ERASMUS UNIVERSITY ROTTERDAM

Erasmus School of Economics
Department of International Economics

Master Thesis

"What is the impact on trade flows by leaving the Andean Trade Promotion and Drug Eradication Act?"

Submitted by: Lukas Klautke (455447)
Programme: M.Sc. International Economics
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Supervisor: Aksel Erbahar
Second assessor: Laura Hering
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Abstract

This paper examines how leaving the Andean Trade Promotion and Drug Eradication Act (ATPDEA), affected the trade flows between Bolivia and the United States of America. To perform the empirical analysis, a natural experiment set up is used with Bolivia and Ecuador serving as the respective treatment and control group, over the time period from 2001-2013. HS six-digit product code panel data on USA imports, have been used to conduct a high dimensional fixed effects model. The Poisson-Pseudo Maximum Likelihood (PPML) estimator has been applied to account for zero trade flows. The theoretical base of this research paper is given by the gravity model. Previous research has found that entering a trade agreement leads to an increase in trade volumes between partner countries. Thus, a decrease is expected when leaving such an agreement. This research paper provides insight on the effect of breaking up a chosen trade agreement on import volumes.

This paper finds that for a one percent increase in the tariff rate, which is due to leaving the ATPDEA, the import volume is expected to decrease by 16.30%. Furthermore, a one percent decrease of the exporting country's currency, results in a significant increase of imports by 6.21%. This paper finds significant effects when breaking up a chosen trade agreement.

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1. Introduction

In October 2002, the Bush administration of the United States of America (USA), granted Bolivia, Colombia, Ecuador and Peru preferential access to its home market via reduced tariff rates on imports under the Andean Trade Promotion and Drug Eradication Act (ATPDEA) (Bush, 2002). By offering alternative income generating possibilities via reduced tariffs on goods of partner countries entering the USA, the preferential trade agreement aimed at reducing the production of drugs in partner countries (USTR, 2002). Nevertheless, on December 15th, 2008 president Bush effectively withdrew Bolivia from the ATPDEA due to a lack of cooperation in counternarcotic efforts (Perino, 2008). Therefore, this set up enables this empirical study to research the trade effects by leaving a preferential trade agreement.

1.1 The natural experiment set-up

Since the decision of the USA to withdraw Bolivia from the ATPDEA, has been uncorrelated to the dependent variable imports, this case represents an exogenous policy shock. Thereby providing a unique natural experiment with Bolivia being the treatment group. Unlike Bolivia, Ecuador has been the only partner country to remain in the ATPDEA until 2013 and continued to enjoy preferential tariffs for Ecuadorian products. Furthermore, Ecuador and Bolivia followed a common trend in their trade dynamics with the USA before Bolivia had to leave the ATPDEA. Therefore, Ecuador serves as the control group in this natural experiment.

1.2 Relevance of the study

According to Ed Gresser, a trade policy specialist, the ATPDEA is the first ever trade preference program by the USA to "fade out" (Reuters, 2013). This historic example in trade policy is a possibility to highlight and research the real effects of breaking up trade ties in a globalized and trade dependent world. With the current Brexit decisions on they way, which might risk trade ties to break up, this paper provides insights of one chosen natural experiment on the real costs to eliminating existing trade agreements. The research question is of academic relevance since the effects of trade agreements have experienced large academic attention. This research paper will add to the academic literature by filling the gap of estimating the effects of leaving a trade agreement. Next to its academic relevance, this paper bears a policy interest. Therefore, the findings can support an extended debate on the "real costs" of breaking

up trade agreements, in the current political climate, which is characterised by looming global "trade wars" and protectionist policy (The Economist, 2018).

1.3 Research objective

The aforementioned case provides the base for carrying out a difference-in-difference analysis via a gravity model framework. This paper will conduct the gravity model with panel data. It adopts a high dimensional fixed effects model with a difference-in-difference estimator. The Poisson-Pseudo Maximum Likelihood (PPML) method will be used to account for zero trade flows. Therefore, this paper's research question is: "What is the impact on trade flows by leaving the ATPDEA?".

This paper finds that when looking at a one percent increase in the tariff which is due to leaving the ATPDEA, imports are expected to decrease by 16.30%. Furthermore, this paper finds that by decreasing the exchange rate of the exporting country there is a positive impact on imports.

The research structure of this paper is threefold: First, a brief overview of the ATPDEA and its trade implications is given Second, the current state of the academic literature measuring the impact of PTA's on trade and its application to this paper, will be illustrated. Third, the data, methodology and results will be highlighted before the results will be discussed and conclusion is drawn.

2. The Andean Trade Promotion and Drug Eradication Act

The ATPDEA was a unilateral nonreciprocal PTA, enacted on October 31st, 2002, which ensured lower tariffs on products imported from partner countries (USTR, 2002). PTA's represent an exception to the fundamental non-discrimination principle (Most-Favoured-Nation principle) of the World Trade Organization (WTO), in which WTO-member countries are not permitted to assign different tariffs to different trading partners (WTO, 2011). However, via the "enabling clause for developing countries", developed countries are allowed to engage in PTA's with developing countries, in order to promote the participation of developing countries in the WTO (WTO, 1979).

2.1 Origin of the ATPDEA

Since 2002, the ATPDEA included the following partner countries: Bolivia, Colombia, Ecuador and Peru (USTR, 2002). The ATPDEA was the successor of the Andean Trade Preference Act (ATPA), which started in 1991 and also granted partner countries reduced tariff rate access to the market of the USA (ATPA, 1991). Colombia and the USA signed a bilateral free trade agreement in 2006 which went into effect on May 15th, 2012 and marked the exiting of Colombia from the ATPDEA (USTR, 2012). In 2006, Peru signed a bilateral trade promotion agreement with the USA which was implemented on February 1st, 2009 and as a result Peru left the ATPDEA on that date (The President, 2009). Furthermore, and most important for this research paper is that Bolivia lost its beneficiary country status on December 15th, 2008 due to its failure to fulfill its effort of reducing narcotic production (Perino, 2008).

2.2 ATPDEA partner countries and their exiting of the agreement

However, a series of political incidents occurring prior to Bolivia being forced to leave the ATPDEA, suggest that the USA tried to retaliate Bolivia for reasons irrespective of neglecting counternarcotic efforts. Before leaving the ATPDEA, Bolivia openly suspected the USA and its ambassador to Bolivia, Philipp Goldberg, to be meddling with Bolivia's internal affairs and meeting with groups involved in organising destabilizing violence. Furthermore, Bolivia found the USA to be spying on Bolivia via Peace Corps volunteers and Fulbright scholars. As a reaction, the Bolivian government expelled the American ambassador from Bolivia (CBS News, 2008; Friedman-Rudovsky & Ross, 2008; Ribando, 2008; Weisbrot, 2009). These incidents might have motivated the withdrawal of Bolivia's partner country status under the ATPDEA. Furthermore, an official study from the United Nations Office on Drug and Crime has shown that Bolivia's drug cultivation area is accounting for the smallest surface of all ATPDEA partner countries as well as that drug production in 2007 has only increased by 5% (UNODC, 2008). In comparison, the area used for the cultivation of narcotics in Colombia, a country which the USA has good diplomatic ties with, has increased over the same period by 27% (ibid.). Therefore, there exist indications that Bolivia being forced out of the ATPDEA was not exclusively due to neglecting counternarcotic efforts.

Similar indications can be found when examining the political incidents predating, the loss of the partner country status of Ecuador in 2013. After Ecuador has faced allegations by USA lawmakers, of consulting whether to provide Edward Snowden with asylum, Ecuador

gave up its preferential trade rights under the ATPDEA to avoid "blackmail" by the USA (Carroll, 2013; Forero, 2013). As a result, the ATPDEA expired for Ecuador on July 31st, 2013.

To summarize, Peru and Colombia entered into bilateral trade agreements with the USA and left the ATPDEA in 2009 and 2012, respectively. Bolivia and Ecuador lost their member status of the ATPDEA in 2008 and 2013, respectively.

2.3 The objective and scope of the ATPDEA

The main objective of the ATPDEA was to foster economic development, by strengthening legal industries in partner countries (USTR, 2001). The idea has been that by offering preferential market access, legal alternative industries would thrive and the incentive to engage in the narcotics business would be reduced. Member countries also had to demonstrate efforts to actively fulfil their international targets of reducing the production and trafficking of drugs (USTR, 2001).

Initially 5.600 duty free products were included under the ATPA. The ATPDEA expanded this base up to 6.300 products (USTR, 2002). By default, all products which were grown, produced or manufactured in the partner countries were included, unless they have been explicitly excluded (ATPDEA, 2002). A further criterion for the product eligibility has been, that the sum of the cost of the materials and the direct costs of processing must be smaller than 35% of the value of the product in order to be granted a reduced tariff rate (ATPA, 1991). The previous ATPA, excluded the following products from duty-free treatment: textile & apparel articles; footwear; tuna in airtight containers; petroleum & petroleum derivatives; watches & watch parts; articles to which reduced rates of duty apply; sugar, syrups & molasses; rum & tafia (ibid.). The ATPDEA adopted the following product categories: footwear; petroleum; watches and watch parts; handbags, luggage, flat goods, work gloves & leather wearing apparel (ATPDEA, 2002). Thus, excluded from the ATPDEA were the following: textiles and apparel articles; rum & tafia; sugars, syrups & sugar containing products subject to over-quota duty rates and tuna in airtight containers (ibid.).

The following section reviews the contributions in the literature which measure the impact of trade agreements on trade flows.

3. Literature review of the gravity model

In order to answer the research question: "What is the impact on trade flows by leaving the ATPDEA?", the following will provide an overview of the existing literature measuring the impact of trade agreements on trade flows. The analysis of the research question is based on the gravity model, which is considered the central "workhorse" for the past 50 years of measuring the impacts of trade agreements on trade flows according to Head & Mayer (2014). The basic gravity model stems from Tinbergen (1962), who observed a mere empirical relationship between bilateral trade flows being explained by the mass of trading economies, measured by their gross domestic product (GDP), and their distance to one another. Thereby, bilateral trade is predicted to be increasing with the size of the economies and decreasing with the distance between the two trading partners. The gravity model first gained some theoretical footings by the study of Anderson (1979), who set up a theoretical two country framework in a market situation of total specialization. Since then the gravity research has emerged in numerous theoretical specifications.[1]

As illustrated by the following paragraph, there exists a large body of research on the impact of trade agreements on trade flows. However, there does not yet exist a significant amount of literature, using an ex-post assessment via the gravity equation, on the effects of withdrawing from trade agreements. Although the ATPDEA is a PTA, this literature review will include findings of general trade agreements.

Caliendo et al. (2015), who use a large scale heterogenous-firm trade model, find that over 90% of trade gains are due to the reductions in most favoured nations tariffs. However, Saucier & Rana (2017) and Kohl et al. (2016) suggest, that there exists a large heterogeneity between PTA's which makes it hard to observe PTA's as a homogenous category. Furthermore, there is a sharp rise in the existence of PTA's. Compared to the year of 1990, there existed up to four times more PTA's in 2010 (Limão, 2016). Limão (2016) argues that PTA's have represented the most important reform of trade policy in the last two decades for most countries, making the topic of the research question currently important. Based on the literature review, there does not exist a research paper analysing the impact of leaving a PTA via a difference-in-difference gravity model.

[1] For a well-structured overview of the micro foundations for the gravity equations see Head & Mayer (2014).

3.1 General Findings of the Literature Review

Baier et al. (2014) and Kohl (2014), find that the existence of trade agreements with deeper levels of economic integration, experience a larger impact on international trade flows. Similar results have been found by Ghosh & Yamarik (2004), Kohl & Trojanowska (2015) and Ebbel (2016). Thus, one can expect that the ATPDEA's trade flows will only have been modestly impacted, since PTA's represent one of the weakest forms of economic integration. Gil-Pareja et al. (2017) establish, that reciprocal agreements have a large impact on increasing export flows from beneficiary countries to benefactor countries, in comparison to nonreciprocal agreements. Therefore, weaker impacts on trade flows should be expected in the case of the ATPDEA since it is a nonreciprocal PTA. Furthermore, there exits evidence that the full impact of economic integration agreements on the sum of the bilateral trading flows becomes first visible after ten to fifteen years (Baier & Bergstrand, 2007). As Baier et al. (2014) notices, economic integration agreements such as PTA's are of a "slow-moving nature" and it is of importance to capture time displaced influences. Thus, when assessing the ATPDEA, lagged effects to measure impacts first occurring at a later stage will be taken into account when checking the model for its robustness.

3.2 Empirical Findings

Since its emergence, the gravity equation has undergone substantial developments which has impacted the validity of its studies. Therefore, the following will put forth the main empirical findings as well as its methodological advancements.

There exists a large body of literature utilizing gravity models to measure the trade effects of trade agreements. However, it has been argued by Baier & Bergstrand (2007) that the evidence on trade creation by trade agreements has been rather mixed. For the free trade agreement (FTA) on the European Community for instance, there have been two opposing findings. On the one hand, Brada & Mendez (1985), Aitken (1973) and Abrams (1980) show significant effects on trade flows increasing amongst member states, whereas Frankel et al. (1995) and Bergstrand (1985) retrieved insignificant effects (Baier & Bergstrand, 2007). Furthermore, Dee & Gali (2005) find that most PTA's did not raise the trade flows of its members. It has been argued that both the empirical findings commented by Baier & Bergstrand (2007) as well as those by Dee & Gali (2005) have been fallen subject to the treatment effect of self-selection into free trade agreements and thus must be observed with caution.

Therefore, dropping the assumption that FTA dummies are exogenous since they self-select and are related to the level of trade, emerged into a new era of research (Baier & Bergstrand, 2007). This caution to endogeneity bias, when assessing trade policies in international economics, has also been put forth by Trefler (1993), who found that when solving the bias via instrumental variables, the effect of trade policies increased significantly by a factor of ten. However, Baier & Bergstrand put forth that panel data controls better for endogeneity since it is easier to obtain and good instruments are not readily available (Baier & Bergstrand, 2007) Thus, it has been argued by Baier & Bergstrand (2007), that research estimating the effects of FTA's and treating them as an exogenous action, on the corresponding developments in the trade flows, have been fallen subject to providing an incorrect estimation of the true impact of trade agreements by as much as 75-85%.

The second stage of research, which solved the endogeneity bias shows a lot of evidence for an increase in trade flows by the creation of trade agreements. Baier & Bergstrand (2007) find on average that the bilateral trade flows between two parties increased by 100% after 10 years of the introduction of a trade agreement, thereby doubling bilateral trade. Furthermore, Dür et al. (2014) and Goldstein et al. (2007), find that PTA's significantly increase international trade flows on average. However, these studies have not taken zeros trade flows into account and thus are giving biased estimates.

Therefore, papers taking zero trade flows into account find different estimates. One paper measuring the impact of all non-reciprocal PTA's, between 1960-2008, using an PPML method via the gravity equation, finds that beneficiary and partner countries both significantly increase their export volumes (Gil-Pareja et al., 2014). However, the authors were not able to find that the predecessor of the ATPDEA, namely the ATPA, resulted in an increase of exports to the USA. Gil-Pareja et al. (2017) find that non-reciprocal trade agreements increase both the volume exports of beneficiary countries as well as those of partner countries. Powers (2007) also finds that when controlling for zeros and solving the endogeneity bias, that in all but two analyzed sectors preferential tariff reduction leads to a significant increase in trade. According to Kohl et al. (2016), there seems to exist a common view in the literature, like Subramanian & Wei, 2007; Tomz et al., 2007; Liu, 2009; Chang & Lee, 2011; Herz & Wagner, 2011, that trade agreements lead to higher trade flows when taking zeros trade flows into account. Additionally, Barbalet et al. (2015) find that PTA's increase trade flows between member countries on average, but they show negative trade effects with non-members.

Overall, when controlling for endogeneity biases as well as taking the differing effects into account between various forms of economic integration, there seems to be evidence for trade creation effects by trade agreements including PTA's. Therefore, this paper hypothesizes that by eliminating a PTA, like in the case of Bolivia, the opposite effects will occur, i.e. the withdrawal of a PTA will lead to lower trade flows between beneficiary countries and partner countries.

4. Application of the gravity equation for trade flow modelling

The following section will provide the basis for the methodological set up of this research paper. Hence, it is going to highlight the main methodological achievements, which will be included in this paper.

4.1 Solving the endogeneity bias

Baier & Bergstrand (2007) put forth that the independent variables of the gravity model, for instance the dummy variable for the existence of a trade agreement, are likely correlated with the error term. They point out that this is problematic since the regression will be subject to an endogenous bias. Baier & Bergstrand suggest that the root of this cause might be due to omitted variables. Specifically, their study suggests that the omitted variables bias stems from the strong relationship between the decision to enter a trade agreement and other policy- and economic factors which are not observable but included in the error term. In another paper Baier & Bergstrand (2004) find that the bigger the GDP as well the more alike economically two countries are, the bigger is the chance of two countries to form a trade agreement. Their probability to enter such a trade agreement is also rising, if two countries show a bigger difference in their endowments of production factors. Since both the differences in endowments as well as the similarities of the GDP's can be seen as benefitting the promotion of trade agreements but are not taken care of in the regression, there might be endogeneity bias. In order to solve this kind of bias, Baier & Bergstrand suggest using a fixed effects modelling approach with panel data. They argue that this takes care of the unobserved and time-invariant heterogeneity and reaches more accurate estimates. Kohl et al. (2016) also employ this kind of model to solve for endogeneity. The research design and the estimation specification of this research paper assessing the impact of the ATPDEA, might also fall subject to the aforementioned endogeneity bias due to differences in the countries which represent the control and treatment group. Additionally, in this scenario the decision of the USA, to withdraw

Bolivia from the ATPDEA, is uncorrelated to the dependent variable imports since it has been a pure exogenous policy shock. Thus, in this paper the combination of the exogenous nature of the policy shock as well as the panel data and fixed effects approach, aims at taking care of the endogeneity bias.

4.2 Handling zero trade flows

Omitting zero trade flows has been practiced a lot by previous research papers including Baier & Bergstrand (2007). Researchers attempted to deal with zero trade values by giving previous zero values, just very small values in order to still log linearize them. Zero trade flows are problematic, since they often represent a large percentage of the entire trade flows in data sets and removing them would lead to a sample selection bias. The data of this research paper assessing the impact of the ATPDEA, shows that 90% of trade flows are zeros, which is due to the fact that trade flows are analyzed on a highly disaggregated level, i.e. the HS 1996, 6-digit level. Urata & Okabe (2014), argue that the more disaggregate the trade data, the higher the share of zeros. The reason for research papers to leave out the zeros is that when applying the log of a zero, its value is mathematically not set. Urata & Okabe (2014) emphasize the importance of including the zeros, since zero trade flows are not randomly distributed due to various factors impacting them. Urata & Okabe (2014) argue that "distance, lack of political and cultural links, and large differences in production structures" have an impact on generating the zero trade flows. It has been argued that the occurrence of zeros is not random since they find them to be correlated to distance. Santos Silva & Tenreyro (2006) use the Poisson Pseudo Maximum Likelihood (PPML) method in order to account for zero trade flows and heteroskedasticity. They find robust estimates whilst having heteroskedasticity. Although their method has been criticized to not perform well with a high share of zeros (Martin & Pham, 2015), they find in a more recent paper that their estimates are unbiased even when having a lot of zero trade values (Santos Silva & Tenreyro, 2011). Therefore, the PPML estimator is applied in this paper, since the literature has shown that when only including non-zero trade flows, there is a significant divergence between estimated and actual trade flows which translates into a bias in the interpretations of the models results.

4.3 Multilateral resistance terms

Furthermore, Anderson & van Wincoop (2003) define the average unobserved trade barrier as multilateral resistance. They argue: a country who faces difficulties to trade with all other given partners in a region is more likely to be forced to trade with a certain other bilateral

partner. Increasing trade barriers such as transport costs or tariffs, raises the level of the multilateral resistance. Raising trade barriers uniformly, increases the multilateral resistance. Especially small countries are more dependent on trade outside the own country and are thus more impacted than larger countries which can still fall back on domestic trade. Thus, dealing with multilateral resistance is important in specifying and correctly estimating the gravity equation. Kohl et al. (2016) argue that the fixed effect approach will pick up time varying unobservable variables correlated to the error term as well as unobservable effects like prices. Powers (2007) also employs a fixed effects approach paired with panel data with a PPML method, to account for multilateral resistance. Metulini (2013) argues as well that in a panel data model, fixed effects will fully account for the classical multilateral resistance terms. Also, Baier & Bergstrand (2007) put forth the necessity to use both exporter- / importer time fixed effects in order to account for the multilateral resistance terms. Feenstra (2015) provides evidence that correct and consistent coefficient can be estimated if the importer-/exporter fixed effects will be used to capture multilateral resistance terms. Therefore, using the fixed effect approach will take into account these multilateral resistances.[2]

5. Methodology

This section describes the regression specification as well as the empirical estimation strategy. As mentioned above, this paper will employ the gravity model with panel data. It adopts a high dimensional fixed effects model with a difference-in-difference estimator. Furthermore, the Poisson-Pseudo Maximum Likelihood (PPML) method will be used to estimate the regression in order to account for zero trade flows.

5.1 The regression specification

This paper uses the gravity equation as a natural starting point in order to set up the model. Thereby, an adjusted form of the gravity equation by Anderson & van Wincoop (2003) and Silva & Tenreyro (2006) is used. The gravity equation used looks as follows:

$$M_{ijt} = ß_0 + ß_1\ ExitATPDEA + ß_2\ ln\ realGDPpc_{jt} + ß_3\ ln\ exchangerate_{jt} + ß_4\ tariff_{ijt} + ß_5\ ln\ fdiinflows_{jt} - \boldsymbol{x}_{ij} - \gamma_t + e_{ijt}$$

[2] A comprehensive overview of papers using fixed effects modelling to take care of multilateral price terms can be found in Gomez Herrera (2013).

Where the dependent variable M_{ijt} represents the absolute import value (in million USD) of the USA of product category *i* from exporting country *j* in the year *t*. In this paper's set up scenario, the importing country is always the USA whereas the exporting country is either Bolivia or Ecuador. The other participant countries do not serve as well as control groups since they have transformed their trade agreements with the USA already at an earlier stage and would thus be difficult to compare.

In the regression equation $ß_0$ is a constant value. The dummy variable *ExitATPDEA* takes the value of one if the country is in the treatment group and the year is in the treatment period, otherwise it will take the value zero. Thus, $ß_1$ represents the difference-in-difference estimator of this research paper. Its empirical implications and set up will be discussed below.

The coefficient $ß_2$ represents the logged variable $realGDPpc_{jt}$ which is the real gross domestic product per capita (in USD) of exporting country *j* in year *t*. Thus, after taking the natural logarithm the variable is measured in terms of percentage with a higher value indicating a higher state of gross domestic product per capita.

The coefficient $ß_3$ represents the logged variable $exchangerate_{jt}$ which is the exchange rate between the currencies of the importing country (always the USA) and exporting country *j* in year *t* in percentage. An increase in the exchangerate reflects an appreciation of the exchange rate of the exporting country.

The coefficient $ß_4$ represents the variable $tariff_{ijt}$ which is the duty rate (in percent) of the importing country applied on product category *i* for products exported by country *j* in year *t*. The variable is given in terms of percentage.

The coefficient $ß_5$ represents the logged variable $fdiinflows_{jt}$ which is the net foreign direct inflows into exporting country *j* in year *t*.

The variable $\boldsymbol{x}_{ij}$ represents the product code country fixed effects on product category *i* to exporting country *j*. The variable γ_t captures the year fixed effects in year *t*. The variable e_{ijt} captures the error term which contains the remaining variation of the dependent variable which has not been explained by the independent variables in the model. All regressions are run with robust standard errors using the Stata command "vce (robust)".

The dependent variable imports represent the trade flows coming into the USA. Thereby, imports into the USA have been chosen over exports from Bolivia and Ecuador, since the USA are likely having a higher quality of trade flow data reporting due to their more

credible statistical agencies. Furthermore, the explanatory variable GDP per capita has been chosen over GDP, since GDP per capita serves as a proxy for the capital endowment ratio. Also, two countries with a comparable GDP might be in completely different developmental statuses (Bergstrand, 1985). The control variable exchange rate has been adopted since it has been argued that its volatility over several years might have an impact onto the trade flows (Kepaptsoglou, 2010).[3] The variable tariff has been chosen since it is regarded as one of the main resistance factors and since the tariffs are changed due to existence/absence of trade agreements. It adds to the transportation cost which are likely to lower the trade flows the higher the tariff (ibid.).[4] The variable FDI inflows has been chosen since there seems to be evidence that FDI inflows have a positive impact on exports (Chang, 2005).

5.2 Natural experiment & difference-in-difference estimation

This paper researches the effects on trade by leaving a preferential trade agreement via a difference-in-difference estimation. The estimation strategy can be applied since there is a natural experiment at hand. According to Dunning (2012), there are three criteria that have to be met in order for a scenario to qualify as a natural experiment. The first criterium is that the assignment to the treatment (i.e. leaving the ATPDEA) or control is as-if random. This should lead to a randomized trial which is independent of the researchers set up of the model (Barlow et al., 2018). Second, the statistical model used to analyze the data of the model must be credible. Therefore, the differences between the control and treatment group should not be the result of confounders (Dunning, 2012). Third, there should exist a relevance to the estimated difference between treatment and control group (ibid.).

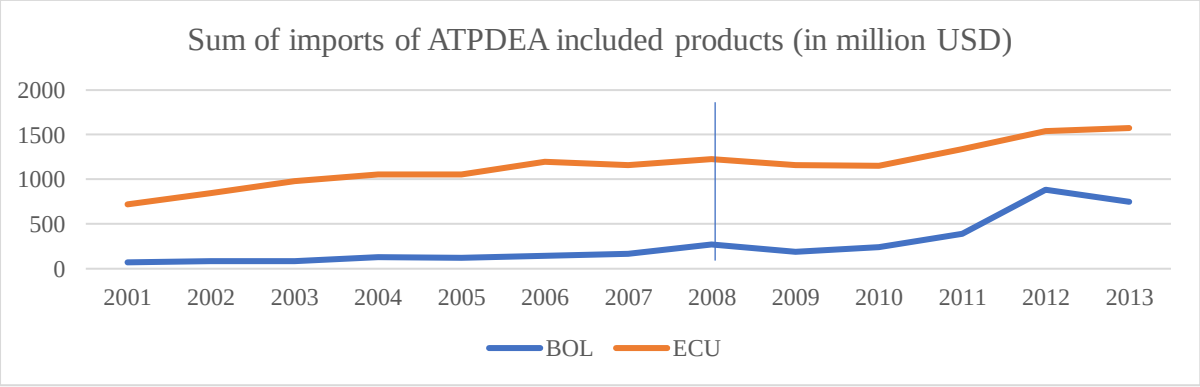
The treatment in this natural experiment set up, describes the situation in which Bolivia is leaving the ATPDEA in the year of 2008 by the decision of president Bush due to a lack of counternarcotic efforts on Bolivia's side. As mentioned in the introduction, the decision of withdrawing the eligibility status of Bolivia being a member of the ATPDEA, occurred in a random and unforeseeable manner which no party could have anticipated. The ATPDEA break up has also not been part of a reform linked to economic crises. Furthermore, the method which is going to be applied here is carried out in a transparent manner and derived from the current academic literature. Additionally, the data gathering process will be laid out and there has not

[3] Studies using exchange rate as an explanatory variable include: Rose (2000), Arghyrou (2000), Eger (2002), Tang (2005), Nowak-Lehmann et al. (2007).
[4] Studies using tariff as an explanatory variable include: Fukao et al. (2003), Wilson et al. (2003), Pelletiere & Reinert (2004), Lampe (2008), Urata & Okabe (2014).

been evidence of differences in confounders between different groups. The natural experiment set up is both academically relevant, since there is not yet a lot of literature on withdrawing from PTA's, as well as practically relevant due to its large policy relevance for future trade agreement break ups. Therefore, to the knowledge of this research paper, all necessary conditions for a natural experiment are fulfilled.

5.3 Common trend assumption

Due to the natural experiment character of this research scenario, the difference-in-difference (DID) estimation is chosen. The general idea of the DID estimation is that one compares the treatment and control group before and after the policy change (here Bolivia leaving the ATPDEA). The underlying assumption of the DID estimation is the common trend assumption. This means that the trade flows of the treatment and control group to the USA are supposed to be close to one another before the treatment took place. Therefore, in order to estimate this treatment effect this research paper uses the DID estimation by the creation of the dummy variable *ExitATPDEA*. It takes the value one for Bolivia after 2008 but zero for Ecuador. Since this papers interest is purely on this treatment effect, only the product codes which have been included over all times and overall years in Ecuador and Bolivia, before the treatment, are included. This is the case since the only variable which is going to change due to the policy shock, is the tariff rate. The following figure shows the common trend assumption, in which one can arguably visually identify a common trend before the policy intervention for Bolivia (BOL) and Ecuador (ECU).



5.4 Estimation specification

The aforementioned regression is estimated by the PPML method and is therefore dealing with the zero-trade flow problem that has been mentioned in this paper's literature review. Since the model of this research paper is based on product code data and is therefore

highly disaggregated, multiple zero values are present which require this form of estimation. Furthermore, this estimation method also provides unbiased estimates even though there might be heteroskedasticity. As Gomez Herrera (2013) points out, when using this method all observations are weighted equally and the mean is always positive. Because PPML fits the equation of the form $\mu = e^{\alpha+ßx}$, we can interpret the coefficients of the independent variables as if the dependent variable was logged and the independent variables are in linear combination. The independent variables are left the same type as inserted when interpreting as the dependent variable is logged (PennState, 2008)

Furthermore, the methodology employed in this research uses a high dimensional fixed effects approach combined with the PPML estimator. Therefore, this paper makes use of the newly developed "ppmlhdfe" Stata command developed by Correia et al. (2019). According to Guimarães & Portugal (2011), a fixed effect classifies as a high dimensional fixed effect if it possesses many categories which increase with the size of the sample (Correia, 2016). Introducing high dimensional fixed effects may control for unobserved heterogeneity which occurs amongst a group of observations (Guimarães & Portugal, 2011). This research paper employs high dimensional fixed effects since the model has a large number of observations and variables and therefore introducing individual dummy variables to account for the fixed effects would be infeasible. Furthermore, the here applied high dimensional fixed effects take care of the endogeneity bias as well as the multilateral resistance terms mentioned earlier in the literature review like distance, common border, language and adjacency or any time invariant heterogeneity. Also, these high dimensional fixed effects pick up the relatively small variation of the importer's real gross domestic product per capita.

6. Data

This paper uses panel data which is arranged by country-year. This study finds that the data set is strongly balanced as shown when employing the product code-country coding for panel data. This means that for each product code and country pair, there is an observation during the entire time period (years). The data set includes yearly timeseries import data between Ecuador and the USA as well as Bolivia and the USA for the years 2001-2013. As mentioned earlier in the paper, unlike Bolivia, Ecuador remained in the ATPDEA until the year 2013. Thus, Ecuador remained 5 years in the ATPDEA after Bolivia had to leave. The other participant countries do not qualify as a potential control group since they have been transforming their trade agreements with the USA already at an earlier stage and would thus

be difficult to compare. Although Ecuador has also fallen subject to a clear exogenous policy shock in the year 2013, by its withdrawal from the ATPDEA, it lacks the control group for the period after 2013. Assuming that any other of the included countries, which transformed the ATPDEA into a free trade agreement, could serve as a good control would be not accurate. Baier & Bergstrand (2007) argue that trade agreements liberalize trade well beyond the reduction of tariffs. Thus, both the time period from 2001-2013 as well as the specified control and treatment groups have been identified.

6.1 Variables

This paper's main dependent variable is the yearly imports from Bolivia and Ecuador to the USA for the period 2001-2013. The data stems from the United Nations Comtrade database (UN Comtrade, 2019) and is given in USD. This paper is using disaggregated import data in the Harmonized System (HS) coding on the six-digit product level. The import data has been converted to the HS 1996 standard. It has been argued that the Standard International Trade Classification (SITC) is not as detailed as the HS, which has been the reason to choose the aforementioned HS coding system (UN Trade Statistics, 2019). Baier et al. (2014) argue that the higher the level of aggregation, the lower the correlation of the extensive margin of trade and the determinants of trade. Using trade data on the product level solves the problem of too much aggregation. The general data on the six-digit product level includes 5113 different product categories. However, since not all product categories are included in the ATPDEA and this paper is interested in estimating the effect of leaving the trade agreement some data manipulations have been done. Therefore, only product categories included in the ATPDEA in each year from 2001 to 2008 are taken into account and will be analyzed for the period from 2001-2013. After dropping the surplus categories, 1853 product categories remain.

The tariff data, which is given in percentage, stems from the UNCTAD Trade Analysis Information System (TRAINS, 2019). The data has been downloaded for each year and converted into the HS 1996 standard. Since the data has been given on the ten-digit product level, the data has been aggregated. This research paper is only analyzing the tariff changes and therefore all non-ad valorem tariffs have been dropped.

The real GDP and the population stems from the WBG (2019). The real GDP is held constant at 2010 USD. The real GDP per capita has been calculated manually. The exchange rate is the real effective exchange rate, given in percentage, with the year 2010 representing

the base year. The real effective exchange rate data stems from CEPII EQCHANGE database (CEPII, 2019). The FDI inflow data stems from the WBG (2019) and is given in current USD.

6.2 Descriptive Statistics

Table 1. – Descriptive Statistics

Variable	Observations	Mean	Std. Dev.	Min.	Max.
Imports (in mil. USD)	48178	0.33	8.73	0	666
ExitATPDEA (dummy)	48178	0.230	0.421	0	1
Real GDP p.c. (in USD)	48178	3156.97	1352.26	1613.41	5311.21
Exchangerate (in %)	48178	97.58	8.92	80.24	118.80
Tariff (in %)	48178	0.97	6.01	0	350
FDI inflows (in mil. USD)	48178	567	387	-239	1750

Dataset includes the years from 2001-2013 for Bolivia & Ecuador

Table 1 reports the descriptive statistics of the most important variables. The values for imports, tariffs and FDI inflows show a large spread, which is due to the disaggregated nature of the data set as well as the long observation period and the zero trade flows. Also, exchange rate is having a high spread according to the standard deviation of around 6%. On the other hand, the distribution of the real GDP per capita is rather narrowly spread since only two countries of a somewhat similar size and development status are included. The following descriptive statistics will highlight those similarities between the treatment and the control group.

Table 2. -Descriptive Statistics Bolivia

Variable	Mean	Std. Dev.	Min.	Max.
Population (in mil.)	9.44	0.59	8.49	10.40
Gross Domestic Product (in mil. USD)	17600	2960	13700	23200
Real GDP p.c. (in USD)	1852.82	194.79	1613.41	2231.48
HDI	.63	.01	.61	.66
Exchangerate (in %)	95.59	11.56	80.24	118.80
FDI inflows (in mil. USD)	560	476	-239	1750

Dataset includes the years from 2001-2013 for Bolivia

Table 3. -Descriptive Statistics Ecuador

Variable	Mean	Std. Dev.	Min.	Max.
Population (in mil.)	14.2	0.88	12.9	15.7
Gross Domestic Product (in mil. USD)	63900	10600	48300	83200
Real GDP p.c. (in USD)	4461.11	466.49	3759.89	5311.21
HDI	.70	.01	.67	.73
Exchangerate (in %)	99.57	4.21	90.89	105.63
FDI inflows (in mil. USD)	574	269	166	1060

Dataset includes the years from 2001-2013 for Ecuador

The additional data of the variables from Table 2 & 3 stem from the World Bank Group (WBG, 2019) and the United Nations Development Program (UNDP, 2019). As previously mentioned, this research paper attempts to analyze the effects of the natural experiment in which Bolivia is serving as the treatment group and Ecuador as the control group. In a perfect artificial experiment, both groups would be exactly the same before the treatment. However, since this is not the case in this real-world scenario, the included controls which are shown in the aforementioned tables are used to account for the differences between the two countries.

In the main regression of this research paper, the real GDP per capita is included to take into account the different economy sizes, population and developmental status of the two economies. The Human Development Index (HDI) is an alternative, which shows the developmental status of a country. In the tables 2 & 3 it can be seen that both countries are roughly similarly well developed with Ecuador scoring a little bit higher in HDI. According to the World Bank Group categories, Bolivia is classifying as a Lower-Middle income country whereas Ecuador is already defined as an Upper-Middle income country (WBG, 2019). Both countries show a mean which is close to one another and therefore do not differ to much in this regard. As previously discussed, the standard deviation of the exchange rate shows that Bolivia has been more exposed to exchange rate volatility than Ecuador. It can also be observed that Bolivia is facing a higher spread in its FDI inflows than Ecuador. All the aforementioned additional controls in table 2 & 3 will be evaluated in the robustness check. The following section will discuss the results of this research paper.

7. Results & Discussion

The following shows the results of the above stated regression model, using the described methodology and data. The model uses the PPML estimator with high dimensional fixed effects. The PPML estimator takes into account all zero trade flows and the import values are not logged. Table four shows the final estimation results.

Table 4. Final Estimation Results

	(1)	(2)	(3)	(4)
Independent Variables	PPML (tariffs)	PPML (ExitATPDEA)	PPML (combined)	PPML (interaction)
Ln Real GDP p.c.	-26.01**	-25.89**	-25.91**	-25.93**
	(11.56)	(12.16)	(12.15)	(12.15)
Ln Exchangerate	6.124***	6.063**	6.057**	6.061**
	(1.861)	(2.667)	(2.667)	(2.665)
Ln FDI inflows	0.278	0.277	0.277	0.282
	(0.216)	(0.219)	(0.218)	(0.218)
Tariffs	0.0133		0.0132	0.0298*
	(0.0255)		(0.0254)	(0.0180)
ExitATPDEA		0.0176	0.0165	0.0308
		(0.456)	(0.456)	(0.456)
ExitTariff				-0.178***
				(0.0617)
_cons	194.0**	193.3**	193.4**	193.5**
	(9.571)	(90.12)	(90.11)	(90.00)
Observations	14563	14563	14563	14563
pseudo R^2	0.956	0.956	0.956	0.956

Robust standard errors shown in parentheses. Statistical significance: * $p < .10$, ** $p < .05$, *** $p < .01$

The PPML model is dropping 31762 observations which are singletons or separated by a fixed effect, leaving the estimation with only 14563 observations. According to Correia (2015), singletons groups are groups which only hold one observation. Correia argues that keeping these observations in the estimation, will lead to biased results in which standard errors are likely to be underestimated and the statistical significance will be overstated.

Furthermore, the pseudo-R^2 is known as the correlation between observed and predicted values (Pfaffermayr, 2019). Thus, the value of 0.956 of the PPML pseudo-R^2 indicates a high goodness of fit of the model.

The PPML model is split up into four different regressions in which the fourth

regression is the final one including all effects. The regression in column one only focuses on isolating the effect that tariffs have on imports whilst leaving the dummy ExitATPDEA aside. However, tariffs taken by themselves do not show to have a significant impact on imports in this model.

Column two shows the effect leaving the ATPDEA on imports without tariffs. As observable from the table, the dummy variable ExitATPDEA is insignificant.

The next regression in column three, including both tariffs and ExitATPDEA doesn't result into significant results on imports by leaving the ATPDEA. The coefficient suggests that by leaving the ATPDEA, the imports into the USA from Bolivia have increased by 1.66 % (i.e. $e^{0.0165}$-1) in comparison to the control group. According to the literature review, joining a trade agreement should increase bilateral trade and thus leaving a trade agreement should result in the counterfactual result, i.e. a reduction in trade. This is explained by the tariff levels effectively not changing since after Bolivia has left the ATPDEA it was still eligible for the General Scheme of Preference (GSP) of the USA. This scheme is specifically targeted at developing countries and is trying to promote developing economies by offering them lower import tariffs for entering the market of the USA. As a result, in 2008 when Bolivia left the ATPDEA one can argue that its terms of trade with the USA has not worsened that much since it was still part of the GSP. This can be seen from table five.

Table 5. -Descriptive Statistics on Bolivian Tariffs

Statistics	2008	2009	Difference in Tariffs from 2008-2009
Observations	1853	1853	1735
Mean	0.600	1.954	0.77
Standard Deviation	4.080	10.206	6.21
Minimum	0	0	-20.00
Maximum	87.5	350	233.33
Median	0.00	0.00	0.00
25% Quantile	0.00	0.00	0.00
75% Quantile	0.00	1.50	0.00

Dataset includes the tariffs for Bolivia, Bolivia left the ATPDEA in December 2008 and continued to be in the GSP in 2009

Table five displays the descriptive statistics on tariffs that the USA applied to Bolivia before and after leaving the ATPDEA trade agreement. When looking at the difference between year 2008 and 2009, once can observe that in the 75% quantile, the change in the average tariff rate has been zero implying that 75% of the entire tariffs didn't change effectively. Furthermore, one can observe that tariff rates on average did change a lot between the years

but only by 0.77, which is rather a low change, thus not impacting trade on average by a lot. Furthermore, the low mean shows a very low tariff level. To sum up, the third column regression doesn't show a significant change in imports by Bolivia, which is due to the absence of substantial tariff changes.

Adding the interaction term between ExitATPDEA and the tariff rate gives us the results of column four of table four. This new variable is called ExitTariff and it captures only the changes in the tariff rates which are due to leaving the ATPDEA. This means it only measures those tariff changes which were caused by dropping out of the trade agreement. Therefore, this interaction controls for the GSP having similar tariff rates as the ATPDEA.

In the fourth regression no significant results are found for ExitATPDEA and for the FDI inflows. Similar to the previous regressions of column one to three, the fourth regression shows that a one percent increase in the independent variable realGDPpc, the dependent variable imports is expected to decrease by 22.74% (i.e. $1\text{-}1.01^{-25.93}$) holding all other variables constant. This coefficient holds at the 0.05 significance level. As mentioned above, this result is counterintuitive to the literature on the gravity equation.

Furthermore, a one percent decrease of the exporting country's currency, compared to the 2010 baseline, results in an increase of imports by 6.21% (i.e. $1\text{-}1.01^{6.061}$) at the 0.05 significance level. This result holds with the literature since if the currency of the exporting country is getting cheaper in comparison to the value of the currency of the importing country, then the importing country has access to cheaper imports and would thus import more.

The main result of the fourth regression is that for a one percent increase in the tariff rate, which is due to leaving the ATPDEA (ExitTariff), the imports are expected to decrease by 16.30% (i.e. $e^{-0.178}$ -1) at the 0.01 significance level, which is in line with the literature review. This suggests that when only looking at the tariffs that have changed due to the leaving of the ATPDEA one can observe a very significant decrease in the imports.

7.1 Robustness Checks

In order to establish that the previously applied methodology fits the data and that the results obtained are robust, the following will focus on performing robustness checks.

When investigating which years might have an impact on the lagged effects, one finds that the first and third year might have a statistical significance. However, holding all other variables constant it can be found in table 6 in the appendix, that both coefficients of the lagged

effects (ExitATPDEA1 & ExitATPDEA 3) have no statistical significance at the 0.05 level. Therefore, it can be argued that the PPML model should not include lagged effects since they will not add to the significance of the model.

The model has also been checked for serial auto-correlation which might bias the significance levels of the model estimators. Therefore, the model has been regressed with the option "vce robust" which should prevent biasing due to serial auto-correlation since this command is running the regression with robust standard errors.

Additionally, the model estimation reported a Wald Chi-square statistic of 78.47 and a p-value is reported at 0.000. The Wald Chi-square tests for the null hypothesis that all the coefficients are zero. Since this research paper finds a p-value of 0.000 for the test statistic one can strongly reject the null hypothesis.

Furthermore, this research paper is testing whether alternative variables proxying for economic mass have an impact on the main variable of interest, namely ExitATPDEA. Therefore, the initial regression specification with the PPML model is performed with a different variable. The regression replaces the independent variable real GDP p.c. with the independent variable HDI. However, when replacing this alternative measure of development which includes economic performance, no significant effects can be found as can be seen in table 7 of the appendix.

7.2 Limitations

One limitation of this research paper is that since it is a natural experiment, the observation period after which Bolivia has left the ATPDEA is rather short with only five years. This might impact the results since it is often argued that the real effects of forming a trade agreement will be first visible after about ten years. Thus, possibly the real effects of splitting up the ATPDEA might have been possibly also first visible after such a period. According to Kohl et al. (2016), there exists a vast heterogeneity in the design and implementation of different trade agreements, thus it is hard to apply the findings on leaving the ATPDEA to other trade agreements without accounting for that precise heterogeneity.

8. Conclusion

This research paper aimed at answering the research question: "What is the impact on trade flows by leaving the ATPDEA?". Over the time period from 2001-2013, Bolivia has been taken as the treatment group and Ecuador as the control group in a natural experiment set up. HS six-digit level product code level panel data on imports to the USA, have been utilized to run a high dimensional fixed effects model. The Poisson-Pseudo Maximum Likelihood estimator has been applied to account for the large number of zero trade flows. The high level of disaggregated imports has helped to account for individual tariff rate changes. The high dimensional fixed effects have taken care of time invariant heterogeneity. The base of the theoretical model is the gravity model. Previous research predicted, that by entering a trade agreement, the trade volume would increase.

The findings of this paper suggest that for a one percent increase in the tariff rate, which is the result of leaving the ATPDEA, the imports are expected to decrease by 16.30% at the 0.01 significance level, which is in line with the literature review. Also, a one percent decrease of the exporting country's currency, compared to the 2010 baseline, results in an increase of imports by 6.21% (i.e. $1\text{-}1.01^{6.061}$) at the 0.05 significance level which is in line with the literature. However, the other variables included in the regression model have failed to replicate the findings of previous research. Future research should focus on exploiting natural experiment set ups and incorporating more than one control and treatment group in investigating the impact of leaving preferential trade agreements.

APPENDIX

Table 6. Lagged Effects – Robustness Checks

Variables	(1) imports	(2) imports
ExitATPDEA1	0.658	
	(0.539)	
ExitATPDEA3		0.599
		(0.624)
Ln Real GDP p.c.	-25.49**	-12.84
	(12.91)	(24.28)
Ln Exchangerate	4.207*	3.099
	(2.329)	(4.247)
Tariff	0.0307*	0.0292
	(0.0183)	(0.0213)
Ln FDI inflows	0.160	0.232
	(0.229)	(0.296)
ExitTariff	-0.204**	-0.211***
	(0.0638)	(0.0637)
_cons	200.9**	103.3
	(100.8)	(177.4)
N	13016	10071
pseudo R^2	0.957	0.959

Robust standard errors shown in parentheses. Statistical significance: * $p < .10$, ** $p < .05$, *** $p < .01$

Table 7. Replacing realGDPpc with HDI – Robustness Checks

Variables	(1) imports
ExitATPDEA	0.571
	(0.458)
Ln HDI	81.75
	(53.49)
Ln Exchangerate	1.587
	(2.619)
Tariff	0.0263
	(0.0175)
Ln FDI inflows	0.0731
	(0.203)
ExitTariff	-0.194**
	(0.0640)
_cons	42.62
	(28.90)
N	14563
pseudo R^2	0.956

Robust standard errors shown in parentheses. Statistical significance: * $p < .10$, ** $p < .05$, *** $p < .01$

Bibliography

Abrams, R. K. (1980). International trade flows under flexible exchange rates. *Economic Review*, *65*(3), 3-10.

Aitken, N. D. (1973). The effect of the EEC and EFTA on European trade: A temporal cross section analysis. *The American Economic Review*, *63*(5), 881-892.

Anderson, J. E. (1979). A theoretical foundation for the gravity equation. *The American Economic Review*, *69*(1), 106-116.

Anderson, J. E., & Van Wincoop, E. (2003). Gravity with gravitas: a solution to the border puzzle. *American economic review*, *93*(1), 170-192.

Arghyrou, M. G. (2000). EU participation and the external trade of Greece: an appraisal of the evidence. *Applied Economics*, *32*(2), 151-159.

ATPA (1991). *Title II - Trade Preference for the Andean Region.* US Public Law 102-182. Retrieved April 18, 2019 from: https://en.wikisource.org/wiki/Public_Law_102-182/Title_II.

ATPDEA (2002). *Trade Act of 2002. Division C—Andean Trade Preference Act.* Retrieved April 18, 2019 from: https://en.wikisource.org/wiki/Trade_Act_of_2002/Division_C.

Baier, S. L., & Bergstrand, J. H. (2004). Economic determinants of free trade agreements. *Journal of international Economics*, *64*(1), 29-63.

Baier, S. L., & Bergstrand, J. H. (2007). Do free trade agreements actually increase members' international trade? *Journal of International Economics*, *71*(1), 72-95.

Baier, S. L., Bergstrand, J. H., & Feng, M. (2014). Economic integration agreements and the margins of international trade. *Journal of International Economics*, *93*(2), 339-350.

Barbalet, F., Greenville, J., Crook, W., Gretton, P., & Breunig, R. (2015). Exploring the links between bilateral and regional trade agreements and merchandise trade. *Asia & the Pacific Policy Studies*, *2*(3), 467-484.

Bergstrand, J. H. (1985). The gravity equation in international trade: some microeconomic foundations and empirical evidence. *The Review of Economics and Statistics*, 474 481.

Brada, J. C., & Méndez, J. A. (1985). Economic integration among developed, developing and centrally planned economies: A comparative analysis. *The Review of Economics and Statistics*, 549-556.

Bush, G. (2002), *Andean Trade Promotion and Drug Eradication Act by the President of the United States of America-A Proclamation.* Retrieved April 18, 2019 from: https:// georgewbush-whitehouse.archives.gov/news/releases/2002/10/20021031-9.html.

Caliendo, L., Feenstra, R. C., Romalis, J., & Taylor, A. M. (2015). *Tariff reductions, entry, and welfare: Theory and evidence for the last two decades* (No. w21768). National Bureau of Economic Research.

Carrol, R. (2013). *Ecuador breaks US trade pact to thwart 'blackmail' over Snowden asylum.* The Guardian on June 27th, 2013. Retrieved April 18, 2019 from: https://www.theguardian.com/world/2013/jun/27/ecuador-us-trade-pact-edward snowden.

CBS News (12.02.2008). Alleged U.S. Espionage Angers Bolivia. *CBS News.* Retrieved April 18, 2019 from: https://www.cbsnews.com/news/alleged-us-espionage-angers bolivia/.

CEPII (2019). *EQCHANGE database.* Retrieved April 18, 2019 from: http://www.cepii.fr /CEPII/en/publications/wp/abstract.asp?NoDoc=10395.

Chang, P. L., & Lee, M. J. (2011). The WTO trade effect. *Journal of International Economics*, *85*(1), 53-71.

Chang, S. C. (2005). The dynamic interactions among foreign direct investment, economic growth, exports and unemployment: evidence from Taiwan. *Economic Change and Restructuring*, *38*(3-4), 235-256.

Correia, S. (2015). Singletons, cluster-robust standard errors and fixed effects: A bad mix. *Technical Note, Duke University*.

Correia, S. (2016). A feasible estimator for linear models with multi-way fixed effects. *Duke University Preliminary Version.* Retrieved April 18, 2019 from: *www. scorreia.com/research/hdfe.pdf*.

Correia, S., Guimarães, P., & Zylkin, T. (2019). PPMLHDFE: Fast poisson estimation with high-dimensional fixed effects. *arXiv preprint arXiv:1903.01690*.

Dee, P., & Gali, J. (2005). The trade and investment effects of preferential trading arrangements. In *International Trade in East Asia, NBER-East Asia Seminar on Economics, Volume 14* (pp. 133-176). University of Chicago Press.

Dunning, T. (2012). *Natural experiments in the social sciences: a design-based approach*. Cambridge University Press.

Dür, A., Baccini, L., & Elsig, M. (2014). The design of international trade agreements: Introducing a new dataset. *The Review of International Organizations*, *9*(3), 353-375.

Ebell, M. (2016). Assessing the impact of trade agreements on trade. *National Institute Economic Review*, *238*(1), R31-R42.

Feenstra, R. C. (2015). *Advanced international trade: theory and evidence*. Princeton university press.

Forero, J. (2013). *Ecuador's strange journey from embracing Snowden to turning him away*. The Washington Post on July 2, 2013. Retrieved April 18. 2019 from: https://www.washingtonpost.com/news/worldviews/wp/2013/07/02/ecuadors-strange journey-from-embracing-snowden-to-turning-him-away/?noredirect=on&utm_term=. 648afd98dc53.

Frankel, J., Stein, E., & Wei, S. J. (1995). Trading blocs and the Americas: The natural, the unnatural, and the super-natural. *Journal of Development economics*, *47*(1), 61-95.

Friedman-Rudovsky J. & Ross, B. (2008*). Exclusive: Peace Corps, Fulbright Scholar Asked to 'Spy' on Cubans, Venezuelans.* ABC News on February 8, 2008. Retrieved April 18. 2019 from: https://abcnews.go.com/Blotter/story?id=4262036&page=1.

Fukao, K., Okubo, T., & Stern, R. M. (2003). An econometric analysis of trade diversion under NAFTA. *The North American Journal of Economics and Finance*, *14*(1), 3-24.

Ghosh, S., & Yamarik, S. (2004). Does trade creation measure up? A reexamination of the effects of regional trading arrangements. *Economics Letters*, *82*(2), 213-219.

Guimaraes, P., & Portugal, P. (2011). A simple feasible procedure to fit models with high dimensional fixed effects. *The Stata Journal*, *10*(4), 628-649.

Gil-Pareja, S., Llorca-Vivero, R., & Martínez-Serrano, J. A. (2014). Do nonreciprocal PTAs increase beneficiaries' exports?. *Journal of Development Economics*, *107*, 291-304.

Gil-Pareja, S., Llorca-Vivero, R., & Martínez-Serrano, J. A. (2017). The effect of nonreciprocal PTAs on benefactors' exports. *Empirical Economics*, *52*(1), 143-154.

Gomez-Herrera, E. (2013). Comparing alternative methods to estimate gravity models of bilateral trade. *Empirical Economics*, *44*(3), 1087-1111.

Goldstein, J. L., Rivers, D., & Tomz, M. (2007). Institutions in International Relations: Understanding the Effects of the GATT and the WTO on World Trade. *International Organization*, *61*(1), 37-67.

Head, K., & Mayer, T. (2014). Gravity equations: Workhorse, toolkit, and cookbook. In *Handbook of International Economics* (Vol. 4, pp. 131-195). Elsevier.

Herz, B., & Wagner, M. (2011). The 'Real'Impact of GATT/WTO–a Generalised Approach. *The World Economy*, *34*(6), 1014-1041.

Kepaptsoglou, K., Karlaftis, M. G., & Tsamboulas, D. (2010). The gravity model specification for modeling international trade flows and free trade agreement effects: a 10-year review of empirical studies. *The open economics journal*, *3*(1).

Kohl, T. (2014). Do we really know that trade agreements increase trade?. *Review of World Economics*, *150*(3), 443-469.

Kohl, T., & Trojanowska, S. (2015). Heterogeneous trade agreements, WTO membership and international trade: an analysis using matching econometrics. *Applied Economics*, *47*(33), 3499-3509.

Kohl, T., Brakman, S., & Garretsen, H. (2016). Do trade agreements stimulate international trade differently? Evidence from 296 trade agreements. *The World Economy*, *39*(1), 97-131.

Lampe, M. (2008). Bilateral trade flows in Europe, 1857–1875: A new dataset. In *Research in Economic History* (pp. 81-155). Emerald Group Publishing Limited.

Limão, N. (2016). PTAs. In *Handbook of commercial policy* (Vol. 1, pp. 279-367). North Holland.

Liu, X. (2009). GATT/WTO promotes trade strongly: Sample selection and model specification. *Review of international Economics*, *17*(3), 428-446.

Martin, W., & Pham, C. S. (2015). *Estimating the gravity model when zero trade flows are frequent and economically determined*. The World Bank.

Metulini, R. (2013). Spatial gravity models for international trade: a panel analysis among OECD countries.

Nowak-Lehmann F., Herzer D., Martinez-Zarzoso I., & Vollmer S. (2007). The Impact of a Customs Union between Turkey and the EU on Turkey's Exports to the EU. *JCMS: Journal of Common Market Studies*, *45*(3), 719-743.

Pelletiere, D., & Reinert, K. A. (2004). Used automobile protection and trade: Gravity and ordered probit analysis. *Empirical Economics*, *29*(4), 737-751.

PennState (2018). *Poisson Regression Model.* Retrieved April 18, 2019 from: https://newonlinecourses.science.psu.edu/stat504/node/168/.

Perino, D. (2008). *Statement by Press Secretary Dana Perino on Nov. 26, 2008.* Retrieved April 18, 2019 from: The Whitehouse: http://www.sice.oas.org/TPD/USA_ATPA/ Suspension_Bolivia_e.pdf.

Pfaffermayr, M. (2019). Gravity models, PPML estimation and the bias of the robust standard errors. *Applied Economics Letters*, 1-5.

Powers, W. M. (2007), 'Endogenous Liberalization and Sectoral Trade', *Office of Economics Working Paper*, No. 2007-06-B (Washington, DC: United States International Trade Commission).

Reuters (25.07.2013). Congress to let U.S. trade benefits for Ecuador expire. *Reuters*. Retrieved April 18, 2019 from Reuters: https://www.reuters.com/article/us-usa ecuador-trade-idUSBRE96O1BL20130725.

Ribando, C. (2008, August). *Bolivia: Political and economic developments and relations with the United States.* Congressional Research Service. Retrieved April 18, 2019 from Library of Congress: https://www.everycrsreport.com/files/20081114_RL32580_705 9640453053afa300978d0e6653c79794928ec.pdf.

Rose, A. K. (2000). One money, one market: the effect of common currencies on trade. *Economic policy*, *15*(30), 08-45.

Silva, J. S., & Tenreyro, S. (2006). The log of gravity. *The Review of Economics and statistics*, *88*(4), 641-658.

Silva, J. S., & Tenreyro, S. (2011). Further simulation evidence on the performance of the Poisson pseudo-maximum likelihood estimator. *Economics Letters*, *112*(2), 220-222.

Saucier, P., & Rana, A. T. (2017). Do preferential trade agreements contribute to the development of trade? Taking into account the institutional heterogeneity. *International Economics*, *149*, 41-56.

Tang, D. (2005). Effects of the regional trading arrangements on trade: Evidence from the NAFTA, ANZCER and ASEAN countries, 1989–2000. *The Journal of International Trade & Economic Development*, *14*(2), 241-265.

The Economist (08.03.2018). A tarrifically bad idea: The looming global trade war. *The Economist.* Retrieved April 19, 2019, from: https://www.economist.com/news/ briefing/ 21738392-america-setting-dangerous-new-precedents-it-tries-curb -imports looming-global-trade.

The President (2009). *Proclamation 8341 of January 16, 2009*. Retrieved April 18, 2019 from: Federal Register: https://www.govinfo.gov/content/pkg/FR-2009-01-22/pdf/E9 1573.pdf.

Tinbergen, J. J. (1962). Shaping the world economy; suggestions for an international economic policy.

Tomz, M., Goldstein, J. L., & Rivers, D. (2007). Do we really know that the WTO increases trade? Comment. *American Economic Review*, *97*(5), 2005-2018.

TRAINS (2019). UNCTAD Trade Analysis Information System. Retrieved April 18, 2019 from: http://wits.worldbank.org/WITS/WITS/QuickQuery/TariffViewAndExport RawData/TariffViewAndExportRawData.aspx?Page=TariffViewAndExportRaw Data.

Trefler, D. (1993). Trade liberalization and the theory of endogenous protection: an econometric study of US import policy. *Journal of political Economy*, *101*(1), 138 160.

UN Comtrade (2019). United Nations Comtrade Database. Retrieved April 18, 2019 from: https://comtrade.un.org/data/.

UNDP (2019). United Nations Development Programme Database. Retrieved April 18, 2019 from: http://hdr.undp.org/en/data.

UNODC (2008). *Coca Cultivation In The Andean Region - A survey of Bolivia, Colombia and Peru.* Retrieved April 18, 2019 from: United Nations Office on Drugs and Crime: https://www.unodc.org/documents/crop-monitoring/Andean_report_2008.pdf.

UN Trade Statistics (2019). *Trade Statistics Coding Systems.* Retrieved April 18, 2019 from: United Nations Trade Statistics Knowledgebase: https://unstats.un.org/unsd/tradekb/ Knowledgebase/Trade-Statistics-Coding-Systems?Keywords=System.

Urata, S., & Okabe, M. (2014). Trade Creation and Diversion Effects of Regional Trade Agreements: A Product-level Analysis. *The World Economy*, *37*(2), 267-289.

USTR (2001). *Third Report to the Congress on the Operation of the Andean Trade Preference Act.* Retrieved April 18, 2019 from: United States Trade Representative: https://web.archive.org/web/20080605220144/http://www.ustr.gov/assets/Trade_Dev elopment/Preference_Programs/ATPA/asset_upload_file215_3783.pdf.

USTR (2002). *ATPA Fact Sheet. New Andean Trade Benefits.* Retrieved April 18, 2019 from: United States Trade Representative: http://www.sice.oas.org/tpd/USA_ATPA/ Studies/FactSheet_Andean_e.pdf.

USTR (2012). *United States- Colombia Trade Promotion Agreement.* Retrieved April 18, 2019 from: United States Trade Representative: https://ustr.gov/trade-agreements /free-trade-agreements/colombia-tpa.

WBG (2019). *World Bank Group.* Retrieved April 18, 2019 from: https://data.worldbank.org.

Weisbrot, M. (2009). *Can the US and Bolivia get along?* The Guardian on February 25. 2009 from: https://www.theguardian.com/commentisfree/cifamerica/2009/feb/25/bolivia us-obama-bush.

Wilson, J. S., Mann, C. L., & Otsuki, T. (2003). Trade facilitation and economic development: A new approach to quantifying the impact. *The World Bank Economic Review, 17*(3), 367-389.

WTO (1997). *Differential and More Favourable Treatment Reciprocity and Fuller Participation of Developing Countries. Decision of 28 November 1979 (L/4903).* Retrieved April 18, 2019 from: World Trade Organization: https://www.wto. org/english/docs_e/legal_e/enabling_e.pdf.

WTO (2011). *World Trade Report 2011: The WTO and PTAs: From Co-Existence to Coherence.* Retrieved April 18, 2019 from: World Trade Organization: https://www.wto.org/english/res_e/booksp_e/anrep_e/wtr11-2a_e.pdf.