



Summer 8-2015

The effects of NAFTA on consumption, income, and employment

Warren Mills

Follow this and additional works at: <https://commons.und.edu/theses>

 Part of the [International Economics Commons](#), and the [Labor Economics Commons](#)

Recommended Citation

Mills, Warren, "The effects of NAFTA on consumption, income, and employment" (2015). *Theses and Dissertations*. 841.
<https://commons.und.edu/theses/841>

This Thesis is brought to you for free and open access by the Theses, Dissertations, and Senior Projects at UND Scholarly Commons. It has been accepted for inclusion in Theses and Dissertations by an authorized administrator of UND Scholarly Commons. For more information, please contact zeinebyousif@library.und.edu.

THE EFFECTS OF NAFTA ON CONSUMPTION, INCOME, AND EMPLOYMENT

by

Warren M. Mills
Bachelor of Science, Troy University, 2013

A Thesis

Submitted to the Graduate Faculty

of the

University of North Dakota

in partial fulfillment of the requirements

for the degree of

Master of Science
In Applied Economics

Grand Forks, North Dakota

August
2015

Copyright 2015 Warren M. Mills

This thesis, submitted by Warren M. Mills in partial fulfillment of the requirements for the Degree of Master of Science Applied Economics from the University of North Dakota, has been read by the Faculty Advisory Committee under whom the work has been done and is hereby approved.

Dan Biederman, Ph.D.

David Flynn, Ph.D.

Prodosh Simlai, Ph.D.

This thesis is being submitted by the appointed advisory committee as having met all of the requirements of the School of Graduate Studies at the University of North Dakota and is hereby approved.

Wayne Swisher
Dean of the School of Graduate Studies

Date

PERMISSION

Title: The Effects of NAFTA of Consumption, Income, and Employment

Department: Economics

Degree: Master of Science in Applied Economics

In presenting this thesis in partial fulfillment of the requirements for a graduate degree from the University of North Dakota, I agree that the library of this University shall make it freely available for inspection. I further agree that permission for extensive copying for scholarly purposes may be granted by the professor who supervised my thesis work or, in his absence, by the Chairperson of the department or the dean of the School of Graduate Studies. It is understood that any copying or publication or other use of this thesis or part thereof for financial gain shall not be allowed without my written permission. It is also understood that due recognition shall be given to me and to the University of North Dakota in any scholarly use which may be made of any material in my thesis.

Warren M. Mills
July 3, 2015

TABLE OF CONTENTS

| | |
|--|------|
| LIST OF FIGURES..... | vi |
| LIST OF TABLES..... | vii |
| ACKNOWLEDGEMENTS..... | viii |
| ABSTRACT..... | ix |
| CHAPTER | |
| I. INTRODUCTION: | 1 |
| II. TRADE LIBERALIZATION AND COMPARATIVE ADVANTAGE..... | 4 |
| Employment loss versus a shift in employment..... | 6 |
| III. TRADE IMBLALANCES: PROTECTIONISM AND GROWTH..... | 8 |
| The case for protectionism..... | 9 |
| IV. THE DATA..... | 12 |
| Selection of independent variables and regressing U.S. employment..... | 15 |
| Independent variable selection and regressing U.S.Consumption and income..... | 18 |
| V. CONCLUSION: Are Negative Effects of NAFTA Reasonable..... | 24 |
| APPENDIX..... | 27 |
| REFERENCES..... | 28 |

LIST OF FIGURES

| Figure | Page |
|---|------|
| 1. Employment and Labor Participation..... | 13 |
| 2. Part a) Consumption and Income Correlation and Part b) Employment Rate Fluctuation..... | 14 |
| 3. Labor Participation, Employment Rate, Income, and Consumption..... | 25 |

LIST OF TABLES

| Table | Page |
|--|------|
| 1. Employment: before and after NAFTA..... | 17 |
| 2. Consumption and Income: before and after NAFTA..... | 21 |

ACKNOWLEDGEMENTS

Inspiration, confidence, and encouragement are the core of every successful endeavor. And it is my family which has been limitless providers of these three things; and, for that, I will be forever thankful.

To all of those I have encountered who have chosen to share the gift of knowledge and teach the means of thought...thank you, as well.

ABSTRACT

A significant amount of concern exists in popular and political culture concerning the effects of trade liberalization on the domestic economy in the U.S. Difficulty exists in isolating the effects of a particular trade agreement due to unrelated trade policy changes that happen preceding, during, and following the signing of an agreement. This research seeks to do an analysis of the big picture involving consumption, income, and employment not with the intent of determining causation, which has proven highly problematic in previous research; instead, the focus is on whether we can exclude a negative effect by NAFTA on these measures of economic well-being in the U.S.

CHAPTER I

INTRODUCTION

The effects of trade agreements have been, are being, and will likely continue to be a hotly debated topic in national popular culture and in political circles. The theoretical and empirical effects of free trade are well accepted by those in the economics discipline and the basic fundamentals of comparative advantage have been effectively restated many times. However, the difficulty in applying this accepted view of trade to agreements such as the North American Free Trade Agreement (NAFTA) is that, while NAFTA incorporates components of free trade, it preserves at its core a very protectionist trade foundation, albeit one which expands the protectionism to a regional area.

This maintenance of a protectionist posture in NAFTA causes any assumption of free trade effectiveness for economic growth to evaporate and introduces contention to the discussion of trade agreements. We can observe similar dynamics in the present day discussion of the Trans-Pacific Partnership (TPP) trade agreement being debated nationally at this time. Beyond the fact the precise terms of the agreement are being shielded from public consumption and the argument about fast-track authority for the Obama administration (a mostly political battle), we can see similar for/against “battle lines” forming as those which took place with NAFTA.

Proponents of the trade agreement laud the potential for growth in trade and expansion of U.S. marketplaces as trading partners experience the economic growth that free(r) trade generally entails. Opponents of TPP focus their attacks on the agreement around the impending loss of jobs, national sovereignty, and a decline in economic standing that will inevitably (their words) result from the U.S. facing increased competition abroad; particularly in countries that have lower labor standards, lower wages, and less business regulation. There are fundamental problems with both arguments that are rather relevant to a discussion and analysis of NAFTA: 1) in reference to the proponents of NAFTA (and TPP), preferential trade agreements do not necessarily share strict comparative advantage characteristics with free trade, and 2) regarding opponents of the trade agreements, comparative advantage can reduce (or eliminate) inefficiencies and make the workforce more productive in the long run leading to growth in the job market overall.

While free trade may be easier to measure, preferential trade agreements have many more moving parts that make measurement difficult and frustrate attempts to explain correlation, much less lend themselves to causation. McDaniel and Agama (2003) stated it rather succinctly when they wrote that “NAFTA is not a particularly clean policy to assess” (p. 939). McDaniel and Agama (2003) point out that trade liberalization in Mexico had begun well before NAFTA and add that other “events that confound the identification of the effects of NAFTA include the establishment of the World Trade Organization and its associated agreements in 1995” (p. 939).

Additionally, the lack of immediacy that is inherent in the political process further complicates attempts at empirical analysis. The cliché “an act of Congress” is rooted in

reality, thus the process by which government(s) enacts trade regulation is problematic for any snapshot analysis. The slow nature of trade policy negotiation had other impacts on the calculable effects of NAFTA in that in anticipation of a trade agreement, the nations involved began independently taking steps to reduce tariffs, etc.; and, companies began shifting resources and production prior to the agreement being officially approved.

That being said, part of this paper's analysis is an attempt to isolate before- and after-effects of independent variables in regressions on consumption, income, and employment. This was in hope of gaining insight into whether causation of any "negative" domestic effects of NAFTA could be excluded. The attempt is not necessarily to perfectly explain those three dependent variables, but instead to see the shifting explanatory significance of a fixed set of relevant independent variables on the respective dependent variables.

CHAPTER II

TRADE LIBERALIZATION AND COMPARATIVE ADVANTAGE

As mentioned above, comparative advantage does not necessarily exist in preferential trade agreements as it does in free trade structures. This is an uncomfortable reality for the proponents of regional trading agreements as steps toward free trade. In fact, due to rules of origin (ROO) provisions in NAFTA, there is evidence of a shift away (potentially) from a broader access to advantaged production than what may have existed prior to NAFTA. For example, Krueger (2000) extensively addresses the conflict between trade creation and trade diversion within NAFTA when she asks: “can we use trade data to identify shifts of production to locations with comparative advantage within NAFTA and shifts from low-cost producers in the rest of the world to higher cost producers in the NAFTA countries” (p. 769)? The question in itself illustrates a possible negative effect of NAFTA for a movement towards a more globalized free trade structure; which is whether NAFTA’s attempt to increase trade regionally may serve to reduce some free trade effects through de facto tariff imposition if producers with a true comparative advantage are utilized. This speaks to the difficulty in characterizing NAFTA as a free trade agreement and analyzing it as such.

It would seem reasonable, then, that NAFTA could increase employment in the NAFTA countries and have limited effects (or potentially negative ones) on consumption due to increased base costs of goods as producers shift inward to shield from relatively higher tariffs driven by ROO. Krueger (2000) hesitantly concludes that the expansion of trade amongst NAFTA partners, particularly Mexico and the U.S., was due largely to trade creation rather than diversion (p. 774). However, it is important to note that, in Krueger's (2000) analysis, loss in value due to diversion was less likely due to the devaluation of 1994 in Mexican currency (Krueger, 2000, p. 773).

This idea that NAFTA (and similar agreements) are merely expanded protectionism inspires another question, which is why would producers change a preference from state level of industry protection to a regional one? The instinctive response would be the rise of the multinational corporations that would be capable of taking advantage of a controlled expansion in trade. Chase (2003) supports and expands on this premise with two arguments:

First, producers support trading blocs when access to the regional market enables them to take advantage of economies of scale. Firms producing goods with steep cost curves seek regional arrangements because increased production for an enlarged market yields significant reduction in unit costs...Second, producers supporting trading blocs when an integrated regional market enables them to move stages of production across borders. Because barriers to regional trade and investment restrict opportunities to take advantage of differences in wages, skills, or capital costs, firms seek arrangements if they can redeploy intermediate production between labor-rich and labor-scarce areas (*pp. 141-142*).

This establishes a basis of support for such a regionally isolated trading agreement and tends the NAFTA argument more toward protectionism than to liberalization. In fact, Chase (2003) largely argues that lobbying activities can be linked to this ability to scale

production and indicates that the policy was, at least to some extent, driven by the desire to merely move the barriers to entry rather than removing them (p. 168). While the existence of large scale lobbying efforts might seem to imply a presumption of negative overall effects, the two are not necessarily related.

Employment loss versus a shift in employment

Opponents of free trade agreements in a highly developed country like the U.S. generally have a central argument against liberalization of trade which is employment. However, this is a very short-run perspective that requires a lack of foresight and can disproportionately weight present-day interests at the expense of future growth. Comparative advantage, by definition, implies an increase in efficiency; sometimes that efficiency manifests itself in increased labor outputs or a better use of capital which opens up future investment.

This touches on the heart of the free trade principles that were incorporated into NAFTA. For instance, in the auto industry the trend toward assembly in Mexico had been taking place before NAFTA; however, component production began to shift back into the U.S. to comply with ROO. While the ROO is fundamentally protectionist, the division of production across national borders is based somewhat on (regional) advantage. The more capital intensive production of (certain) components found its way to the country with a high ratio of capital to labor, while the labor intensive assembly process increased the speed at which the process migrated towards the south.

Therefore, it is reasonable that inefficiencies that would have existed more so in the absence of trade would be reduced, making more capital available for investment in

both countries. This is the classic factor endowment (Heckscher-Ohlin) theory of trade versus autarky example in a two-nation model. Of course, not only does the ROO have a driving effect from the rest of the world (ROW) into the region, but it also limits the likelihood that too much of this production would just come from one (or a group of) developing country(s) outside of the region into Mexico exclusively. Once again, the numerous moving parts of NAFTA's regulatory underpinning make it difficult to quantify the nature of production shifts and labor demand.

Francis and Zheng (2011), however, did an analysis of state level data and concluded that "the demand elasticity of NAFTA shows that NAFTA increased labor demand by .27%" and they predicted NAFTA then had and would continue to have a "small but positive effect on U.S. labor demand" (p. 1666). Francis and Zheng (2011) also concluded that growth in state level unemployment reduced by 4.4% annually due to NAFTA (p. 1669).

CHAPTER III

TRADE IMBALANCES: PROTECTIONISM AND GROWTH

While the political rhetoric that surrounds trade agreements such as NAFTA and TPP generally have a “sky is falling” for the American worker tenor to it, the literature review clearly illustrates a different (more empirical) result consistent with well-accepted economic theory on trade. Protectionism, while certainly alluring to the general public (and thus politicians), has costs; however, these costs are defrayed and possibly remediated when expanded to a regional position. This appears most likely in a circumstance where advanced countries can partner with a developing country and gain, to some extent, from the growth of the developed country. Increases in buying power in the developed country can be strategically controlled by the advanced country(s) to increase its own exports while still benefitting from some level of gains from comparative advantage.

The reason I believe this to be an appealing move (politically) in modern times is the belief that the shift toward a new equilibrium in production can be controlled. The traditional fear of free trade is not that goods will be too affordable, but that no one would be able to afford them after “all the jobs” have moved overseas. Whether or not this fear

is rational is irrelevant; however, that this fear is so pervasive presses policy makers to obscure the intentions of trade agreements in incrementally expanding trade. While the long term effectiveness of these policies in achieving free trade could be argued, it seems regional agreements serve as political cover for expanding global trade for some.

Furthermore, with the disparity in political, religious, and philosophical positions globally, the idea of a large scale global free trade pact is untenable to even consider, much less pursue. There is little hope of effectively expanding simplified free trade, as well as too much focus on economics as political soft-power to ever imagine a fluid trading arrangement worldwide.

The case for protectionism

Importantly, however, there is a significant portion of the population that believes protectionism serves a positive economic interest. It is this belief that may help further this incremental expansion of trade. For example, Gomory and Baumol (2011) make the argument that the shift in American production from a higher ratio of manufacturing to a greater level of services is untenable in the long run (p. 688). In fact, their argument is inherently anti-comparative advantage and they appear to view the relationship between goods and services as antagonistic in the long run. They attempt to bolster this view that having an economy based on innovation and technology is insufficient for long run growth by stating:

Americans remain large-scale consumers of manufactured goods—from automobiles, to television sets and computers, to machines of every sort. If we do not make these products ourselves, we must trade for them. However, since most trade—and, notably, most of America's imbalance in trade—is in manufactured goods, we are unlikely to be able to shift our negative balance toward a surplus solely by increasing our positive trade

balance in services. Thus, without improving its manufacturing performance, Americans eventually will have to curtail their consumption of manufactured goods sharply or else continue to go deeper into debt with America's trading partners—especially China. This process surely will not be allowed to go on indefinitely (*Gomory & Baumol, 2011, p. 688*).

Beyond this statement being rather regressive in its position, it has another significant major flaw. This statement prefaces a call by the authors to begin subsidizing manufacturing or institute an export/import credit trading scheme to reduce the levels of imports relative to exports (*Gomory & Baumol, 2011, p. 689*). Ultimately, the authors call for reducing domestic consumption of manufactured goods in the present term (which would be the most likely result of either of the two policies they suggest) in the hopes of avoiding having to reduce the consumption of these goods in some future period. A future period the authors can neither predict in real terms nor quantify the imbalance necessary to facilitate the need for such a reduction.

This is the central complication to the success of protectionist trade policy, either domestically or within a region. The policy requires fear of some unknown (and, arguably unseen) calamity as the basis for restricting comparative advantage and rejecting the idea that countries engaging in free trade are very likely to ultimately gain from this trade. *Gomory and Baumol (2011)* seem to prescribe a treatment for an ailment for which there is no evidence. Is this assessment meant to imply Pareto optimality in free trade? Certainly not; however, the assumption that large scale distortions in the market due to protectionism will actually have no more negative effects on the economy while “saving” those who would be hurt by trade liberalization is speculative and unsubstantiated at the very least.

Of course, from a policy standpoint, opposition to free trade is a very powerful force that crosses traditional political lines, making for some very interesting bed follows. This was the case during NAFTA's passing and is clearly apparent as the TPP debate continues to heat up. The common thread among these different groups which generally are in opposition to one another is that more liberalized trade will "hurt the American worker" with no real acknowledgement of what positive effects may be realized in increased consumption or freed up capital for expanding domestic production of goods or ability to trade in services. While there are significant complexities that create noise that interrupts any empirical analysis, this complexity is, in part, a result of the information asymmetry inherent in the political process that leads to difficulties in policy development and execution. These considerations are important as we look a NAFTA going forward in this research paper.

CHAPTER IV

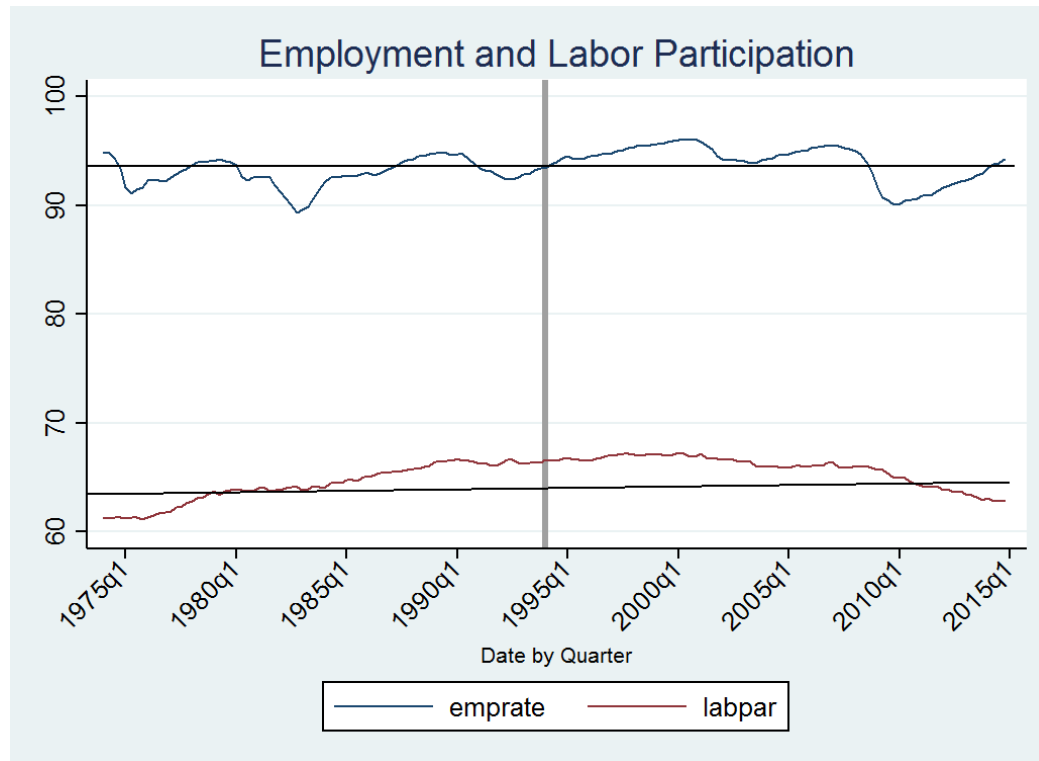
THE DATA

The variables being used as proxy indicators of economic gain or loss due to adoption of NAFTA were chosen based on their being the central argument of those who assert negative effects of enhanced trade liberalization. First, I began with the level of employment (*emprate*) which is found by subtracting the civilian unemployment rate (*unrate*) from 100 to provide the level of the population who wish to work that are employed over the sample period (U.S. Bureau of Labor Statistics, 2015). The second variable of interest is consumption (*consum*) which is the measure of real personal consumption (U.S. Bureau of Economic Analysis, 2015). Finally, I consider income (*income*) which is real income excluding transfer receipts (U.S. Bureau of Economic Analysis, 2015).

Some might argue that the employment rate without the consideration of labor participation rates might be misleading; however, my findings in labor participation can be observed in *Figure 1* where clearly the participation rate fluctuates, but it does so with a slight upward trend. Additionally, we can observe that in no way does participation dip directly following passage of NAFTA. Instead, it is much more realistic that participation began a descent due to the wealth created during the “tech boom” of the late 1990’s and continued due to factors associated with the recession that followed that boom. This continued until a leveling out of participation came at the peak of the housing boom and the more precipitous fall occurred during the Great Recession for a

large variety of reasons. Ultimately, labor participation shows no graphical evidence of a drop due to NAFTA's passage.

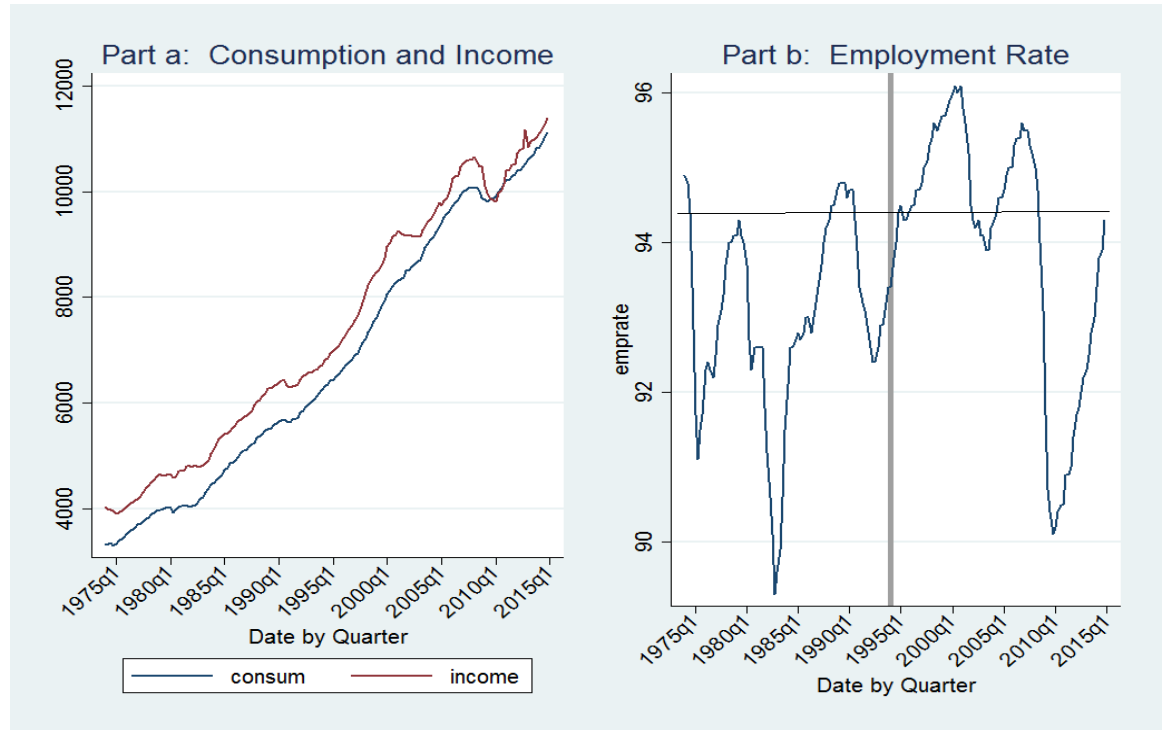
Figure 1: Employment and Labor Participation



The biggest problem encountered with these variables was the high level of correlation (0.9973) between consumption and income, due largely to the diminishing rate of savings over time and the high likelihood that as people earn more they tend to consume more. *Figure 2, part a* clearly illustrates this high level of correlation in the trend of these variables. Looking at *Figure 2, part b* the graph illustrates the movement of the employment rate over the same period. We can observe in *Figure 2, part b* that the level of employment does experience significant fluctuation; however it is largely stationary with a very slight upward trend. In *Figure 2, part b*, the first period of 1994 is

marked to indicate the adoption of NAFTA; although, admittedly, the execution of NAFTA was anything but swift.

Figure 2: a) Consumption and Income and b) Employment Rate



With respect to *Figure 2, part a*, at no time is either consumption or income used as an explanatory variable of the other; the problem is mostly that of redundancy. Therefore, to help reduce redundancy, consumption was utilized most frequently in the initial analysis and income was used simply to check results to make certain that the conclusions carried through consistently to income as well as consumption levels. However, while there is a great level of correlation, I found the effects of the independent variables on consumption and income vary in important ways which will be addressed below.

Selection of independent variables and regressing U.S. employment

The next step was to find a set of independent variables which could be used both as explanatory variables for the dependent variables while also serving as NAFTA performance variables. For example, in all regressions, a set of export and import variables were used as explanatory variables. These included U.S. exports to Canada and Mexico and imports into the U.S. from Mexico and Canada. This approach developed out of the desire to measure the shifting significance (if any existed) of the most fundamental trade indicators from the period before NAFTA and the period following its passage.

The intent was to craft regressions that contained independent variables likely to show a shift in real terms due to NAFTA (import/export variables) along with independent variables unlikely to shift significantly due to the agreement as a way to tether the regressions and lend stability. Additionally, as might be expected in macro-level data, there was a stochastic trend that needed to be remedied. To accomplish this many of the macro-level variables were transformed using first differencing (which will be indicated with in the equations with a “d.”).

The first set of regressions used the employment rate (*emprate*) as the dependent variable and I decided the best fit and applicability to NAFTA incorporated the independent variables U.S. imports from Mexico (*imp_mex*), U.S. exports to Mexico (*exp_mex*), U.S. imports from Canada (*imp_can*), U.S. exports to Canada (*exp_can*), U.S. GDP (*gdp*), U.S. inflation (*cpi*), the Fed Funds rate (*fedfunds*), and the monetary base of the U.S. (*monbase*).

$$\begin{aligned}
 emprate = & \alpha + \beta_1 d.impmex + \beta_2 d.expmex + \beta_3 d.impcan + \beta_4 d.expcan \\
 & + \beta_5 d.cpi + \beta_6 fedfunds + \beta_7 d.monbase + \epsilon
 \end{aligned}$$

The model yielded some interesting results when the impact on employment was regressed before the passage of NAFTA and after.

I first employed a regression covering the ten years prior to NAFTA to capture a period where the fundamental economic environment was relatively fixed. Second, a regression of the ten year period following NAFTA's passage was performed. Finally, the "after" regression was expanded using data from NAFTA's passage through the final quarter of 2014. This approach was conceived to attempt to isolate near term effects from long term ones; keeping in mind that the short term was relative due to significant variation in implementation. The results, in *Table 1*, show how a shift in significance did not occur outside of CPI which would not likely be attributed to NAFTA.

It seems important to first identify which variables did not change in their significance, although a change in magnitude of the effect was evident. U.S. GDP and the Fed Funds Rate maintained consistency in their effect on the dependent variable *emprate*. However, it is notable that in the near term (19947-2003) the effect of CPI on employment exhibits a reduction in significance from the 1% level to having no significance. This muting of the effect of CPI does not appear to have been temporary and no return in significance or magnitude is observed in the longer term sample. Theory would suggest that the change in CPI's effect on employment was likely unrelated to NAFTA and would logically be attributed to the economic (tech) boom that dominated following NAFTA. Another important observation is that the monetary base had no

significant effect in either the period before NAFTA or in the long run; however, there is a small level of significance in the short-run. This would seem to indicate that the growth in significance might be attributed to an unrelated economic development.

Table 1: Employment Rate Before and After NAFTA

| | | Before 1985-1994 | Short Run 1994-2003 | Long Run 1994-2015 |
|---------------------|------------------|---------------------|------------------------|-----------------------|
| Exports to Mexico | | 0.00 | -0.00 | -0.00 |
| | <i>d.exp_mex</i> | (0.75) | (-0.40) | (-0.20) |
| Imports from Mexico | | -0.00 | 0.00 | 0.00 |
| | <i>d.imp_mex</i> | (-1.32) | (0.67) | (0.51) |
| Exports to Canada | | 0.00 | -0.00 | -0.00 |
| | <i>d.exp_can</i> | (0.49) | (-0.36) | (-0.19) |
| Imports from Canada | | 0.00 | 0.00 | -0.00 |
| | <i>d.imp_can</i> | (0.08) | (0.11) | (-0.05) |
| Inflation | | 0.76*** | 0.06 | 0.14 |
| | <i>d.cpi</i> | (3.27) | (0.16) | (0.61) |
| Monetary Base | | 0.02 | 0.00* | 0.00 |
| | <i>d.monbase</i> | (1.04) | (1.72) | (1.47) |
| GDP | | 0.00 | 0.00 | 0.00 |
| | <i>d.gdp</i> | (0.95) | (0.22) | (0.20) |
| Fed Funds Rate | | 0.23*** | 0.24** | 0.25*** |
| | <i>fedfunds</i> | (4.75) | (2.70) | (4.86) |
| _cons | | 90.95*** | 93.57*** | 93.53*** |
| | | (209.36) | (187.70) | (241.12) |
| N | | 35 | 36 | 44 |
| R-sq | | 0.67 | 0.37 | 0.43 |

t statistics in parentheses

* p<.10 **p<.05 ***p<.01

The variables which pertain most directly to NAFTA and were the focus of this analysis did not see any profound shifts. First, U.S. exports to Mexico and Canada in the period before NAFTA had a positive, yet insignificant, effect on employment. This circumstance appears to have reversed in sign following the adoption of the trade

agreement without any change in significance level. Additionally, imports from Mexico and Canada exhibit no increase in significance and what appears to be a minor change in magnitude. Seeing that none of these variables had significance before or after NAFTA indicates no foundational shift in the employment rate took place due to the agreement. This would seem support the idea that NAFTA was not the mass job killer it was often accused of being, nor could the agreement claim responsibility for any significant increase in labor demand in the U.S.

Independent variable selection and regressing U.S. consumption and income

The same methodology was applied to the analysis of U.S. consumption and the effects of NAFTA, but the variable selection was slightly different in an effort to capture a stable model for consumption (and income) throughout the sample period. A “perfect” forecasting model was not required, but a solid model incorporating the four trade variables for the NAFTA partners was important. As mentioned previously, the high level of correlation between consumption and income caused the focus of analysis to shift more singularly (initially) to consumption while income’s use as a dependent variable was initially isolated to use as confirmation of results. Interestingly, while a high level of correlation exists between income and consumption, some very important disparities emerged in the regressions.

The independent variables utilized in this second set of regressions differed somewhat from the regressions on employment rate, but I kept the variables the same for both consumption and income. This was not done at random; instead, this consistency was maintained so that the two dependent variables (consumption and income) could be

compared, before and after, in very specific terms. Additionally, the high level of correlation allowed the fit of the regressions to be similar while the effects of the individual variables on each dependent variable could be looked at separately. The two equations for the respective regressions are below.

- $consum = \alpha + \beta_1 emprate + \beta_2 labpar + \beta_3 d. expmex + \beta_4 d. impmex + \beta_5 d. expcan + \beta_6 d. cpi + \beta_7 d. monbase + \epsilon$
- $income = \alpha + \beta_1 emprate + \beta_2 labpar + \beta_3 d. expmex + \beta_4 d. impmex + \beta_5 d. expcan + \beta_6 d. cpi + \beta_7 d. monbase + \epsilon$

The variables used (in addition to the import/export variables) are: *labpar* being the labor participation rate (U.S. Bureau of Labor Statistics, 2015), *emprate* which is the rate of employment, *cpi* which is the rate of inflation (U.S. Bureau of Labor Statistics, 2015), and *monbase* which is the monetary base (Federal Reserve Bank of St. Louis, 2015). Again, due to the presence of unit root, many of the variables were transformed by using the first difference.

It was expected that the effects of variables such as employment rate, labor participation rate, inflation, and the monetary base would likely stay consistent in the time period before and after NAFTA for both income and consumption. This was not necessarily true in all cases, though. For example, in *Table 2*, we can observe that the effect of the employment rate on consumption was insignificant in the period before and directly following NAFTA, while the in the long-run the effect exhibited significance at the 5% level. The magnitude of the coefficient of employment rate was growing, however, which may indicate a slow rise toward significance due to NAFTA. It must also be kept in mind that consideration of the effects of employment rate and labor participation with respect to NAFTA must be cautiously interpreted considering the

extraordinary economic growth that took place in the 10 years following the agreement. For example, it would be consistent from a theoretical perspective that the tech boom of the late nineties would likely have influenced changes in magnitude and significance in those two variables, as would have the Great Recession that occurred much later.

The changes in the levels of significance and the magnitude of the coefficient of CPI on consumption and income are also more likely the tech boom effect showing up in the regression. Furthermore, we can observe that no real fundamental changes in the effect of changes in the monetary base on either of the dependent variables in question. Ultimately, these four variables would appear to stay relatively constant with respect to NAFTA considerations.

Results of the effect of the import/export variables were rather interesting. First, exports to Mexico were insignificant prior to NAFTA with respect to consumption and income; however, in the period directly following NAFTA the effect became highly significant with respect to consumption and moderately significant in their long-run effects on income. This would seem to indicate that exports to Mexico had a positive effect on income and consumption due to NAFTA.

Imports from Canada had a similar result which included a shift from a negative (insignificant) effect on consumption prior to NAFTA to a positive one with significant at the 10% level which grew to 5% in the long-run. Additionally, the effect of imports from Canada had growing significance with respect to income in the short-run period. This would seem to indicate that, while the magnitude of trade between the U.S. and Canada was not extraordinary, the efficiency of this trade may have improved substantially.

Table 2: Consumption and Income Before and After NAFTA

| | D.consum | | | D.income | | |
|-----------------------------|---------------------|----------------------|--------------------|---------------------|------------------------|---------------------|
| | Before | Short | Long | Before | Short | Long |
| | 1985-1994 | 1994-2003 | 1994-2015 | 1985-1994 | 1994-2003 | 1994-2015 |
| Employment Rate | 3.99 (0.51) | 12.82 (1.24) | 18.15** (2.14) | 16.65* (1.90) | -12.41 (-0.61) | 25.69 (1.53) |
| Labor Participation | 5.94 (0.51) | 20.07 (0.70) | -18.95 (-1.18) | -4.26 (-0.33) | 150.01** (2.68) | -1.75 (-0.06) |
| Exports to Mexico | 0.04 (0.70) | 0.04*** (2.82) | 0.04*** (3.07) | 0.07 (1.12) | 0.03 (1.01) | 0.05** (2.03) |
| Imports from Mexico | 0.10* (1.78) | -0.01 (-0.81) | -0.02 (-1.18) | 0.05 (0.81) | -0.03 (-0.84) | -0.02 (-0.45) |
| Exports to Canada | -0.01 (-0.32) | -0.02 (-1.41) | -0.02** (-2.25) | -0.03 (-1.28) | -0.03 (-1.42) | -0.01 (-0.45) |
| Imports from Canada | -0.03 (-1.48) | 0.02* (1.82) | 0.03** (2.40) | 0.02 (0.94) | 0.04* (1.85) | 0.02 (1.06) |
| Inflation | -43.54** (-2.71) | -25.20** (-2.15) | -18.80* (-1.85) | -48.46** (-2.72) | 6.70 (0.29) | -11.46 (-0.57) |
| Monetary Base | -0.99 (-1.06) | -0.01 (-0.20) | 0.00 (0.15) | -0.69 (-0.66) | -0.09 (-1.22) | -0.03 (-0.46) |
| _cons | -670.28 (-0.64) | -2469.30* (-1.96) | -371.30 (-0.53) | -1186.23 (-1.02) | -8785.68*** (-3.56) | -2243.51 (-1.62) |
| N | 35 | 36 | 44 | 35 | 36 | 44 |
| R-sq | 0.34 | 0.54 | 0.42 | 0.39 | 0.47 | 0.31 |
| t statistics in parentheses | | | | | | |
| * p<.10 **p<.05 ***p<.01 | | | | | | |

Of course, not all of the results were positive in this analysis. In fact, imports from Mexico shifted from having a positive and significant (at the 10% level) effect on consumption to having a negative and insignificant effect. The effect of Mexican imports on income experience the same sign shift; however, there was no significance either before or after NAFTA. While we can observe a negative relationship between Mexican imports and consumption it is certainly not of a cataclysmic scale. This negative effect is important; however, it would certainly not seem to imply that NAFTA led to any large scale loss of consumption or income; particularly when coupled with some of the positive effects from the previously discussed import/export variables. Additionally, it must be considered that this result may indicate a loss of comparative advantage globally if shifts of production from outside the region into Mexico were based on protectionist measures and not the value of the goods involved.

The final import/export variable to be addressed is exports to Canada. There was relative consistency in the magnitude of the coefficient and in the sign of the coefficients. However, we can observe that there was no significance either before NAFTA or in the short-run regression following the agreement. The only significance was in the long-run effect of exports to Canada with respect to consumption. This could certainly indicate a steady reduction in exports to Canada following NAFTA that resulted ultimately in a negative economic result. This would not necessarily be a surprising result considering what might be expected when two developed countries enhance trade relations with a developing nation. Theory would suggest that early gains might be captured disproportionately by the developing country and not between the two advanced economies. Considering NAFTA had some very protracted implementation, the long-run

regression does not necessarily cover such a long period. This may be why some of the import/export results are rather delayed in significance.

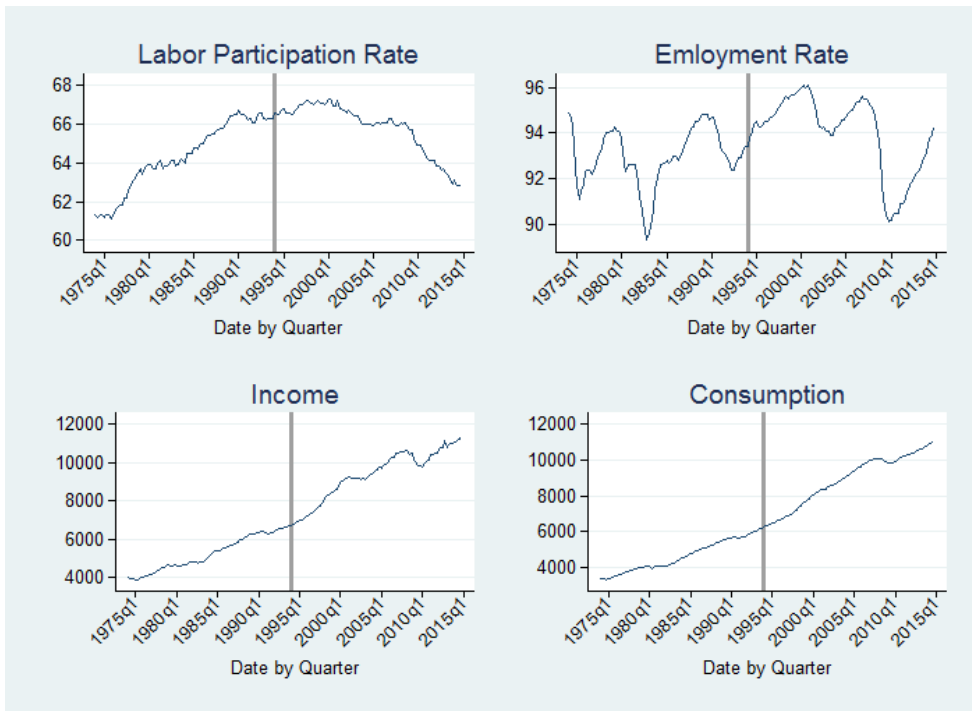
CHAPTER V

CONCLUSION

While measuring effects from NAFTA have proven very problematic from a causal perspective, it does seem that the ability to reject negative effects of the trade agreement is reasonable. This paper sought to identify whether the direct effects of shifts in trading patterns among NAFTA countries might be discounted as having a negative influence on U.S. employment, consumption, and income. While the difficulty is in the magnitude of the effects that can be attributed to NAFTA; it would seem relatively clear that no large scale negative effects on the U.S. economy took place.

The fact that real income continued its trend and consumption continued to increase would also appear to indicate graphically (in *Figure 3*) that if NAFTA had a negative effect on these indicators of economic well-being and individual well-being it is well concealed from view. Furthermore, any argument framed from the perspective that NAFTA was negative although all indicators and empirical results indicate the opposite would be a normative one indeed. While it remains clearly difficult to indicate causation for increases, it appears fair that effects due to NAFTA are unlikely and, if anything, ambiguous.

Figure 3: Labor Participation, Employment Rate, Income, and Consumption



This research does not prove NAFTA to be a “good” policy, nor did it set out to do so; however, it certainly gives evidence that NAFTA was not the end of economic growth in the U.S. This result seems relatively clear even amidst all the economic noise that surrounded that period in time. The problem that exists going forward is that regardless of analysis of NAFTA, little insight will be provided with respect to future trade deals (i.e. TPP) because of the considerable disparity that exists among many of the complex agreements, particularly when greater numbers of countries are included. It is reasonable to assume that increased trade liberalization will continue to prove the relevance of comparative advantage, but the amount of liberalization will have to be measured on an agreement-by-agreement basis. One thing does seem clear on policies similar to NAFTA, that the nature of these expanded protectionist agreements will largely

be muted and the U.S. will continue to benefit from expanded trade relations, even if only slightly. This seems to be true both in the short run and in the long run.

A question that occurred and would be interesting for future research on NAFTA would be to analyze its effect on the tech boom that followed in the latter part of the 1990s. It seems realistic that increases in efficiency in U.S. industrial sectors may have created an environment ripe for a growth in innovation and freed up the capital to do endeavor such a growth.

Additionally, some valuable insights might be found by incorporating exchange rate considerations into this research. If significance exists due to monetary value considerations, we may gain more insight into how aggregate level import/export actually effect employment, income, and consumption. Furthermore, executing analysis on Mexico and Canada may have some interesting insights and clarify whether these results are consistent through the region or whether the results are being driven by outside factors. One thing is certain; the debate on trade (at least politically) will continue to rage on regardless of empiricism due to the fear and expediency of free trade as an antagonist to the U.S. economy.

APPENDIX

| <i>Correlation Table</i> | | | | | | | | | | | |
|----------------------------|---------------|----------------|---------------|---------------|----------------|-----------------|-----------------|-----------------|-----------------|---------------|----------------|
| | <i>In Inc</i> | <i>In Cons</i> | <i>In CPI</i> | <i>In GDP</i> | <i>In Base</i> | <i>InExpMex</i> | <i>InImpMex</i> | <i>InExpCan</i> | <i>InImpCan</i> | <i>LabPar</i> | <i>EmpRate</i> |
| <i>In Income</i> | 1.0000 | | | | | | | | | | |
| <i>In Consumption</i> | 0.9958 | 1.0000 | | | | | | | | | |
| <i>In CPI</i> | 0.9648 | 0.9750 | 1.0000 | | | | | | | | |
| <i>In GDP</i> | 0.9965 | 0.9985 | 0.9803 | 1.0000 | | | | | | | |
| <i>In Monetary Base</i> | 0.9587 | 0.9651 | 0.9042 | 0.9535 | 1.0000 | | | | | | |
| <i>In Exp. Mexico</i> | 0.9602 | 0.9604 | 0.9873 | 0.9707 | 0.8807 | 1.0000 | | | | | |
| <i>In Imp. Mexico</i> | 0.9855 | 0.9853 | 0.9804 | 0.9907 | 0.9203 | 0.9777 | 1.0000 | | | | |
| <i>In Exp. Canada</i> | 0.9418 | 0.9419 | 0.9726 | 0.9553 | 0.8423 | 0.9802 | 0.9676 | 1.0000 | | | |
| <i>In Imp. Canada</i> | 0.9800 | 0.9802 | 0.9745 | 0.9860 | 0.9167 | 0.9732 | 0.9946 | 0.9722 | 1.0000 | | |
| <i>Labor Participation</i> | 0.6210 | 0.5935 | 0.6839 | 0.6284 | 0.4182 | 0.7407 | 0.6620 | 0.7725 | 0.6565 | 1.0000 | |
| <i>Employment Rate</i> | 0.6354 | 0.5826 | 0.5353 | 0.6067 | 0.4805 | 0.5969 | 0.6296 | 0.6571 | 0.6395 | 0.7052 | 1.0000 |

| Summary Statistics | | | | |
|----------------------------|-----------|-----------|----------|----------|
| | Mean | Std. Dev. | Min | Max |
| <i>In Income</i> | 9.0141094 | 0.2272031 | 8.60067 | 9.340631 |
| <i>In Consumption</i> | 8.941094 | 0.2602468 | 8.40961 | 9.316464 |
| <i>In CPI</i> | 5.122324 | 0.2344044 | 4.675004 | 5.470353 |
| <i>In GDP</i> | 9.36382 | 0.2333931 | 8.927699 | 9.698595 |
| <i>In Monetary Base</i> | 6.938077 | 0.6948695 | 6.111024 | 8.312037 |
| <i>In Exp. Mexico</i> | 8.687161 | 0.8504628 | 6.900428 | 9.921951 |
| <i>In Imp. Mexico</i> | 8.913109 | 0.9093217 | 7.248646 | 10.13256 |
| <i>In Exp. Canada</i> | 9.407725 | 0.5431052 | 8.149659 | 10.21047 |
| <i>In Imp. Canada</i> | 9.585922 | 0.5401521 | 8.584272 | 10.33947 |
| <i>Labor Participation</i> | 65.86555 | 1.132901 | 62.8 | 67.3 |
| <i>Employment Rate</i> | 93.86975 | 1.482643 | 90.1 | 96.1 |

REFERENCES

- Board of Governors of the Federal Reserve System. (2015). *Canada/U.S. Foreign Exchange Rate*. Retrieved May 2015, from FRED:
<https://research.stlouisfed.org/fred2/series/EXCAUS/>
- Federal Reserve Bank of St. Louis. (2015). *St. Louis Adjusted Monetary Base*. Retrieved May 2015, from FRED: <https://research.stlouisfed.org/fred2/series/BASE/>
- Board of Governors of the Federal Reserve System. (2015). *Capacity Utilization: Total Industry*. Retrieved May 2015, from FRED:
<https://research.stlouisfed.org/fred2/series/TCU/>
- Board of Governors of the Federal Reserve System. (2015). *Effective Federal Funds Rate*. Retrieved May 2015, from FRED:
<https://research.stlouisfed.org/fred2/series/FF/>
- Board of Governors of the Federal Reserve System. (2015). *Industrial Production Index*. Retrieved May 2015, from FRED, Federal Reserve Bank of St. Louis:
<https://research.stlouisfed.org/fred2/series/INDPRO/>
- Chase, K. A. (2003). Economic Interests and Regional Trading Arrangements: The Case of NAFTA. *International Organization*, 57(No. 1), 137-174.
- Francis, J., & Zheng, Y. (2011). Trade liberalization, unemployment and adjustment: evidence from NAFTA using state level data. *Applied Economics*, 43, 1657-1674.
- Gomory, R. E., & Baumol, W. J. (2011). Trade, education, and innovation: Prospects for the U.S. economy. *Journal of Policy Modeling*, 33, 682-697.
- Krueger, A. O. (2000). NAFTA's Effects: A Preliminary Assessment. *World Economy*, 23(6), 761-775.
- McDaniel, C. A., & Agama, L.-A. (2003). The NAFTA Preference and US-Mexico Trade: Aggregate-Level Analysis. *World Economy*, 26(7), 939-955.
- OECD. (2014). *Current Price Gross Domestic Product in Canada*. Retrieved May 2015, from Main Economic Indicators-complete database:
<http://dx.doi.org/10.1787/data-00052-en>

- OECD. (2014). *Current Price Gross Domestic Product in Mexico*. Retrieved May 2015, from Main Economic Indicators-complete database:
<http://dx.doi.org/10.1787/data-00052-en>
- U.S. Bureau of Economic Analysis. (2015). *Real Imports of Goods & Services*. Retrieved May 2015, from FRED, Reserve Bank of St. Louis:
<https://research.stlouisfed.org/fred2/series/IMPGSC96/>
- U.S. Bureau of Economic Analysis. (2015). *Personal Savings Rate*. Retrieved May 2015, from FRED, Federal Reserve Bank of St. Louis:
<https://research.stlouisfed.org/fred2/series/PSAVERT/>
- U.S. Bureau of Economic Analysis. (2015). *Real Gross Domestic Product (GDPC1)*. Retrieved May 2015, from FRED Federal Reserve Bank of St. Louis:
<https://research.stlouisfed.org/fred2/series/GDPC1/>
- U.S. Bureau of Economic Analysis. (2015). *Real Personal Consumption Expenditures*. Retrieved May 2015, from FRED, Federal Reserve Bank of St. Louis:
<https://research.stlouisfed.org/fred2/series/DPCERL1A225NBEA/>
- U.S. Bureau of Economic Analysis. (2015). *Real personal income excluding current transfer receipts*. Retrieved May 2015, from FRED:
<https://research.stlouisfed.org/fred2/series/W875RX1/>
- U.S. Bureau of Economic Analysis and US Bureau of the Census. (2015). *U.S. Exports of Goods to Canada*. Retrieved May 2015, from FRED:
<https://research.stlouisfed.org/fred2/series/EXPCA/>
- U.S. Bureau of Economic Analysis and US Bureau of the Census. (2015). *U.S. Exports of Goods to Mexico*. Retrieved May 2015, from FRED:
<https://research.stlouisfed.org/fred2/series/EXPMX/>
- U.S. Bureau of Economic Analysis and US Bureau of the Census. (2015). *U.S. Imports of Goods from Canada*. Retrieved May 2015, from FRED:
<https://research.stlouisfed.org/fred2/series/IMPCA/>
- U.S. Bureau of Economic Analysis and US Bureau of the Census. (2015). *U.S. Imports of Goods from Mexico*. Retrieved May 2015, from FRED:
<https://research.stlouisfed.org/fred2/series/IMPMX/>

- U.S. Bureau of Economic Analysis. (2015). *Real Exports of Goods & Services*. Retrieved May 2015, from FRED, Federal Bank of St. Louis:
<https://research.stlouisfed.org/fred2/series/EXPGSC96/>
- U.S. Bureau of Labor Statistics. (2015). *Civilian Labor Force Participation Rate*. Retrieved May 2015, from Fred, Federal Reserve Bank of St. Louis:
<https://research.stlouisfed.org/fred2/series/CIVPART/>
- U.S. Bureau of Labor Statistics. (2015). *Civilian Unemployment Rate*. Retrieved May 2015, from FRED, Federal Reserve Bank of St. Louis:
<https://research.stlouisfed.org/fred2/series/UNRATE/>
- U.S. Bureau of Labor Statistics. (2015). *Consumer Price Index for All Urban Consumers: All Items*. Retrieved May 2015, from FRED:
<https://research.stlouisfed.org/fred2/series/CPIAUCSL/>