefits were not enhanced. The authors found that more risk-averse investors were will to pay higher fees to switch from to a dynamic strategy from a static strategy.

Moving the discussion beyond the effects of exchange rate fluctuations on international trade, Kurihara (2013) opted to examine the relationship between international trade and exchange rate fluctuations in both developing and developed countries and the relationship between international trade and financial development in developed countries. It was found that, in developing countries, exchange rate

fluctuations do not necessarily have negative effects. Rather, financial development was seen to have a positive effect on international trade, and could be an effective way to promote economic growth and international trade. As exchange rate volatility, cannot always be avoided, a stable financial system should be a priority. Kurihara noted the limitations of his conclusions due to data availability.

Studies of the effects of exchange rate fluctuations on international trade in different regions and using disaggregated data found that the experience of industries differed depending on the duration of the fluctuations. In the study of the relationships of exchange rate uncertainty to trade flows between Thailand and the United States from 1971 to 2006, Bahmani-Oskooee and Satawatananon (2012) found that, in the short run, exchange rate uncertainty has effects on the trade flows of most industries. However, they found that these effects do not last into the long run for industries with a large trade share. In the long run, the level of economic activity in both the U.S. and Thailand are the main determinants of trade flows.

In a study of U.S. trade with South Korea from 1965 to 2006, Bahmani-Oskooee, Harvey, and Hegerty (2012) found similar results. Applying the ARDL cointegration methodology, they found that exchange rate uncertainty had short-run effects in most industries. On the other hand, for most industries that had a cointegrating relationship, exchange rate volatility had no significant effect in the long run. Measured by the trade shares, most industries that are affected are small. For most industries, in the long run, it is the level of economic activity, which is most important.

In the study of Malaysian trade with the European Union, using monthly data for the period of 2000 to 2013, Aftab et al. (2015) used ARDL approach to look at the import and export flows of industries, as a function of economic activity, relative prices, and volatility. They found that significant differences in the response of Malaysian trade to increased exchange rate uncertainty exist, depending on the length of time involved. Only a small percentage of trade responded to uncertainty in the long run. However, a large number of industries had a significant response in the short run. The authors conclude that exchange rate volatility has no significant influence on bilateral trade between Malaysia and the E.U. for the majority of Malaysian industries and suggest that this has important implications for the formulation of Malaysian trade policy.

Over the period of 1985 to 2010 Soleymani and Chua (2014) had similar findings in the study of Malaysian trade with China. They found that exchange rate volatility had short-run effects on the majority of the 175 Malaysian industries they studied. However, far fewer industries were affected in the long run. The results also indicated that, for the majority of these industries, the exchange rate uncertainty had positive effects, particularly in import models.

In a study of the effect of exchange-rate stability on real exports in both the short and long run, Demirhan and Demirhan (2015) used data for Turkey from February 2001 to January 2010, and carried out a Johansen cointegration test to determine the long-run relationship of the variables, which affected real export volume. The parsimonious error-correction model was also estimated to determine the short-run relationship. The findings

indicated that real export volume was significantly and positively affected by exchange rate stability in both the short run and the long run. They recommended that policies be implemented which minimize exchange-rate fluctuations.

Financial shocks and exchange rate volatility. Several studies have also looked at the effects of financial shocks, such as recessions on international trade and exchange rates. Savoiu, Dinu, and Tachiciu (2012) proposed an extended method for assessing foreign trade under the influence of major recessions. The extended method provides three additional instruments, spread rates, the Hirschman index, and Gini-Struck type in the curve ABC, which operate as signals, limits, and interpretive structural thresholds. Examining the Romanian economy under two difficult recessions, the first in the interwar decade of the twentieth century, and the second in the first decade of the twenty-first century, the study quantified the broad outline of a reactive profile of the foreign trade of the national economy in relation to the economic shock of recession in both time periods which was slightly lagging and inertial. It was found that while an early stage small gap of Romanian foreign trade initially appeared to be favorable, an inertial trend extending for a little more than a year had amplified negative relationships. The example of Romania suggests that small, less developed economies are unable to afford interventions and policies of scale in competing in international markets.

In the case of Malaysian bilateral trade with the European Union, Aftab et al. (2015) found that the financial crisis, which took place in 2007-2008, had an adverse effect on trade between the two countries. The relationships were sterner to Malaysian

import demand than to export demand. Studying the role that exchange rates could have as shock absorbers, Cavallari and D'Addona (2015) used a panel VAR model and a sample of twenty-three developed economies to study the dynamics of trade margins in response to trade shocks. Among peggers, the average response of the extensive margin is almost three times as high as among floaters and average cumulated output effect is twice as large. They found that adjustment to real shocks mainly occurs at the extensive margins in fixed regimes. The relationship between terms of trade innovations and extensive margins was found to be positive, but the effect on intensive margins was deemed negligible. The model demonstrated that a positive shock, or appreciation, to a country's terms of trade causes world expenditure to switch toward foreign products, which, in turn, leads to start-up investments in the foreign economy to be reallocated. The range of varieties that will be exported is reduced by the fall in the range of products available in domestic markets. On the other hand, producers that are more domestic may elect to export when export prices increase.

Active management of exchange rates. Economic policy may sometimes involve attempts by national governments actively to manage exchange rates and the effects on trade, particularly in times of financial shocks. Aizenman, Edwards and Riera-Chrichton (2012) looked at the degree to which the transmission of international price shocks to real exchange rates were relationships ed by the active management of international reserves and exchange rates in Latin American countries from 1970 to 2007. They found that active reserve management significantly lowers the relationships to

commodity terms of trade (CTOT) in short run and, in the long run, affects the adjustment of real exchange rate (REER), lowering its volatility. They suggested that the economy could be as effectively insulated from CTOT shocks through relatively small increases in Latin American economies' average reserve holdings as by a fixed exchange rate regime. In the analysis of active use of reserve accumulation to smooth REERs, they concluded that this was more effective when intervening to support weak currencies rather than attempting to slow the pace of real appreciation. This study was limited by the dataset employed to focus only on international reserves and does not identify the precise share of reserves to deal with specific buffering roles.

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The effect of real exchange rate volatility on firm-level export performance and its dependence on existing financial constraints in China was studied by Héricourt and Poncet (2013). Using export data for more than 100,000 exporters in the period from 2000 to 2006, they investigated how real exchange rate volatility affected the intensive and extensive margins of firm-level exports to the international partners of Chinese exporters. Common features of the exchange rate system shared by Chinese exporters and all the destination markets were controlled through fixed effects. The results showed that RER volatility had a trade-deterring effect despite China's restricted and misaligned real exchange rate regime and was a significant barrier to export performance. The authors found that higher exchange rate volatility in the destination market leads to a tendency for firms to export less and reduce the entries into such markets; financially vulnerable firms experience this negative effect much more strongly. These negative relationships are dampened by financial development, particularly on the intensive margin. The authors recommend caution among emerging countries in relaxing exchange rate regimes and point out the hazards of moving to a fully floating regime without sufficient levels of financial development.

Chinese government's policy has attracted considerable attention in financial study in recent years. China is the second largest economy in the world and has strong prospects for growth in the near future. Many have been critical of the Chinese policy regarding its exchange rate with the U.S. dollar, which they see as a distortion of market forces, which unduly benefits Chinese exporters. Evenett, Fritz, and Jing (2012) suggest that the nominal bilateral rate is a poor guide to changes in the real rate and the relief offered to American firms. The study looks instead at the significance of the VAT export rebate changes undertaken by China during the East Asian financial crisis and the recent global economic crisis. These changes were introduced in thirteen stages and some of them affected thousands of product lines. It had been suggested that, before the recent global crisis, Chinese changes in VAT export rebates had been motivated by export management rather than export promotion. The authors suggested that that motivation had continued. By 2010, over a trillion dollars' worth of Chinese exports benefited from at least one VAT rebate increase. This allowed exporters based in China to lower prices and retain the foreign market shares. Because Chinese exports use a relatively high share of imported content, profitability for exporters could increase by 12 percent because of a 1 percent increase in the VAT rebate. The authors characterized this as export management on a grand scale.

Taking on the American politicians claims that the exchange rate of the Chinese renminbi (RMB) with the U.S. dollar is one of the major causes of the large U.S. trade deficit, Yue and Zhang (2013) used theoretical and empirical analyses to address three

questions from the different perspectives presented in a number of studies. First, how was the United States able to run a growing trade deficit with the rest of the world for more than thirty years, since the late 1970s? Second, did the Chinese exchange rate cause the large U.S.-China trade deficit? Third, what factors were behind the large U.S.-China deficit? The findings of the study suggested that the U.S. deficit was the result of international institutional arrangements whereby the American dominance in the international monetary system allows it to benefit nationally by running trade deficits with the rest of the world. The authors' empirical analysis led them to reject what they characterized as the misperception that the manipulation of the undervalued RMB by the Chinese government was the cause of the growing American trade deficit. While the deficit with China might disappear if the RMB were to appreciate to the point where the prices of China's exports were higher than those of other countries or American domestic prices, the authors point out that, in that situation, the U.S. trade deficits with the rest of the world would not decrease. They suggest that China became the major source of the U.S. trade deficit for factors other than the exchange rate, including relocation of other Asian exports to China, measurement differences, over counting of Chinese to U.S. exports and undercounting U.S. exports to China, American consumption without saving and the American restriction of high-tech exports to China.

The effect of exchange rates on foreign direct investment. Another aspect of exchange rate uncertainty, which has received some attention in recent studies, has been its effect on foreign direct investment in national economies. Handley (2014) undertook

such a study by focusing on trade policy which is a ubiquitous source of uncertainty. He provides a tractable model of heterogeneous firms to deliver theoretical predictions and an estimation strategy for export market entry patterns. The model suggests that uncertainty with regard to trade policy will cause exporters to delay entering new markets and to be less responsive to applied tariff reductions. Uncertainty can be reduced and product entry increased by multilateral policy commitments at the WTO. The predictions for WTO commitments were tested by using a disaggregated product level dataset of Australian imports from 2004 to 2006. The value of securing preferences through a preferential trade agreement (PTA) for a developing country, and whether that reduced trade uncertainty for firms, was tested by looking at a firm-level dataset for Portuguese exporters at the point of that country's entry into the European Community in 1986. The Australian evidence suggested that prospective exporters take into consideration the possibility that trade policy may be reversed, which may delay the entry decisions. Handly found that multilateral policy commitments at the WTO helped to reduce this uncertainty and that almost as much product entry could be generated by policy commitments as by unilateral tariff reductions. In the case of Portugal, he found that net entry of Portuguese exporters into the European Community was higher than it could have been if the EC only lowered tariffs without admitting Portugal into the EC.

Choosing an exchange rate policy for developed or developing countries must take into consideration all of the macroeconomic implications of the choice. In some developing countries, policy may be effectively dictated by underlying macroeconomic

conditions. Abbott, Cushman, and De Vita (2012) studied the effect of exchange rate policy on foreign direct investment (FDI) flows to 70 developing countries from 1985 to 2004. Using a system of generalized methods of moments estimation, they found that both fixed and intermediate exchange rate regimes were significantly more successful in attracting FDI flows than was the option of floating exchange rate. One constraint imposed on the study was the absence of data on bilateral foreign direct investment to or from developed/developing and developing/developing countries.

A relatively new phenomenon in the global economy is foreign direct investment that is specifically targeted to the export sector. Biswas, Mandal, and Saha (2014) provided some theoretical and empirical explanations for the influence of foreign capital inflow on exchange rate appreciation. Using an extended three-sector specific factor model, they analyzed how and why the price of non-tradable goods is increased by foreign capital inflow that, in turn, can tilt the exchange rate in favor of the host country. To substantiate the theoretical findings, they based an empirical analysis on a panel dataset of twelve developing countries between 1980 and 2011

Looking at the relationship between the volatility of global foreign exchange and the excess returns from the strategy of carry trades, i.e. strategies that borrow in currencies with low-interest rates and invest in currencies with high interest rates Menkhoff, Sarno, Schmeling, and Schrimpf (2012) built on earlier studies, which mainly used the search for appropriate time-varying risk *premia* as the avenue of research. Menkhoff, et al. found the results of these studies unsatisfying and instead used asset

pricing theory and well-established methods in which aggregate volatility innovations serve as a risk factor for portfolio returns. They found that with global foreign exchange volatility innovations a significant negative co-movement of high interest rate currencies could be observed, while low interest rate currencies could provide a hedge against unexpected changes. They also found that liquidity risk matters less than volatility risk for expected foreign exchange returns.

Tariffs

The current study raises the question of whether any possible correlations exist between tariff elimination, exchange rates, and trade volume elasticity on major aspects of the economy. Numerous studies have been undertaken in recent years on the effects of tariff elimination on international trade, national economies, and the benefits and /or disadvantages on welfare at the individual level (Caglayan, Dahi, & Demir, 2013; Kim & Kose, 2014; Li, 2013). A study by Laborde, Estrades, and Bouët (2013) examined the potential negative consequences of the export taxes implemented by many countries, mostly in the energy and agricultural sectors, without the discipline of international agreement. They used a new detailed dataset on export taxes at the HS6 level for all countries of the world and simulated the removal of all export taxes within a general equilibrium framework using the Modeling International Relationships in Applied General Equilibrium (MIRAGE) model. They found that removing all export taxes would result in a 0.24 percent increase in real income globally by 2020 and that would be a 2.7

percent increase in world trade volumes. Both developed and developing countries would benefit from the policy change.

The energy sector and export taxes implemented by Commonwealth of Independent States countries would play an important role in the overall economic relationships, but some countries, for example Argentina, would experience income losses under such a policy change. The authors were unable to capture the value-added support structure of export taxes in some large sectors, such as the car industry, because of the intra-sectoral aspect of some export taxes. In the study of trade liberalization in Mexico in 2008, Lora, Córdova and Kuper (2012) found that the high level of MFN tariffs and Mexico's complex customs structure prior to 2008 put companies that needed inputs from countries that did not have free trade with Mexico at a disadvantage with competitors and generated distortions which could inhibit the efficient allocation of productive resources within the country. Early estimates of the relationships to imports of the phasing out of Mexican tariffs indicated the creation of an incentive to import more goods from non-preferential partners.

Li (2013) examined the effects of trade liberalization on the prices of tradable goods using the evidence of the Canada-U.S. Free Trade Agreement. The study used disaggregated CPI data for both countries to investigate the relationships to border cost and on the domestic consumer price of tradable goods in Canada. Results showed that increasing the FTA tariff concession by one percent decreased consumer prices of those goods by 7.19 percent to 11.6 percent. Li concluded that the elimination of bilateral

tariffs as trade barriers had a significant effect on the consumer price of tradable goods. However, Van Biesebroeck, Gao, and Verboven (2012) found that the Korea-US FTA had a greater effect on Canadian production than did the Korea-Canada FTA, although the estimated at most the total loss of production would be 0.79%.

On the other hand, in a study of the relationships to tariff elimination under the provisions of the Korea-U.S. Free Trade Agreement on the structure of the Korean passenger car market, Park and Rhee (2014) found that price reduction of imports alone was not enough to have significant relationships to market share. The Korean automobile market is one of the most closed in the world, with the overall share of imported cars in Korea in 2011 less than 7 percent of the market. Non-Korean automakers attributed the imbalance to tariff and non-tariff barriers implemented by the Korean government. Park and Rhee began by estimating the automobile demand function for product-level sales data between 2006 and 2009 and then used two scenarios of tariff and tax reforms to simulate the change of market price and equilibrium share for all vehicle models in the market. Comparing the simulated and actual market shares for the period, they found that the projected growth of market shares for import cars in the Korean market was only modest. They concluded that the price reduction expected under the FTA would not be enough to increase the market share of imported cars without additional improvements in other value attributes, such as perception of quality. Not enough demand substitutability exists in the Korean automobile market between domestic and imported products to increase market share for the latter based solely on price reduction

While Park and Rhee were looking at the projected relationships of tariff reductions to trade between the U.S. and Korea, in a related study, Tovar (2012) investigated the effects of trade liberalization and tariff removal in the early 1990s on consumer prices in the automobile industry in Columbia. The results indicated that significant relationships between the car industry and the trade reforms. Considerable benefits accrued to the domestic consumer, both in the increased availability of foreign cars introduced into the market and in a drop-in car prices. On average, consumers' welfare per purchaser increased by almost $3000 as compared to pre-reform levels. The study concluded that the gains are explained largely by an increase in the variety of product available rather than by reduced prices. Tovar cautioned that these effects are only partial. To quantify the total domestic welfare on the automobile industry, the study would have to extend to quantifying the effects of the reforms on the firms' profits. In addition, the study is focused on only one sector of the economy, even though it is an important sector. No conclusions can be made with regard to the relationships of trade liberalization to productivity or the overall effect on the economy.

The two previous studies examined the potential or real effects of trade liberalization and tariff reduction on consumer prices and product choice. Amiti and Davis (2012) studied the effect of trade liberalization on wages. They attempted to account for at two important empirical facts that emerged in the previous decade with regard to international production. The first of these is the heterogeneity of firms. In other words, large firms are more likely to engage in exporting and importing and tend to be

more productive and pay higher wages. The second fact they take into consideration is that intermediate trade, as distinct from final goods trade, plays a prominent role. Heterogeneity of firms is the foundation of the approach to firm-level wages. Using a combination of theories, they developed a general equilibrium model with firm heterogeneity, trade in intermediate and final goods, and firm-specific wages, which they applied to highly, detailed firm-level data from the period of trade liberalization in Indonesia from 1991 to 2000. The data allowed for the separation of the effects of cuts in input and output tariffs. The results suggested that wages at firms that are oriented exclusively to the domestic markets are reduced by cuts in output tariffs, but wages at firms that export a share of the outputs are raised by the same cuts. Cuts in input tariffs tend to raise wages at firms that import inputs, but have little effect on the wages of workers at non-importing firms. The authors point out that the data does not allow them to rule out some role for shifts within education categories or changes in unobserved heterogeneity of workers in the different wage responses of exporting and non-exporting firms.

In her study of Kenya in the 1980s, Omolo (2012) found that the relationship between trade liberalization and poverty was stochastic and that investments and capital stock had a significant effect on poverty determinants in the stochastic model. The findings suggested that very little difference occurs between protecting and not protecting sensitive products. While trade liberalization had a positive effect on household welfare and poverty reduction, selective liberalization, which protects sensitive products and

sectors, has much less relationships to welfare. The strongest effect of trade liberalization was related to increased export and overall output level. This, in turn, increased the demand for labor that increased average incomes and household consumption.

At least one study, however, argued the benefits of a sector-specific tariff. Zhang and Delener (2013) used the Global Trade Analysis Project (GTAP) model and a RunGTAP software simulation analysis to study the effect of carbon tariffs on agricultural exports from China. No carbon tariffs have been imposed on agricultural products at a global level, although some European countries have attempted to impose domestic carbon taxes. The Canadian province of British Columbia imposed a carbon tax in 2008, and South Africa and other developing countries have made efforts to collect carbon emission tax on industry, and the American "Clean Energy Security Act" will begin imposing high carbon tariffs on some emissions-intensive imports in 2020. Carbon tariffs have become an international issue, both politically and economically. Zhang and Delener examined the effects that carbon tariffs could have on agricultural trade in China. They found that such tariffs would lead to reductions in exports and outputs of agricultural products, a decrease in domestic sale prices and an increase in export prices. The balance of trade for agricultural products would be reduced, trade terms would deteriorate, and GDP would decrease. All of this would lead to an overall decline in social welfare levels. However, in spite of the negative economic relationships, the authors conclude that carbon tariffs are, overall, beneficial. They suggest that carbon tariffs are a form of trade protection, which takes the form of green trade barriers. The

purpose of conventional tariffs is to obtain fiscal revenue or protect national industry. The carbon tariff is levied to protect the environment. Due to the growing awareness of the need for environmental protection, it has been suggested that we could have carbon tariffs in place in the near future. Zhang and Delener propose that is topic of discussion should not be whether, but how should such tariffs be applied in practice, in order to establish a fair and consistent trading protocol and a global standard of carbon tariffs. They conclude with a number of policy recommendations, which the Chinese government could follow to find a solution to the issue.

WTO Bindings on Applied Tariffs

In a study of the relationship between WTO tariff bindings, in which member countries commit not to raise tariffs to MFN above a certain level, and applied tariffs, Beshkar, Bond, and Rho (2015) examined predictions of the terms-of-trade theory in circumstances where governments value flexibility in setting policies. They argue the importance of recognizing the trade-off between flexibility in trade agreement design and curbing beggar-thy-neighbor motivations as a factor in explaining patterns in tariff binding and applied tariffs under the WTO. They discovered that often the applied tariffs are lower than those bound under the WTO, which allows governments to have considerable policy flexibility. They also found that a variation in the extent of flexibility across sectors and countries exists. Providing a systematic account of the relationship between tariff commitments, applied tariffs and measures of import, they found evidence that the tariff binding level and the size of the overhang are in inverse relation to

measures of import market power. The study did not take into consideration the possibility of including an escape clause in the agreement, which would allow tariffs to be set higher than the committed bindings, an additional means by which a country could obtain flexibility. Also, not considered were issues regarding non-discrimination clauses and the associated flexibility measures, including anti-dumping agreements.

Regional Integration and Trade Agreements

Incentives to Form PTAs

It has been suggested that, in general, trade agreements are seen as a way of escaping from an externality-driven prisoner's dilemma in which tariffs have negative relationships to the exporters' terms of trade. Trade agreements should be a commitment to reduce tariffs and other protectionist measures (Beshkar et al., 2015). Manger (2012) considers the explosive growth of preferential trade agreements (PTA), which have come to dominate international trade since the Cold War era. In 2010, the majority of world trade was covered by 270 PTAs. Since the 1990s, the most common form of PTA has either been that of a highly unequal agreement between a developed country and one or more developing countries or between a developed country and an economy recently operating under a communist system. Manger refers to these as North-South PTAs. Although the growth of this type of PTA has been acknowledged, relatively little study of its causes and effects have been conducted. Manger argues that vertical specialization of manufactured trade goods plays a role in this, as it leads to a political coalition in support of trade liberalization through a PTA. In less-developed countries, governments see PTAs

as a means of attracting export-oriented foreign direct investment, as firms from developed countries relocate the production of less-capital-intensive goods to these countries. Manger uses the Japan-Thailand free trade agreement as a case study to show the link between vertical specialization and political coalition led by lead firms, which are able to have the suppliers lobby for narrow liberalization in a PTA. His statistical analysis indicates that the larger the share of vertical intra-industry trade, the likelier the North-South pair of countries are to form a PTA.

Pontines and Pomfret (2014) examined the relationships of exchange rate level and volatility to bilateral trade among sixteen East Asian economies from 1990 to 2010. In the course of the period, many of these economies went from not being part of any regional trade agreement (RTA) to being part of a number of RTAs in the region. The study found that exports were related positively to RTA membership and exchange rate depreciation but negatively related to exchange rate volatility. Notably, they found that when the two economies had a trade agreement both exchange rate effects were magnified. Exchange rate volatility was particularly harmful to trade flows within East Asian RTAs because the agreements are related to fragmentation and regional value chains. In some cases, a member country may use exchange rate depreciation as a protection instrument, which may be potentially harmful to other countries. The authors conclude that over time, as trade integration deepens, the desire for exchange rate stability will come to be more important than the desire to retain a protectionist tool.

Although inter-regional free trade agreements (FTA) have been a growing phenomenon in global trade and are becoming increasingly complex, they have received little study. Wignaraja, Ramizo, and Burmeister (2013) undertook a comparative and agreement level analysis of 22 FTAs between Asian and Latin American economies between 2004 and November 2013. They proposed a comprehensive qualitative framework to study the legal texts of agreements and assess liberalization in FTAs in goods and services and trade policy related to regulatory barriers. They found that most inter-regional FTAs are characterized by relatively fast and comprehensive liberalization. Many of the Asian-Latin American agreements extend liberalization to support even faster and deeper integration. However, some of the FTAs took a cautious approach to liberalization of such sensitive areas as investment, competition, and government procurement in response to domestic business lobbies and geopolitical issues. The authors concluded that implementation of the Trans Pacific Partnership (TPP) may stimulate further deep integration between Asian and Latin American economies.

The Advantages

Baldwin and Yan's (2012) study of the effects of entry and exit from export markets on productivity growth among Canadian manufacturing plants found that export market entrants tended to improve the productivities relative to the populations from which they originated. In a later study, they looked at whether integrating Canadian manufacturing firms into a global value chain (GVC) would improve productivity (Baldwin & Yan, 2014). Overall, they found that, for new GVCs, the gains in

productivity were greatest in the technology sector, supporting the inference that technology transfer is a major benefit of becoming a GVC.

Benefits can accrue to both the national economies and to individual welfare. In a study of 28 emerging economies, Caglayan, Dahi, and Demir (2013) found that, contrary to the presumption that emerging countries have greater export growth as they interact with the North, empirical evidence indicates that trade among emerging countries can promote further trade growth. In the study of the welfare implications of reform programs and trade liberalization for developing countries, Kim and Kose (2014) analyzed the effect on transitional and long-run welfare of different combinations of tariffs on imported consumption goods, capital goods, and intermediate inputs and of taxes on consumption and labor and capital income. The findings indicated that reform programs and liberalization could produce large welfare gains. Trade programs that involve the removal of tariffs on imports often result in larger welfare gains. Having access to international financial markets allows households to borrow in those markets in order to increase production without reducing consumption. Li's (2013) study of the effects of the Canada-U.S. free trade agreement also found that it translated into benefits for Canadian consumers of tradable goods with significant reductions in consumer prices when tariffs were reduced.

As suggested by Antràs and Staiger (2012), one of the attractions of trade agreements for governments is the opportunity they offer to escape from behind-the-border policies. In the absence of a trade agreement, countries begin by setting tariffs

inefficiently high, but set behind-the-border policies at more efficient levels. According to terms-of-trade theory, trade agreements have to be able to prevent terms-of-trade manipulation, reduce tariffs, and raise trade volumes while avoiding the introduction of distortions that may result from negotiated constraints on tariffs. Results show that the need to bargain over terms of exchange by foreign producers and domestic consumers in the absence of the discipline offered by market clearing conditions, internationally efficient policies cannot be achieved by shallow integration. Deeper integration is required, in which direct negotiations of both border and behind-the-border policies can occur.

The Disadvantages

Not all studies found that PTAs offered unadulterated benefits to participating countries. Copelovitch and Pevehoue (2013) point to the lack of attention paid in the literature to the relationship between choice of exchange rate policy and international trade agreements. They sought to address the gap by focusing on the degree to which a country's choice of exchange rate regime is influenced by membership in preferential trade agreements. They argued when that a country has signed a PTA with its 'base' country most likely to be its anchor currency based, it is less likely to adopt a fixed exchange rate and will have a more depreciated currency. Such a PTA would constrain a government's ability to improve the international competitiveness of domestic producers by using trade protection. This would increase the government's incentives to engage in exchange rate protection. PTAs also tend to constrain the economic policy autonomy of a

government, making it reluctant to give up its monetary and fiscal autonomy even if it does not actively manipulate the exchange rate. The authors raise the question of whether international trade agreements are credible mechanisms for commitment when close policy substitutes at the domestic level are in practice.

Differences in Performance and Relationships of PTAs

Some studies have suggested that the performance and relationships to PTAs can vary for a number of reasons. MacPhee and Sattayanuwat (2014) studied the effects of twelve regional trade agreements (RTA) on trade flows in member developing countries between 1980 and 2008. They found considerable variation in the performance of the RTAs in generating trade creation. Some of the RTAs did not generate intra-bloc trade creation; others generated import trade diversion but had insignificant effect on exports, while others increased intra-bloc trade. The authors concluded that the variation in the performances of the RTAs was related to the implementation policies. In some cases, a failure to eliminate tariffs and other barriers across the board, in other cases failure to lower restrictions on imports from non-member states blocked increased competitiveness of exports in world markets.

In a study, Urata and Okabe (2014) analyzed the relationships of RTAs to trade flows for 67 countries from 1980 to 2006 at a disaggregated level of 20 products. They found that the type of RTA and the type of product could cause a variation in the relationships to the agreements. They found that products in customs unions have a higher trade creation and a lower trade diversion effect than is found in FTAs. They concluded that the optimal RTA was a customs union that had low external tariffs and a large membership. With some of the larger regional trade agreements having been in effect for a significant number of years, some studies have begun looking at the effects over time. In a study of the relationships of the European Union to Eastern European markets, Snieška (2015) suggested that the key to regional competitiveness is cluster-based economic development. He found that, although the internal market of the EU was supposed to be an area in which no trade barriers should exist, the legal basis of the EU allows for the possible misuse of health and safety requirements to hamper full integration of all members of the expanding union. In another study, Villareal and Fergusson (2014) carried out an overview of the first twenty years of the North America Free Trade Agreement (NAFTA) and its economic effects. When first proposed, the agreement was controversial due to the fact that it was the first free trade agreement between two developed countries and a developing country, with one side of the debate predicting the creation of thousands of jobs and a reduction of income disparity, and the other side predicting huge job losses in the United States. Villareal and Fergusson concluded that NAFTA did neither, and that the overall effect on the American economy

was modest due to the small percentage of U.S. GDP, which comes from trade with Canada and Mexico. They suggest that the TPP negotiations could alter some of the rules and commitments, which govern North American trade and investment. While the study focused on the effects of NAFTA on the United States economy, a study of its effect on the Mexican economy found that NAFTA significantly changed the way in which the Mexican manufacturing sector adjusted to RER shocks (Fuentes & Ibarrarán, 2012).

The Trans Pacific Partnership trade agreement, which is currently being negotiated, may have significant relationships to trade if implemented. Fergusson, Jurenas, and Williams (2013), in the advice to Congress, described the TPP as an ambitious agreement, which could have relationships to American trade and trade policy, with some U.S. interest groups seeing it as a way to correct flaws in previous FTAs. Williams (2013) suggested that the TPP agreement could become the platform for an Asia-Pacific free trade area, which would encompass over half of global production and 40% of the world's population. Mexico, as the United States' second largest partner among TPP countries, after Canada, in goods and services flows, has the potential for increased economic exchange with the U.S., although existing FTAs between the two countries may somewhat lessen that potential.

Mexico

The current study focuses on trade between Mexico and the United States, with particular attention to the automobile and auto parts industries. In the study of Mexican trade from 1960 to 2006, Blecker and Ibarra (2013) noted that earlier studies attributed

the slowdown in growth after trade liberalization to a tightening of the balance of payment (BP) constraints. Using a disaggregated model of the BP constraint for two types of imports and exports, the estimates showed that, in fact, the BP-equilibrium growth rate rose in the post-liberalization period. They concluded that other factors, such as internal and external policies and RER need to be considered to explain the slowdown.

In the study of the effect of trade liberalization on the way an open economy reacts to aggregate shocks, Fuentes and Ibarrarán (2012), looked at the Mexican response to two very large RER depreciations that occurred in different economic environments. The first was in the mid-1980s, and the second was in 1994-1995. The most important change in the economic environment between the two occurrences was the implementation of NAFTA. They found that, in the second occurrence, manufacturing firms responded more rapidly to RER depreciations, in terms of increasing output, investment, and employment. They concluded that, as NAFTA was the main structural change in the Mexican economy between the two periods it was the most likely reason for the different response by the manufacturing sector.

Focusing on the relationship between globalization and automobile manufacturing, Wójtowicz and Rachwał (2014) identified two emerging types of centers of automobile manufacturing resulting from the globalization of the industry in the previous twenty years. The first type is potentially large domestic markets with low-level ownership of motor vehicles. The second type exists on the peripheries of core regions of automobile manufacturing and is able to benefit from both lower production costs and

proximity to the larger markets. They identify Mexico as one of the second type of center and assess the effect of foreign direct investment on the development of production is this type of emerging region. They found that globalization was a major driver of change, which forced companies to adapt to global standards of labor productivity and quality of technology. In Mexico, modernization proceeded quickly because of its focus on Canadian and American markets. As Mexico largely serves as a parts manufacturing base for American corporations operating in Canada and the United States, its automotive industry was more strongly affected by the financial crisis of 2008. Growth in Mexico's automotive industry largely depends on the state of the American and Canadian economies.

Conclusion

The ambiguity in the literature on the relationship between exchange rates and international trade noted by Auboin and Ruta continues in the more recent literature. One significant trend, which has been emerging among researchers, however, is the recognition of the need to counter the distortions of aggregation bias in earlier studies. More and more researchers, using increasingly disaggregated datasets, are finding that a greater number of variables do exist, which can influence trade flows than may have been previously considered. Studies focusing on specific regions, on different types of industries, industry size and efficiency, levels of economic development, foreign investment, external financial shocks, exchange rate volatility and the nature and implementation of trade agreements have found that all of these factors can have, to some

extent, relationships to international trade. The current study continues this trend in focusing on a specific region and industry to examine the relationship between tariff elimination, RER, and import-export volume in the automobile and auto part industries in Mexico and the United States within the theoretical framework of preferential trade theory and exchange rate theory. The study contributes to a broader understanding of the effect tariff eliminations under NAFTA on regional economies through the experiences of one industry.

Chapter 3: Research Method

Introduction

As trade barriers decrease, globalization tends to become more intensified, and many questions remain unanswered as to whether trade agreements help developing countries grow their economies (Fuentes & Ibarrarán, 2012; Gandolfo, 1998; Jackson, 1997; Romalis, 2007; Zhang, 2010). Several researchers have expressed concerns that often contradict one another creating more confusion regarding the influence that NAFTA has had to the U.S. and Mexican economies. One potential source of this confusion may have originated from focus on macrolevel relationships, which are difficult to measure (Depken & Ford, 1999; Fuentes & Ibarrarán, 2012). Although many researchers have investigated the influence of NAFTA on regional market behavior, the actual effects of tariff elimination are not clear (Depken & Ford, 1999).

The preferential trade theory, originated from Viner (1950); the exchange rate theory from Cassel (1918); and the commercial policy theory were derived from GATT, and they are the essence of international trade policies. I aimed to test the theories of preferential trade (tariff elimination) within the context of NAFTA and to assess the effect the exchange rate has on trade volumes during tariff elimination. In particular, the arrangements between the Unites States and Mexico were important to my study, as the trade deficit between these countries is often blamed on NAFTA (Francis, 2011).

Some economists suggest tariffs may pose a significant threat to imports and exports, and subsequently to the entire economy. The discussion on trade is not complete

without considering the relationships to currency fluctuations, especially in terms of international trade. Thus, the purpose of this study was to investigate the real effects of tariff elimination and the influence of the real exchange rates on trade elasticity between Mexico and the United States. In this study, I used regression analyses to determine correlational relationships between exchange rate fluctuations, trade elasticity (imports and exports), and tariff elimination following NAFTA. In this chapter, I outline the research design and approach, as well as the role of the researcher and the procedures of the analysis. I also detail the data collection method and sample used during data analysis, and I include various strengths and weaknesses of the study.

Research Design and Rationale

Several competing theories and findings contradict whether the agreement achieves its purpose, and whether NAFTA holds up to its expectations as a regional economic integration mechanism (Romalis, 2007). Many researchers studying the effect of trade liberalization through tariff reduction have experienced significant difficulty in measuring the effects of NAFTA on the regional economy (Depken & Ford, 1999; Romalis, 2007); the implementation of the agreement, according to this study, created additional costs for businesses and ended up increasing transaction costs that hampered the capability of small businesses to compete adequately in the regional market as intended. The focal theories of this study were Viner's (1950) preferential trade theory and Mussa's (1984) exchange rate theory.

Viner (1950) advanced the idea depicted trade creation and trade diversion in a static welfare analysis (Panagariya, 1995, 2000; Panagariya & Bhagwati, 1996), while Mussa (1984) synthesized older contributions to the theory of exchange rate determination. The purpose of exchange rate theory, according to Mussa, was to explain trade behavior observed in the real world. The researcher presented a schematic asset price model of exchange rate, which considered a sum of economic factors with the expectation that they could affect both present and future foreign exchange markets.

In examining Viner's (1950) preferential trade theory and Mussa's (1984) exchange rate theory, I assessed how exchange rate fluctuations influence regional trade following regional economic integration (i.e., NAFTA). This study pertained to the fluctuations of regional trade during the time in which NAFTA was enacted. I considered data several years before and after this enactment, and treated tariff elimination as an aspect of NAFTA, which guided the context for the following analyses. I conducted this study within the context of the automobile and auto parts industries and aligned my research to the following research question:

How can tariff eliminations contribute to the rise in import-exports in the automobile and auto parts manufacturing sectors in both Mexico and the United States?

In addressing this question, and to determine the effects of tariffs, the research followed a quantitative design. In the context of the research, the independent variables were the exchange rate between the United States and Mexico, as well as the corresponding degree of tariff elimination. I assessed the effect of the variables on trade

elasticity; values for import and export volume were the dependent variables. I measured the dependent variables as the import expenditures and export related revenues in U.S. dollar amounts.

This design included a correlational research approach; more specifically, the approach entailed utilization of two multiple linear regression analyses. These models provided statistical insight into the relationship between tariff eliminations and imports or exports using data from several years during tariff elimination. The data included measurements of 27 years beginning in 1989, or 5 years prior to tariff elimination, to 2013, or 5 years post final elimination of tariffs. This study included a specific examination of exchange rate volatility on trade elasticity for auto parts exchange between the United States and Mexico during the gradual elimination of tariffs between the years of 1989 and 2013. The cost of this study was minimal because the researcher utilized archived data already compiled by the Department of Commerce Bureau of Economic Administration (BEA), International Trade Administration (ITA), and U.S. International Trade Commission (USITC) databanks. This information significantly diminished the time required for data collection.

Methodology

Population

The population of interest to this study was not a specific demographic group of people, but rather import and export trade values between the United States and Mexico within the context of the automobile industry. Analysis in this study pertained to

automotive import expenditures and export related revenue following NAFTA, as measured in U.S. dollar amounts. Thus, the target population was auto manufacturers in the United States and Mexico only, specifically regarding data from the years between 1989 and 2013. This population was chosen with the intention of making statistical assertions that could be generalized to regional trade and regional economies between the United States and Mexico. Data for this population were sufficient to exceed the sample size requirement, and useful in making generalizations to the regional trade tendencies between the countries.

Sampling Procedures

Purposive sampling was the chosen strategy because of the specific focus of the study. I extracted the sample for this study from a large pool of archival data available for automobile and auto parts trade volumes. I drew public information from the following data sources, the Department of Commerce BEA, ITA, and USITC databanks, and the Association for Automakers. A purposive sampling strategy was best suited for this study because of the specific focus and the subsequent need to gather data relevant to import and export values for automobile and auto part manufacturers only.

To conduct this correlational analysis, I matched data for each year's import and export volume to a corresponding measure of the year's exchange rate and degree of tariff elimination. Using purposive sampling, I accessed all archival data applicable to automobile and auto part trade for time period of interest (i.e., 1989 to 2013). Manufacturer trade values for each year represented each individual observation, or unit

of analysis. As such, the sample consisted of 27 yearly observations for each manufacturer in the available archives, where each yearly unit of data for a given manufacturer held expenditures for imports and revenue from exports, as well as that year's average exchange rate and degree of tariff elimination.

Because these data were accessible for public view, no special permissions or recruitment procedures was needed. I gained access to the data using publicly posted information from government sources. I downloaded these data into a PDF format, which I transcribed into an Excel format. The data were then transferred to SPSS for analysis. In addition to being accessible to the public, all of the data sources were government agencies, such as the Department of Commerce, the U.S. Trade Commission, and the Treasury Department. Because these data were presented from governmental sources for use in research and economic development, it is safe to consider the data valid and reputable. For this reason, the data sources were the most appropriate for use in this research.

The study involved two multiple linear regression analyses (i.e., one analysis per dependent variable) with an identical number of predictor variables each, and I conducted a priori sample size calculation for the regression model relevant to both analyses. This regression model included two predictor variables, defined as the degree of tariff elimination and the year's average exchange rate. I employed G*Power 3.1.7 to calculate a minimum suggested sample size for this model. Considering an expected medium effect size (.25), as used by other researchers for understanding the statistical significance of

difference of a sample, a generally accepted power of .80, and a significance level of .05, the desired sample size to achieve empirical validity for a multiple linear regression analysis with two predictor variables. The archival data housed far more observations than the required 68, as each manufacturer contributed multiple observations (i.e., one commodity per year), and more than 100 commodities were included in the available archival data for each year.

Data Analysis Plan

I transcribed data collected in PDF format into Excel and immediately entered that data into SPSS Version 22.0 for Windows. The use of this software facilitated data organization and allowed for statistical analysis. The data analysis included descriptive statistics to describe the sample's features, as well as the research variables used in the analysis. In addition, I calculated means and standard deviations for all continuous data of interest, such as the average revenue associated with exports, the average cost of imports for each given year, or yearly average exchange rates and degrees of tariff elimination.

Descriptive statistics and frequency distributions were examined to determine that responses were within the possible range of meaningful values (i.e., the data were not distorted by outliers or nonsensical values). I tested the presence of outliers by the examination of standardized residuals. Standardized values represent the number of standard deviations that an observation's value falls from the mean, and were created for each import or export measurement. I assessed standardized values for each observation

for values that fell above 3.29 and values that fall below -3.29, which indicates the observation is an outlier; any such cases were removed from the data.

After removing outliers and missing data, the final cleaning procedures occurred. These procedures included identification of commodity headings to determine which were applicable to the automotive industry. Through review of the available data, I determined 12 commodity headings. All commodities not within these headings were removed from the sample. Tables 1 and 2 in the Results section present a detailed description of these headings and the proportional representation of the commodities. I retained these observations in the sample, which resulted in a final *N* of 1,689 for imports and 1,437 for exports.

Research Question

How can tariff eliminations and real exchange rate contribute to the rise in import-exports in the automobile and auto parts manufacturing sectors in both Mexico and the United States?

In examining the central research question, I created a series of two null and alternative hypotheses to focus on imports and exports in particular. This allowed inferences to be made regarding these two measurements of trade, with the goal of determining the precise effects of tariff elimination as observed during the introduction of NAFTA. The two hypotheses were:

H_{01a}: There is no statistically significant correlation between tariff elimination, real exchange rate, and import volumes between Mexico and the United States automobile and auto parts industries.

H_{a1a}: There is a statistically significant correlation between tariff elimination, real exchange rate, and import volumes between Mexico and the United States automobile and auto parts industries.

H_{01b}: There is no statistically significant correlation between tariff elimination, real exchange rate, and exports volumes between M*ex*ico and the United States automobile and auto parts industries.

H_{a1b}: There is a statistically significant correlation between tariff elimination, real exchange rate, and exports volumes between Mexico and the United States automobile and auto parts industries.

To examine the research question and the resulting hypothesis, I conducted a series of two multiple linear regression analyses. In each of the two analyses, the two continuous predictor variables included the tariff level for each year and the average exchange rate for each year. The outcome or dependent variable was the import value for each year in Regression 1, and the export value for each year in Regression 2. Units of analysis represented the yearly measures for each independent and dependent variable among all the commodities and from all manufacturers included in the archival data, such that up to 147 unique observations from each manufacturer could be assessed per year during the 27-year period.

I used standard multiple regression—the enter method. Using the standard method, I entered all predictors into the regression model simultaneously. The multiple correlation coefficient of determination (R^2) for the overall model was also reported and used to determine how much variance in the dependent variable could be accounted for by the set of both predictor variables overall.

The assumptions of the multiple linear regressions include normality, homoscedasticity, and absence of multicollinearity. The assumption of normality is that a normal bell curve distribution in the error between the regression's predicted values and the actual outcome values exists, while homoscedasticity is the assumption that scores are near equally distributed about the regression line. I assessed normality and homoscedasticity by examination of scatter plots; a normal P-P plot was used to assess normality, while a residual scatterplot was used to visually assess the homoscedasticity. The absence of multicollinearity is the assumption that predictor variables are not too closely related, which can result in errors of artificial inflation to each variable's calculated variance, and can cause the regression to not converge. The absence of multicollinearity is assessed using Variance Inflation Factors (VIFs), with VIF values higher than 10 indicating the presence of multicollinearity and a violation of the assumption.

Threats to Validity

Threats to external validity in this study included the representation of only one manufacturer type, such that non-automobile industries may not be adequately

represented by the findings, and the monetary changes in import and export may not reflect the economy as a whole. Though the aim was to inform the body of knowledge regarding the economy as a whole, this limitation did not impede the results as the study, as they pertain only to this sector. Because the data were drawn from what was available in this sector, the findings represent a large part of the economy as a whole, and may indicate trends both inside and outside of the sampling frame. In addition, the large sample size allowed the results to maintain validly when extrapolated to the whole of the population at hand.

Within the scope of the research, threats to internal validity may have caused me to interpret a change in import expenditures or export related revenue as caused by tariff elimination, when in fact these changes may have been caused by some unforeseen factor. Some potential concerns include maturation of the sample, instrumentation, regression towards the mean, or mortality. Because no direct data collection methods were utilized (i.e., I did not directly collect measurements from the manufacturers themselves), issues concerning the instrumentation or researcher error did not present any foreseeable threats to internal validity.

The maturation of the data must be regarded as monetary values have inflated since the primary date of data collection in 1989. I addressed this by using the consumer price index (CPI) to adjust the dependent variables (measures of import costs and export related revenue) to standardized measurements. In correcting for inflation, this threat was expected to be fully rectified. However, experimental mortality could have posed a threat

to the data collection. Experimental mortality refers to subjects (or units of measurement) being unavailable for measurement at any subsequent measurement time point from the starting time. Within the frame of this research, this threat to validity would have been encountered if an overly large portion of manufacturers were to go out of business between the years of 1989 and 2013. However, in the case of a manufacturer's nonexistence in any successive measurements past 1989, that company would still contribute to the analysis for years where it did exist. Because the full sample size was met, this limitation did not impose any problems to the analysis itself.

Other such threats included unrelated fluctuations in import costs or export revenues because of various factors, such as a manufacturer's success, loss of business, recalls, or publicity. Unrelated changes in economic standing for any manufacturer may weigh the data in such a way as to indicate significant changes where they do not pertain to exchange rates of tariff elimination alone. The researcher attempted to correct this through elimination of outliers, although direct correction for intervening variables is not possible without an unrealistic amount of data collection regarding any such potential covariates.

Ethical Procedures

Because of the nature of the data used in this study, no ethical procedures were applicable to data sensitivity or protection of confidentiality. Data for automobile manufacturers in the United States and Mexico are presented and fully available for public use, and no issues of anonymity or confidentiality were relevant in this study. No

specific individuals were included, and the analysis only involved publicly available company-level data. In addition, I adhered to strict ethical standards in conducting the research and interpreting the results; this included not extending the results to populations irrelevant to the study, and not using the results to influence any party for personal gain. The IRB approval number for this study is 07-25-16-0137636. In line with IRB requirements, data will be destroyed after a period of 3 years following completion of the research**.**

Summary

Chapter 3 provided a detailed explanation of the procedures used in the research. I outlined these procedures in-depth to detail the research design, methodology, data collection procedures, and finally the action plan regarding data analysis. The issues of ethics, researcher's role, and issues of trustworthiness were also addressed with special consideration to potential methods that may remedy these difficulties or harms. I adhered strictly to these procedures in gathering and analyzing data to cleanly and efficiently address the issue of tariff elimination in the presence of fluctuating exchange rates, and the effect of these variables on economic measures of imports and exports between Mexico and the United States.

I addressed the problem through utilization of a quantitative design and a correlational approach, and thus described the influence of tariff elimination and yearly exchange rates on automotive imports and exports during and following the implementation of NAFTA. The collected data related to this issue and its relationships to

economic standing as seen through the scope of the automotive industry. In Chapter 4, I present, analyze, and interpret these findings are to a form a quantitative measure for the effect of tariff eliminations on the economy as it regards the automotive sector.

Chapter 4: Results

Introduction

In this chapter, I present the results of analyses that tested the theories of preferential trade and the dynamic of exchange rate. The purpose of this research was to investigate the real effects of tariff elimination and the relationships of the real exchange rate to trade elasticity in the auto and auto parts industry between Mexico and the United States. Through these analyses, I assessed the effects that the dynamic of exchange rate had on trade volumes during tariff elimination. Thus, my focus was on the automobile and auto parts manufacturing industry from 1989 through 2013, when tariffs were being eliminated. In particular, arrangements between the Unites States and Mexico were important to the study, as the trade deficit between these countries is often blamed on NAFTA (Francis, 2011). Tariffs may pose a significant threat to imports and exports, and subsequently to the entire economy.

In this study, I used regression analyses to determine correlational relationships among exchange rate fluctuations, trade elasticity (imports and exports), and tariff elimination following NAFTA. The chapter begins with a description of the data collection procedures, including the time frame and any data cleaning procedures. The results of the study analyses follow this and include a description of the final sample, tests of analytical assumptions, and the findings from both regression analyses.

Data Collection

I drew data from the Bureau of Fiscal Service division of Federal Investments within the Department of Treasury, through a liaison in the Funds Management Branch for the exchange rate fluctuation collection and included relevant variables from 1989 to 2015. The tariff elimination schedules are collected were from the U.S. International Trade Commission (USITC), whereas the trade volume (imports-exports) were collected from the U.S. Census Bureau. Data from this range of dates included tariff values, exchange rates, and import and export values between the United States and Mexico for approximately 147 different commodities within the headings of 8701 through. These headings represent vehicles other than railway or tramway rolling stock, as well as parts and accessories thereof. Before these data could be used, I removed irrelevant commodities. Irrelevant commodities included bicycles and bicycle parts, baby carriages, and nonmotor invalid carriages, or invalid carriage parts. The remaining data consisted of 12 commodity headings.

Table 1

Headings in the Final Dataset and Corresponding Commodities

Heading	Commodity Label
8701	Tractors
8702	Motor vehicle for transport 8–10 persons
8703	Motor car and vehicle for transporting persons
8704	Motor vehicles for transport of goods
8705	Special purpose motor vehicles NESOI
8706	Chas W Eng F Trac, Mtr Veh F Pass/gd and special purpose
8707	Bodies (including cabs), for specific motor vehicles
8708	Parts and access for motor vehicles (from head 8701–8705)
8709	Works trucks, self-prop, no lift; stat tractors; Pt
8710	Tank and other armored fight vehicles, motorized; and parts
8711	Motorcycles (including Mopeds) and cycles with aux motor
8713	Carriages for disabled persons, motorized or not

Next, I assessed outliers using Cook's distances. I calculated Cook's distances for the regression of export data. The mean distance of Cook's distance from the export regression was 0.001. Based on the same convention, 49 observations required removal from the export data

Results

I calculated the results for this study from a series of regression analyses. Prior to these analyses, descriptive statistics helped to determine the final number of observations in the data, as well as the way that these observations were distributed in terms of commodity types for both exports and imports. In addition, I calculated the assumptions

of the regression analysis to examine the validity of the findings, and to determine whether modifications should be made to the data. Following these assumption tests, the results of the final regression analyses are presented in order of hypothesis, starting with Hypothesis 1(a), or the examination of import data, and closing with Hypothesis 1(b), or the examination of export data.

Descriptive Statistics

Commodities in the final data set were repeated for each of the 27 years of interest (i.e., 1989–2015), with various numbers of exports and imports for each commodity within the set of years. Between these years, I gathered a total of 1,689 relevant imports for analysis. Of the commodities, the most commonly exported between these years were parts and access for motor vehicles from the 8701 through 8705 headings (n = 407, 24.1%). The least common import consisted of tanks and other armored fight vehicles and their parts (n = 22, 1.3%). Exports between the years of interest consisted of a total of 1,437 commodities. The most common exports consisted of tractors (n = 305, 21.2%), and the least common exports consisted of motor vehicles used for transport of eight to 10 persons (n = 7, 0.5%). Table 2 presents a tabulation of these commodities in the final data set.

Table 2

Descriptive Statistics for the Final Sample of Imports and Exports

Commodity	*n*	%
Import	1,689	-
Bodies (including cabs), for specific motor vehicles	134	7.9
Carriages for disabled persons, motorized or not	29	1.7
Chas W eng F trac, motor vehicle F Pass/gd and special purpose	34	2.0
Motor car and vehicle for transporting persons	333	19.7
Motor vehicle for transport (8–10 persons)	7	0.4
Motor vehicles for transport of goods	199	11.8
Motorcycles (including mopeds) and cycles with aux motor	49	2.9
Parts and access for motor vehicles (head 8701-8705)	407	24.1
Special purpose motor vehicles NESOI	61	3.6
Tank and other armored fight vehicles, motorized; and parts	22	1.3
Tractors	329	19.5
Works trucks, self-propelled, no lift; static tractors; Pt	85	5.0
Export	1,437	-
Bodies (including cabs), for specific motor vehicles	127	8.8
Carriages for disabled persons, motorized or not	29	2.0
Chas W eng F trac, motor vehicle F Pass/gd and special purpose	31	2.2
Motor car and vehicle for transporting persons	265	18.4
Motor vehicle for transport (8–10 persons)	7	0.5
Motor vehicles for transport of goods	183	12.7
Motorcycles (including mopeds) and cycles with aux motor	25	1.7
Parts and access for motor vehicles (head 8701-8705)	299	20.8
Special purpose motor vehicles NESOI	61	4.2
Tank and other armored fight vehicles, motorized; and parts	20	1.4
Tractors	305	21.2
Works trucks, self-propelled, no lift; static tractors; Pt	85	5.9

Assumptions

I conducted an analysis of dollar values for imports and exports in relation to exchange rates and tariff elimination through two regression analyses. First, imports included two predictor variables, tariff level and exchange rate. I examined the assumptions of this regression through visual examination of two scatterplots, including the normal P-P plot and a residual scatterplot. The normal P-P plot allowed me to assess the normality of the regression's residuals, while the residual scatterplot allowed me to assess the hat matrix elements, which indicated the degree of homoscedasticity to the regression data.

Import regression assumptions. As seen in Figure 1, which presents the normal P-P plot, normality could not be assured. However, because of the constraints of the central

limit theorem, the relatively large number of data points assured that the data could be approximated to normal for use in the regression. I considered several data transformations, including the $x_j = \frac{1}{2}\log(\frac{x_j}{1-x_j})$ transformation, as well as the $x_j = \log(\frac{1+x_j}{1-x_j})$ transformation. Neither transformation resulted in normally transformed import data, and both were ultimately rejected.

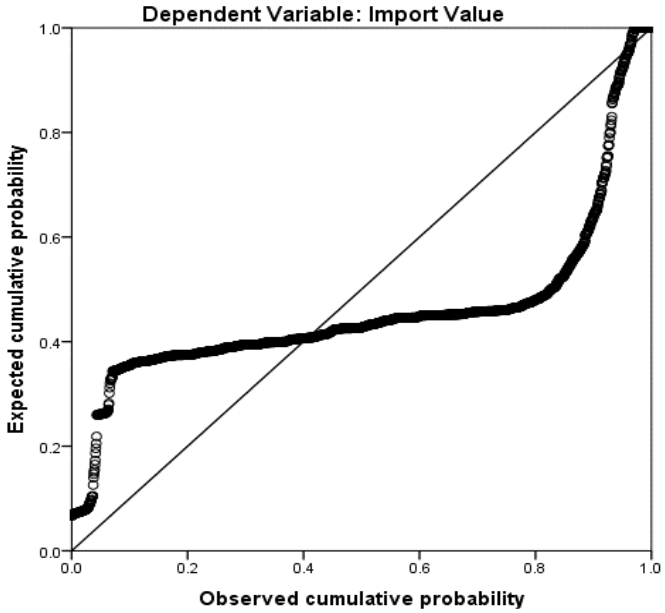

Figure 1. Normal P-P plot for import regression.

Next, I assessed hat matrix elements and homoscedasticity using a residual scatterplot. As seen in Figure 2, the initial examination of this plot showed that most data were randomly distributed, but also revealed a slight gap in data in the middle of the plot. This does not inherently introduce a problem, but indicates that it may be possible to improve the model. However, with a sufficiently large sample size, slight deviations from

perfect homoscedasticity have little effect on the results of the *F* test, which I expected to hold true for the following regression equations.

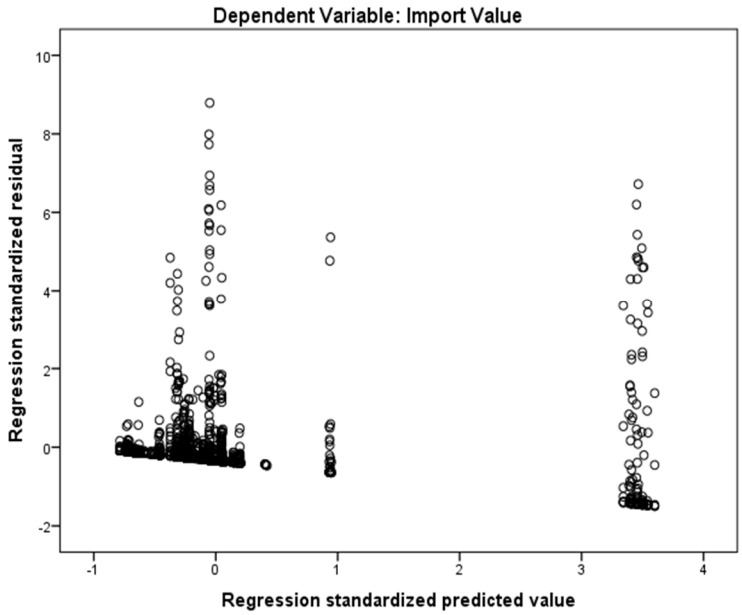

Figure 2. Residual scatterplot for import regression

Export regression assumptions. Next, I assessed assumptions for the regression of export data. As seen in Figure 3, the normal P-P plot, normality could not be assured. However, because of the constraints of the central limit theorem, the relatively large number of data points (i.e., $N > 30$) assured that the data could be approximated to normal for use in the regression. Similar to the regression on import data, I considered several data transformations, including the $x_j = \frac{1}{2}\log(\frac{x_j}{1-x_j})$ transformation and the $x_j = \log(\frac{1+x_j}{1-x_j})$ transformation. Neither transformation resulted in normally transformed export data, and were ultimately rejected.

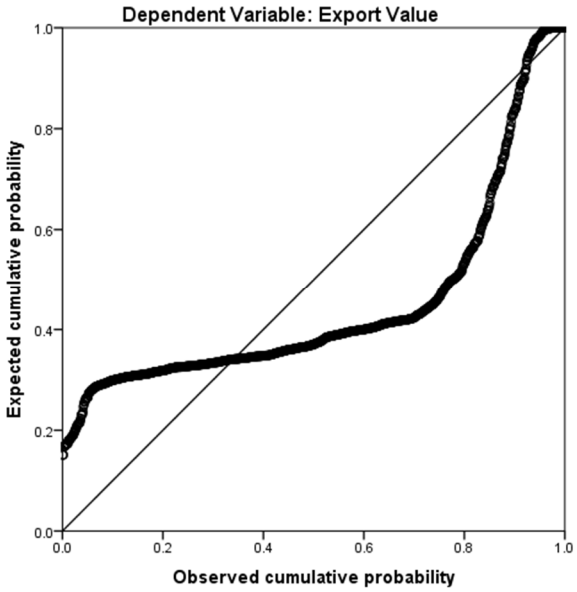

Figure 3. Normal P-P plot for export regression.

Next, I assessed hat matrix elements and homoscedasticity using a residual scatterplot. As seen in Figure 4, the distribution of data in the export regression was sufficiently random. Based on this finding, the regression on exports could be conducted as proposed, and no modifications were made.

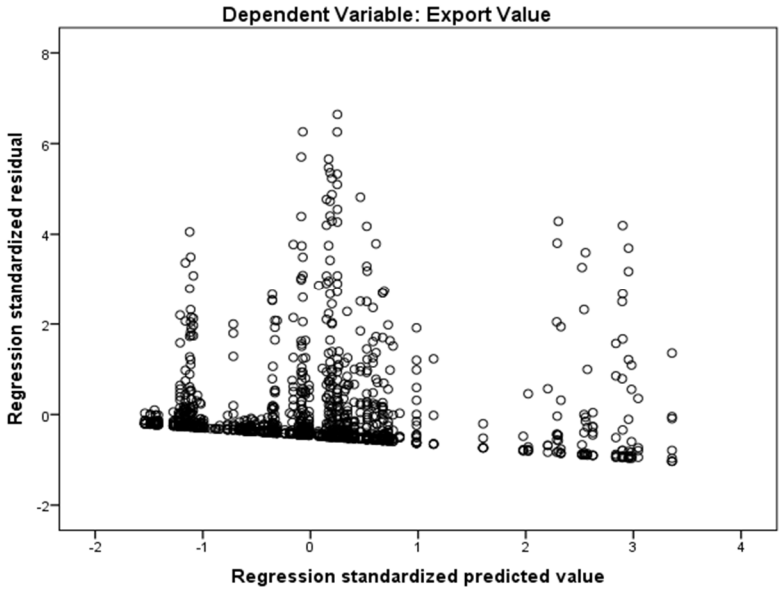

Figure 4. Residual scatterplot for export regression.

Statistical Findings

Following data cleaning and assumption testing, I conducted two regressions on the imports and exports to the predictor variables of tariff level and exchange rate. The calculation of results determined the answer to the overarching research question, *how can tariff eliminations contribute to the rise in import-exports in the automobile and auto parts manufacturing sectors in both Mexico and the United States?* Based on the need to assess two dependent variables, I created the two null hypotheses, where each had a corresponding alternative hypothesis. The first hypothesis test pertained to the import data, while the second test pertained to the export data.

H_{01a}: There is no statistically significant correlation between tariff elimination, real exchange rate, and import volumes between Mexico and the United States automobile and auto parts industries.

H_{a1a}: There is a statistically significant correlation between tariff elimination, real exchange rate, and import volumes between Mexico and the United States automobile and auto parts industries.

Based on the critical *F* of 3.00 for this analysis, the overall *F* test of the regression fit indicated a significant model, F (2, 1686) = 87.06, $p < .001$, $R^2 = .09$, suggesting yearly exchange rate and tariff levels could be used to predict approximately 9% of the variation in yearly import volume. The 95% mean prediction interval was [117,261,228.50; 186,184,598.10]. Table 3 provides the ANOVA outcomes.

Table 3

ANOVA Table for Regression of Import Volumes

Model	SS	*df*	MSE	*F*	*p*
Regression	34780300000000000000	2	17390100000000000000	87.06	< .000
Residual	336780000000000000000	1686	199751000000000000		
Total	371560000000000000000	1688			

As the overall regression was significant, I assessed the individual predictors of tariff level and exchange rate for their unique contributions to the equation using *t* tests. The *t* test to assess exchange rate's contribution to import values did not indicate that a year's exchange rate predicted import volumes with any predictive ability beyond what was attributed to tariff levels ($t = -1.43$, $p = .153$). Conversely, the tariff level in a year did have a significantly predictive relationship with import volumes, $t = 13.19$, $p < .001$. These findings indicate information about import volumes can be predicted using tariff

levels alone, where the predicted import value (y_a) can be calculated using the following equation,

$$y_a = 95499582.41 + \text{Tariff level} * (2370765186)$$

This equation shows a positive relationship between tariff levels and import value, where each one unit increase in tariff level (i.e., 1%) corresponds with a $2,370,765,186 increase in import value for that year. Based on the standardized coefficient (.31), tariff was related to import values with a weak to moderate correlational strength. Table 4 includes a listing of these findings.

Table 4

Outcome for Regression of Import Value on Exchange Rate and Tariff Level

Source	*B*	*SE*	β	*t*	*p*	95% CI Lower	95% CI Upper	VIF
1	95499582.41	24165690.12	-	3.95	-	48101673.98	142897490.80	-
2	-3651813.94	2553958.96	-.03	-1.43	.153	-8661077.59	1357449.71	0.99
3	2370765186.00	179760638.20	.31	13.19	<.000	2018187700.00	2723342671.00	0.99

Note. 1 = Constant, 2 = Exchange rate, 3 = Tariff; F (2, 1686) = 87.06, $p < .001$, $R^2 = .09$.

H_{01b}: There is no statistically significant correlation between tariff elimination, real exchange rate, and exports volumes between M*ex*ico and the United States automobile and auto parts industries.

H_{a1b}: There is a statistically significant correlation between tariff elimination, real exchange rate, and exports volumes between Mexico and the United States automobile and auto parts industries.

To examine hypothesis 1(b), I conducted the second multiple linear regression with each year's export volumes as the dependent variable, and with both the year's exchange rate and the year's tariff level as independent variables. In the regression equation for this measure, y_b = the export volume for a year, b_0 = constant, b_1 = regression coefficient for exchange rate, b_2 = regression coefficient for tariff level, x_1 = exchange rate of that year, x_2 = tariff level of that year, and e = the residual error. Using the standard enter method for placing the predictors in the model, I assessed both tariff level and exchange rate for their contributions to the prediction of export values simultaneously. The overall F test of the regression fit indicated a significant model, F (2, 1434) = 20.34, $p < .001$, $R^2 = .03$, suggesting yearly exchange rate and tariff levels could be used to predict approximately 3% of the variation in yearly export volume. The 95% mean prediction interval was [21,352,963.26; 30,601,034.90]. Table 5 provides the ANOVA outcomes.

Table 5

ANOVA Table for Regression of Export Volumes

Model	SS	*Df*	MSE	*F*	*p*
Regression	125000000000000000	2	62600000000000000	20.34	< .000
Residual	4410000000000000000	1434	3080000000000000		
Total	4540000000000000000	1436			

As the overall regression was significant, I assessed the individual predictors of tariff level and exchange rate for their unique contributions to the equation using a series of t tests. The t test to assess exchange rate's contribution to export values indicated a

year's exchange rate predicted export volumes with predictive ability uniquely different from the influence of tariff level, $t = 4.40$, $p = < .001$. The tariff level was also significantly predictive of export volumes, with a predictive ability that was unique from data that exchange rates provided in predicting export volume, $t = 13.19$, $p < .001$. These findings indicate information about import volumes can be predicted using a combination of data regarding yearly exchange rates and tariff levels, where the predicted export value (y_b) can be calculated using the following equation:

$$y_b = 7546359.48 + \text{Exchange rate} * (1619863.52) + \text{Tariff level} * (98524193.48)$$

This equation shows a positive relationship between both tariff levels and import values, and exchange rates and import values. In this equation, each one unit increase in exchange rate corresponds with a $1,619,863.52 increase in export value for that year if tariff levels are held constant. Similarly, each one unit increase in tariff level (i.e., 1%) corresponds with a $98,524,193.48 increase in export value for that year. Based on the standardized coefficients, both exchange rate (.12), and tariff (.11) were related to import values with a weak correlational strength. Table 6 includes a listing of these findings.

Table 6. Outcome for Regression of Export Value on Exchange Rate and Tariff Level

Source	*B*	*SE*	β	*t*	*p*	95% CI		VIF
						Lower	Upper	
Constant	7546359.48	3701026.72	-	2.04	-	286352.70	14806366.26	-
Exchange Rate	1619863.52	368345.59	.12	4.40	< .001	897309.57	2342417.47	1.00
Tariff	98524193.49	22698999.70	.11	4.34	< .001	53997389.37	143050997.60	1.00

Note. F (2, 1434) = 20.34, $p < .001$, $R^2 = .03$.

Summary of Hypothesis Testing

As seen in the detailed analyses, both import and export values significantly correlated with tariff levels for each of the 12 commodities within the 27 years of interest, which were selected based on the inclusion of NAFTA's implementation during that timeframe. This inference is made with consideration to the influence of actual exchange rates, which also significantly influenced both import and export values. By entering this influence into the regression equation, any significance attributed to the yearly exchange rates could be removed from the significance of tariff levels, which allowed for a more focused and confident determination of the tariff levels' influence.

I conducted further examination of the relationships between tariff level and imports or exports by plotting the linear relationship. However, in line with the requirement to control for exchange rates, a simple scatterplot was not sufficient. Instead of the scatterplot, I created partial scatterplots. These plots show the same relationship,

where tariff levels are plotted on the x axis and imports or exports are plotted along the y axis, but do so after adjusting these scores based on the covariate of exchange rate. Figures 5 and 6 present these visual interpretations.

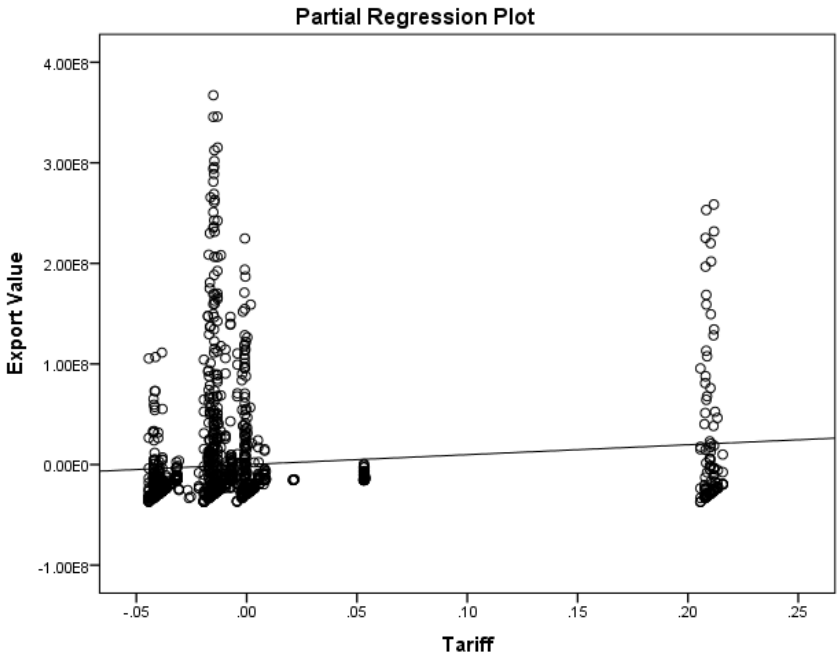

Figure 5. Partial regression plot of tariffs and export values after controlling for exchange rates.

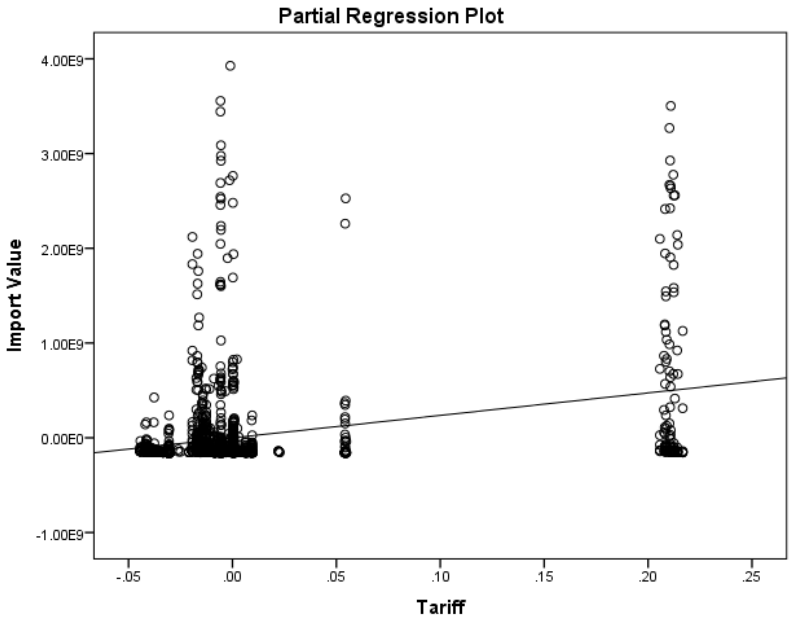

Figure 6. Partial regression plot of tariffs and import values after controlling for exchange rates

Summary

Analysis in Chapter 4 began with the entry and cleaning of data in preparation for regression analysis. After removing outliers based on Cook's values in either regression, the resulting final data set was described in terms of commodity types, and I reviewed assumptions of the tests. As slight deviations from normality existed, I considered normality transformations, but ultimately rejected those based on the inability to result in a univariate normal distribution. Large data sets can be approximated to follow normality assumptions for the *F* test, and I conducted the regression as originally proposed. Both Null Hypothesis 1(a) and Null Hypothesis 1(b) were rejected, suggesting that tariff levels significantly predicted the rise in import-exports in the automobile and auto parts manufacturing sectors in both Mexico and the United States. I expand this finding in

Chapter 5, with relation back to the literature that guided this study and the theory of preferential trade. Chapter 5 also includes suggestions for future research and implications for the field, and I explain any procedures future researchers might follow to expand on the present findings.

Chapter 5: Discussion, Conclusions, and Recommendations

Introduction

The purpose of this study was to investigate the real effects of tariff elimination and the relationships between the real exchange rate and trade elasticity in the automobile and auto parts industry between Mexico and the United States. Although researchers have examined the fundamentals of trade barriers and tariff eliminations resulting from NAFTA, most have focused on the relationship between exports and economic growth (Kalsoom & Rukhsana, 2012). In addition, it has not been demonstrated whether real exchange rate volatility has had any relationships to trade volume, or whether other factors may affect trade elasticity when tariffs are eliminated (Kalsoom & Rukhsana, 2012). Existing literature lacks clarity regarding whether correlations existed between tariff eliminations, exchange rate, and trade elasticity (Kongsted, 2012; Pomfret & Pontines, 2013). The automobile and auto parts industry is a helpful framework for examining NAFTA's relationships with tariff elimination and exchange rates and its effect on import and export volumes between Mexico and the United States.

Results revealed tariff levels significantly predicted the rise in import-exports in the automobile and auto parts manufacturing sectors in both Mexico and the United States. In this chapter, I interpret the relationship between tariff level and import-exports in the automobile and auto parts manufacturing sectors. In addition, this chapter contains sections on the limitations of the study, implications for social change, recommendations for future research, and a conclusion.

Interpretation of the Findings

The overarching research question was: How can tariff eliminations and real exchange rate contribute to the rise in import-exports in the automobile and auto parts manufacturing sectors in both Mexico and the United States? I conducted tests on the following hypotheses to examine both import and export data.

H_{01a}: There is no statistically significant correlation between tariff elimination, real exchange rate, and import volumes between Mexico and the United States automobile and auto parts industries.

H_{a1a}: There is a statistically significant correlation between tariff elimination, real exchange rate, and import volumes between Mexico and the United States automobile and auto parts industries.

H_{01b}: There is no statistically significant correlation between tariff elimination, real exchange rate, and exports volumes between M*ex*ico and the United States automobile and auto parts industries.

H_{a1b}: There is a statistically significant correlation between tariff elimination, real exchange rate, and exports volumes between Mexico and the United States automobile and auto parts industries.

Both Null Hypothesis 1(a) and Null Hypothesis 1(b) were rejected, suggesting tariff levels significantly predicted the rise in import-exports in the automobile and auto parts manufacturing sectors in both Mexico and the United States. The level of import volume can be predicted by changes in tariff levels. This relationship between import

volume and tariff level is consistent with the findings of prior studies. as discussed in the literature review. For example, Lora, Córdova, and Kuper (2012) and Li (2013) found positive relationships of tariff reduction to goods imported by Mexico from other countries with the FTA, and, in the case of Canada, importing durable goods from the United States. Other researchers, such as Park and Rhee (2014) and Tovar (2012), focused on the imported automobile market and confirmed the findings of the present study related to import volume. However, empirical evidence suggests not all tariff eliminations automatically lead to increased trade when more quality products are imported into Mexico where its manufacturing industry was once protected by tariffs (Fuentes & Ibarrarán, 2012).

The relationships to tariffs elimination was evident in early studies, especially when taking into account how tariffs elimination helped facilitate direct foreign investments in Mexico that revolutionized the manufacturing industry as a direct result of policy changes made possible by NAFTA (Waldkirch, 2010). Since the enactment of NAFTA, the United States has traded more with Mexico than in the pre-NAFTA period, with Mexico becoming the second largest trading partner (Romalis, 2007). This suggests that NAFTA had significant influence on trade volume between the two countries (Romalis, 2007). In the early stage of NAFTA, many concerns existed regarding the agreement. Although early researchers only had limited data to analyze the real relationships to NAFTA, Goud (1998) argued the NAFTA had significant relationships to trade volume between Mexico and the Unites States. As indicated by the present study,

the NAFTA still produces significant relationships, especially on the automobile industry (Kokoe, 1994).

As to the relationships of exchange rate to import volume, the findings of the present study are consistent with the findings of prior studies and those of mixed results. However, it is still unclear how significant of relationships exchange rate volatility had to trade elasticity. Even though this study showed some level of correlations between the exchange rate volatility and the import volume, the question of significance is still inconclusive. One thing is clear: exchange rate volatility can influence tradable goods pricing; still, prior studies have yielded ambiguous results at best (Depken & Ford, 1999; Romalis, 2007). The present study not only confirmed this inconclusiveness, but also extended knowledge that when tariff eliminations are analyzed simultaneously with exchange rate volatilities, evidence exists regarding relationships to trade elasticity. This study showed 9% of import value of automobiles and auto parts could be predicted by fluctuations in exchange rates when tariffs are eliminated, which is significant compared to existing empirical studies in the body of knowledge.

One area where NAFTA was shown to be controversial was in the manufacturing industry, mainly the automobile and auto parts sector, with unions drawing attention to factories closing and moving jobs to Mexico (Hartman, 2011). The reason prior studies showed mixed results on NAFTA's relationships to trade was partly because of the way data were aggregated (Bahmani-Oskooee & Bolhassani, 2012). Other factors to be considered are geographical and development levels as explained in the literature review

(Adam, 2012), as well as the monetary policy decisions that had implications on trade when exchange rates increased or decreased. Bahmani-Oskooee and Bolhassani (2012) found earlier researchers investigating the relationships of exchange rates to trade in the automobile industry did not yield meaningful results because of the bias in the data and how they were aggregated. However, when the data were disaggregated, the results were different and showed significant relationships to trade (Bahmani-Oskooee & Bolhassani, 2012). In contrast, some researchers found negative or no relationships at all (Musila & Al-Zyoud, 2012). Nevertheless, exchange rate fluctuations may have relationships to the pricing of imported goods, such as automobiles and auto parts, and this could have made the goods unattractive for customers; therefore, relationships to import volumes could exist (Auboin & Ruta, 2013; Frieden, 2015).

Consequently, the results for exports of automobile and auto parts between Mexico and the United States in the context of NATA are mixed depending on the period of concern. From 2003 through 2008, the data of exported automobiles and auto parts increased, especially for accessories for motor vehicles; this increase was observed through 2013, despite the upwards fluctuation of the peso exchange rate (fiscal.treasury.gov, 2017). Conversely, the export of auto bodies increased from the early stage of the NAFTA agreement through 2009 and decreased considerably from 2010 until 2013. The data showed that at the same time, the exchange rate for the peso compared to the U.S. dollar saw a considerable rise from mid-2008 to 2013 and beyond. This suggests that fluctuation in the exchange rate may have relationships to trade in some subsectors of

the car manufacturing area, but not all, making it difficult to access the real relationships of the exchange rate fluctuations to the overall industry. However, intra-industry assessment both in the United States and Mexico may yield different results (Manger, 2012). Thus, the importance of the present study is revealed by these observations. Although it was intended that by 2008 tariffs would be eliminated and most goods would have their tariffs eliminated or extensively reduced, the relationships of these tariffs to exported commodities, such as motor vehicles and auto parts, beyond 2008 suggests other factors, such as the demand of the goods or the quality, may negate the relationships to the tariff reductions, as well as to exchange rate fluctuations. In the case of NAFTA, the 2008 global financial crisis also may have had some relationships to trade volume (Aftab et al., 2015), though this study did not pertain to those factors.

Auboin and Ruta (2011) referred to the relative prices of tradable to non-tradable products as real exchange rates (RER). Real exchange rates can serve as a measure of real competitiveness that can potentially have relationships to trade flows and act as incentives for resource allocation between sectors producing those goods. Furthermore, Auboin and Ruta stated the relationships of the exchange rate to the volume of tradable goods depends on the pricing strategies and the production networks for firm engaged in the international trade. Nonetheless, Auboin and Ruta found that in the short run, the volatility in the exchange has relationships to trade elasticity, but the relationships dissipated over time. Empirical results in studies focusing solely on exchange rate relationships to trade within NAFTA confirmed short term relationships that are not

consistent in all studies. The present study, however, revealed exchange rate fluctuations could have relationships to trade elasticity alongside tariff eliminations simultaneously when tariff elimination was examined with exchange rate volatility.

Trade Trends

The underlying proposition of this study was to identify trade trends 5 years prior to NAFTA, the period of its execution when tariffs are being eliminated, and 5 years after the tariffs are supposed to be significantly reduced or eliminated on most goods. Prior to NAFTA, the United States had trade relations with Mexico that were more restricted with high tariffs impositions. The debt crisis in 1982, followed by the drastic decline in oil prices, plunged the Mexican economy into major turmoil, and trade between Mexico and the United States was affected, highlighting the need for a viable trade agreement between the two countries and economic reforms (Cabral & Mollick, 2011). From 1989 to 1993, although exports from the United States to Mexico saw a slow growth, imports from Mexico showed significant decline, especially during 1991 and 1992 before rebounding in 1993 right before the enactment of NAFTA enactment (census.gov). This trend in the automobile and automobile parts industry continued throughout the implementation period of the NAFTA from 1994 through 2008. However, while imports increased by 45% in 1995 despite the peso crisis, exports to Mexico saw a significant decline of about 20% (census.gov). Although the peso crisis started in 1994, it was felt in trading mostly in 1995. Positive trends continued until both economies were hit

drastically by the global financial crisis in 2008, and subsequently by the September 11, 2001 terrorist attack in the United States.

While relationships to 9/11 was only felt in 2003 trade data for imports from Mexico, it was more accentuated in the exports data in 2001, 2002, and 2003, respectively (census.gov). Furthermore, the global crisis of 2008 sent the U.S. economy into a recession; consequently, the automobile industry was severely hit and a significant decline in imports to the United States from Mexico ensued (e.g., 5% in 2008 and 17% in 2009, with a major shock in the export market of about a 28% decline in United States exports to Mexico; census.gov. The most two important changes in the economic environment between the two countries was the implementation of NAFTA and the peso crisis between 1994–1995 (Fuentes & Ibarrarán, 2012). However, according to Fuentes and Ibarrarán (2012), in terms of increased output, foreign direct investment, and employment, the manufacturing industry, including the automobile and auto parts industry, responded well to RER depreciations. NAFTA was the main structural change and the reason for the different response by the manufacturing sector, suggesting drastic change in exchange rate may influence trade depending on the economic environment and the size of the economy.

Cabral and Mollick (2011) reported in the pre-NAFTA period the relationships of imports to intra-industry productivity was negative but positive in the post-NAFTA period. The findings of the present study support this and provide evidence that NAFTA did have, and continues to have, significant relationships to the manufacturing industry,

especially in automobile and auto parts trade between Mexico and the United States. Furthermore, the depreciation of the Mexican peso, the openness of the Mexican economy, the spillover across borders of technology, and the flow of foreign investments facilitated production plant reallocations, which in long run had relationships to productivity and led to increased trade between both countries (Cabral & Mollick, 2011). Although the present study did not relate to cross border spillover of technology and foreign investments, it is important to recognize the indirect relationships between tariffs elimination attracting foreign investors into Mexico that led to increased export to the United States, and increased export from the United States to Mexico post-NAFTA as compared to pre-NAFTA.

The theoretical framework of this study was based on two theories, the preferential trade theory (Viner, 1950) and the exchange rate theory (Mussa, 1984). As explained by Mussa (1984), the integrated model of the exchange rate helps explain behavior observed in the real world. The preferential trade theory (Viner, 1950) helps explain how trade creation is the result of the removal of trade barriers. Preferential trade agreement is a form of economic integration in which a country's tariffs for certain products are reduced or eliminated for those countries signatory to the agreement. Preferential theory was the fundamental trading system basis for GATT and WTO. The theoretical framework of this study assumes that elimination of trade barriers creates trade (Bhagwati & Panagariya, 1996; Viner, 1950). The findings in this study confirm the overall regression analysis to determine any correlations between tariffs

elimination and import volume does show evidence of relationships. In the context of this study, views based on preferential trade theory and exchange rate theory are proven to be appropriate; thus, are supported by the findings.

The theoretical and empirical literature on exchange rate volatility remains inconclusive (Auboin & Ruta, 2013). The two key issues, which stand out in the evolution of the trade debate identified by Auboin and Ruta (2013), are exchange rate volatility and the misalignment of the currency policy, which continue to be the central point of focus of trade debate. Although the relationships of the dynamics of exchange rate volatility to trade are still somewhat unclear, the findings in this study demonstrate that when a study is focused on specific industry and region, the relevance and the significance of exchange rate to the monetary policy can be observed and segregated (Cabral & Mollick, 2011).

Limitations of the Study

The main concerns in the early stage of this study were using an appropriate model and finding the appropriate sources of data to examine the relationships of tariffs eliminations and the exchange rate fluctuations to trade elasticity. However, after analyzing the results, the findings suggest these limitations are no longer of concern. The data collected from the Department of Commerce are the most trustworthy. The concerns of validity and reliability that arose from the conception of this project are no longer concerns because of the source of the data. The source of the data was the United States' government Census Bureau, Treasury, and the United State International Trade

Commission; thus, validity and reliability were not of concern. In addition, the researcher did not assess the relationships of NAFTA to the manufacturing industry itself, rather its relationships to trade elasticity. According to Cabral and Mollick (2011), it is difficult to segregate the empirical evidence regarding the effect of NAFTA and non-NAFTA in the early age of the agreement. However, because of other potential areas that the study did not pertain to, the following sections provide recommendations for further research.

Recommendations for Further Research

The relationships of tariff eliminations and fluctuations of the exchange rate to trade elasticity could yield important information if a study on the contribution of the quality of the product could be quantified and tested in the statistical analysis. Also, the currencies manipulation factor may not have been well represented in this study; thus, I recommend further studies to examine:

- How currencies manipulation could have relationships to trade elasticity and be the source of a trade deficit between the United States and China as it is played in the political dialogue;
- How exchange rate fluctuations could affect the competitiveness of the auto industry;
- How intra-product lines relate to the exchange rate, which would allow researchers to focus on product types within the automobile and auto parts industry;

- How to desegregate data, if possible, on automobile producing companies and compare the relationships from NAFTA to non-NAFTA periods to confirm if growth could be attributable to NAFTA.

Implications

Information from this study could lead to positive social change by adding to the body of knowledge regarding the relationships of currency manipulations and the implication of exchange rate fluctuations to trade. Information from this study could also enhance exporters' understanding of the complexity of the exchange rate fluctuation relationships to trade elasticity, thereby helping them plan accordingly when addressing trade elasticity. Trade policymakers must adjust their thinking and take into account the changes in ongoing investigations of exchange rate contributions to the trade debate and especially currency manipulations.

Conclusion

Early development of the industrial innovation in the manufacturing sector in Mexico started with the maquiladora project. The maquiladora project was a way to respond to the idea of trade liberalization with Mexico and opened the door for multinational corporations to enter Mexico's market. Gradually this led to the prospect of the NAFTA agreement (Sotomayor, 2012).

The increase of intra-industry trade in Mexico enabled the country to compete with others in the region, and a greater analysis into the relationships of the maquiladora to international trade from a non-maquiladora perspective provided clarity on the need to

segregate the real relationships from NAFTA and those from the maquiladora, to avoid overstating Mexico's benefits from NAFTA (Sotomayor, 2012).

NAFTA continues to animate the political debate, and the ambiguity of America's approach to trade is raising serious questions about what the definition of international trade ought to be. Certainly, currency manipulation should be of concern, and the United States should continue raising these questions with the Chinese. The paradox is that currency manipulation is used as fodder by politicians to complain about the trade deficit with China, but few researchers are concerned with this phenomenon (Park & Rhee, 2014). In addition, the research models used to test the correlation between exchange rates and trade elasticity do not meet expectations (Musila & Al-Zyoud, 2012; Verheyen, 2012). If trade deficits between China and the United States can be blamed on currency manipulations, one should expect all existing economic models to help expose these correlations. Reassessment of the models and inclusion of other factors that can enhance these models may yield better results. The main effect of NAFTA was to eliminate trade barriers to facilitate cross-border trading; however, after 20 years, unions in the United States still argue NAFTA has bled the United States of its manufacturing jobs (Datta & Kouliavtsev, 2009; Villareal & Fergusson, 2014).

The available data suggest the United States imports more cars and auto parts from Mexico than it exports; nevertheless, it is more of the economic environment of competitiveness that forces companies to look for ways to reduce costs to stay competitive in the world market than issues arising from removing trade barriers. This

study clearly illustrates that the real concerns may not be the exchange rate in relation to currency manipulation, but rather the competitive environment of trade and the social relationships global trade has on global populations, especially the manufacturing sectors in the United States and Mexico. The reaction to trade around the globe and particularly with Brexit and the ongoing debate on NAFTA with the threat from the new Trump administration to renegotiate NAFTA and the TPP are not entirely because of currency manipulations, but rather relate to how trade agreements are interpreted and used as a cover to move manufacturing plants across borders in the pursuit of cheap labor to remain competitive in the international market.

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