The Effect Of NAFTA On Trade And Investment Between Member Countries

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ABSTRACT

Literature is full of studies on the relationship between trade and investment. Since trade agreements have the potential of altering this relationship, this study employed gravity model analysis to determine how NAFTA might have affected trade and investment among member countries. Overall improvement in NAFTA economy enhanced exports in the region; however, it was relative improvement in domestic economy that attracted foreign investment. Responsiveness plots show that the impact of NAFTA on exports was short lived, but was longer on FDI.

Keywords: NAFTA; exports; FDI; gravity model; responsiveness

INTRODUCTION

𝒯he relationship between trade and foreign direct investment (FDI) is either complementary or substitutable. Because they affect each other in any way, trade and foreign direct investment (FDI) are considered two of the most important methods for entering a foreign market. When trade is unrestricted, it involves less risk than foreign direct investment. Hence, the goal of the World Trade Organization (WTO) is that member countries will have access to each other's market and enjoy relatively low import tariffs. Although WTO members stand to benefit from free trade (job creation, competition, new markets, and investment), it is regional trade agreements that enhance such benefits (Shadlen, 2005). The tenets of the enhanced benefits led to the creation of the North American Free Trade Agreement (NAFTA) in 1994. However, the benefits attributed to NAFTA are often subjects of contention. For instance, opponents of NAFTA quickly attribute any success choked to the value of the U.S. dollar. There are many studies on FDI and trade (as would be seen later), but none has been done specifically for the three only NAFTA economies. The objective of the paper is to analyze the impact of NAFTA on the economies of the three member countries through trade and investment for the periods before and after the introduction NAFTA. The analysis employs gravity modeling and country-pair data.

The North American Free Trade Agreement is an agreement between the U.S., Canada, and Mexico to expand trade and investment between them. It is the largest free trade region in the world and accounts for about $17 trillion worth of traded goods and services (USTR.GOV). Soon after the advent of NAFTA, tariffs on many imports were eliminated (Figure 1). As of 2008, the region remains tariff free and seeks to eliminate non-tariff barriers as well (commerce.gov). Also, the three countries have some of the lowest import tariffs in the world.
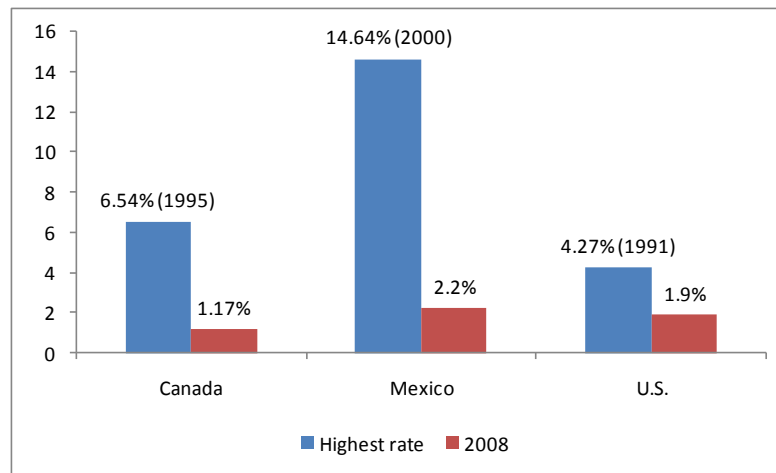
Figure 1: Tariff Rates in the U.S., Canada, and Mexico

Trade records show that member countries have benefited from the agreement. The Office of the United States Trade Representative reports a 198 percent increase in trade among the three countries between 1993 and 2006. US exports to Canada and Mexico increased by 157 percent compared to an increase of 103 percent to the rest of the world. In 2008, although the U.S. had a goods trade deficit ($75 billion) with its two land neighbors, it had a services trade surplus ($29.6 billion) with them (USTR.GOVa). Because of the large trade within the region, Canada and Mexico are among the top three U.S. (world's largest economy) trading partners.

Economic reforms in Mexico have been kept on track by NAFTA. Foreign equity has led to higher productivity (Kessel and Kim, 1995). Foreign direct investment (FDI), which used to focus on high-tech, has expanded to include transport, machinery, and metals (Morales, 1999). The abundance of cheap labor in Mexico is an attraction to U.S. firms. This is responsible for 49 percent of the value-added created by in-bond industries in Mexico (INEGI, 1998). As a result, one of the benefits of NAFTA to Mexico is job creation. In 1993, Mexico-U.S. trade created 29,385 jobs in the U.S., but in 2004, 559,564 jobs were displaced in the U.S. (Scott et al, 2006). It is worth noting that the jobs created in Mexico were mostly in Maquiladora industry (metal and equipment, electronics, textiles, paper, and plastic products) and that the agricultural sector continues to experience job losses (Scott et al, ibid). Gruben (2001) even attributes the observed job creation to the devaluation of the peso, and not NAFTA.

While NAFTA is the largest free trade area, the largest bilateral trading relationship in the world is between Canada and the U.S. (Myles and Cahoon, 2004). The Canada-U.S. free trade agreement began in 1989, five years before NAFTA. About $1.5 billion worth of goods and services crossed the world's longest land border (5,524.6 miles) in 2008. The U.S. was the destination of 78% of Canadian exports and the source of 56% of its imports (MSCI, 2010). About one-third of the exports were energy related while motor vehicles accounted for 13.6% (MSCI, 2010). Canada enjoyed a significantly high trade surplus with the U.S. in the 1990s, but this high surplus, like the job creation in Mexico, has been attributed to the then low value of the Canadian dollar relative to the U.S. dollar and the strong U.S. economy (Dobbin, 2008). A study by Scott et al (2007) shows that unemployment remained the same 15 years after the initial Canada-U.S. free trade agreement. About 400,000 manufacturing jobs were lost between 1989 and 1993 and regained by 2001. It is currently is on a decline again. The energy sector, on the other hand, has experienced significant job growth.

FACTORS INFLUENCING TRADE AND FDI

Literature shows many factors have influence on FDI and trade relationship. This section is not intended to be exhaustive, but limited in scope to studies more pertinent to international trade, foreign direct investment and exchange rates published in the past two decades.

In 1996, Brouthers, Werner, and Wilkinson investigated the relationship between FDI inflow and trade balances by the host country's level of development. They postulated that FDI inflow, especially if it is factor seeking, will have a positive impact on a developing country's trade balance, but a negative impact on that of a developed country. They estimated three models to test their hypothesis. Each model had *level of development* and FDI as its independent variables, but differed with respect to their dependent variables - trade surplus, change in exports, and change in imports. Their results show a short-term negative relationship between trade surplus and FDI inflow in developed countries if the investment is to seek foreign markets; however, in developing countries there is positive relationship if the investment is efficiency-seeking. The general relationship is, however, weak in both cases.

Wilamoski and Tinkler (1999) used a vector error-correction model to study the effect of U.S. FDI in Mexico on U.S. trade with Mexico. Impulse response functions and variance decomposition showed that FDI has a positive impact on exports to and imports from Mexico. In 1999, Hejazi and Safarian conducted a similar study between Canada and 35 other countries and another study in 2001 between U.S. and 51 countries using a gravity model. In both studies, they found that FDI has a stronger impact on exports than on imports, which implies a positive impact on trade balance. For China, Liu et al (2001) examined causal links between FDI and trade for the 1984-1998 period. They found that imports have positive impact on inward FDI and inward FDI has a positive impact on exports.

A qualitative analysis of structural changes induced by FDI inflows in Ireland revealed that uncertainty over macroeconomic and exchange-rate stability, future trading arrangements among others, caused FDI into the Irish manufacturing sector to focus on the home market or geographically proximate markets (Barry and Bradley, 1997). It was also found that export-oriented FDI is better than tariff-jumping FDI for small economies, such as Ireland. As a result, trade liberalization should be a prerequisite for substantial FDI inflows to such small economies.

In 2002, Chung and Alcacer investigated how location characteristics influence FDI in the U.S. manufacturing sector. They examined 1,784 FDI transactions between U.S. and the Organisation for Economic Co-operation and Development (OECD) nations from 1983 to 1993 by estimating a random parameter logistic regression (RPL). Results show that greater market size, lower factor costs, and better access to surrounding states attract FDI inflow. They also found that firms in research-intensive industries are attracted to states with high R&D. However, overall, R&D intensity does not attract FDI.

Büthe and Milner (2008) conducted statistical analyses of 122 developing countries for the period 1970 to 2000. They used OLS with country fixed effects to estimate the panel data. The independent variables used include cumulative preferential trade agreements (PTAs), GATT/WTO membership, bilateral investment treaties, market size, political instability, and GDP growth, among others. Results showed that WTO members and participants in PTAs had more FDI inflows than otherwise.

Using panel data, Clougherty and Grajek (2008) studied the impact of the International Organization for Standardization (ISO) diffusion on country-pair economic relations. They estimated FDI and export gravity equations using ordinary least squares (OLS). Their estimation revealed that ISO diffusion has no impact on FDI and trade in developed countries, but has a positive impact on inward FDI and exports in developing country.

METHODOLOGY

The use of gravity models to study trade-FDI relationship is well documented in literature. From the "potluck assumption" in the 1960s to a set of standards established in the late 1990s, the model has come under rigorous review (Baldwin and Taglioni, 2006). Many variables and methods have been employed. The most common variables are FDI inflow and outflow, exports and imports, exchange rate, and the level of economic development in a given host country. According to Baldwin and Taglioni (2006), the basic gravity model is frosted with biases which are often ignored. The biases are due to omitted variables which cause endogeneity problem (Gold medal error), the use of logs of average bi-lateral trade variables as the dependent variable instead of the use of the average of the logs of the variables (Silver medal error), and spurious correlation due to incorrect deflation of

trade values (Bronze medal error). They showed that nation dummies and pair dummies (for panel data) could solve the problems.

The current study focuses on how trade agreement, specifically NAFTA, has affected FDI and trade in North America. It considers trade and investment flows from each member country to the other member countries. In this light, the proposed model deviates from the traditional bi-directional model, which requires averaging of trade flows between nations to the use of uni-directional trade. Equation 1 below therefore avoids the "Silver medal error." Hejazi and Safarian used a similar model in their 1999 Canadian study. Also, as recommended by Baldwin and Taglioni (2006), the model includes pair dummies for trade between two given nations to solve for the "Gold medal error" using panel data. Lastly, the included time dummy corrects the bronze medal error.

ESTIMATED MODEL

Inflow of FDI has a positive impact of exports when it takes advantage of cheap resources in the host country. In this case, the produced goods are exported back to the originating country of the investment. The equation below is based on this assertion:

$$X_{i,j} = b_0 + b_1 FDI_{i,j} + b_2 GDP_i + b_3 GDP_j + b_4 ER_{i,j} + b_5 N + b_6 UC + b_7 UM + b_8 T \tag{1}$$

Where

$X_{i,j} =$	Exports value from country i to country j
$FDI_{i,j} =$	inward Foreign direct investment stocks from j to i
$GDP_i =$	Gross Domestic product of i
$GDP_j =$	Gross Domestic product of j
$ER_{i,j} =$	Exchange Rate between i and j
$N =$	NAFTA dummy: 1 for 1995-2002; 0 for 1990-1994
$UC =$	US-Canada pair dummy: 1 for US-Canada data, 0 otherwise
$UM =$	US-Mexico pair dummy: 1 for US-Mexico data, 0 otherwise
$T =$ time variable	

The inclusion of the country pair dummies and time variable solve the gold medal and bronze medal errors, respectively, identified by Baldwin and Taglioni (2006). While there is no clear impact of exports on FDI inflow, the existence of unrestricted exports from country i to j could motivate FDI inflow from j to i to take advantage of cheap resources. Hence, estimating an FDI function below, together with the export function above, would seem appropriate. However, it is past exports that are likely to have influence on current FDI inflow, hence, a lagged export (Exlag) is used instead of current exports.

$$FDI_{i,j} = a_0 + a_1 Exlag_{i,j} + a_2 GDP_i + a_3 GDP_j + a_4 ER_{i,j} + a_5 N \tag{2}$$

Exports data were obtained from Foreign Trade Statistics of the US Census Bureau and Statistics Canada, CANSIM. They are in millions of US dollars on a nominal basis. FDI data are from UNCTAD WID country profiles and are in millions of dollars. For exchange rate (ER), annual rate between two countries were used. The source of GDP data is the Statistics Division of the United Nations.

Hausman endogeneity test revealed that OLS estimation is more efficient than a 2SLS estimation. However, each equation was separately estimated with Maximum Likelihood method in order to correct for autocorrelation. Also, the inclusion of GDP and exports data is likely to cause collinearity problems. Condition index for both equations were 19.75 and 5.11, which indicate moderate level of collinearity.

RESULTS

Table 1 shows the maximum likelihood estimates of equations 1 and 2. The models are all generally of good fit with statistically significant F values. Adjusted R^2 are above 0.80. Correcting for autocorrelation improved Durbin-Watson statistics from 0.94 and 0.89 to 1.62 and 1.91 in that order.

Table 1: Results Of Maximum Likelihood Estimates Of Exports And Fdi Models

	Intercept	FDI	GDPd	GDPf	ER	Dnafta	UC	UM	time	DW	Adj R^2	F value
Exports	-14896*	0.0289	0.0191*	0.0230*	-477.3	4668	-22467	-83817*	-1353	1.62	0.96	559*
model	(0.0122)	(0.8276)	(0.0001)	(0.0001)	(0.425)	(0.1675)	(0.276)	(0.0009)	(0.145)			(0.0001)
	Intercept	Lagged Exports	GDPd	GDPf	ER	Dnafta				DW	Adj R^2	F value
FDI	19217	0.4119*	0.0044*	-0.0056*	-5240*	7702*				1.91	0.85	193*
model	(0.1091)	(0.0001)	(0.0016)	(0.0001)	(0.0001)	(0.039)						(0.0001)

P values in parenthesis
*Statistically significant at 5 percent level

The results indicate a positive relationship between FDI and exports. While this relationship is statistically insignificant in the export equation, FDI responds significantly to previous years' exports. Both domestic and foreign GDP have a significantly positive impact on exports. In regard to FDI, however, foreign GDP has a negative influence on FDI inflow. This implies that while overall improvement in NAFTA economy enhances exports in the region, it is relative improvement in domestic economy that attracts foreign investment. The exchange rate coefficients are negative, but only significant in the FDI equation. As a result, depreciation of domestic currency attracts FDI inflow. The positive impact of NAFTA was significant on FDI, but not on exports.

RESPONSIVENESS

The estimated coefficients were used to compute elasticities which were subsequently used to plot the figures below. Focus is placed on plots with conspicuous changes. Figure 1 shows the responsiveness of exports to FDI. While the responsiveness was falling before the advent of NAFA, it flattened after NAFTA.
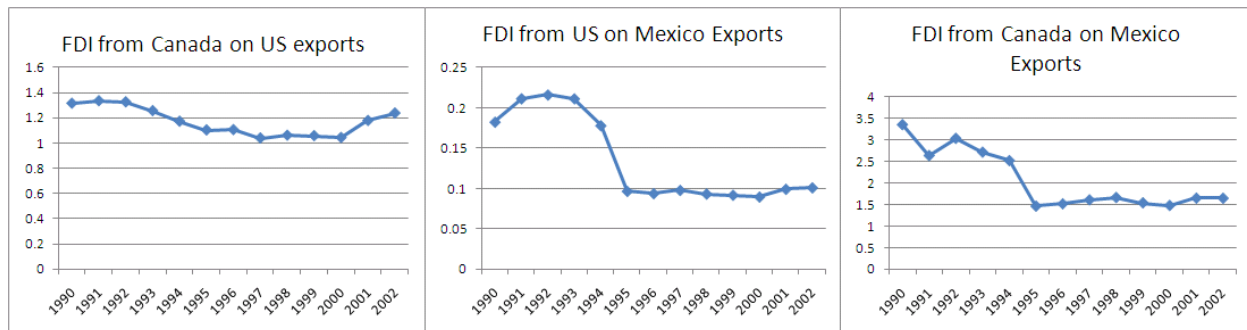

Figure 1: Responsiveness of Exports to FDI Inflow

Figure 2 shows that the responsiveness of exports to exchange rate changes is weakening over time. Although NAFTA caused a noticeable increase in responsiveness, it was short lived.
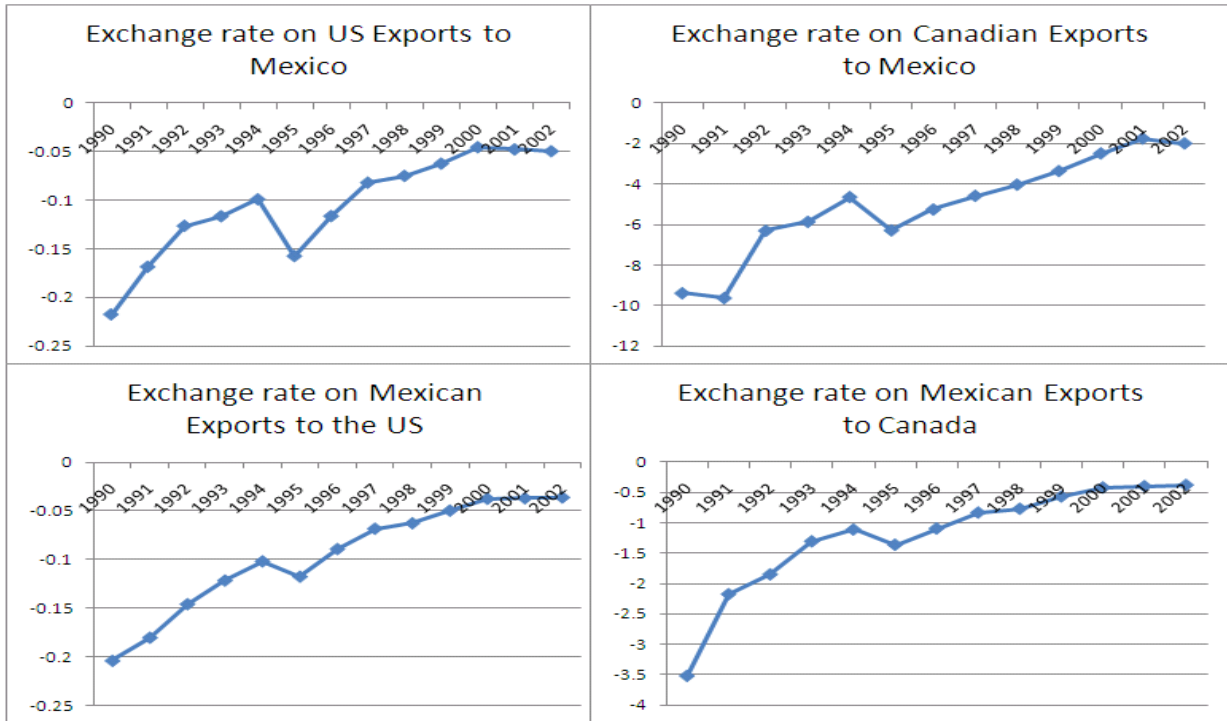
Figure 2: Responsiveness of Exports to Exchange Rate

Figure 3 shows the responsiveness of exports to foreign GDP is positive, but declined between 1990 and 2000. This observation is similar to Engel's law about the proportion of income spent on food consumption as income increases. In this case, the strong economic growth in the NAFTA region led to decreasing growth rate in trade during the period. However, the economic slowdown in the early 2000s led to increased responsiveness of trade.
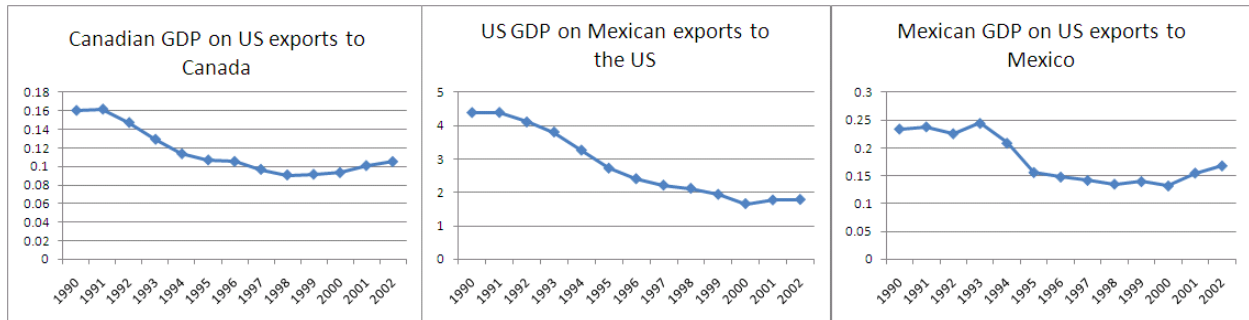

Figure 3: Responsiveness of Exports to Foreign GDP

Figure 4 shows that while the responsiveness of Mexico and Canada exports to US GDP had a similar pattern to the response of US exports to their respective GDPs, the former was significantly greater than the latter.
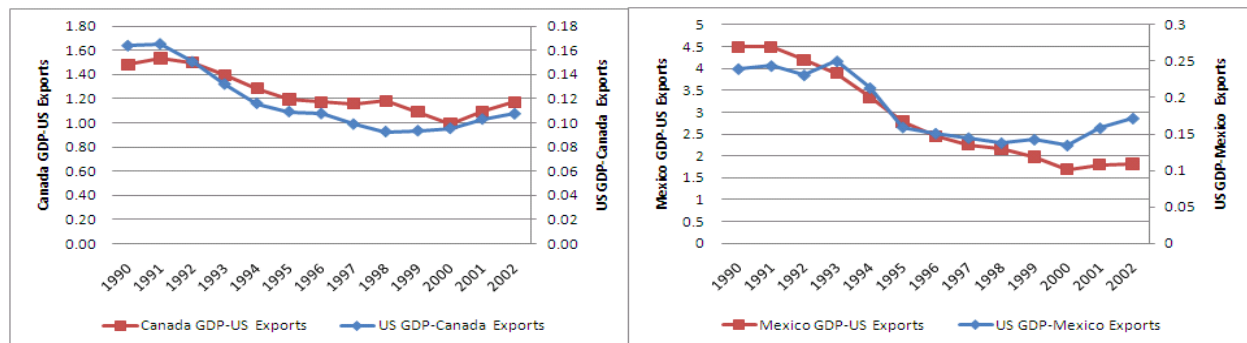

Figure 4: Comparison of Exports-foreign GDP Response between US and Other NAFTA Members

CONCLUSION

The paper set off to examine the impact NAFTA have had on trade and investment on its member economies. The study employed a gravity model which took into account the three medal errors identified by Baldwin and Taglioni (2006). Although the study did not find evidence of complementary impact of investment on trade, a plot of the responsiveness of trade to investment shows that responsiveness fell sharply and stabilized after NAFTA. There is strong evidence of previous trade inducing inflow of foreign investment. Also, NAFTA destabilized the relation between exchange rate and trade for just one year. The study also revealed that positive relationship between economic performance and trade weakens as the member economies improve, and vice versa.

AUTHOR INFORMATION

Dr. Beverly J. Frickel has been on the faculty of the Dept. of Accounting and Finance at the University of Nebraska at Kearney since 2001. She received her Ph.D. from the University of Nebraska at Lincoln. She served on the faculty of the University of Central Oklahoma and University of North Texas prior to her years at UNK.

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Bruce Elder holds a B.S. degree from the University of Nebraska at Kearney (1977) and a J.D. from the University of Nebraska College of Law (1980). He was formerly in private practice as an attorney and currently he is a professor of business at the University of Nebraska at Kearney where he teaches graduate and undergraduate courses in business law. His ongoing research interests include business ethics, employment law, and water law.

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