How Trade Liberalization affects Unemployment under the Trans-Pacific Partnership: A Panel Data Analysis

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Abstract:

Between 1994 and 2000, NAFTA eliminated over 700,000 U.S. jobs from an increasing trade def icit. Will the TPP have similar detrimental effects? This study uses panel data to investigate the r elationship between trade liberalization and unemployment among the TPP confirmed and intere sted signatories. The results show that a negative correlation exists between taxes on internationa l goods and the net barter terms of trade index, indicating and ceteris paribus that the elimination of duties could result in a larger trade deficit for countries with comparably stronger currencies. Additionally, the fixed-effects GLS regression yields real exchange rates to be insignificant, supp orting cheaper resources in a foreign nation could be the primary driver for companies to relocate in said nation.

JEL Classification: C23, F13, F14, O57
Keywords: Trade Liberalization, Trans-Pacific Partnership, Unemployment

1.0 INTUITION AND INTRODUCTION

The North American Free Trade Agreement (NAFTA) is a comprehensive trade agreeme nt that sets rules of trade and investment for the U.S., Canada, and Mexico. NAFTA systematical ly removes trade barriers to bring economic growth, job creation, and better prices and selection i

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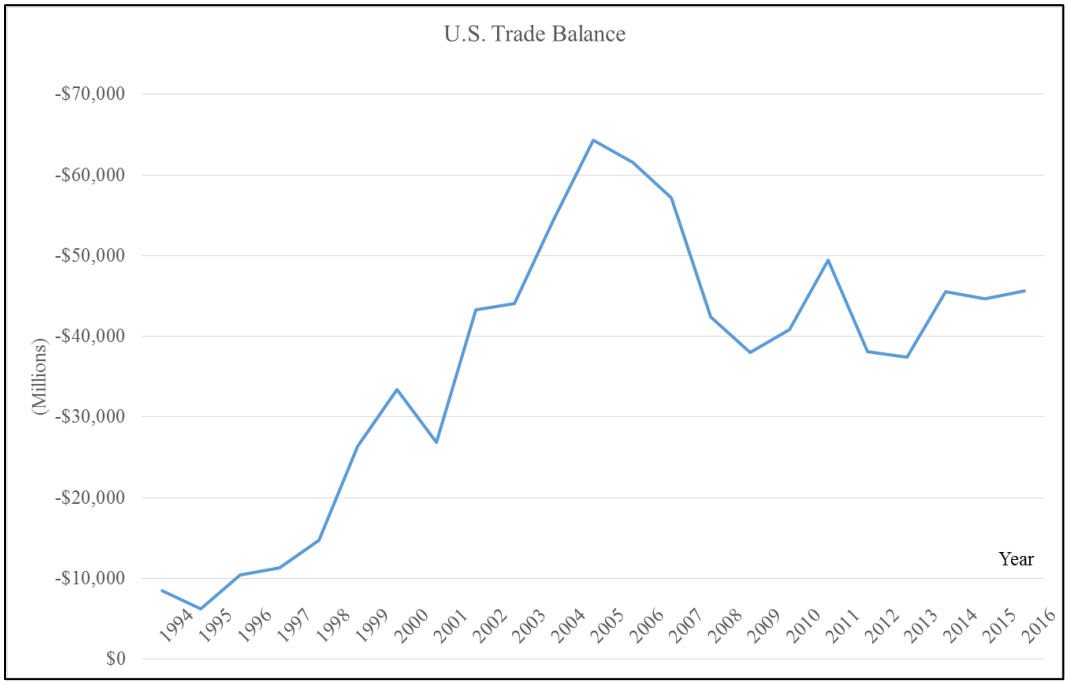
n consumer goods. Signed by President Bill Clinton, this regional treaty was to launch an export boom for the U.S (NAFTA).

Since the U.S. entered into NAFTA with Canada and Mexico in 1994, the trade deficit of goods has been increasing rapidly. Figure 1.0 shows the increase in the U.S. trade deficit from 19 94 to 2016:

Figure 1.1: U.S. Trade Balance



Source: Author Calculated

Observing the graph, a decrease in the trade deficit in 2001 and 2008 was a result of the Bush Administration and Financial Crisis. Exports of goods expand domestic production, while i mports replace goods that could have been produced and specifically in the U.S., eliminating ind ustrial jobs; since the introduction of NAFTA, the increase in the U.S. trade deficit with Canada and Mexico from 1994 to 2000 alone eliminated over 700,000 U.S. jobs that relocated to Mexico . Additionally to note, in 2010 NAFTA accounted for 32.3% of U.S. exports to the world. Trade experts have studied this consequence as only a short-term cost, as the majority of U.S. outbound goods are exported to other countries. However, other experts argue NAFTA will persist to direc tly increase the trade deficit in the U.S., indicating no long-term benefit (Scott, 2003; The North American Free Trade Agreement (NAFTA)).

Recently in discussions and negotiated in 2012, is the introduction of the Trans-Pacific Partnership (TPP)—an international trade treaty among twelve Pacific Rim countries and at the time of this study, in the ratification process. Current trade agreements, such as NAFTA, will be reduced to those provisions that do not conflict with the TPP, or provide greater trade liberalization. Like NAFTA, the TPP will aim to increase economic growth, support the creation and retention of jobs, enhance competition, innovation, and reduce poverty. In addition, the TPP will improve labor and environmental protections (Isfeld, 2015; What is the Trans-Pacific Partnership?) Since the introduction of the TPP, trade experts have now proposed a concern: Will the TPP have similar detrimental effects as NAFTA?

The purpose of this study is to examine the relationship between trade liberalization and the net barter terms of trade index (in turn, a given fact of increasing or decreasing the unemployment rate) (NTT), among the confirmed and interested signatories of the TPP. With dynamic panel data, this study uses both time and fixed-effects of a GLS regression model; the data is from 2001 to 2012 based on data availability. From a policy perspective, this analysis is important because countries and international organizations need to give special attention in the sequencing of trade liberalization of exports and imports to achieve a better balance. As well, there is no guarantee an efficient allocation of resources contributes towards a more equal trade balance, given the significance of taxes on international goods and the real exchange rate. Given trade liberalization stimulates an import growth (discussed in 3.0 Literature Review), an increase in the U.S. money supply will result in cheaper resources.

The scope of this paper was guided by three research objectives unlike past studies: First, taxes on international goods (both exports and imports) must stimulate an import growth more than an export growth, yielding in an increasing trade deficit. This assumption must yield a high significance against the NTT and have a negative correlation. Second, resource rents, which is an aggregate total of the difference between the production costs of natural resources such as oil, natural gas, all coal, mineral, and forest and their price points, will determine the significance of cheaper resources. Last, real exchange rates, calculated from nominal exchange rates and Consumer Price Indexes, will determine the cost of doing business across borders, also supported by cheaper resources. It should be noted that the outcome of research objectives two and three will determine whether or not the strength of the U.S. dollar and/or cheaper resources, in countries with comparably weaker currencies, contribute to the favorability of the TPP to be ratified.

The remainder of the study is organized as follows: Section 2.0 gives data trends aligned with this study's research objectives. Section 3.0 gives a brief literature review of past studies tha t have analyzed international trade. Section 4.0 goes more in depth about the data collected, and discusses the empirical methodology and results of the study. Finally, Section 5.0 concludes whe ther or the TPP with have the same detrimental effects as NAFTA and discuss potential policy i mplications.

3.0 RESEARCH OBJECTIVE TRENDS

Prevalent amongst the Pacific Rim countries from 2001 to 2012 (further discussed in Sect ion 4.0 Data and Empirical Methodology/Results), taxes on international goods and the NTT dep ict a negative correlation shown in Figure 3.1 U.S. Net Terms of Trade and Duties below. This m eans that for a 1% decrease in the revenue collected from taxes on international goods results in a n increase in the NTT, indicating the value of the imports increased more than the value of the ex ports. This trend is a supporting indication that the elimination of taxes could result in a trade def icit.

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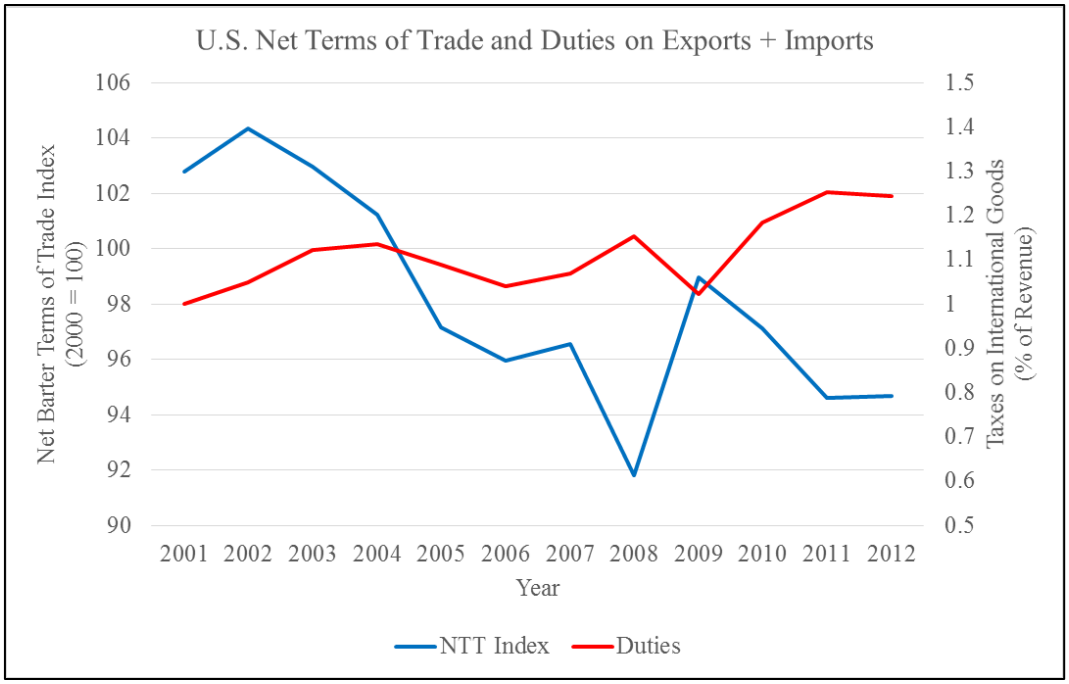
Figure 3.1: U.S. Net Terms of Trade and Duties



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Figures 3.2 and 3.3 shown below are trend representations of resource rents compared to t he NTT for Mexico and Canada between 2001 and 2012. In both graphs, a positive correlation ex ists between both variables. This means that for a 1% increase in the production of resources resu lts in a decrease in the NTT, indicating the value of exports increases more than the value of imp orts. This trend is significant because countries that sell resources at a cheaper value will expect t o export more of their resources than import them.

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Figure 3.2: Mexico Net Terms of Trade and Resource Rents

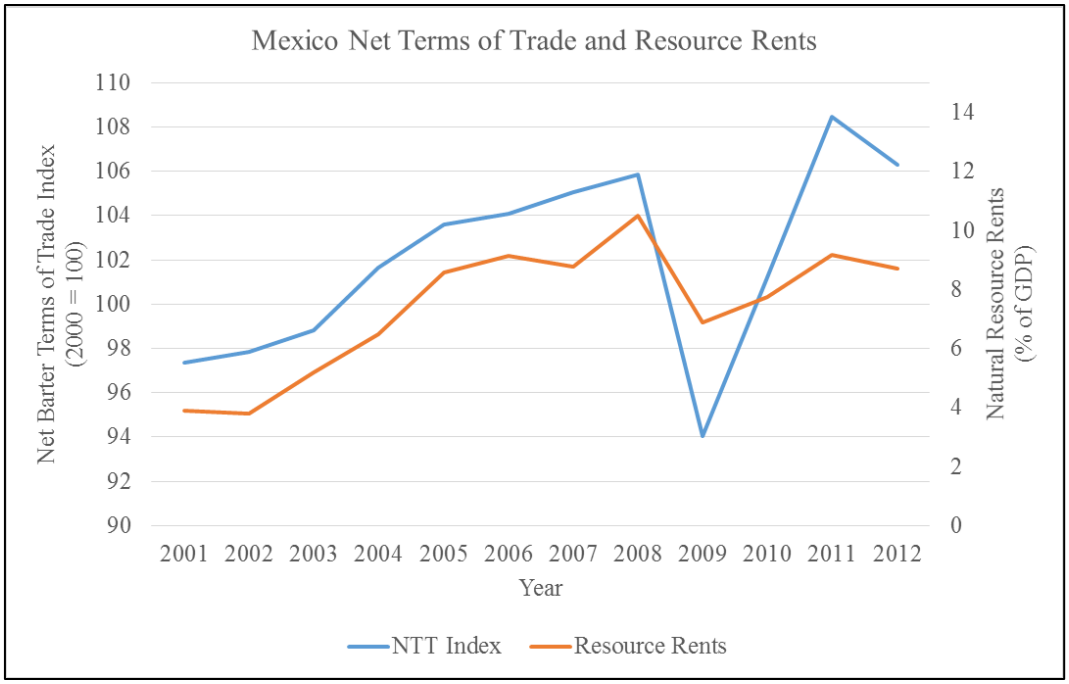

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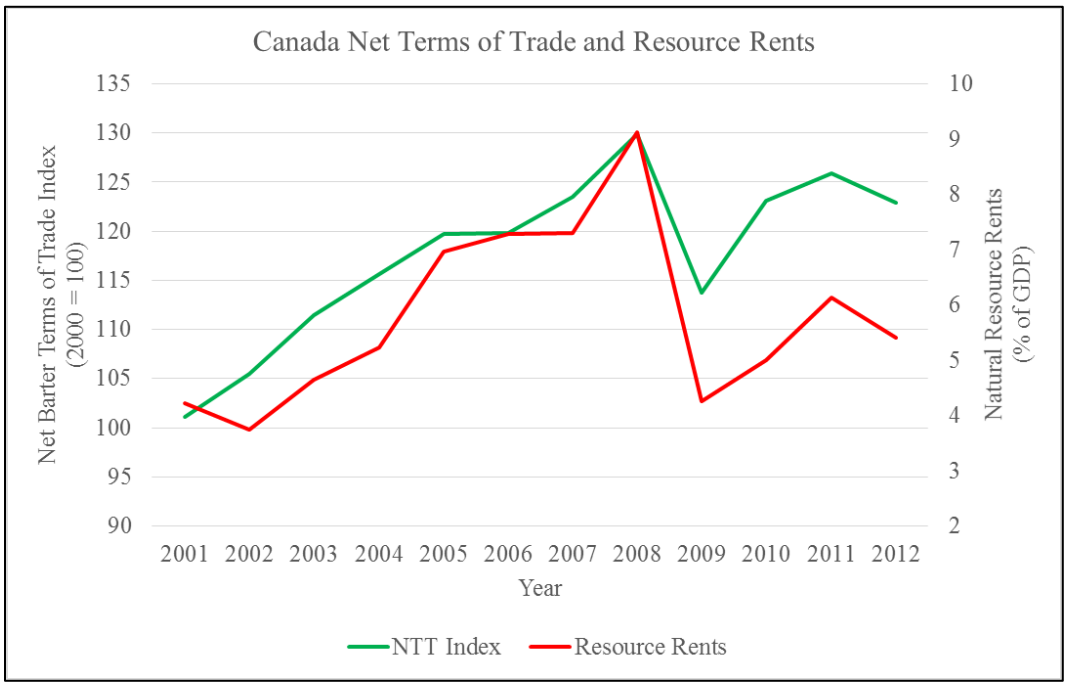
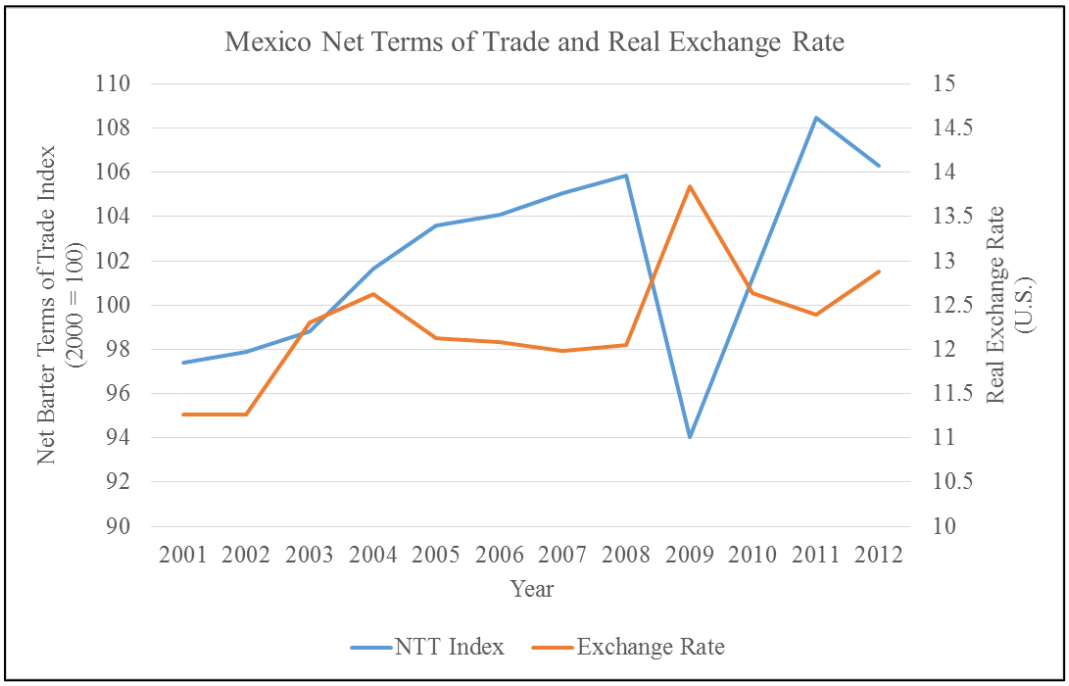
Figure 3.3: Canada Net Terms of Trade and Resource Rents



Source: Author Calculated

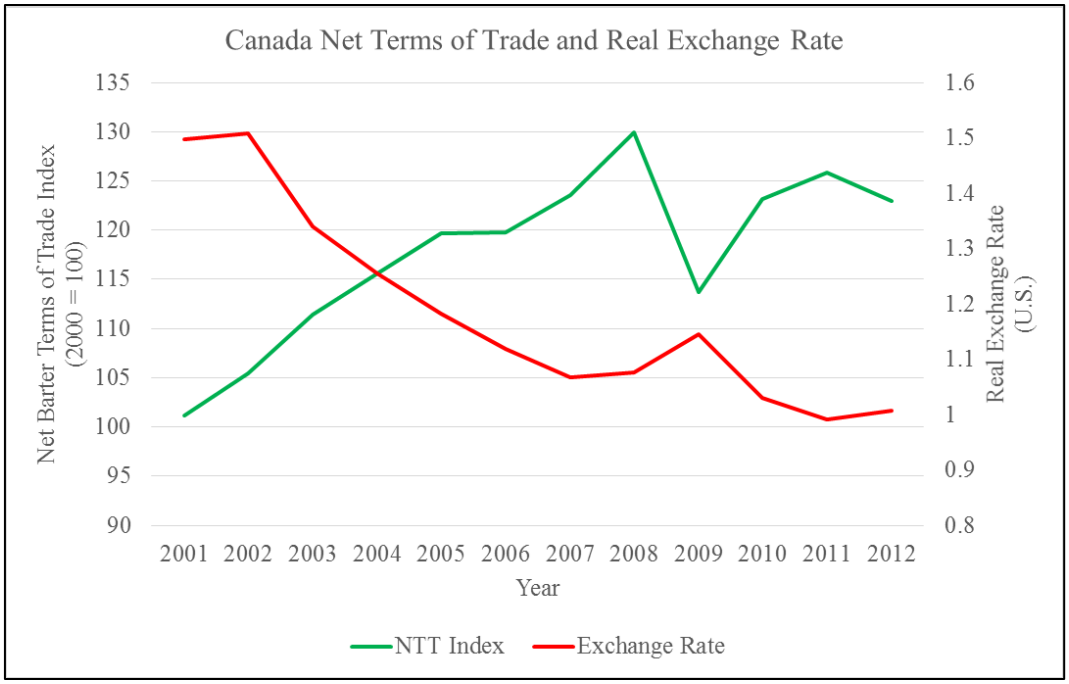
Figures 3.4 and 3.5 shown below are graphs that represent the real exchange rate and the NTT for Mexico and Canada between 2001 and 2012. The findings show a negative correlation e xists although not as strong as taxes on international goods compared to the NTT. In Figure 3.4, t he real exchange rate seems to have a positive correlation with the NTT from 2001 to 2004; this t rend will need to be further explored. Although based on the negative correlation, this means that for a 1% decrease in the real exchange rate, the NTT will increase, signifying an increase in the value of imports. Interestingly because of the unclear correlation, the real exchange rate can be e xpected to have little significance and/or deemed exogenous measured by a fixed-effects GLS Re gression model. If true, a secondary model must be explored to accommodate the real exchange r ate. Whether the correlation is positive or negative, the real exchange rate will be important to co nclude a country's accessibility to export and import.

Figure 3.4: Mexico Net Terms of Trade and Real Exchange Rate



Source: Author Calculated

Figure 3.5: Canada Net Terms of Trade and Real Exchange Rate



Source: Author Calculated

Based on the panel data, the trends primitively highlight the expectations driven by the re search objectives. Given the outcome of the model, will determine whether or not this study is in favor of the TPP. The variables included in this study and discussed in Section 4.0 are economic factors that directly impact international trade; however, these variables could be endogenous or exogenous given the results of the test. As previously mentioned, the opinions whether or not tra de liberalization results in economic growth is highly debated, and can be dependent on the econ omic conditions.

2.0 LITERATURE REVIEW

One of the major purposes of trade liberalization is to promote economic growth. In order to do so, a country must capture gains from trade through a more efficient allocation of resource s, competition, increase in knowledge, investment, and a faster rate of capital accumulation. In th e forefront, it is also important for advancements in technology to occur. Generally, barriers such as high value of resources, strong currency, volatile inflation, and so forth reduce export growth below potential. It is presumed that trade liberalization increases both exports and imports, but th e balance of trade and payments is uncertain because of the impact of liberalization and the price of traded goods.

Studies performed by Santos-Paulino and Thirlwall (2004) and Edwards (1993) measure d the impact of trade liberalization on exports, imports and the balance of payments of developin g countries using a variety of test methods. Santos-Paulino and Thirlwall (2004) specifically used data that consisted of 22 developing countries from different continents that have undergone ext ensive trade liberalization since the mid-1970's. Using a mix of panel data and time series/cross s ection data analysis, their study found that liberalization stimulated export growth less than impo rt growth, leading to a more imbalance of payments. Due to this finding, which is believed to hav e constrained the growth of output and living standards, the results arose important policy implic ations for the sequencing and degree of liberalization. One model this study utilizes is a GLS reg ression that measures trade liberalization on import growth. It was found that the impact of impor t duties on import growth was significantly negative and the effect of import liberalization is stro ngly positive. Moreover, it was found liberalization affects both the price and income elasticities of demand in the expected direction. This model is significant for this study in regards to taxes o n international goods and supporting the elimination of them to contribute to a growing trade defi cit.

Interestly, Beyer et al. (1999) empirically measures the link between trade liberalization a nd wage inequality in Chile (classified as a developing country according to a low GDP PPP figu re). Using a Heckscher-Ohlin-Samuelson (HOS) model, the researchers uses cointegration techni ques to estimate the long run relationship between the skill premium in Chile and the prices of pr oducts; also including openness and factor endowments. It was found that the decrease in the rela tive price of labor-intensive goods helps explain the increase in wage inequality. Additionally it was found that the labor force with a college degree shrunk the wage gap. Last, openness, which was measured as the volume of trade over GDP, widened the wage gap between unskilled and sk illed workers. Due to data availability, the cost of labor was not included in this study, although s hould be explored upon following revisions.

As previously discussed that trade liberalization potentially impacts unemployment, Hasa n et al. (2012) and Ranan (2012) were referenced to observe the linkage between these economic variables. In Hasan et al. (2012) it was concluded that in India, this study yielded no evidence of any unemployment increasing effect on trade reform. In addition, a state-level analysis revealed that urban unemployment declines with trade liberalization in state with flexible labor markets an d larger employment shares in net exporter industries. Last, in an industry-level analysis, it was f

ound that workers in industries experiencing greater reduction in trade protection were less likely to become unemployed. Oppositely, Ranan (2012) found that trade liberalization increases both job creation and destruction in the import competing sector while job creation and destruction de creases in the export competing sector. It was also noted that a more generous unemployment be nefit increases the responsiveness of job destruction to trade liberalization.

The studies are important because they highlight the uncertain variables that might explai n the link between trade liberalization and unemployment. The last reference that provided motiv ation for this study was Trefler (1993) that studied trade liberalization and the theory of endogen ous protection. It is predicted that the theory of endogenous protection results in higher levels of import penetration that will lead to greater protection. It was found in this study that when trade protection is modeled endogenously, its restrictive impact on imports is large, and significantly si zed compared to treating protection exogenously.

4.0 DATA AND EMPIRICAL METHODOLOGY/RESULTS

4.1 Data

This study uses annual panel data from 2001 to 2012. The Pacific Rim countries included are: Australia, Bruinei, Canada, China, Colombia, Indonesia, Japan, Malaysia, Mexico, New Ze aland, Peru, Philippines, Singapore, Thailand, United States, and Vietnam. Not only were the twe lve countries that are signatories of the TPP, but also four countries that have shown interest in p articipating. It should be noted that South Korea is omitted from this study due to data availabilit y.

Data were obtained from the World Bank Group with the exception of the real exchange r ate that was retrieved from the U.S. Department of Agriculture. The variable, taxes on internatio nal goods contains missing data that has been automatically eliminated during the regression test, resulting in the final total number of observations to be 118 as opposed to 192. Summary statisti cs for the data are provided in Table 4.1.1 below.

Table 4.1.1: Summary Statistics

Summary Statistics					
Variable	Observation	Mean	Std. Dev.	Min	Max
ntt	192	108.4273	29.834	60.49142	243.4635
inf	182	3.412222	3.181961	-2.314972	23.11632
resource	180	9.961088	12.51775	0.018467	67.73461
taxes	131	4.124507	5.345917	-15.84169	22.1913
expc	192	3.04E+11	4.30E+11	5.13E+09	1.87E+12
rer	192	2237.579	5828.513	0.9675622	25478.54
income	192	4.103152	3.200176	-5.526976	15.24038

4.2 Empirical Model

Following Santos-Paulino and Thirlwall (2004) this study adapted and modified their mo del that measured the effect of trade liberalization on import growth. The independent variables u sed to explain import growth were: the rate of change of import prices relative to domestic substi tutes, the growth of domestic income, lagged import growth, the measure of import duties, a dum my variable to measure the year of liberation, and slope dummies on relative price and import gr owth. The dynamics of this study are previously discussed in Section 2.0.

For this study, the variables: inflation of consumer prices, resource rents, taxes on exports and imports as an aggregate total, and the unemployment rate have been added to accommodate and capture the scope of the TPP.

The model could be written as follows:

$$NTT_{it} = \beta_0 + \beta_1 INF_{it} + \beta_2 RESOURCE_{it} + \beta_3 TAXES_{it} + \beta_4 UN_{it} + \beta_5 RER_{it} + \beta_6 INCOME_{it} + \varepsilon_{it} \quad \textbf{(1)}$$

NTT_{it} is the net barter terms of trade index for a country i and a year t. NTT_{it} is this study' s dependent variable. The net barter terms of trade index is calculated as the percentage ratio of t he export unit value indexes to the import unit value indexes, measured relative to the base year 2000 (2000 = 100). These indexes are based on data reported by countries that demonstrate reliab ility under UNCTAD quality controls. UNCTAD constructs a set of average prices indexes at the three-digit product classification of the Standard International Trade Classification (SITC). Non e of the literature reviews discussed in Section 2.0 uses the net barter terms of trade index as a va

riable. For this study, an increase or decrease in NTT_{it} results in a change in the unemployment ra te.

Independent variables consist of six obtained from various sources within the World Ban k Group. Appendix A and B provide data sources, acronyms, descriptions, and expected signs. Fi rst, INF_{it} (inflation of country i at year t) represents inflation of consumers prices measured as a p ercentage. $RESOURCE_{it}$ represents natural resource rents, which is an aggregate total of the diffe rence between the cost of a natural resource and its price point. The natural resources included ar e oil, natural gas, coal (hard and soft), minerals, and forests all measured as a percentage of GDP. $TAXES_{it}$ are taxes on international goods. This variable includes import duties, export duties, pro fits of export or import monopolies, exchange profits, and exchange taxes all measured as a perc ent of revenue. UN_{it} is a country's unemployment rate measured as the percentage of the total lab or force. RER_{it} are the real exchange rates calculated from nominal exchange rates and Consumer Price Indexes. Last, $INCOME_{it}$ represents the annual percentage growth rate of GDP at market p rices based on constant local currency. An error term (ε_{it}) is appropriately included to represent u nexplained variation as part of a population model.

4.3 Empirical Results

Table 4.3.1 below is a correlation matrix of these variables. Using a benchmark of 50% to determine multicollinearity, inflation and the real exchange rate are correlated by 71.3%, which could explain the 1% significance of the inflation rate in both the random and fixed effects regres sions.

Table 4.3.1: Correlation Matrix

Correlation Matrix							
Variable	**ntt**	**inf**	**resource**	**taxes**	**un**	**rer**	**income**
ntt	1.0000						
inf	0.0462	1.0000					
resource	0.4457	0.3809	1.0000				
taxes	-0.4093	0.2031	-0.1474	1.0000			
un	0.0415	0.3803	-0.0286	0.2051	1.0000		
rer	0.0218	0.7130	0.3676	-0.0965	0.4129	1.0000	
income	0.1042	0.3219	0.4478	0.2785	-0.0500	0.1607	1.0000

Note: 0.5 is used as a benchmark for multicollinearity

The empirical estimation results are presented in Table 4.3.2. The empirical estimation sh ows the negative correlation between taxes on international goods and net barter terms of trade in dex, a positive correlation between NTT and resource rents, and a minimal negative correlation b etween NTT and real exchange rates.

Table 4.3.2: Regression Results, Random and Fixed

Regression Results (ntt)		
	Random Effects	Fixed Effects
Constant	102.923*** 11.65	112.868*** 11.38
inf	-2.142*** (2.72)	-2.328*** (2.92)
resource	3.583*** 8.02	3.571*** 7.62
taxes	-3.530*** (4.42)	-4.249*** (4.64)
un	0.483 0.50	0.01 0.01
rer	-0.001 (0.46)	-0.001 (0.08)
income	-0.162 (0.30)	-0.126 (0.23)
R-squared	0.3261	0.3048
F-stat	N/A	28.78***
Obs.	118	118

Note: ***, **, and * denotes significance at the 1%, 5%, and 10% respectively
T-statistic in parentheses

Taxes on international goods was significant at the 1% level in both random and fixed eff ects tests. This variable is consistent with the results of Santos-Paulino and Thirlwall (2004) in w hich a decrease in taxes on international goods stimulate an import growth more than an export g rowth. This is also represented in Figure 3.1. For this study, it can be concluded that ceteris parib us an elimination of duties could result in an increasing trade deficit. Given the scope of the stud y, the fixed effects regression allows for the best interpretation of the results. As expected resour

ce rents are positively correlated and significant at the 1% level. This finding indicates that a cou ntry whom sells a resource at a higher price point then their neighboring country, that country wi ll be more like to experience an export growth over and import growth. Once again, given everyt hing else held constant. Interestingly, the real exchange is not significant in both random and fixe d effects regressions. It can be determined that the real exchange rate is exogenous and there are other variables that impact it. This finding is also supported by trend graphs Figures 3.4 and 3.5. Similarly, the unemployment and annual percentage of GDP are not significant. Last, inflation of consumer prices is negatively correlated and significant at the 1% level. This yields that an incre ase in inflation results in more exports over imports. The explained variation in the random effect s regression is 0.3261 and the fixed effect regression yields about 2% lower at 0.3048. We can co nclude from this statistic that more variables should be included to explain a change in the net ba rter terms of trade index for a country in a given year.

5.0 CONCLUSION

In summary, taxes on international goods is significant and negatively correlated with the net barter terms of trade index. This indicates that trade liberalization could grow the trade defici t in a country. Additionally, resource rents were significant and positively correlated supporting t hat cheaper resources in a country is a driving factor why companies relocate to those countries. This supports the reasoning why over 700,000 U.S. industrial jobs relocated to Mexico after the i ntroduction of NAFTA. Last, the real exchange rate was insignificant in both the random and fix ed effects models, indicating the variable to be exogenous. Together, this study concludes to not be in favor of the Trans-Pacific Partnership holding extraneous variables constant.

There were some data limitations while measuring this relationship. First, there was missi ng data for taxes on international goods. This significantly decreased the number of observations from 190 to 118. Further datasets should be explored to account for this variable. In addition, due to data availability and cost, including other variables such as CO^2 emissions, cost of labor, and i ntellectual property payments (provisions as part of both NAFTA and the TPP) would have great ly increased the explained variation. It is unknown whether including these variables will effect t axes on international goods, resource rents, and the real exchange rate.

In regards to policy implications and making reference to Santos-Paulino and Thirlwall (2004), it would be of best interest to draft an extension of NAFTA to accommodate for more of a

long-term trade balance and potentially decrease the amount of taxes for specific tariff classifications to lift stifling trade barriers stopping companies from reaching foreign markets. Last, increasing the money supply in countries with strong currencies would allow for more exports, also supporting the trade balance. Due to several exogenous macro variables, implementing policy changes to account for the TPP will have unknown effects in other economic areas.

In order for these conclusions to stand true, assumptions needed to be observed. First, it is debated that NAFTA directly eliminated over 700,000 U.S. industrial jobs within a six year time period. It is noted that only about a third of U.S. goods are exported to Canada and Mexico, and thus difficult to measure industrial job destruction. As well, further research needs to be explored in order to capture provisions of both NAFTA and the TPP including the trade of intellectual property, cost of labor, greenhouse gas emissions, the new Logistics Performance Index, and more in order to account for the unexplained variation. Last, a secondary model could be included to measure the importance of the real exchange rate in regards to the scope of this study. To conclude, it is proven that trade liberalization to some magnitude contributes to an imbalance of trade, however still uncertain given the presence of additional exogenous variables that need to be tested.

Appendix A: Variable Descriptions and Data Sources

Variable Descriptions and Data Sources		
Acronym	Variable Description	Variable Source
inf	Inflation as measured by the consumer price index reflects the annual percentage change in the cost to the average consumer of acquiring a basket of goods and services that may be fixed or changed at specified intervals, such as yearly. The Laspeyres formula is generally used (annual %).	International Monetary Fund, International Financial Statistics and data files
resource	Total natural resources rents are the sum of oil rents, natural gas rents, coal rents (hard and soft), mineral rents, and forest rents (% of GDP).	Estimates based on sources and methods described in "The Changing Wealth of Nations: Measuring Sustainable Development in the New Millennium" (World Bank, 2011)
ntt	Net barter terms of trade index is calculated as the percentage ratio of the export unit value indexes to the import unit value indexes, measured relative to the base year 2000. Unit value indexes are based on data reported by countries that demonstrate consistency under UNCTAD quality controls, supplemented by UNCTAD's estimates using the previous year's trade values at the Standard International Trade Classification three-digit level as weights. To improve data coverage, especially for the latest periods, UNCTAD constructs a set of average prices indexes at the three-digit product classification of the Standard International Trade Classification revision 3 using UNCTAD's Commodity Price Statistics, interna-tional and national sources, and UNCTAD secretariat estimates and calculates unit value indexes at the country level using the current year's trade values as weights (2000 = 100).	United Nations Conference on Trade and Development, Handbook of Statistics and data files, and International Monetary Fund, International Financial Statistics
un	Unemployment refers to the share of the labor force that is without work but available for and seeking employment (% of total labor force).	International Labour Organization, Key Indicators of the Labour Market database
taxes	Taxes on international trade include import duties, export duties, profits of export or import monopolies, exchange profits, and exchange taxes (% on revenue).	International Monetary Fund, Government Finance Statistics Yearbook and data files
rer	Real exchange rates calculated from nominal exchange rates and CPIs (relative to U.S.).	Dr. Kari Heerman from the U.S. Department of Agriculture
income	Annual percentage growth rate of GDP at market prices based on constant local currency. Aggregates are based on constant 2005 U.S. dollars. GDP is the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products. It is calculated without making deductions for depreciation of fabricated assets or for depletion and degradation of natural resources.	World Bank national accounts data, and OECD National Accounts data files.

Appendix B: Variable Descriptions and Expected Signs

Variable Descriptions and Expected Signs			
Acronym	Variable Description	Captures	Expected Sign
inf	Inflation as measured by the consu mer price index	Percentage value of inflation of consumer prices in a host country	-
resource	Total natural resource rents of oil, natural gas, coal, minerals, and for ests	Percentage value of all resour ce rents in the host country	+
un	Unemployment rate	Percentage value of the unem ployed labor of total labor in a host country	+
taxes	Taxes on international trade for bo th exports and imports	Percentage value of all taxes in the host country	-
rer	Real exchange rates	Nominal exchange rates an d CPIs relative to the U.S.	+/-
income	Annual percentage growth rate of GDP	Market prices based on co nstant local currency	-

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