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ESTIMATING THE EFFECTS OF THE NORTH AMERICAN FREE TRADE AGREEMENT ON NORTH AMERICAN TRADE USING THE GRAVITY MODEL

Bachelor's thesis

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Tallinn 2016

I declare I have written the bachelor's thesis independently.
All works and major viewpoints of the other authors, data from other sources of literature and elsewhere used for writing this paper have been referenced.

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TABLE OF CONTENTS

ABSTRACT

The North American Free Trade Agreement (NAFTA) is one of the longest lasting free trade agreements and has become an example for many since its creation in 1993. However, the effects of the agreement on North American trade are still questionable. This research used the popular gravity model of trade to estimate the influence. Performing the regression provided results, which indicated that although NAFTA has had a positive impact on trade among the United States, Canada, and Mexico, the effect has been insignificant. That is because it was proven that the connection between NAFTA and the volume of imports and exports is quite weak. Moreover, the regression error margin displayed uncertainty of the degree of positive influence of the agreement. A brief analysis was conducted on the overall economic impact of NAFTA and its criticism addressed. Examining the different aspects of the NAFTA influence allowed concluding that the agreement can be considered a modest success.

Key words: North American Free Trade Agreement, the United States, Canada, Mexico, North American trade, gravity model of trade

INTRODUCTION

Free trade agreement (FTA) is an increasingly important phenomenon in today's economy. In essence, a FTA is an agreement between two or more countries to encourage the growth in trade relations between the member states. That is done by reaching an understanding on tax, tariff, and non-tariff measures involved in the export and import of goods and services. Normally these deals aim to establish a free trade area within the involved countries, which means that all trade barriers imposed would be either lowered or abolished completely.

What is more, modern FTAs usually include much more than simply diminishing tariffs. They provide regulations on various intra-trade governing topics like respecting standards, safeguard provision, and customs administration (Scope of RTAs 2016). Sometimes, FTAs include regulations on investment, competition, intellectual property rights, environment, and labor, which are far more than traditional trade policy mechanisms (Scope of RTAs 2016).

All these rules boost trade since it enlarges the market different industries have access to. In theory, FTAs should also benefit customers because increased competition should create lower prices and more options in products (Grimson 2014). Whether FTAs actually have a positive effect on the economies and trade flows of the member countries is still questionable.

The North American Free Trade Agreement (NAFTA) negotiations formally began in June 1991 and lasted until 1993 when the United States, Canada, and Mexico reached an agreement. This was not achieved with ease since no trade agreement so broad had ever been negotiated within countries at such diverse level of economic development. The ambitious agreement sought to transform the trade conditions between the countries. The topic raised opposition in governmental levels as well as in the civil society, mostly in labor unions and environmentalists. Despite the uproar the agreement officially went into effect January 1, 1994. (Mayer 1998, 4, 109)

NAFTA has numerous provisions but the main ones focus on eliminating tariffs completely. This was an easy task between the United States and Canada because of the existence of the United States-Canada FTA but the process of completely abolishing all tariffs with Mexico was done gradually over 15 years. Non-tarriff barriers, such as import licenses were also addressed and consequently removed by 2008. (North American Free Trade Agreement 2016)

Other important points include protection for foreign investment by committing to treat all investors from a NAFTA country no less favorably than their own domestic investors. Connected to the same aspect NAFTA provides easier access for business professional to travel effortlessly throughout the member countries. There is also protection for intellectual property, which includes a broad range of rights like patents and trademarks and providing access to government procurement. (North American Free Trade Agreement 2016)

NAFTA is a significant FTA not only because of the extent of provisions it includes but also due to the size of the economies involved in the deal and because it has been an example for numerous others since its creation. Hence, it is quite clear why it has been of interest for economists to investigate the effects the agreement has had on the trade flows of each member. Furthermore, the topic has been important considering the longevity of NAFTA.

The main research question in this analysis is whether NAFTA has influenced trade flows in North America in a positive way. It is vital to obtain new results with updated data and compare that to previously done research based on the same model but also compared to research on their economies as a whole. This is important to answer the other research question if the NAFTA can be considered a success even 23 years later or was it only beneficial for a certain amount of time.

Moreover, since large FTAs are becoming increasingly more popular, it is important to analyze previous agreements to ensure their effectiveness. That is especially valuable when examining an enduring FTA like the NAFTA. Admittedly, research into only one substantial agreement is not enough to draw thorough conclusions concerning all FTAs but combined with other similar analysis could prove to be extremely useful in estimating the efficiency of future FTAs such as the much debated the Transatlantic Trade and Investment Partnership.

This research provides an overview of the trade trends under NAFTA, an analysis of previous research based on the gravity model and most importantly studies the impact of NAFTA

using new data in the same model. Then overall effect of NAFTA on the economies of the United States, Canada, and Mexico are reviewed, followed by criticism on the topic. Finally, the paper seeks to conclude if NAFTA can be considered a success. The methods of research are explained in the next part.

METHODOLOGY

This research uses empirical evidence and analyzes it to make conclusions and offer opinions. The evidence was collected mostly using publications available online since real books and articles concerning the impact of NAFTA are scarce in Estonia. However, the situation did not hinder the research process. All the sources used were published between 1998-2016 and included books, articles, and databases.

The qualitative data was divided into different chapters and then investigated to gain understanding on the topic in hand. The quantitative data was systematized into a separate dataset, which was necessary to perform the statistical analysis. This was done using the gravity model (explained in length in the next stages) in Microsoft Excel. The results were combined with the knowledge gained from the qualitative data and then a final conclusion was made.

1. OVERVIEW OF TRADE BETWEEN THE NAFTA COUNTRIES

To visualize the importance of the agreement, it is useful to review the trade changes that have occurred since 1993 until now. Trade between the NAFTA countries has definitely increased since its creation. For instance in 1993 the United States imports from Mexico started at 40.7 billion U.S. dollars, in merely six years it had more than doubled to 111 billion U.S. dollars (United States Imports by Country and Region 2016). Fifteen years later, in 2014, the same indicator had climbed up to an astonishing 294 billion U.S. dollars (United States Imports by Country and Region 2016).

The same trend can be seen with United States' imports from Canada. That is especially since Canada is the leading supplier of crude oil for its southern neighbor. Hence it is not surprising that when the import from Canada started at 113.6 billion U.S. dollars, then by 1999 the amount had grown to 201 billion U.S. dollars (United States Imports by Country and Region 2016). In 2014 imports had reached 326 billion U.S. dollars, which is a 72% increase (United States Imports by Country and Region 2016).

Canadian imports from the United States also experienced success growing from 88 billion U.S. dollars in 1993 to 144 billion U.S. dollars in 1999 (Canada Imports by Country and Region 2016). Ten years later it was already 164.2 billion U.S. dollars and more recently in 2014 the figure was 251 billion U.S. dollars (Canada Imports by Country and Region 2016). Imports from Mexico to Canada have been one of the lowest compared to trade patterns concerning other parties but have nevertheless increased from 2.7 billion U.S. dollars in 1993 to 26 billion U.S. dollars in 2014 (Canada Imports by Country and Region 2016).

Likewise, Mexican imports from Canada have been quite modest. The year of the creation of NAFTA, 1993, it remained slightly under 1 billion U.S. dollars but has now peaked at 10 billion U.S. dollars (Mexico Imports by Country and Region 2016). On the other hand, the

United States has historically been an important trade partner for Mexico, which can also be witnessed by the high import numbers in 1993, when it was 48 billion U.S. dollars and in 1999 when it crossed the 100 billion line at 105 billion U.S. dollars (Mexico Imports by Country and Region 2016). Naturally, now the imports have increased even more and the last available data in 2014 showed it nearing 200 billion U.S. dollars being only 4 billions short (Mexico Imports by Country and Region 2016).

It is clear that during the existence of NAFTA the imports within the agreement partners have grown immensely, and the same tendency is true concerning their exports. However, this progress can be explained by overall global trends or other factors not caused by NAFTA. Consequently, it is vital to attempt to investigate the effect NAFTA separately has had on the countries involved.

2. LITERATURE REVIEW

The relationship between NAFTA and the member countries' trade flows has been researched several times in the past. There have been different methods to determine the effect of NAFTA but the most dominant one since the question surfaced has been the gravity model. Some of the most significant studies have been Gould (1998), Krueger (1999), Wall (2003) Montenegro, Soloaga (2006), and Frickel, Kotcherlakota, Tenkorang, Elder (2011).

David M. Gould did one of the earliest analyses about NAFTA in 1998, four years after the implementation of the agreement using a model deriving from the basic gravity model. He used quarterly data starting 1993 until 1996 to draw conclusions on the effect of NAFTA on the three countries separately (Gould 1998). According to his results, U.S.-Mexican trade grew by 16% per year with NAFTA, which he does admit has only had a marginal effect on the United States overall trade flows (Gould 1998). Analyzing Canadian-U.S. trade shows that both import and export have experienced little change due to NAFTA; both increases are fewer than 9% (Gould, 1998). More importantly, the author admits that in trade between these two states the NAFTA effect is in fact statistically unimportant (Gould 1998).

Lastly, Canadian-Mexican trade was investigated and the conclusion was that the statistical margin of error was quite large so the outcome cannot be heavily relied upon but it did show that NAFTA had had a negative effect on Canadian imports from Mexico as well as on Canadian exports to Mexico (Gould 1998). Hence, the author concluded that NAFTA likely influenced U.S.-Mexican trade and it was unlikely that it affected Canadian-U.S. or Canadian-Mexican trade flows (Gould 1998). That also illustrates that even though some important estimations can be made based on the gravity model, it cannot be viewed in absolute terms.

Another research on the effects of FTAs was conducted a year later in 1999 by Anne O. Krueger. She used data for the years of 1987, 1989, 1991, 1993, 1995 and 1997 (Krueger 1999, 18). She was analyzing a wider range of countries to find out the impact of various FTAs,

including NAFTA. Krueger determined that when both countries were a part of this particular agreement the effect was positive but minor (Krueger 1999, 19). Since she did not measure the consequences of NAFTA separately for the three countries it cannot be directly compared to Gould's work but both seem to conclude that the overall influence at the time was minimal.

In 2003, Howard J. Wall wrote a paper on the impact of NAFTA on different regions of Canada and the United States using data from 1990 to 1998 (Wall 2003, 20). This provided a very detailed look of both the regions but also the countries' trade flows as a whole under the agreement. He discovered that Canadian exports to the United States (imports from Canada to the United States) increased by 29.2% and imports from the United States to Canada (exports from the United States to Canada) by 14.3% (Wall 2003, 20). The author also determined that trade between Canada and Mexico changed quite notably for imports from Mexico – 48.2% and less for exports to Mexico – 11.5% (Wall 2003, 20). These results are among the most optimistic ones and show significant benefits for the United States and Canada resulting from NAFTA.

Three years after Wall's analysis, Claudio E. Montenegro and Isidro Soloaga revisited the topic of NAFTA trade effects. They used data from 1988 to 2003, which makes this research different from its predecessors due to its scope. Montenegro and Soloaga also included over 100 other countries into their model to analyze effects of NAFTA on non-member states (Montenegro, Soloaga 2006, 50). According to their study, NAFTA had a small but positive impact on the United States imports from Mexico but no meaningful influence on imports from Canada (Montenegro, Soloaga 2006, 52). Canadian imports from the United States showed no changes before and after NAFTA, whereas imports form Mexico experienced a positive development due to the agreement from 2001 to 2003 but not in the previous period (Montenegro, Soloaga 2006, 53). Mexico's imports from both the United States and Canada increased statistically significantly (Montenegro, Soloaga 2006, 53). That helps conclude that just as in previous studies that the effects have been positive but not of great importance.

The latest research using the gravity model to investigate NAFTA outcomes was done in 2011. The authors used data from 1990 to 2002 to estimate the agreement's influence on both trade as well as foreign direct investment (FDI) (Frickel, Kotcherlakota, Tenkorang, Elder 2011, 1). They discovered that despite the fact that NAFTA enhances exports in the region, as the

member countries' economies improve the positive relationship between economic achievement and trade weakens (Frickel, Kotcherlakota, Tenkorang, Elder 2011, 7).

These five influential researches provide a wide range of approaches using the gravity model. Even though they all were investigating the NAFTA influence from a particular viewpoint and using data from different periods, all achieved a similar result. Wall (2003) was the most optimistic on the effects of NAFTA, others mostly concluded that the effect had been slightly positive and only Gould (1998) states that the impact could have been negative for Canada's economy.

3. ANALYZING NAFTA IMPACT BASED ON THE GRAVITY MODEL OF TRADE

Although there have been several studies investigating the impact of NAFTA on its member countries, the latest one was made five years ago and more importantly, it was done using data up to 2002. Since FTAs are long-term agreements, it is vital to analyze their influence in a longer period of time. That is why it was essential to review the matter using updated data and see if the results would differ now, over 20 years after the agreement was implemented.

To estimate the effects of NAFTA, it was necessary to analyze trade between the three countries. However, the indicators of import and export cannot be the only basis for the investigation since there are various other factors that have affected the growth of trade, not only NAFTA. That is especially true since the agreement was established in 1993 and implemented a year later in 1994, over 20 years ago. Hence, it was important to find an appropriate model to attempt to extract the influence of NAFTA from other components. Furthermore, to attempt to find the most accurate results, the research analyzes data from 1990-2014.

3.1 Definition of the model

The gravity model of trade was first used in 1962 by Jan Tinbergen when he attempted to determine a certain pattern in international trade using Newton's law of universal gravitation as inspiration (De Benedictis, Taglioni 2011, 55). The initial formula assumed that trade flows are directly related to the economic size of the involved parties, and inversely related to the distance between them (De Benedictis, Taglioni 2011, 56). The basic form of the formula:

$$GF_{ij}=\frac{M_i M_j}{D_{ij}} \quad i \neq j$$

The gravity model has been used to estimate the influence of various events like migration flows. The original formula has been modified in different ways to include more relevant variables and has been customized from the original model to conform to the situation. Hence since the initial creation of the gravity model Anderson (1979), Helpman and Krugman (1985), Bergstrand (1985), and Bikker (1987) and numerous others have further developed the equation to include more factors that could influence bilateral trade (Gould 1998, 15). The modified models are specifically designed to analyze separate factors on the trade flow, such as a certain FTA. This research will focus widely on Bergstrand's version of the equation also used in Gould's analysis in 1998.

This equation assumes that bilateral trade is also influenced by both of the involved countries' GDPs, their GDP deflators, the exchange rate between them, the exchange rate with the rest of the world, the United States-Canada free trade agreement and of course the NAFTA agreement. Additionally, the flow from one country to the other depends on nine terms, which can be categorized as (Gould 1998, 15):

- Income in the exporting and importing countries that reflects the potential demand and supply;
- Wedges between the export and import price of the traded goods caused by tariffs and nontariff barriers;
- Price terms reflecting the substitutability between this traded good and the others.

To achieve a clearer view of NAFTA influence on both imports and exports, two separate equations are used. The modified formulas are as follows:

$$M_t^{ij}=\alpha_0+\alpha_1 M_{t-q}^{ij}+\alpha_2 Y_{t-q}^{i}+\alpha_3 Y_{t-q}^{j}+\alpha_4 E_{t-q}^{ij}+\alpha_5 E_{t-q}^{iw}+\alpha_6 P_{t-q}^{i}+\alpha_7 P_{t-q}^{j}+\alpha_8 D_t+\alpha_9 NAFTA_t+\epsilon_t$$

$$X_t^{ij}=\beta_0+\beta_1 X_{t-q}^{ij}+\beta_2 Y_{t-q}^{i}+\beta_3 Y_{t-q}^{j}+\beta_4 E_{t-q}^{ij}+\beta_5 E_{t-q}^{iw}+\beta_6 P_{t-q}^{i}+\beta_7 P_{t-q}^{j}+\beta_8 D_t+\beta_9 NAFTA_t+\mu_t$$

Definitions of the variables (Gould 1998, 16):

M^{ij} is country i's imports from country j (i and j in this case are either the United States, Canada or Mexico)

X^{ij} is country i's exports to country j

t is the current date

q shows the period a variable is lagged, which for this research is 1 year

Y^i stands for the real GDP of country i

Y^j stands for the real GDP of country j

P^i is country i's GDP deflator

P^j is country j's GDP deflator

E^{ij} shows the real exchange rate between country i and j

E^{iw} shows the real exchange rate between country i and the rest of the world, excluding country j

D is a binary variable that represents other FTAs, which in this case would be the U.S.-Canada FTA beginning in 1989

NAFTA represents the period when the agreement was implemented so it equals 0 before 1994 and 1 after that

α and β are estimated coefficients

ε and μ are error terms

All the variables are expressed in log first-differences (Gould 1998, 16). To simplify this research the variable E^{iw} has been omitted. The binary variable D is no longer relevant since the data used will begin with the year 1990 and end in 2014 when the U.S.-Canada FTA was already in place. Inflation separately was not included in the research because the GDP price deflator indicator already measures inflation and deflation.

The import and export data was found through the World Bank World Integrated Trade Solution website (Canada Exports by Country and Region 2016; Canada Imports by Country and Region 2016; Mexico Exports by Country and Region 2016; Mexico Imports by Country and

Region 2016; United States Exports by Country and Region 2016; United States Imports by Country and Region 2016). Data on Mexico's international trade for the year of 1989, which is necessary because of the lagged period variable in the equation, was retrieved from their National Institute of Statistics and Geography (INEGI) (Historical Statistics of Mexico 2009, 12, 15, 86). All the GDP data, including the GDP deflator information, is from the World Bank DataBank (World Development Indicators 2016).

Exchange rate data was obtained from various sources. The U.S. dollar-Canadian dollar and U.S. dollar-Mexican peso exchange rate is from the Federal Reserve Bank of St. Louis Economic Research website (Canada / U.S. Foreign Exchange Rate, 2016; Mexico / U.S. Foreign Exchange Rate, 2016). The Canadian and Mexican exchange rate with other countries was acquired using the Canadian Foreign Exchange Services interactive tool (Historical Exchange Rates 2016). Since the previously mentioned exchange rate data sources only contained information beginning in 1994 the FXTOP website was used for years 1989-1993 (Historical Rates 2016).

The period of 1990-2014 was chosen because the research needed to include years before and after the implementation of NAFTA. 1990 was chosen both because information is easily accessible starting from that year and that meant that it was possible to exclude the binary variable representing the U.S.-Canada FTA. That simplified the process and allowed more focus on the effects of NAFTA. The end period 2014 was chosen merely since that is the last year that all of the required data was available for.

All the calculations and regressions were performed using Microsoft Excel. Two separate datasets were created: one for imports and the other for exports. Each of them consisted of six pairs of countries for each year to include imports from each of the other states for the United States, Canada, and Mexico. Altogether there were 150 pairs of countries in each dataset.

Consequently, the data needed to be checked for normality and multicollinearity principles. The passing of the checks demonstrates the validity of the information used and increases the accuracy of the final results. Then a multiple linear regression was performed, which provided results for an analysis on the main question of the research. The output and explanation of the regression is provided in two tables (Tables 2 and 3).

3.2 Econometric challenges

As mentioned earlier, to ensure that the data used provides accurate and valid results it needed to be checked before performing the regression. It was important to test for multicollinearity and perform a normality check. Both are common ways to identify errors or abnormalities in the data.

3.2.1 Normality test

This check discovers the proportionality of errors, which is easiest to do plotting a normal probability plot (Kutner, Nachtheim, Neter, Li 2005). A normal or desirable graph should place the dots close and around the diagonal reference line. Dots that are not adjacent to the line are signs of significant error that should be further examined. Only the dependent variable is assumed to be normally distributed.

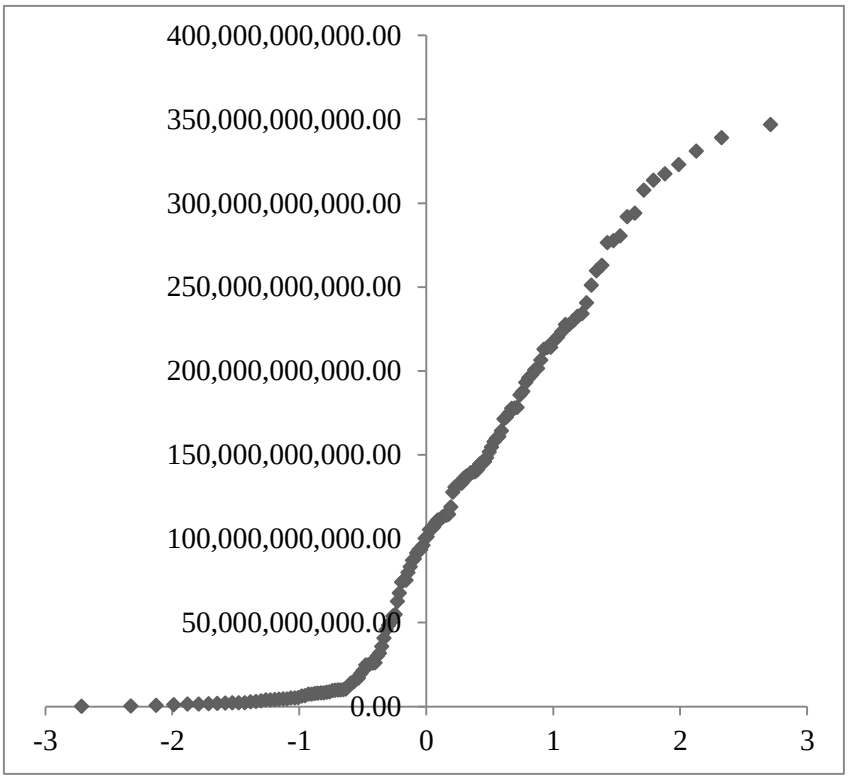

Figure 1. Import data normality test

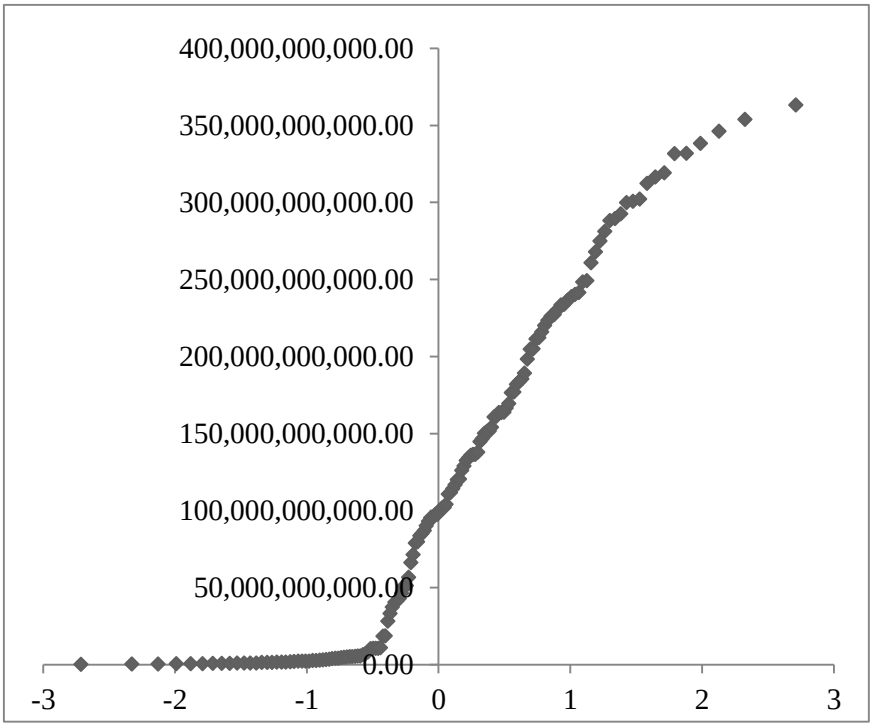

Figure 2. Export data normality test

Above are presented the normal probability plots of the import and export dependent variables (Figures 1 and 2). It is clear that there is an abnormality on the lower left side of both charts where a lot of outlier points are located. Since the fluctuation is so noticeable it is advised to use logarithmic transformation to fix the outliers issue (Kutner, Nachtheim, Neter, Li 2005). The new normality plots using logs of the dependent variables are included below in Figures 3 and 4.

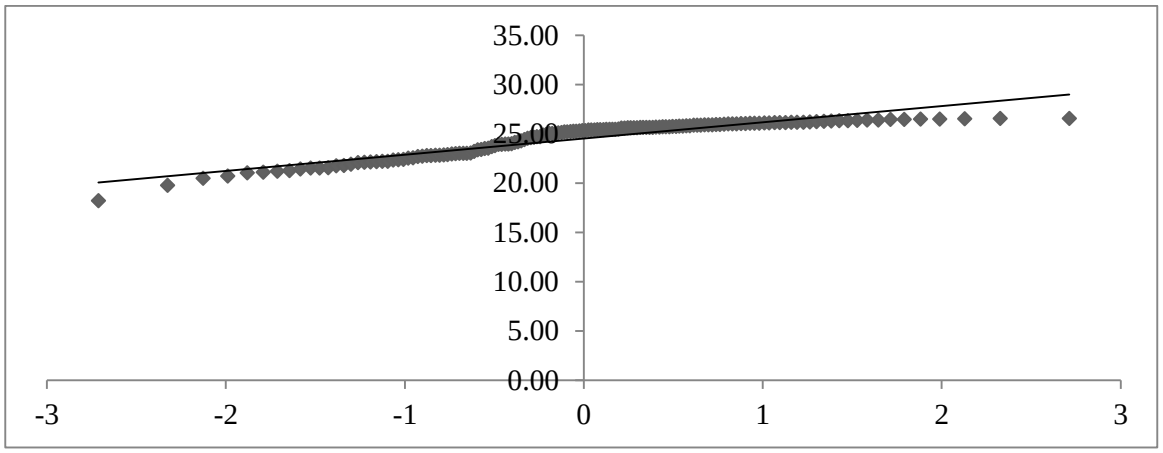

Figure 3. Import data normality test using logarithmic transformation

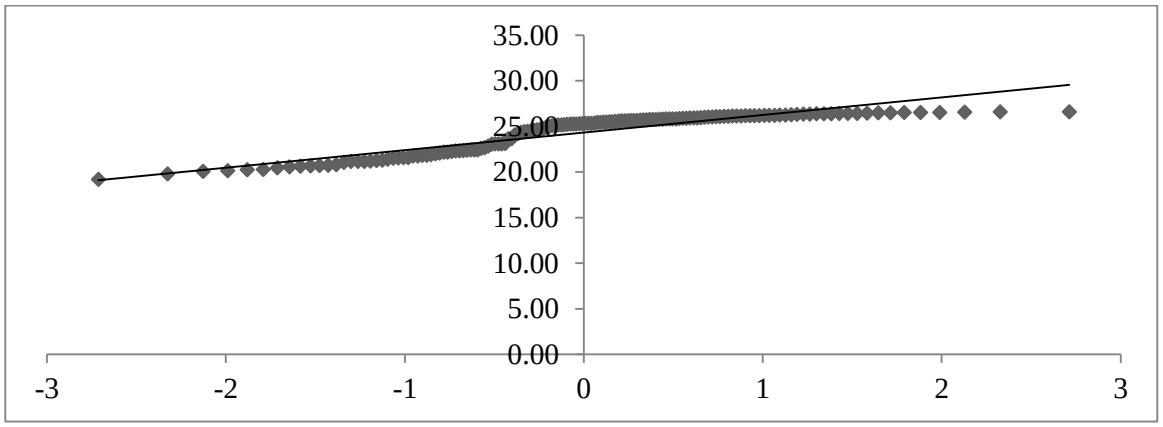

Figure 4. Export data normality test using logarithmic transformation

Although at first glance the charts may look identical the import normal probability plot has a few abnormal points on the left part of the graph. Both show slight abnormalities in the middle part and the right side of the diagram that could have a slight influence on the overall results. However, the irregularities are significantly less dominant than before and a perfect normal probablity plot does not exist.

3.2.2 Multicollinearity test

When two or more independent variables are in high correlation, the principle of multicollinearity is violated, which could obscure the final results. One way to measure

collinearity is to construct a correlation matrix. Another possible way to measure the impact of collinearity among the independent variables in the model is to calculate The Variance Inflation Factor (VIF). (Kutner, Nachtheim, Neter, Li 2005)

The correlation matrixes were calculated using the correlation option in Microsoft Excel data analysis. The output is included in the appendices (Appendix 1, Appendix 2). The multicollinearity principle is breached when the value reaches close to 1 or -1, in the first case meaning the variables are in total positive correlation, in the second case they are in total negative correlation. Consequently, the desired values should be as close to 0 as possible, where no correlation is detected.

Looking at the imports, the lowest coefficient is -0.15 and the highest is 0.67, which are both great results demonstrating that the principles of multicollinearity in this instance are most likely not disrupted because the relationships between the independent variables are not extremely strong. When reviewing the results for exports the range of coefficient is somewhat larger from -0.4 to 0.67 but can still be considered not influential for the final regression outcome. The coefficient 0.93 shown is between the dependent and one independent variable, which is to be expected because it shows that the independent variable causes changes in the dependent variable, in this case the volume of export. Multicollinearity between the independent variables is the aspect that is important to analyze.

Since there are two separate equations in this research, then the VIF test was executed on imports and exports separately as well. The value is calculated according to this equation (Kutner, Nachtheim, Neter, Li 2005):

$$VIF=\frac{1}{1-R^2}$$

To determine the VIF, each of the independent variables was used as the dependent variable in turns to find their r-square (R^2) available in the regression output. Then the VIF value was calculated. The results are organized in a table below (Table 1). The threshold of the VIF value is 10, if it were larger, then the impact of multicollinearity could be strong (Kutner, Nachtheim, Neter, Li 2005). It is evident that the highest value in this study is 7.15 allowing the conclusion that the multicollinearity principle is not breached.

Table 1. The VIF test of import and export data

Imports	VIF	Exports	VIF
Volume of import 1 lagged period	5.18	Volume of export 1 lagged period	7.15
GDP import country lagged by 1 period	5.80	GDP import country lagged by 1 period	5.03
GDP export country lagged by 1 period	3.18	GDP export country lagged by 1 period	6.59
Exchange rate number between country I and J	1.05	Exchange rate number between country I and J	1.09
GDP price deflator of country I	1.21	GDP price deflator of country I	1.30
GDP price deflator of country J	1.21	GDP price deflator of country J	1.19
NAFTA trade agreement	1.48	NAFTA trade agreement	1.48

Source: author's calculations

3.3 Results

After the checks were performed to ensure the validity of the data used, the regression was performed using Microsoft Excel. The regression output gives a considerable amount of information on the equation performed. The regression output for import and export are provided below in tables 2 and 3.

Table 2. Import regression output

Linear Regression							
Regression Statistics							
R	0.97231						
R-square	0.94539						
Adjusted R-square	0.9427						
S	2.32E+10						
N	150						
ANOVA							
	d.f.	SS	MS	F	p-level		
Regression	7	1.30E+24	1.90E+23	351.20441	0		
Residual	142	7.70E+22	5.40E+20				
Total	149	1.40E+24					
	Coefficient	Standard Error	LCL	UCL	t Stat	p-level	H0 (5%)
Intercept	-3.43E+10	7,101,286,132.55	-4.83E+10	-2.03E+10	-4.83073	3.48E-06	rejected
volume of import 1 lagged period	0.31906	0.04479	0.23052	0.4076	7.12339	4.85E-11	rejected
GDP import country lagged by 1 period	0.01284	0.00091	0.01105	0.01464	14.16358	0	rejected
GDP export country lagged by 1 period	0.00761	0.00066	0.0063	0.00891	11.55018	0	rejected
Exchange rate number between country I and J	-2,558,677,491.00	600,236,472.30	-3,745,231,548.23	-1,372,123,433.77	-4.26278	0.00004	rejected
GDP price deflator of country I	138,157,405.60	99,208,182.83	-57,958,420.88	334,273,232.08	1.3926	0.16592	accepted
GDP price deflator of country J	159,383,388.77	98,971,289.95	-36,264,145.25	355,030,922.80	1.6104	0.10953	accepted
NAFTA trade agreement	1.02E+10	6,316,848,935.04	-2,308,788,985.29	2.27E+10	1.61131	0.10933	accepted
T (5%)	1.97681						
LCL - Lower value of a reliable interval (LCL)							
UCL - Upper value of a reliable interval (UCL)							

Source: author's calculations

Table 3. Export regression output

Linear Regression							
Regression Statistics							
R	0.97928						
R-square	0.95898						
Adjusted R-square	0.95696						
S	2.23E+10						
N	150						
ANOVA							
	d.f.	SS	MS	F	p-level		
Regression	7	1.70E+24	2.40E+23	474.30371	0		
Residual	142	7.10E+22	5.00E+20				
Total	149	1.70E+24					
	Coefficient	Standard Error	LCL	UCL	t Stat	p-level	H0 (5%)
Intercept	-3.00E+10	7,029,147,140.65	-4.39E+10	-1.61E+10	-4.26469	0.00004	rejected
volume of export 1 lagged period	0.56273	0.04719	0.46944	0.65601	11.92469	0	rejected
GDP import country lagged by 1 period	0.00701	0.0008	0.00544	0.00859	8.81287	0	rejected
GDP export country lagged by 1 period	0.0084	0.00091	0.0066	0.0102	9.22973	0	rejected
Exchange rate number between country I and J	-2,102,466,401.34	594,257,478.93	-3,277,201,118.73	-927,731,683.95	-3.53797	0.00055	rejected
GDP price deflator of country I	296,624,397.61	96,734,417.61	105,398,737.40	487,850,057.81	3.06638	0.00259	rejected
GDP price deflator of country J	-54,151,916.91	92,260,096.37	-236,532,689.68	128,228,855.86	-0.58695	0.55817	accepted
NAFTA trade agreement	7,545,467,261.98	6,070,697,114.30	-4,455,153,532.58	1.95E+10	1.24293	0.21594	accepted
T (5%)	1.97681						
LCL - Lower value of a reliable interval (LCL)							
UCL - Upper value of a reliable interval (UCL)							

Source: author's calculations

Firstly, it is vital to investigate the R-square value of the linear regression since it demonstrates the importance and validity of the findings. This value shows correlation between the dependent and independent variables, which means that this measures how much the independent variables explain fluctuations in the dependent variable. The closer the value to 1, the more weight the results truly carry. R-square in the case of imports is 0.94539 and 0.95898 for the export regression, which is an extremely positive outcome. In this study it means that almost all changes of the import or export values are caused by the import or export volume lagged by one period, GDP of both countries lagged by one period, exchange rate between them, GDP price deflators, and NAFTA.

Secondly, it is important to examine the degree of influence the independent variables have had on the dependent variable. That can be determined in a few different ways. The p-level is perhaps the most valuable factor because it demonstrates, which independent variables have notably impacted the increase or decrease of the dependent variable. The t-stat value can exhibit the same but the p-level values are easier to analyze. The desired value for p-level would be lower than 0.05, which suggests that there is less than a 5% chance that this results could come up in a random distribution. In turn that allows concluding that it is 95% certain that this independent variable has had the effect visible in the regression output.

In the import regression results it can be seen that the volume of import lagged by one period, GDP of both countries lagged by one period, and their exchange rate has a p-level of lower than 0.05 (Table 2). On the other hand, the GDP price deflators and the NAFTA variable p-levels are above 0.1, which conveys that even though they have had an influence on the volume of imports it has been quite insignificant (Table 2). For the export regression output, the volume of export lagged by one period, GDP of both countries lagged by one period, their exchange rate, and the GDP price deflator of the export country all have a p-level considerably smaller than 0.05, showing a strong likelihood of their impact on the volume of export (Table 3). However, again the GDP price deflator of the other country and the NAFTA variable demonstrate poor performance. Here the p-level values are even higher that in the case of import: 0.56 and 0.21 respectively (Table 3). It is necessary to remember that although p-level shows whether the

variable has had an important influence on the dependent variable, it does not measure the level of the impact.

The LCL (lower confidence level) value and the UCL (upper confidence level) indicate confidence intervals for the coefficients. LCL is the lowest value of the coefficient and UCL the highest. When the smallest of these values is negative and the biggest positive that is already an indication that the variable has most likely not had a significant effect on the dependent variable. In the import regression that would mean GDP price deflators for both countries and the NAFTA variable and in the export regression that would be the GDP price deflator of the import country and the NAFTA variable (Tables 2 and 3). This is compatible with the conclusions resulting from the p-level values.

Next to the LCL values, there is the standard error column expressing the standard error associated with the coefficients. This also helps estimate the accuracy of the coefficient predictions. The standard error value is extremely high when checking the NAFTA variable, yet again showing how difficult it is to evaluate its real effect.

Lastly, the most important findings for this research are located in the coefficient column. Namely, this explains firstly if the influence on the dependent variable (volume of import or export) has been positive or negative. What is more, it shows the extent of the impact. Leaving out the variables with less significance, it is evident that the volume of import or export lagged by one period has had the biggest influence in the growth of the dependent variable. In the export regression the GDP price deflator of the export country also has had an important positive impression but has quite a high standard error, which makes it difficult to compare with the volume of export lagged by one period.

As anticipated, the effect of NAFTA has been negligible judging from the high p-levels as well as the immense differences between LCL and UCL. Moreover, the standard error of the NAFTA variable is the highest out of all the independent variables. Admittedly, the coefficient in both import and export regression results is positive but for the aforementioned reasons it cannot be considered absolute or meaningful.

Accordingly, NAFTA seems to have minimal effect on the trade among its member countries. And since previous researches carried out throughout the existence of NAFTA, with a gap since 2011 (using data from 2002), have concluded the same, it is evident that time does not

determine the efficiency of the agreement. The positive insignificant influence seems to be constant.

3.4 Discussion

The results concerning influence of NAFTA on trade flows were expected but should be discussed to recognize what has caused this phenomenon. This research is among numerous that have been able to prove little connection between the growing import or export trends and the NAFTA agreement. There can be a few explanations to the situation.

Primarily, this can be justified by referring to the Canada-United States Free Trade Agreement (CUSFTA). Since this was established in 1989, before NAFTA, and it already liberalized trade between Canada and the United States, it can be argued that this diminished the effects of NAFTA. The lowering of the tariffs and other measures assigned by NAFTA with Mexico then changed little compared to the dominating nations.

Moreover, NAFTA took a long time to implement: the abolishment of all tariffs took 15 years to accomplish, which means that trade became more open gradually. That also explains why it is difficult to estimate its influence using yearly data. It is natural that changes happened slowly and maybe could be assessed more accurately using monthly or quarterly data, which could be challenging to obtain.

Additionally, trade flows have been influenced by other factors in North America. For instance, the rapidly growing United States economy in the 1990s has contributed to both import and export growth. In Canada, for example, trade was also affected by the depreciating Canadian dollar, caused mainly due to depressed natural resource prices (McKinney 2005, 4). Similarly, Mexico suffered through a significant currency crisis in 1994 when the government suddenly devaluated the peso against the U.S. dollar (McKinney 2005, 4).

Lastly, the effects of NAFTA have been dissimilar in different commodity groups across the member countries. Measuring the impact separately in these groups could provide a detailed

overview of the impact of the agreement in various sectors. However, that would essentially lead to the same conclusion if added together and analyzed as a whole.

4. PREVIOUS RESEARCH

There has been extensive research into the effects of NAFTA before, which can support the claim that the agreement has had an overall positive effect. A significant amount of these researches have been performed using the gravity model, which makes it possible to compare to the current paper. However, the effect that NAFTA has had on each of the countries' economies is different, which is why they should also be examined separately.

4.1 NAFTA influence on the United States economy

There has not been extensive research into the effect of NAFTA on the economy of the United States in quite a long period of time. Nonetheless, in 2001 Burfisher, Robinson and Thierfelder evaluated if post-NAFTA effects were the same as the ones predicted before the implementation of the agreement. For the United States the most important concern was the labor market, which according to the presidential candidate Ross Perot would experience a "giant sucking sound" when United States jobs would be moving south to Mexico because of NAFTA (Burfisher, Robinson, Thierfelder 2001, 128).

In reality, this drastic event has not happened, instead it was estimated that about half a million people lost their jobs due to NAFTA (Burfisher, Robinson, Thierfelder 2001, 129). Considering the size of the working force of the United States this cannot be perceived as a drastic change. Research has found that the labor market in the United States is far more strongly influenced by the United States macroeconomic trends like their rapidly growing economy than by NAFTA (Burfisher, Robinson, Thierfelder 2001, 129).

A few years later, in 2003 the Congressional Budget Office conducted a full-scale investigation into the impact of NAFTA on the economy of the United States (The Effects of

NAFTA on U.S.-Mexican Trade and GDP 2003). As with any other examination involving the agreement, it was difficult to include all other possible influences on trade into the process. However, the research did allow drawing certain conclusions.

Firstly, trade between the United States and Mexico had certainly increased but it was proven that 91% of the imports from Mexico and 85% of exports to Mexico would have still occurred without the implementation of NAFTA beginning in 1994 (The Effects of NAFTA on U.S.-Mexican Trade and GDP 2003, 19). These figures indicate that the agreement had a positive but quite insignificant effect on the United States trade with Mexico. That could also be explained by the growth in trading between the neighboring countries that had started before 1994.

Secondly, this study investigated NAFTA's impact on the United States GDP. According to the Congressional Budget Office, in the first 10 years of NAFTA, it had increased the United States annual GDP by approximately a few billion dollars (The Effects of NAFTA on U.S.-Mexican Trade and GDP 2003, 21). The amount can seem meaningful but in reality that equals to only a few hundredths of a percent of the total United States GDP. That again illustrates the small effect the agreement has had on the largest member.

Since 2003, the NAFTA topic did not receive much attention. That changed in 2013 and 2014, when the agreement celebrated its 20 years of being in effect. That is when the question of its impact resurfaced. In an article published in Foreign Affairs, it was revealed that according to the U.S. Chamber of Commerce an estimated six million jobs in the United States rely on trade with Mexico and another eight million on their trade with Canada (Hills 2014). That directly does not mean that all these jobs were created thanks to NAFTA but it could be argued that since it has livened trade in the region, it has helped these numbers remain constant and high. Without the highly integrated supply chain, it could be that the United States corporations would have redirected its manufacturing jobs to China or elsewhere contributing to a high unemployment rate within their own country.

4.2 NAFTA influence on Canada's economy

Similarly to the United States, the impact of NAFTA on Canada's economy has been widely debated. The main argument for the opponents of NAFTA is that Canada had already established a FTA with the United States in 1989 so their trade was already growing prior to the agreement involving Mexico. What is more, as mentioned in the overview on trade of the NAFTA countries, Canadian-Mexican trade has still remained modest at best compared to United States and Mexico or Canada and the United States.

Another argument was that Canada hoped that the liberalization of trade with the United States would decrease the labor productivity gap between the two countries. Unfortunately, the indicator in 2012 was still 28% lower than in the United States (Villarreal, Fergusson 2015, 23). Admittedly, that has so far not harmed the considerably stable Canadian economy but this issue could influence Canadian competitiveness in the future.

Nonetheless, Canada has also received several gains from joining NAFTA. For example, the stock of foreign direct investment from the United States has increased from 1% of Canadian GDP in the beginning of the agreement to 18% now (Villarreal, Fergusson 2015, 24). That is an important increase for Canada's economy.

What is more, despite not being able to compete with the labor productivity of the United States, Canada has been able to diversify their export products. Traditionally Canada has exported mostly oil to the United States but now they have added selling more high-value-added commercial services to their achievements (McKinney 2005, 3). In fact, they now sell more of the named commercial services to the south than they purchase from it. (McKinney 2005, 3).

4.3 NAFTA influence on Mexico's economy

As the previous countries, Mexico has enjoyed positive effects resulting from NAFTA. How dramatic or modest those are, remains a topic of discussion. According to researches carried out during the negotiations of NAFTA seemed to agree that Mexico would enjoy the largest amount of benefits resulting from the agreement (Burfisher, Robinson, Thierfelder 2001, 126).

However, a research conducted ten years after the implementation of NAFTA states that even though Mexico's economy benefitted as a whole from this agreement, the wealth resulting from that has not been evenly distributed within the state (Villarreal 2010, 7).

The goal of NAFTA was to decrease the gap in prices of both goods and services, as well as wages in North America but there still remains a significant salary difference between Mexico and its northern neighbors (Villarreal 2010, 7). On the other hand, certain goods like clothes, televisions, and food have become less expensive, leading an economic consulting firm to estimate that the cost of basic household goods since NAFTA's implementation has decreased by 50% (Sergie 2014). That can be seen as an important gain for the country's economy.

Additionally, there have been major changes in the manufacturing industry in Mexico. Most notably, the country has now become focused on becoming a center for automotive manufacturing (NAFTA, 20 Years Later: Do the Benefits Outweigh the Costs? 2014). Since NAFTA, Mexico has specialized in producing cars for the United States market, when before it was much more closed off. That has also caused a spillover effect into other sectors of the economy. Productivity has increased in all export-oriented industries in Mexico (NAFTA, 20 Years Later: Do the Benefits Outweigh the Costs? 2014).

Moreover, a World Bank study in 2005 concluded that NAFTA has helped Mexican industries to adapt United States technology, which in turn has encouraged a raise in wages and quality of jobs (Villarreal 2010, 9). That is especially important for Mexico because it was assumed that it would continue to be a country for only low skilled workers. Consequently, it has given hope to lessen the wage gap with the United States and Canada in the future.

While the subject of salaries is still a point of criticism, the positive impact NAFTA had on Mexico's economy after the 1994 currency crisis cannot be overlooked (Villarreal 2010, 7). That was mainly because Mexico still continued to liberalize trade with the United States and Canada according to NAFTA (Villarreal 2010, 7). Naturally, the approach of the government in other parts of their economic policy was also vital to overcoming the crisis but the trade and foreign direct investment coming from other NAFTA countries accelerated the process. In fact, at this time foreign direct investment was key to recovery and it has been evaluated that without NAFTA, Mexico would have had 40% lower investment (Villarreal 2010, 7). Most importantly,

Mexico has now adopted common economic management practices, which assists the country to avoid future crises.

Another important benefit was proven by a research conducted in 2012, where the relationship between welfare and trade effects of NAFTA was examined. The authors used a new general equilibrium model and established that welfare thanks to trade creation in Mexico, due to NAFTA's tariff reduction, increased the overall welfare by 1.72% (Caliendo, Parro 2012). The same figure for the United States and Canada was only 0.04% (Caliendo, Parro 2012). That also proves that not only did certain sectors of Mexico benefit from the agreement but also at least to some extent, the society as a whole.

4.4 NAFTA influence on the region

Besides having an important effect on each of the economies involved, NAFTA has had an influence on the whole North American region. Perhaps most importantly, it is responsible for creating an efficient and highly integrated supply chain among the three countries (Hills 2014). The process of cross-border manufacturing has allowed the production to happen wherever it is most efficient. That has made it possible for the United States to trade 2 billion U.S. dollars worth of goods and services with Canada every single day and about 1 billion U.S. dollars with its southern neighbor Mexico (Hills 2014).

In addition to NAFTA's goal to increase trade in North America, it also was created to encourage foreign direct investment in the region. Since 1993, the United States has invested more than 310 billion U.S. dollars into the Canadian economy and in return Canada has contributed 200 billion U.S. dollars to the United States (Hills 2014). The United States directly benefits from the investment into Canada, since a large part of the output returning to the country as imports are intermediate goods, which gives the United States companies an opportunity to solely concentrate on producing finished goods (Hills 2014).

5. CRITICISM OF NAFTA

The immense agreement has caused tensions since its creation until now. Even though the governments of all member countries have claimed that the negative effects were minimal and temporary, critics disagree. Most admit that NAFTA has had a modest, slightly positive influence on trade but that does not overshadow other issues it has caused in the economies of especially the United States and Mexico.

First and foremost, the United States and Mexican NAFTA opposers have argued that the loss of jobs has not been as insignificant as estimated. They have stated that United States manufacturing and shipping jobs have suffered deeply, according to a report conducted in 2011, the United States has seen 700,000 jobs transfer to Mexican competitiors (Geewax 2013). What is more, in Mexico agricultural workers have been forced to enter other sectors, and NAFTA has even been said to be responsible for forcing some to illegally immigrate to the United States (Aguilar 2012).

Admittedly, these concerns are legitimate but they might not all have been caused solely by NAFTA. For example, the wage disparity that still exists between Mexico and the other two members is also affected by intense competition with Indian and Chinese workers (Geewax 2013). The specialization to manufacturing might be another reason why agricultural jobs have suffered in Mexico. The loss of these specific jobs cannot be considered as the main cause of illegal immigration from Mexico. The current instable condition brought forth by violence and poverty of certain parts of the country is more likely to blame. And as explained in the previous chapter, the United States lost jobs could have also moved to Asia due to the growing trends in manufacturing, which would give them even less benefits than having these operations managed in their neighboring country of Mexico.

Altogether, NAFTA will continue to be a highly debated issue. This research has only presented a few of the major problems related to the effects of NAFTA. However, it is

increasingly difficult to claim that large economic matters are affected by the agreement implemented over 20 years ago. Greater influence should be credited to global economic and social trends as well as the effects of international trade.

6. CAN NAFTA BE CONSIDERED A SUCCESS?

After analyzing the influence of NAFTA on trade of the member countries, their economies and reviewing some criticism, it is suitable to attempt to deduce whether NAFTA can be considered a success. As with any FTA it has had its positive as well as negative outcomes. The only way to evaluate its accomplishments is to seek to argue, which side has surpassed the other.

As it has been proven that thanks to NAFTA trade has increased, even if it has been by a small margin and FDI between the member countries has grown since 1994. These are signs of certain success. On the other hand, the agreement has not produced as many jobs or helped Mexico develop as hoped. But it could be argued that these were not the real goals of NAFTA. Essentially, it is still an FTA with the main goal to create a free trade zone, which it has established. All the rest was expected as a side effect of the liberalization of trade in the United States, Canada, and Mexico.

In addition to seeing NAFTA as a mild success for achieving growth in trade, the agreement can be seen as triumph simply because it has created a platform for North American cooperation. Even though there is no official NAFTA organ, there are solid economic ties that can be further developed and integrated for other purposes. Having the agreement improves the relationship among the member countries as a whole, which is certainly a success.

CONCLUSION

NAFTA is an important FTA because it was one of the first to be formed among developed and developing countries. The agreement includes three economies that are among the largest in the world and has been in effect since 1994, making it a long-lasting FTA. For these reasons NAFTA has raised various questions, most importantly, what has been the impact of the agreement on the trade of the member countries - the United States, Canada, and Mexico?

Several researchers in the past have used the gravity model to attempt to find the answer and have been able to draw adequate conclusions. Nevertheless, last estimations were done using data from 2002, which illustrated a need for an updated research. What is more, NAFTA was adopted gradually during 15 years and since the completion of the process no new analysis had been made. The gravity model was also chosen to be the basis for this study. Using a modified version of the original gravity model of trade and data from 1990 to 2014 an analysis was carried out.

Using Microsoft Excel a dataset was compiled for import and export information. All the data was checked and tested according to the requirements of multiple linear regression rules to guarantee the legitimacy and accuracy of the final results. Afterwards, the regression was performed, which created an output that could be examined further.

Consequently, some conclusions were possible based on the results. Firstly, it showed a positive effect of NAFTA on both import and export among the member countries. That demonstrates the connection between trade flow growth and the impact of the agreement. However, the calculations also showed that this relationship is relatively weak, which means that the increase in trade volumes is likely caused by other factors. It can only be stated that NAFTA somewhat influences import and export in the United States, Canada, and Mexico.

What is more, the standard error of NAFTA was significant. That prevents from being able to analyze how large the NAFTA effect truly is because the value shown has such a large

error margin. Hence, it is only possible to conclude that NAFTA has had a positive but insignificant impact on trade in North America. The same was concluded in previous studies analyzing this topic. That shows that time does not seem to be a factor in influencing the effects of NAFTA on the trade of its member countries.

This research also desired to determine whether NAFTA could be considered a success. Thus, other effects of NAFTA on the United States, Canadian, and Mexican economies were reviewed. The agreement has had different impact on each of the states, not all positive. That is why criticism on the FTA was also analyzed. Altogether, the positive impact, however small, still outweighs the negative, largely because the agreement cannot be considered responsible for drastic changes in trade or economy as a whole. That is why this study concludes that NAFTA has been a minor success, but one nevertheless.

REFERENCES

Aguilar, J. (2012) Twenty Years Later, Nafta Remains a Source of Tension. *The New York Times*. http://www.nytimes.com/2012/12/07/us/twenty-years-later-nafta-remains-a-source-of-tension.html?_r=0 (02.06.2016)

Burfisher, M. E., Robinson, S. and Thierfelder, K. (2001) The Impact of NAFTA on the United States. *Journal of Economic Perspectives*. Volume 15, Number 1. Pp. 125-144. http://pubs.aeaweb.org/doi/pdfplus/10.1257/jep.15.1.125 (01.05.2016)

Caliendo, L. and Parro, F. (2012) Estimates of the Trade and Welfare Effects of NAFTA. http://restud.oxfordjournals.org/content/early/2014/12/02/restud.rdu035.full#sec-17 (21.04.2016)

Canada Exports by Country and Region. (2016) The World Bank World Integrated Trade Solution. http://wits.worldbank.org/CountryProfile/en/Country/CAN/Year/2014/TradeFlow/Export (05.04.2016)

Canada Imports by Country and Region. (2016) The World Bank World Integrated Trade Solution. http://wits.worldbank.org/CountryProfile/en/Country/CAN/Year/2014/TradeFlow/Import (05.04.2016)

Canada / U.S. Foreign Exchange Rate. (2016) The Federal Reserve Bank of St. Louis Economic Research. https://research.stlouisfed.org/fred2/series/AEXCAUS (08.04.2016)

De Benedictis, L. and Taglioni, D. (2011). The Gravity Model in International Trade. Pp. 55-56. https://works.bepress.com/luca_de_benedictis/20/ (14.04.2016)

Frickel, B. J., Kotcerlakota, V. V., Tenkorang, F. A. and Elder, B. R. (2011) The Effect Of NAFTA On Trade And Investment Between Member Countries. *International Business & Economics Research Journal*. Volume 10, Number 6. Pp. 1-8. http://cluteinstitute.com/ojs/index.php/IBER/article/viewFile/4368/4455 (30.04.2016)

Geewax, M. (2013) Economists Toast 20 Years Of NAFTA; Critics Sit Out The Party. http://www.npr.org/2013/12/08/249079453/economists-toast-20-years-of-nafta-critics-sit-out-the-party (02.05.2016)

Gould, D. M. (1998) Has NAFTA Changed North American Trade? Pp. 15-16. http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.200.3732&rep=rep1&type=pdf (22.03.2016)

Grimson, M. (2014) Free trade agreements: What Is An FTA and What Are the Benefits? http://www.abc.net.au/news/2014-04-07/free-trade-agreement-explained-bilateral-fta-tpp/5371314 (27.04.2016)

Hills, C. A. (2014) NAFTA's Economic Upsides: The View From the United States. Foreign Affairs. https://www.foreignaffairs.com/articles/canada/2013-12-06/naftas-economic-upsides (16.04.2016)
Historical Exchange Rates. (2016) The Canadian Foreign Exchange Services. http://www.canadianforex.ca/forex-tools/historical-rate-tools/historical-exchange-rates (08.08.2016)
Historical Rates. (2016) FXTOP. http://fxtop.com/en/historical-exchange-rates.php?MA=1 (08.08.2016)
Historical Statistics of Mexico (Estadísticas Históricas de México). (2009) National Institute of Statistics and Geography (Instituto Nacional de Estadística y Geografía). Pp. 12, 15, 86. http://www.inegi.org.mx/prod_serv/contenidos/espanol/bvinegi/productos/integracion/pais/historicas10/Tema16_Sector_Externo.pdf (05.04.2016)
Krueger, A. O. (1999) Trade Creation and Trade Diversion Under NAFTA. National Bureau of Economic Research. http://www.nber.org/papers/w7429.pdf (28.04.2016)
Kutner, H. K., Nachtheim, J. N., Neter, J. and Li, W. (2004) Applied Linear Statistical Models. 5th revised ed. New York: McGraw-Hill/Irwin. https://78d0cafdec1787a7bff1fbca7d10f12af8369dc8.googledrive.com/host/0Byp6EJD-1552LXRCaFgxWXpJSHM/KELAS_3SE5/ANAREG/E-BOOK/ebook%20regresi/%5BMichael_H._Kutner,_Christopher_J._Nachtsheim,_John(BookFi.org).pdf (22.03.2016)
Mayer, F. W. (1998) Interpreting NAFTA. New York: Columbia University Press.
McKinney, J.A. (2005) NAFTA's Effects on North American Economic Development: A United States Perspective. https://www.wilsoncenter.org/sites/default/files/Future%20of%20NAFTA%20-%20McKinney%20Paper.pdf (02.05.2016)
Mexico Exports by Country and Region. (2016) The World Bank World Integrated Trade Solution. http://wits.worldbank.org/CountryProfile/en/Country/MEX/Year/2014/TradeFlow/Export (04.04.2016)
Mexico Imports by Country and Region. (2016) The World Bank World Integrated Trade Solution. http://wits.worldbank.org/CountryProfile/en/Country/MEX/Year/2014/TradeFlow/Import (04.04.2016)
Mexico / U.S. Foreign Exchange Rate. (2016) The Federal Reserve Bank of St. Louis Economic Research. https://research.stlouisfed.org/fred2/series/AEXMXUS (08.04.2016)
Montenegro, S. E. and Soloaga, I. (2006). NAFTA's Trade Effects: New Evidence with a Gravity Model. https://www.econstor.eu/dspace/bitstream/10419/66697/1/576827614.pdf (29.04.2016)
NAFTA, 20 Years Later: Do the Benefits Outweigh the Costs? (2014) The Wharton School of the University of Pennsylvania. http://knowledge.wharton.upenn.edu/article/nafta-20-years-later-benefits-outweigh-costs/ (21.04.2016)
North American Free Trade Agreement. (2016) NaftaNow.org. http://www.naftanow.org/agreement/default_en.asp (01.05.2016)
Scope of RTAs. (2016) World Trade Organization (WTO). https://www.wto.org/english/tratop_e/region_e/scope_rta_e.htm (27.04.2016)

Sergie, M. A. (2014) NAFTA's Economic Impact. Council on Foreign Relations. http://www.cfr.org/trade/naftas-economic-impact/p15790 (21.04.2016)
Villarreal, M. A. (2010) NAFTA and the Mexican Economy. Congressional Research Service. https://www.fas.org/sgp/crs/row/RL34733.pdf (20.02.2016)
Villarreal, M.A. and Fergusson, I. F. (2015) The North American Free Trade Agreement (NAFTA). Congressional Research Service. https://www.fas.org/sgp/crs/row/R42965.pdf (22.04.2016)
The Effects of NAFTA on U.S.-Mexican Trade and GDP. (2003) The Congress of the United States Congressional Budget Office. Pp.19-21. https://www.cbo.gov/sites/default/files/cbofiles/ftpdocs/42xx/doc4247/report.pdf (15.04.2016)
United States Exports by Country and Region. (2016) The World Bank World Integrated Trade Solution. http://wits.worldbank.org/CountryProfile/en/Country/USA/Year/2014/TradeFlow/Export (04.04.2016)
United States Imports by Country and Region. (2016) The World Bank World Integrated Trade Solution. http://wits.worldbank.org/CountryProfile/en/Country/USA/Year/2014/TradeFlow/Import (04.04.2016)
Wall, H. J. (2003) NAFTA and the Geography of North American Trade. https://research.stlouisfed.org/publications/review/03/03/Wall.pdf (28.04.2016)
World Development Indicators. (2016) The World Bank DataBank. http://databank.worldbank.org/data/reports.aspx?Code=NY.GDP.MKTP.CD&id=af3ce82b&report_name=Popular_indicators&populartype=series&ispopular=y (04.04.2016)

APPENDICES

Appendix 1. Multicollinearity check of import data

	Volume of import	Volume of import 1 lagged period	GDP import country lagged by 1 period	GDP export country lagged by 1 period	Exchange rate number between country I and J	GDP price deflator of country I	GDP price deflator of country J	NAFTA trade agreement
Volume of import	1							
Volume of import 1 lagged period	-0.01836166	1						
GDP import country lagged by 1 period	0.093757809	0.66800383	1					
GDP export country lagged by 1 period	-0.07319844	0.26907131	-0.3870478	1				
Exchange rate number between country I and J	0.11769802	0.01362966	0.4232437	-0.4084436	1			
GDP price deflator of country I	-0.00085084	0.37248508	0.34417483	0.15944574	0.320366173	1		
GDP price deflator of country J	-0.15186899	0.43550884	0.15944574	0.34417483	0.081152904	0.4793501	1	
NAFTA trade agreement	-0.02808764	0.22346523	0.15791351	0.15791351	0.178321325	0.4883491	0.488349	1

Source: author's calculations

Appendix 2. Multicollinearity check of export data

	Volume of export	Volume of export 1 lagged period	GDP import country lagged by 1 period	GDP export country lagged by 1 period	Exchange rate number between country I and J	GDP price deflator of country I	GDP price deflator of country J	NAFTA trade agreement
Volume of export	1							
Volume of export 1 lagged period	0.963172682	1						
GDP import country lagged by 1 period	0.356415099	0.3389234	1					
GDP export country lagged by 1 period	0.669038978	0.6516291	-0.3870478	1				
Exchange rate number between country I and J	-0.180213417	-0.192899	0.4232437	-0.4084436	1			
GDP price deflator of country I	0.455728423	0.4142616	0.3441748	0.15944574	0.320366173	1		
GDP price deflator of country J	0.468498514	0.4600932	0.1594457	0.34417483	0.081152904	0.4793501	1	
NAFTA trade agreement	0.291668616	0.249723	0.1579135	0.15791351	0.178321325	0.4883491	0.48835	1

Source: author's calculations