Charles University

Faculty of Social Sciences
Institute of Economic Studies

BACHELORS'S THESIS

Analysis of Free Trade Agreements Between European Union and Latin American Countries

Author: **Martin Macháček**

Supervisor: **Ing. Vilém Semerák M.A., Ph.D.**

Academic Year: **2019/2020**

Declaration of Authorship

I hereby proclaim that I wrote my bachelor thesis on my own under the leadership of my supervisor and that the references include all resources and literature I have used.

I grant a permission to reproduce and to distribute copies of this thesis document in whole or in part.

Prague, July 28, 2019

Signature

Acknowledgments

I would like to thank my thesis supervisor Ing. Vilém Semerák M.A., Ph.D., whose door was always open whenever I had a question about my research or when I came across some issue. He consistently allowed this paper to be my own work, but steered me in the right direction whenever he thought I needed it.

I must express my gratitude to my parents for supporting me both financially and emotionally throughout the whole studies and to my girlfriend for providing me with unfailing support and continuous help with econometric issues. This accomplishment would not have been possible without them. Thank you.

Bibliographic note

Macháček Martin. *Analysis of Free Trade Agreements Between European Union and Latin American Countries*. 37. Bachelor thesis. Charles University, Faculty of Social Sciences, Institute of Economic Studies. Supervisor Ing. Vilém Semerák M.A., Ph.D.

Abstract

The aim of this paper is to examine if free trade agreements between Latin American countries and the European Union have positive effect on trade flow between the two. For this purpose, we use gravity models, specifically Ordinary Least Squares and Poisson Pseudo Maximum Likelihood estimations with time and country-pair fixed effects. We apply these methods on five studied countries: Argentina, Brazil, Chile, Colombia and Mexico.

The results show that the agreements with the European Union for the first four mentioned countries have positive impact, although lower than the impact of other agreements signed by these countries. For Mexico, the effect is negative, which corresponds with the reports of the EU, which is negotiating modernization of their agreement.

JEL Classification	C51, F12, F14, F21, H25
Keywords	International trade, gravity model, European Union, Latin America

Author's e-mail	mhmachacek@gmail.com
Supervisor's e-mail	vilem.semerak@fsv.cuni.cz

Abstrakt

Cílem práce je určit, zda dohody o volném obchodu mezi zeměmi latinské Ameriky a Evropskou unií mají kladný efekt na obchodní toky mezi nimi. K tomuto účelu používáme dvě odhadující techniky gravitačního modelu, metodu náhodných čtverců a Poissonovský druh odhadu za použití fixních efektů. Tyto metody uplatňujeme na pět zkoumaných zemí: Argentinu, Brazílii, Chile, Kolumbii a Mexiko.

Výsledky ukazují, že dohody s Evropskou unií mají na obchod prvních čtyř zmiňovaných zemí pozitivní dopad, avšak ne tak výrazný jako mají zbylé dohody těchto zemí. V případě Mexika je pak dopad negativní, což souhlasí s reporty Evropské unie, která jedná s Mexikem o modernizaci vzájemné dohody.

Klasifikace JEL	C51, F12, F14, F21, H25
Klíčová slova	Mezinárodní obchod, gravitační model, Evropská Unie, Latinská Amerika

E-mail autora	`mhmachacek@gmail.com`
E-mail vedoucího práce	`vilem.semerak@fsv.cuni.cz`

Contents

List of Tables viii

List of Figures ix

Acronyms x

Thesis Proposal xii

1 Introduction 1

2 Background 3

2.1 History of trade between Latin American Countries and European Union . . . 3

2.2 Bilateral Trade Agreements . . . 4

2.2.1 Mexico . . . 4

2.2.2 Chile . . . 5

2.2.3 Colombia . . . 6

2.2.4 Mercosur . . . 7

3 Literature Review 10

3.1 Preferential Trade Agreements . . . 10

3.1.1 History of PTAs . . . 10

3.1.2 Reasons to sign PTAs . . . 13

3.2 Gravity model . . . 14

3.3 Free Trade Agreements as a variable . . . 18

4 Data 19

4.1 Potential improvements . . . 21

5 Methodology 23

5.1 Ordinary Least Squares . . . 24

5.2 Poisson Pseudo Maximum Likelihood 25
5.3 Fixed Effects 26

6 Empirical Results **30**
6.1 Results 30
6.2 Discussion of the results 33

7 Conclusion **36**

Bibliography **42**

A Appendix **I**

List of Tables

2.1 Merchandise trade EU28 with Chile (million EUR) 6

4.1 Variables and their sources 19

6.1 Fixed effects estimation with importer fixed effects Controlling for Time Effect 31
6.2 PPML estimation with fixed time effects 32
6.3 PPML with fixed time effects and contiguity 34

A.1 OLS with fixed time and country specific effects including contiguity variable I

List of Figures

2.1 Argentina's exports to European Union 9

Acronyms

ASEAN Association of South East Asian Nations

BLUE Best Linear Unbiased Estimator

BVU Bonus Vetus OLS with simple averages

BVW Bonus Vetus OLS with GDP weights

DDM Double Demeaning

FTA Free Trade Agreement

CES Constant Elasticity of Substitution

EU European Union

FE Fixed Effects

GATT General Agreement on Tariffs and Trade

GDP Gross Domestic Product

GNP Gross National Product

GPML Gamma Pseudo Maximum Likelihood

IBRD International Bank for Reconstruction and Development

IDA International Development Association

IMF International Monetary Fund

ITO International Trade Organization

NAFTA North American Free Trade Agreement

NBPML Negative Binomial Pseudo Maximum Likelihood

NLS Nonlinear Least Squares

OLS Ordinary Least Squares

PPML Poisson Pseudo Maximum Likelihood

PTA Preferential Trade Agreement

RE Random Effects

SILS Structural Iterated Least Squares

US United States

WTO World Trade Organization

Bachelor's Thesis Proposal

Author	Martin Macháček
Supervisor	Ing. Vilém Semerák M.A., Ph.D.
Proposed topic	Analysis of Free Trade Agreements Between European Union and Latin American Countries

Research question and motivation The president of The United States Donald Trump had been questioning the contribution of the North American Free Trade Agreement (NAFTA) since the beginning of his presidential election campaign. Ever since he got elected, he has been trying to renegotiate the agreement or even end it. This would have severe consequences on all countries in the agreement; however, the most impacted would be Mexico. It is important to analyze what are the alternatives for Mexico in international trade. For Mexico, as well as for most Latin American Countries, there are free trade agreements with the European Union.

This paper will examine the free trade agreements between the European Union and Latin American Countries, which have with European Union either bilateral or multilateral free trade agreements. For the examination, I will use the gravity model for the estimation of international flows as a function of GDP, population and trade costs. One of my inspirations was the paper Analysis of Foreign Trade of the 6 Largest Latin American Countries Using Gravity Model (Pöstényi Andrea, 2016). Author in the paper studied Latin American Coutries based on their size and focused on their whole foreign trade. In my thesis, I study the progression in trade between listed countries and European Union over time and focusing on following research questions:

- How did the trade between European Union and Latin American Countries improved?
- Which Latin American Countries have the most benefits from the trade with European Union?
- Can the data tell us, which Latin American country is the most beneficial for the European Union?

Contribution The thesis should bring better comparison and facilitate understanding of the free trade agreements between European Union and the Latin American countries. It may offer the idea of which country benefits the most from the trade and which agreement between European Union had the largest impact on the trade.

Methodology I will use data from The Centre d'Études Prospectives et d'Informations Internationales (CEPII), where I will get the gravity dataset for all studied pairs of countries. The data collected will be used later in gravity model estimated in R Script.

Outline

1. Introduction
2. Free trade Agreements between European Union and selected countries
   - 2.1 Bilateral free trade agreements
   - 2.2 Multilateral free trade agreements
   - 2.3 Possible future improvements in the agreements
3. Gravity model
   - 3.1 Data collection
   - 3.2 Representation of data
   - 3.3 Results
4. Conclusion

Bibliography

BACCHETTA, Marc. A practical guide to trade policy analysis. Geneva: United Nations Conference on Trade and Development, c2012. ISBN 978-92-870-3812-8.

YOTOV, Yoto V., Roberta PIERMARTINI, Jose´-Antonio MONTEIRO a Mario LARCH. An advanced guide to trade policy analysis: the structural gravity model. New York, NY: United Nations, 2016. ISBN 978-92-870-4367-2.

BALDWIN, R. and TAGLIONI, D. (2006), "Gravity for dummies and dummies for gravity equations", National Bureau of Economic Research Working Paper 12516, NBER.

HEAD, K. (2003), "Gravity for beginners", mimeo, University of British Columbia.

Gravity dataset. CEPII [online]. Available at: `http://cepii.fr/CEPII/en/bdd_modele/presentation.asp?id=8(4)`

DIXIT, A. and NORMAN, V. (1980), Theory of International Trade, Cambridge University Press.

Author

Supervisor

Chapter 1

Introduction

The European Union (EU) started their process of closer trading relations with Latin America in the late 1990s that concluded in signing the first trade agreement with a Latin American country, Mexico, which came into force in 2000. It was followed by agreement with Chile in 2003 and with Peru and Colombia in 2013. Last trade agreement EU worked on was with Mercosur, which reached political agreement in June 2019. The first two mentioned, however, are considered by the leaders as outdated and the process of their update are negotiated.

The objective of this thesis is to study the effect of Free Trade Agreements (FTAs) on trade between European Union (EU) and five Latin American countries, Argentina, Brazil, Chile, Colombia and Mexico. In order to do so, we use the gravity model of trade.

The gravity model of trade, a model inspired by Newton's law of gravitation, which was used to assess trade for the first time by Tinbergen (1962), is one of the most commonly used tools to analyze foreign trade between two countries. The model uses economic size (typically represented by GDPs of studied countries), the distance between the two and further factors which influence trade. For our models, we chose variables from three different fields – cultural (Common language, Common religion, Colonial linkages); institutional (FTA between the two countries, Trade freedom, Investment freedom, Monetary freedom, Financial freedom); and sociological (Level of education).

To study the effect, we compare results we receive from two different approaches to gravity models – we use Ordinary Least Squares (OLS) method, which, however, has problems with accounting for zero trade; and Poisson Pseudo Maximum Likelihood (PPML), which includes zero trades.

The thesis is structured as follows. The second chapter provides historical background of trade between Latin American countries. After that, it discusses Bilateral Trade Agreements with the five countries studied in this thesis. Chapter three, which summarizes relevant literature on the topic, is divided into two parts. The first part provides historical background to Preferential Trade Agreements (PTAs) and offers reasons why countries sign PTAs. The second part introduces gravity models, shows its evolution and presents literature, which used this model to analyse trade. At the end of this chapter, papers using gravity model to study the effect of trade agreements on trade are discussed. Chapter four describes the data and offers potential improvements, that might be used in further studies. Chapter five covers the methods used to obtain estimates from our data set. Chapter six provides our results, comparison of all used techniques and comments on the results. Finally, chapter seven concludes our findings and discusses the contribution of this thesis.

Chapter 2

Background

In this chapter, I will briefly summarize history of trade between Latin America and the countries of European Union (EU) and summarize the trade agreements between EU and studied countries. The history and evolution of Gravity models will not be included in this chapter and it will be discussed more profoundly in the Literature review.

2.1 History of trade between Latin American Countries and European Union

European countries, mainly Spain, Portugal and Great Britain, had been colonising the Latin America. After World War I, the United states became a global power and undeniably hegemonic power in the Western Hemisphere (Skidmore et. al (2001)). The European interest in Latin American region grew again in the first part 1980s. Europeans feared that the Central American wars, intervened by both Cold War superpowers, Soviet Union and United states, would escalate. To prevent these escalations, the former European Economic Community (EEC) decided to support peace initiatives in the area. The EEC emphasized on aid distribution in order to fight the poverty and socio-economic differences, which were considered as the roots of the conflict, rather than using the force, which was the approach of the United States. This was the most important milestone for further cooperation between EEC and later EU with Latin America (Smith, 1995).

In the end of 1980s and in the beginning of 1990s, the position of Latin America in EU's foreign policy priorities decreased, and it shifted towards issues closer to home. The political changes in Eastern and Central Europe, after

the breakup of the Soviet Union; as well as the complicated situation in the Balkans, framed by the Yugoslav Wars, which were fuelled by the wars of independence and tension between ethnic minorities; drew more attention of EU. Ironically, the EU's active involvement in Latin America increased. The explanations for this phenomenon vary. On one hand, Holland (2002) and De Brito *et al.* (2001) explained, that EU produced coherent policy for an area it was not deeply interested in, in order to strengthen its foreign policy capabilities and show an example of a unified position, which would be more successful in comparison to the progress in its near abroad. On the other hand, Barrau (1999) and Valladão (1999) give credits for the foreign policy to the changes and developments in 1990s Americas. The regional integration initiatives in the region were expanding. The most important was the creation of North American Free Trade Agreement (NAFTA) in 1994. This agreement was formed by USA, Canada and Mexico. EU feared the loss of its share in its market in favour of the United States. As a reaction, EU initiated negotiations of an agreement with Mexico in 1996 and in 2000 they formed an FTA. Furthermore, EU revived its relations with the other strong economies, especially those in the Southern Cone, Brazil, Argentina and Chile.

2.2 Bilateral Trade Agreements

2.2.1 Mexico

Mexico became the first Latin American country to sign an Economic Partnership with European Union. The negotiations began in October 1996 and the first agreement was signed in December 1997[1]. The agreement consisted of three pillars: An Economic Partnership, Political Cooperation and Cooperation Agreement. These laid the basis for further negotiation of a free trade agreement between the European Union and Mexico. The Economic Partnership, Political Coordination and Cooperation Agreement (the Global Agreement), was approved by the European Parliament in May 1999 and by the Mexican Senate in March 2000. The Free Trade Agreement came into force on October 2000 for trade in goods and in 2001 for trade in services. The objective of the free trade agreement regarding trade was to establish a framework to

[1]Some countries from the EU already had an agreement with Latin American Countries, e.g. Spain had an agreement with Mexico since 1977 after the end of Francoist dictatorship. (Preis (2019))

encourage the development of trade in goods and services, including preferential and bilateral, progressive and reciprocal liberalization of trade in goods and services. The matters covered in the trade in goods included coverage and transitional periods; customs duties on imports and exports, anti-dumping and countervailing measures and customs cooperation and valuation.

During the EU-Community of Latin American and Caribbean States Summit of 2013, both sides agreed to find options for update of the agreement. The negotiations with Mexico started in May 2016 and an agreement in principle was reached in April 2018. The agreement includes chapter on agricultural exports from the EU and discusses how to support exporters of the main exported products, such as poultry, cheese, chocolate, pasta, and pork; chapter on sustainability, which would strengthen the EU and Mexico's actions on sustainable development and to fulfill the obligations both sides undertook under the Paris Agreement on climate change; chapter on providing a high level of protection of intellectual property rights; and chapter on investment protection.

In 2017, the exports from Mexico to the EU were EUR 23.2 billion, where around 25% were machinery and appliances, 17.8% were oil related products and optical/photographic instruments were around 12%. The Mexican imports from EU were EUR 37.9 billion, where the most imported EU products to Mexico were industrial machinery with 36%, automotive sector with 16.5%, closely followed by chemical industries with 14.2%.

2.2.2 Chile

The FTA between Chile and EU came into force in 2003. The trade in goods between the two more than doubled between 2003 and 2017, increasing in total by 114%. The share in total EU trade is stable since 2003, at around 0.5% of total EU trade.[2]

The trade between EU and Chile had a strong bilateral growth between the years 2003 and 2009. In these years, EU was Chile's most important trading partner. However, this position was taken by China in 2009. In 2011, US has overtaken EU's second position, making EU Chile's third trading partner. Both parties have agreed that the FTA improved their trade and it prevented the EU market share in Chile from substantial fall. However, ex-post study evaluation

[2]Source: Report from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions on Implementation of Free Trade Agreements

Table 2.1: Merchandise trade EU28 with Chile (million EUR)

Chile	Base	Latest	Growth	
	2003	2017	total	average
EU28 imports	5,004	8,259	65%	6%
EU28 exports	2,963	8,785	196%	9%
Balance	-2,041	526		
Total trade	7,967	17,044	114%	7%

Source: Trade G2 Statistics/ISDB

showed the need for comprehensive modernisation of the Agreement, which was discussed during the EU-CELAC summit in 2013. The update focuses on recent global development, including sustainability and cyberspace security. The negotiations for the modernization began in November 2017 and as of today, the latest (fourth) round of negotiations took place between 1st-4th April 2019.

Chile is the world's largest producer of copper. A third of its copper exports go to the EU. Roughly a third of EU imports from Chile are agricultural products, where the most imported products are fruits, vegetables, wines and nuts. Most notable are grapes, of which Chile is the world's largest exporter.

2.2.3 Colombia

The trade agreement between the EU and Colombia took effect on 1 August 2013. The goal of the agreement was to open up markets for both Colombian and EU exporters, with an initial claim of annual savings of more than EUR 500 million[3] for companies[4]. EU is Colombia's second largest trading partner after the US. The trade between the two parties has not shown a significant increase and experienced a downfall between 2014-2016, when the exports from Colombia to EU decreased by 28%, but it was in line with Colombia's exports to the world, which decreased by 32% during the same period.

Colombia is a member of Andean Community, along with Bolivia, Ecuador and Peru. The trade agreement between the EU and Colombia was also signed by Peru. The agreement took effect for Peru four month earlier, in March

[3]This number is offered by the European Commission's Press Release on EU-Colombia trade agreement. However, it does not offer methodology of how they obtained this number.

[4]On the European Commission website, there are examples of companies, which benefit from all trade agreements signed by the EU. In case of Colombia, one of the examples is the brewery Brasserie Nationale, a Luxembourgish brewery based in Bascharage. The agreement helped the brewery enter a market 100 times bigger than that of Luxembourg.

2013. Ecuador later negotiated accession to the agreement, which was applied in January 2017. Bolivia is not part of the agreement, but benefits from the Generalised Scheme of Preferences (GSP), which removes import duties on products, which are coming into the EU market from vulnerable developing countries. These countries, however, are not covered in the analysis of this paper, as we focus on top five trading partners of the EU in the region.

2.2.4 Mercosur

Last two countries studied in this paper are Argentina and Brazil. These are listed together as they both are part of MERCOSUR[5] and in addition to bilateral trade agreements between EU and the two countries, they have agreements with EU through trade deal between EU and the founding countries of MERCOSUR, which are Argentina, Brazil, Paraguay and Uruguay.

Since 1999, the trade relations between Mercosur and the EU are based on inter-regional Framework Cooperation Agreement[6]. Negotiations for a Trade Agreement between the two parties started in 2000. These negotiations, however, were inconsistent until May 2016, when the negotiation process between the two parties was relaunched and, in order to improve the process, negotiation rounds and meeting are held in regular intervals. Political Agreement on the trade was reached on 28 June 2019. The key benefits for EU companies of the trade are: attempts to cut tariffs in key EU export sectors, where the custom duties are currently high for these sectors (i.e. 35% for cars and car parts, 14-20% for machinery and 18% for the chemicals); ease of the access to public contracts (Mercosur countries are not involved in the plurilateral Government Procurement Agreement[7], therefore EU firms has not been given access to Mercosur's public tenders so far); and simplification of custom procedures so that the EU companies are not put off from exporting to Mercosur. Key benefits for the EU farmers is, similarly to the benefit for other companies, the removal of high tariffs in main exported products such as dairy products (28%), spirits (up to 35%) or wines (27%). In total, this ambitious agreement is set to save over €4 billion for EU companies in tariffs[8]. Furthermore, the negotiations

[5]The word MERCOSUR stands for Mercado Común del Sur (Eng. The Southern Common Market)

[6]Available at https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=LEGISSUM:r14013

[7]The Agreement on Government Procurement (GPA) is an agreement that protects the parties of the agreement in the other member's government procurements by principles of openness, non-discrimination and transparency.

[8]European Commission (2019) EU and Mercosur reach agree-

include topics of sustainability and upholding the EU's food safety standards to which all imported products into the EU must comply.

Argentina was for several years imposing significant barriers on EU exports, imports and capital flows. Until 2015, the Argentine government was even preventing other MERCOSUR member countries from negotiating individual trade agreements with the EU, as they feared being replaced by EU's product in Brazil, the most important for Argentina. The path of the negotiations changed after 2015 presidential election, when Mauricio Macri was elected. Some of his economic policies were the lift of capital controls[9], the removal of export quotas and limits on how much wheat and corn can be exported[10] and the reduction of tariffs on soybeans[11]. As can be seen in Figure 2.1, the exports from Argentina to EU were increasing since Macri took office in 2015 until 2017. However, the exports decreased drastically in 2018. This was caused by monetary crisis, when Argentine Peso devaluated by more than 50% against the US dollar[12]. The main EU countries importing from Argentina are Netherlands (€5.2 mil) and Spain (€1 mil) and the most exported products were food products (65%) and crude materials except fuel (16%)[13].

Brazil is EU's largest economic partner[14] in Latin America, despite not having any bilateral trade agreement with each other. Furthermore, it is the only studied country that shares border with European Union, specifically French Guyana. Brazil was the most active member of Mercosur in the process of signing the trade agreement between the EU and MERCOSUR (Ayuso & Gratius (2018)). EU's imports from Brazil are primarily food products, beverages and tobacco products, where 16.3% of all EU imports of these products are

ment on trade [Press release] 28 June. Available at: https://ec.europa.eu/commission/presscorner/detail/en/ip$_1$9$_3$396($Accessed : 1July2019$)

[9]President Mauricio Macri lifts Argentina's capital controls. FINANCIAL TIMES [online]. 2015 (Accessed: 3 July 2019).. Available at: https://www.ft.com/content/556d51b4-a447-11e5-873f-68411a84f346

[10]Argentina's Macri scraps corn and wheat export quotas. Reuters [online]. 29 December 2015 (Accessed: 3 July 2019).. Available at: https://www.reuters.com/article/argentina-grains-idUSL1N14I1KX20151229

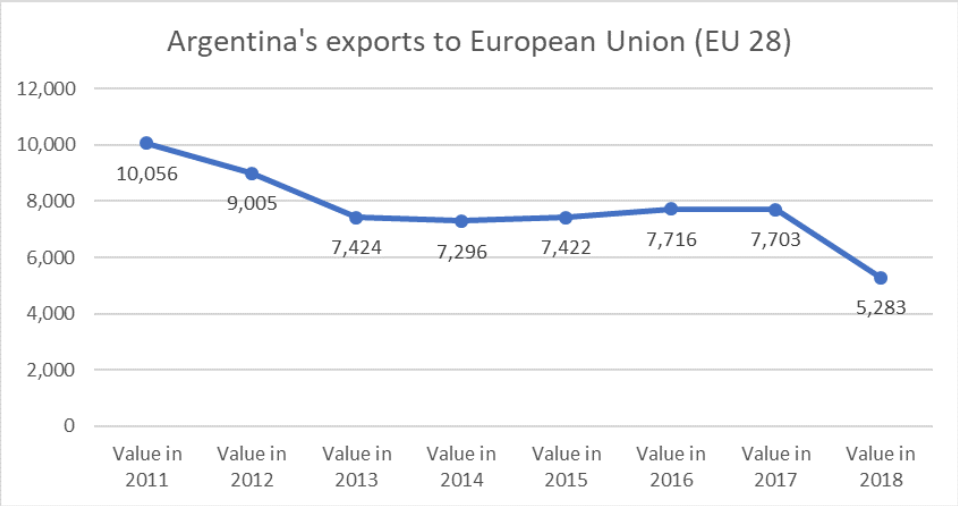
[11]UPDATE 2-Argentina delays soy export tax cut to 2018 amid budget shortfall. Reuters [online]. 4 October 2016 (Accessed: 3 July 2019). Available at: https://www.reuters.com/article/argentina-grains-idUSL2N1C9256

[12]To fight the crisis, the Argentina's government asked for early release of a $50bn loan from the IMF.

[13]European Commission: Bilateral relations between the EU and Argentina [online]. 2019 (Accessed: 3 July 2019). Available at: http://ec.europa.eu/trade/policy/countries-and-regions/countries/argentina/

[14]Although a slight decline is present as China gained the no. 1 position as a trading partner for Brazil.

Figure 2.1: Argentina's exports to European Union



Source: Instituto Nacional de Estadística y Censos statistics, n.d.

from Brazil. EU exports, similarly to other studied countries, to Brazil consist mainly of machinery (26.6%) and chemical products (23.6%).

Chapter 3

Literature Review

This chapter provides brief introduction into the history of Preferential Trade Agreements (PTAs), the motives for their signing; and into gravity models, their development, estimation techniques and the possible variables influencing the gravity models, including Free Trade Agreements (FTAs) as a variable.

3.1 Preferential Trade Agreements

3.1.1 History of PTAs

The history of trade agreements dates to ancient times and different agreements have been present ever since. In 15^{th} and 14^{th} century B.C. the Indians traded goods to Aden by using Arabian vessels, where the goods were transported to Palmyra and then to the ports in Mediterranean Sea (Rawlinson (2001)). One of the most important milestones in international trade was the creation of the Silk Road[1], which became a significant trade route in the 2^{nd} century BC and functioned, although not with a highly consistent effectiveness[2], until early 18^{th} century, and it connected China with Europe.[3]. Another important milestone was the creation of the Dutch East India Company, established in

[1]The name comes from 19^{th} century, when the German geographer Baron von Richthofen named it after silk, the most traded good in the early stages of the Road. It is also important to mention that Silk Roads existed even prior the 2^{nd} century BC.

[2]Several setbacks occurred during the long time of its existence, i.e. in 7^{th} century, the Tibetian conquered the Western Regions, blocking the connection between the final destination.

[3]In 2013, Chinese President Xi Jinping presented a plan to create a new Silk Road between China and Europe. The first train, although not completing the whole route as it only went from Chinese province Zhejiang to Teheran, followed the scheme of the new Road and the planning of the extension, which would go from Teheran to Istanbul and later to Europe, is under making (Van der Leer & Yau (2016)).

1602. It was the first company issuing bonds and stocks to public, making it the first public company. The Dutch East India Company started as a company trading with Mogul Empire[4], from which it imported silk, textiles and spices. Later, it included shipping sugar cane from Formosa[5], and wine from South Africa (Gelderblom *et al.* (2013)). An important milestone in evolution of trade agreements was the Cobden–Chevalier Treaty. This agreement between France and the United Kingdom was signed in 1860 and it reduced duties on French brandy and wine, while it capped the duties on British manufacturing products at 30% (Woodward & Woodward (1962)). The Cobden–Chevalier Treaty was described by Grossman (2016) as the first modern trade agreement. This paper, however, will focus on the modern-day agreements, that formed after the Bretton Woods Conference and after the end of the Second World War.

Immediately after the Second World War, the victors, notably the United States and Great Britain, agreed that the roots of the inter-war political and economic chaos, such as trade bloc rivalry and financial instability, would have been prevented if there was a solid international economic system. Their construction was discussed prior the end of the war, at the United Nations Monetary and Financial Conference in Bretton Woods, New Hampshire.

During the Bretton Woods Conference in 1944, the creation of new international economic institution was discussed, that would be the pillars of a new world economic order: International Bank for Reconstruction and Development[6] (IBRD); and the International Monetary Fund (IMF). Originally, three international economic institutions were discussed, however, only IBRD and IMF came into being. A third institution, International Trade Organization (ITO), however, ITO never came to existence, mainly due to the US Congress, which feared the loss of sovereignty to the proposed body (Trebilcock *et al.* (2005)).

All the parties agreed on a common vision about the trading system that should be implemented post-war, particularly the regulation of any form of discrimination and the need of lower tariffs. Nonetheless, Great Britain and the United States disputed over how the new system would be coordinated with existing regional arrangements. Great Britain wished not abolish the system of

[4]An empire which was located in today's India.

[5]Today's Taiwan.

[6]Today it is one of the two institutions of which the World Bank comprises, together with International Development Association (IDA)

Imperial Preferences[7], whereas the United States were critical of the effect, that the system would have on US exports to Canada and Great Britain, two of their most important trading partners (Irwin *et al.* (2008)). The General Agreement on Tariffs and Trade (GATT) was signed on 30 October 1947. The basic principles were borrowed from RTAA[8] arrangements, only GATT supported the commitment of the members to widen their trade cooperation among members. The main difference was that multilateralism was set as the default system, not an alternative in international trade relations (Brown (2009)).

After GATT came into effect, formation of new trade blocks has not been ruled out as the Article XXIV of GATT allowed the members to create free trade areas or custom unions under the condition, that there will be no increase in non-member's trade barriers on trade with non-members. There is also a second condition, that the FTA should cover a significant share of traded commodities, and, substantially all the trade).

The following evolution in trade agreements can be described as three new waves of regionalism. The first wave was framed by 1950s and 1960s. Europe was on a rise with trade deals. In 1951, the European Coal and Steel Community was established, which led to European Economic Community in 1957. Furthermore, the countries with past or current colonial linkages built a complex network of preferential trade agreements Winters (1993). These European progresses motivated countries from other continents for their own regional and subregional agreements. However, it was not until the second wave when these became successful[9].

The second wave of regionalism happened since mid-1980s until 1990s. During this period, the Europe continued on its single market programme, where the technical, physical and tax barriers would be dismantled by 1992. The finalization of the process was marked by Maastricht Treaty, which came into force in 1993, where the European Union (EU) was established. The newly formed Union also focused on creating new bilateral PTAs with post-Soviet states and members of The Council for Mutual Economic Assistance (COMECON), as a consequence of the dissolution of Soviet Union. These agreements aimed to re-

[7]In 1932, Great Britain created a system of "Imperial preferences" which gave preferential tariff treatment between Great Britain and its colonies. This system came after over 100 years of Britain's non-preferential open trade. (Irwin *et al.* (2008))

[8]The Reciprocal Trade Agreement Act was signed in 1934 and gave the Roosevelt administration authority to negotiate tariff reductions in bilateral agreements, particularly with Latin American countries, but later also with Canada and Great Britain Irwin *et al.* (2008).

[9]These arrangements included the Central American common market and the East African Community, which both collapsed by the end of 1970s (De Melo & Panagariya (1995))

duce tariffs and create agreements on regulations, which later led to the admission of ten new countries into EU in 2004[10] and two more in 2007[11] (Mercurio (2009); Urwin (2014)). Creation of European Union started a worldwide activity towards closer cooperation. Canada, United States and Mexico formed The North American Free Trade Agreement (NAFTA) (Appendini & Bislev (2016)); Argentina, Brazil, Paraguay and Uruguay formed Mercado Común del Sur (Mercosur); and Association of Southeast Asian Nations (ASEAN)[12] created the ASEAN Free Trade Area (AFTA), which sought to protect its members from economic crises and it intended to widen the cooperation in areas such as science and technology, agriculture or tourism (Broinowski (2016)). During this period, many feared that the GATT would be overshadowed by regional deals. Nevertheless, in 1995, the World Trade Organisation (WTO) was created, which successfully reduced some of the second wave's power.

The period since the beginning of the new millennia is labelled as the third wave of regionalism. The European regionalism was represented by the aforementioned widening of the EU. The third wave, however, was mainly concentrated in East Asian region. Bilateral negotiations began between China, India, Japan, the Republic od Korea and Singapore (Katada & Solís (2008)). In addition, Japan and China began negotiations with AFTA (Mercurio (2009)).

3.1.2 Reasons to sign PTAs

Many papers studied the effect of PTAs on international trade. Magee (2003) showed that two countries have higher tendency to sign PTA, when they are already a large trading partners. This paper did not show, however, that the trade between the two would significantly increase, as the countries already had large trade between each other. The positive effect on trade was shown in Baier & Bergstrand (2004), who found that on average FTAs, after 10 years, approximately double the bilateral trade between its members. Governments' incentive to sign PTAs, however, is not only to increase the international trade.

PTAs can also be used as tools in pursuit of peace and security for its members. Moravcsik (1998) used European Community as an example, where

[10] Cyprus, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Slovakia, Slovenia.

[11] Bulgaria, Romania.

[12] At the time of the signing, the association had six members: Brunei, Indonesia, Malaysia, Philippines, Singapore and Thailand. They were joined by Vietnam in 1995; by Laos and Myanmar in 1997; and by Cambodia in 1999.

European leaders after the war used agreements as a mechanism, which would cope with geopolitical issues, such as a protection from external influence – to balance Russians, whose political power was on the rise; and internal issues – to suppress nationalism and Communist extremism. Gowa (1995) studied how countries can use PTAs as a tool to augment trade, which causes increase in national income leading to an increase in their military capacity.

Lobbying is another important aspect when studying reasons to sign PTAs. Firms lobby for PTAs, as it allows them to profit from economies of scale, as the market for firms is larger. This, naturally, benefits the countries in welfare. Therefore, even if a country's government is not decided to sign a PTA, the lobbying by domestic firms can motivate the country to sign it (Chase (2009)). Baccini & Dür (2012) also showed that exporters' lobbying is more intensive in countries that are not included in existing PTAs. As these exporters are discriminated in countries with PTAs, they are pushed to become politically active and encourage their governments to sign the agreements as well. The lobbying pressure to sign PTA is not exclusive to domestic firms. Stoyanov (2009) studied the effect of the foreign lobbying on the example of Canada and its position in NAFTA. The analysis, where he quantified post-NAFTA lobbying in Canada, showed that the foreign lobbying, especially from US firms, can significantly affects the domestic trade policy.

3.2 Gravity model

The Gravity model obtained its name from the Newton's Universal Law of Gravitation. Newton defined gravity as the total force between two masses increases with mass and decreases with larger distance. The formula is:

$$F = G\frac{m_1 \cdot m_2}{r^2} \ , \tag{3.1}$$

where F is the total force between two masses; G is the gravitational constant; m_1 and m_2 are the masses of the objects; and r is the distance between them (Hawking & Israel (1989)). The gravity model of international trade follows the same patterns. The larger the economies are and the closer they are to each other, the higher are volumes of trade with one another. The simplest

formula of gravity model is written as:

$$F_{ij} = G\frac{Y_i^{\alpha_1} Y_j^{\alpha_2}}{D_{ij}^{\alpha_3}} \tag{3.2}$$

where F_{ij} represents volume of trade from country i to country j; Y_i and Y_j represent the economic dimension (typically GDPs) for countries i and j; D_{ij} denotes the distance between the two countries (typically defined as the distance between two capitals); and G is a constant.

The first person to apply the gravitation model in other field than physics was Ravenstein (1889) in Journal of the Royal Statistical Society, where he published his paper *The Laws of Migration*. In this paper, he found similarities between the gravity model in physics and the movement of people across countries in Europe and America by studying migration patterns in 19th century.

Tinbergen (1962) was the first who used the gravity model to assess trade. In his paper, the two countries' economic size and the distance between them represented the most important factors of the optimal level of trade. The definition of the economic sizes in this model differs for importing and exporting country. The exporting country's economic size is determined by its ability to produce exported products. Therefore, an increase of exporter country's GNP increases its trade volume. The importing country's economic size increases with GNP as well. However, the higher is the economic size of a country, the more diverse its production is. When the diversification of its products is higher, the country's incentive for import gets smaller. Thus, if the importer country's GNP increases by one unit, ceteris paribus the volume of import increases, but by less than one unit. The distance[13] affected negatively the trade, as the costs of shipment of goods is costly. The Tinbergen (1962) was followed by other studies, such as Linnemann (1966) and Leamer (1974). These models, however, did not have solid theoretical micro-foundations. These were brought by several works, namely Anderson (1979), Bergstrand (1985; 1990) and Deardorff (1998).

Anderson (1979) was the first to provide a theoretical basis for the gravity model. The paper assumes constant elasticity of substitution (CES) preferences. Furthermore, in this model the goods are differentiated not only by their kind (e.g. cotton, fertilisers, silk, etc.), but the place of production was

[13]The distance is commonly calculated as the distance between the capitals of studied countries.

added, which made the origin of the supplier a crucial characteristic of the product[14]. The model supposes that two goods of the same kind but of a different origin are imperfect substitutes in demand. Anderson (1979) defined the gravity model as:

$$M_{ijk} = \alpha_k Y_i^{\beta_k} Y_j^{\gamma_k} N_i^{\delta_k} N_j^{\varepsilon_k} d_{ij}^{\mu_k} U_{ijk}, \tag{3.3}$$

where M_{ijk} represents the flow of factor k from country i to country j in US dollars, Y_i and Y_j are the incomes of the countries i and j, N_i and N_j are populations of countries i and j, d_{ij} represents the distance between countries i and j. The U_{ijk} is a lognormally distributed error term.

However, despite bringing credibility to the gravity model, it worked only due to a very strict set of assumptions, such as that each country is fully specialized in production of one good. Bergstrand (1985) included the price terms and brought the supply side of the economy. He defined the income of the exporter's country in the form supply capacity, the income of the exporter's country in the form of demand, and he used the distance in the form of transportation costs. In Bergstrand (1990) he modified his model by deriving the gravity equation from a monopolistic trade model. In this model each country specialized in a different set of products. The countries, therefore, exported one set of a differentiated product to other countries. Deardorff (1998) explained trade based on relative differences in factor endowments across countries by using Heckscher-Ohlin model as the base for the gravity model.

Baier & Bergstrand (2001) formulates one of the most commonly used gravity models written as:

$$PX_{ij} = \beta_0 GDP_i^{\beta_1} GDP_j^{\beta_2} D_{ij}^{\beta_3} e^{\beta_4(PTA_{ij})} e^{\beta_5(A_{ij})} \varepsilon_{ij}, \tag{3.4}$$

where PX_{ij} is the nominal bilateral trade flow from exporter i to importer j in any year; β_0 is a constant; GDP_i and GDP_j are exporting and importing, respectively, countries' nominal gross domestic products, D_{ij} is the distance between the two countries' capitals; e represents the natural logarithm base for an array of dummy variables reflecting the presence or absence of a preferential trading agreement (the variable PTA_{ij}) or of a common land border (the variable A_{ij}). The ε_{ij} is a log-normally distributed error term.

An example of the importance of the micro-foundations can be shown on the case of the McCallum border puzzle. McCallum (1995) studied the influ-

[14]This is often referred as the Armington assumption.

ence of the common border by examining the trade between each Canadian province and each state of the United States. The paper implies that the trade between Canadian province and another Canadian province is 22 times higher (2200%) than the trade between a province and a U.S. state. This paper suffered from omitted variable bias, and, more importantly, the model relied on the remoteness of the provinces, not including the effect of third countries and the effect of domestic trade in each of the countries. Anderson & Van Wincoop (2003) showed, after conducting the general equilibrium comparative exercise of removing the US-Canada barrier, that the borders reduce the trade between the U.S. and Canada only by 44%.

When the model got theoretical foundations, the gravity model became the most successful method to analyze foreign trade. After that, many papers studied various factors which influence trade. Oh *et al.* (2011) examined the effect of common languages and the effect of major languages. The result was that common language increases trade and foreign direct investment (FDI), but the effect of major languages is more substantial. Felbermayr & Toubal (2010) constructed a measure of the cultural proximity by using bilateral score data from Eurovision Song Contest which varies over time. They showed that the measure positively affected trade volumes. Lohmann (2011) introduced The Language Barrier Index, a new variable which instead of studying common languages studies the barriers in communication. The paper showed, unsurprisingly, that language barriers are negatively correlated with bilateral trade. Fidrmuc & Fidrmuc (2016) introduced another possibility how to study the influence of languages by combining the traditional gravity models with data on fluency of the major languages spoken in the EU.

Head *et al.* (2010) studied the influence of colonial linkages on international trade by using bilateral trade data from 1948 to 2006. The result was that the trade in the short-run did not change significantly, it decreased in four decades by approximately 65%. The trade between former colonies of the same empire also decreased and it follows the same pattern as the trade with the metropole (colonizer). On the other hand, the trade with third countries decreases by only about 20%. In case of hostile separations, i.e. revolutions, the reduction in trade is large and immediate. Another paper focusing on colonial linkages, Stack *et al.* (2018), focused on the colonial linkages in the analysis of the sugar trade. It showed that while the linkages that follow North-South direction, i.e. the trade with global south, enhance the import of raw sugar, the North-North

direction suppresses it. Furthermore, Stack *et al.* (2018) show that the sugar trade is enhanced by rail infrastructure, the major empire shipping routes and cultural proximity.

Many papers focused on the institutional framework. De Groot *et al.* (2004) studied if institutional quality and institutional homogeneity in bilateral trade have any influence. The result was that similar institutional framework increases on average the bilateral trade by 13%. The quality of governance increases the trade by 30-44%, depending on the position of the trading party, i.e. whether it is importer or exporter. The topic was later elaborated by Álvarez *et al.* (2018). Their paper showed that, in general, the effect of institutional quality is lower than other factors, including distance. However, there was an exception, the agricultural production and natural resources, for which the institutional quality was a key variable.

3.3 Free Trade Agreements as a variable

The most important variable for this thesis is Free Trade Agreements (FTAs), as the aim of the paper is to study their impact on trade between Latin American Countries and the EU. The best source to study the impact of trade agreements is the paper by Cardamone (2007). The paper evaluated 115 research papers, which study the impact of trade agreements on trade using gravity models. The author came with three conclusions: All but two of the papers use dummy variables to proxy the agreements; the effect of trade agreements vary in both significance and the positive/negative sign of the effect; the author claims that all papers ignored at least one estimation issue and, thus, leads the results to be biased.

The FTA and regional integrations are factors examined in Baier & Bergstrand (2001). The paper found that approximately 23-26% of the mean logarithmic growth of trade could be explained by the preferential trade agreements and tariff-rate reductions, while the decline of the transport costs explaines 8-9%. Therefore, the relative contribution of transport costs is three times less that of trade liberalization.Martínez-Zarzoso & Nowak-Lehmann (2003) studied the trade potential between European Union and Mercosur after the signing of the agreement. The authors added to the standard equation novel variables, namely infrastructure endowments, exchange rates and income differences, which proved to be important determinants of bilateral trade flows.

Chapter 4

Data

The data set we used data came from three different sources. Their basic properties are described in the table (4.1). First source of data we obtained from the Centre d'Études Prospectives et d'Informations Internationales (CEPII), the French center for research on the world economy. The first data set, TRADHIST, contained data on trade, which ranged from year 1827 until 2014. As we are interested in the effect of FTAs on trade between EU and selected Latin American countries, we reduced the range to years 1995 until 2014. The second dataset, Gravity, contained data for dummy variables for our model. The data on institutional variables, which come from Heritage Foundation, an American conservative think tank. The education index comes from the United Nations official website. In this chapter, we will explain the origin of the variables, and in case of population, the calculations used to estimate them.

Table 4.1: Variables and their sources

Code	Variable	Source	Values
FLOW	Trade flow	CEPII - TRADHIST	in US dollars
gdp_o	GDP of country of origin	CEPII - Gravity	in US dollars
gdp_d	GDP of country of destination	CEPII - Gravity	in US dollars
distw	Weighted distance	CEPII - Gravity	in km
fta_wto	FTA partners	CEPII - Gravity	{0,1}
colony	Colonial linkages	CEPII - Gravity	{0,1}
comlang_ethno	Common language	CEPII - Gravity	{0,1}
comrelig	Common religion	CEPII - Gravity	{0,1}
tra	Trade freedom	Heritage Foundation	[0,100]
inv	Investment freedom	Heritage Foundation	[0,100]
mon	Monetary freedom	Heritage Foundation	[0,100]
fin	Financial freedom	Heritage Foundation	[0,100]
educ	Education index	United Nations	[0,1]

The dependent variable is the flow of trade between countries i and j in US

dollars. For our model, we use member countries of the EU as the origin (i.e. $eu\_o = 1$). The destinations of the trade are Argentina (i.e. $iso3\_d = "ARG"$), Brazil (i.e. $iso3\_d = "BRA"$), Chile (i.e. $iso3\_d = "CHL"$), Colombia (i.e. $iso3\_d = "COL"$), and Mexico (i.e. $iso3\_d = "MEX"$). The GDPs, represented by gdp_o and gdp_d, are measured in US dollars. We expect these variables to have positive effect on trade. The distance variable distw is calculated by measuring the distance between the largest cities of two studied countries and the intercity distance is weighted by the share of the city's population in the overall population. This data is originally from the data set GeoDist, which is available at CEPII. The authors Mayer and Zignago got the basic idea from Head & Mayer (2002), using their formula:

$$d_{ij} = \left(\sum_{k \in i} \left(\frac{pop_k}{pop_i} \right) \sum_{l \in j} \left(\frac{pop_l}{pop_j} \right) d_{kl}^{\theta} \right)^{\frac{1}{\theta}}, \tag{4.1}$$

where pop_k is the population of the largest city k from country i and pop_l is the population of the largest city l from country j, and θ is the measure of sensitivity of trade flows to bilateral distance d_{kl}. As we use $distw$, the θ is set equal to 1. The distance is expected to have a negative effect on trade.

The Free Trade Agreement (FTA) variable fta_wto is a dummy variable equal to 0, when there is no FTA signed between countries i and j; and it is equal to 1, when the two studied countries have signed an FTA. The data come originally from the WTO website. The data on common religion originated from Andrei Shleifer, which were posted on the website of Department of Economics at Harvard University[1]. This variable is crucial to our study. We expect this variable to have a positive sign and to be a significant variable.

The dummy variables on colonial links *colony* and variable on common language *comlang_ethno* come from, same as the distance variable, from the data set GeoDist. The colony is dscribed as a relationship of two countries, where one of them has governed the other over a period of time and the current state of institutions is influenced by this relationship. For the common language we chose the variable *comlang_ethno*, which is equal to 1, if the two countries have a language is spoken by at least 9% of the population. We preferred this common language variable over the $comlang\_off$, a variable also available in the Gravity dataset, which is equal to 1 when the two countries have common offi-

[1] As of July 20, 2019, the data are no longer publicly available.

cial language, as it allows for ethnically-based trade. We expect both variables to have positive sign.

The variables from The Heritage Foundation have values between 0 and 100. We expect that all of these institutional variables will have a positive sign. The trade freedom variable *tra* is based on two inputs, the nontariff barriers and the trade-weighted average tariff rate. It is a composite measure showing how tariff and non-tariff barriers affect trade of goods and services. The investment freedom variable *inv* shows how much an individual or a firm is allowed to move its resources across the borders without restriction. The regulatory restrictions, which influence this variable, include restrictions on real estate purchases; burdensome bureaucracy; transparency; foreign exchange controls; or capital controls. The monetary freedom variable *mon* combines the price stability and an assessment of price controls. Price controls and inflation negatively influence the overall score. The financial freedom is a variable showing the banking efficiency and the independence from government interference in financial sector, its regulations of financial services and its influence on the credit allocation. Furthermore, it takes into account the financial and capital market development and openness to foreign competition (Miller & Kim (2015)).

We obtained the Education Index from the United Nations website. It is measured in per cents and it is calculated using the mean number of years of education index and the expected number of years of education index. We expect the effect will be positive, as we assume more profound understanding of international trade, which comes with more years of education.

4.1 Potential improvements

There is a potential space for improvements regarding the data set. The most significant would be the addition of the depth index of PTAs, provided by the Design of Trade Agreements (DESTA). This index's values range between 0 and 7, where seven aspects of PTAs are observed:

- More than a partial scope agreement.
- Substantive provision on services.
- Substantive provision on investments.
- Substantive provision on standards.
- Substantive provision on public procurement.

- Substantive provision on competition.
- Substantive provision on intellectual property rights.

  Source: Dür *et al.* (2014)

We have decided not to include this variable into this thesis due to its different setting and structure of data and, thus, temporal difficulty of its inclusion. We keep this possibility, however, as an option for future studies on this topic.

Chapter 5

Methodology

Methodology applied in this thesis works with methods commonly used for estimating gravity models. As we mentioned in the previous chapters, gravity models explain bilateral flow, which are related to the sizes of bilateral partners. It means that the relationships of the flow and the distance between two countries (continents, unions, etc.) or other factors describing these two objects are easy to define. However, a choice of estimation methods can be more complex, as there exist lots of different techniques how to estimate our gravity models. In this chapter, we describe all methods that we chose for the estimation, explain how they work, and we give the reason for our method selection.

First of all, it is appropriate to distinguish two types of methods using for estimating gravity models. One significant difference is in acceptance of zeros values in the dependent variable. Estimation methods such as Ordinary Least Squares (OLS), Bonus vetus OLS with GDP-weights (BVW) and with simple averages (BVU), Fixed Effects, Double Demeaning (DDM), Tetrads, Structural Iterated Least Squares (SILS) estimate gravity models in the log-log form and are not able to have zeros values in the dependent variable, as zero logarithm does not exist. The second type contain the methods of Poisson Pseudo Maximum Likelihood (PPML), Negative Binomial Pseudo Maximum Likelihood (NBPML), Gamma Pseudo Maximum Likelihood (GPML), Nonlinear Least Squares (NLS). They use a multiplicative form via generalized linear models in estimating gravity models, which means that zero logarithm is not a problem here anymore, and thus they are able to have zeros values in the dependent variable.

For this thesis, we decided to choose Ordinary Least Squares (OLS) methods

from the type of no-zeros trade flow and Poisson Pseudo Maximum Likelihood (PPML) from the second type of estimation methods, where is acceptable to have zeros values of dependent variable, which is in our case the flow between two objects. Moreover, we use the dataset and create fixed effects models and discuss possible improvements in the form of creating random effects model and examining which of these models is better for estimating gravity models using Hausman test.

5.1 Ordinary Least Squares

The standard procedure for estimating the gravity model is to take a logarithmic form of variables and obtain a (log-)linear equation, which can be then estimated by Ordinary Least Squares (OLS) regression. Estimating gravity equations using this simply method was used by Tinbergen (1962). OLS method covers data with no-zeros trade flows, meaning it does not accept zero value of the dependent variable (flow). The reason is that we use log-log model and the logarithm of zero is not defined. Furthermore, this specification allows to get elasticity coefficients and a straightforward interpretation of the estimated parameters. Baier & Bergstrand (2010) argued that estimating gravity models by OLS was the key factor of the popularity of gravity models.

In this thesis, we focus on the trade flow between the European Union (EU) and five states of Latin America. Specifically, for the five states we selected Argentina, Brazil, Chile, Colombia and Mexico, as they have the largest trade with the European Union. In other words, these five states are the biggest trading partners in Latin America for the EU.

As mentioned above, we use a log-log equation of gravity model using OLS estimation. It means that the core variables and the dependent variable are in a logarithmic form and the remaining variables (namely dummy variables) are in a linear form. The choice of explanatory variables is described in the Data section. In order to observe the effect of an FTA with the EU, we create new variable into the data set with no zero trade, eu_fta, which we obtained with the formula $eu\_fta = eu\_o \cdot fta\_wto$. The model using Ordinary Least Squares

method is defined as follows:

$$\begin{aligned}\log FLOW_{ijt} =& \beta_1 \log GDP\_o_{it} + \beta_2 \log GDP\_d_{jt} + \beta_3 \log distw_{ij} + \beta_4 eu\_fta_{ijt} + \\ &+ \beta_5 fta\_wto_{ijt} + \beta_6 \text{colony}_{ij} + \beta_7 comlang\_ethno_{ij} + \\ &+ \beta_8 comrelig_{ij} + \beta_9 tra_{jt} + \beta_{10} inv_{jt} + \beta_{11} mon_{jt} + \\ &+ \beta_{12} fin_{jt} + \beta_{13} educ_{jt} + \beta_{14} T + \beta_{15} CP + \varepsilon_{ijt},\end{aligned} \tag{5.1}$$

where β_i represent coefficients of variables discussed in the chapter 4, i stands for exporting country, j for importing country and t for year, T is the set of time dummies, CP represents country-pair dummies and ε_{ij} is the error term. The T and CP variables are discussed in the Fixed Effects subsection. The variables, which are not year specific and do not vary over time, will be omitted in the FE estimation due to collinearity.

5.2 Poisson Pseudo Maximum Likelihood

Poisson Pseudo Maximum Likelihood (PPML) is a method from the type of zeros trade flow, which means that it works with zeros values of dependent variable, as trade flows are not logged. This estimation methods belongs to generalized linear models using the quasi-Poisson distribution. PPML estimation can be used for panel data as well as for cross-sectional data. According to Silva & Tenreyro (2006), estimating gravity models by Ordinary Least Squares (OLS) method leads to inconsistency in the presence of heteroscedasticity. This problem could be fixed by estimating gravity equations in their multiplicative form, which Silva & Tenreyro (2006) recommended. Thus, PPML is able to estimate directly the non-linear form of the gravity model and avoid dropping zero trade. Therefore, in this case, gravity models should be estimated by PPML method.

As explained above, in the thesis, we examine separately trade flow between the European Union and five states: Argentina, Brazil, Chile, Colombia and Mexico as the largest European trading partners in Latin America.

For PPML method, we cannot use a log-log model, as we utilize the dataset containing zeros values of the flow, i.e. the dependent variable. Therefore, we have a level-log model, where the core variables in a logarithmic form and the dependent variable is in a linear form. Again, the chapter Data contains the reason for our selection of the explanatory variables. In order to observe

the effect of an FTA with the EU, we created a new additional variable into the data set including zero trade, eu_fta, which we obtained with the formula $eu\_fta = eu\_o \cdot fta\_wto$. The model using Poisson Pseudo Maximum Likelihood method is defined as::

$$\begin{aligned} FLOW =& \beta_1 \log GDP\_o_{it} + \beta_2 \log GDP\_d_{jt} + \beta_3 \log distw_{ij} + \\ &+ \beta_4 eu\_fta_{ijt} + \beta_5 fta\_wto_{ijt} + \beta_6 \text{colony}_{ij} + \beta_7 comlang\_ethno_{ij} + \\ &+ \beta_8 comrelig_{ij} + \beta_9 tra_{jt} + \beta_{10} inv_{jt} + \beta_{11} mon_{jt} + \\ &+ \beta_{12} fin_{jt} + \beta_{13} educ_{jt} + \beta_{14} T + \varepsilon_{ijt}, \end{aligned} \tag{5.2}$$

where β_i represent coefficients of variables discussed in the chapter 4, i stands for exporting country, j for importing country and t for year, T is the set of time dummies, and ε_{ij} is the error term. We did not include country pair dummies due to complications in our used software. We have to take into account possible biasedness of the results[1]

5.3 Fixed Effects

We decided to use Fixed Effects (FE) in our estimations based on Cardamone (2007). In the paper, the author surveyed 115 papers, which studied the effect of PTAs on trade using gravity models. As the majority of the studied subjects used the FE estimation over the Random effects (RE) estimation, we decided to follow these papers and use FE.

In general, the Fixed Effects (FE) estimator is dealing with omitted variable bias. The FE regression model has a form:

$$y_{it} = \beta_1 x_{it1} + \beta_2 x_{it2} + \cdots + \beta_k x_{itk} + a_i + u_{it}, t = 1, \ ..., \ T, \tag{5.3}$$

where x_{itk} are explanatory variables, β_k are their corresponding coefficients, y_{it} is the independent variable, a_i is an unobserved effect and u_{it} is an error term. As a_i is the fixed effect over time, it has to be removed by a transformation, which is called Fixed Effects transformation or Within transformation. The transformation is based on a technique that firstly, it averages the equation

[1]By using time fixed effects, we avoid making gold medal mistake as defined by Baldwin & Taglioni (2006), a possible bias may occur.

(5.3) over time:

$$\bar{y_i} = \beta_1 \bar{x_{i1}} + \beta_2 \bar{x_{i2}} + \cdots \beta_k \bar{x_{ik}} + a_i + \bar{u}_i, \tag{5.4}$$

where $\bar{y_i} = T^{-1} \sum_{t=1}^{T} y_{it}, \bar{x_{ik}} = T^{-1} \sum_{t=1}^{T} x_{itk}$ and $\bar{u}_i = T^{-1} \sum_{t=1}^{T} u_{it}$. And secondly, the transformation subtracts the equation (5.4) from the original equation (5.3), which gives us a time-demeaned model:

$$\ddot{y_{it}} = \beta_1 \ddot{x_{it1}} + \beta_2 \ddot{x_{it2}} + \cdots + \beta_k \ddot{x_{itk}} + \ddot{u_{it}}, \tag{5.5}$$

where $\ddot{y_{it}} = y_{it} - \bar{y_i}$, is the time-demeaned data on y, $\ddot{x_{itk}} = x_{itk} - \bar{x_{ik}}$ is the time-demeaned data on x and $\ddot{u_{it}} = u_{it} - \bar{u}_i$ is the time-demeaned data on u. The unobserved effect a_i disappears, because it appears in both equations (5.3) and (5.4) in the same form. Then, omitted variable bias is no longer a problem, which means that we can utilize pooled Ordinary Least Squares (OLS) method. Pooled OLS estimator using time-demeaned variables is called the Fixed Effects estimator or Within estimator.

We have seven necessary assumptions and properties of the FE estimator, $\widehat{\beta_{FE}}$:

1. Assumption FE1

   For each i, the model is: $y_{it} = \beta_0 + \beta_1 x_{it1} + \cdots + \beta_k x_{itk} + a_i + u_{it}, t =$ 1, ..., T, where the β_j are the parameters to estimate and a_i is the unobserved, or fixed effect.

2. Assumption FE2

   We have a random sample for the cross section.

3. Assumption FE3

   Each explanatory variable changes over time (for at least some i), and there are no perfect linear relationship among the explanatory variables.

4. Assumption FE4

   For each t, the expected value of the idiosyncratic error given the explanatory variables in all time periods and the unobserved effect is zero: $E\left(u_{it}|X_i, a_i\right) = 0$.

Under assumptions FE1 – FE4, the Fixed Effects estimator $\widehat{\beta_{FE}}$ is unbiased. The key assumption is FE4 – strict exogeneity.

5. Assumption FE5

   $Var\left(u_{it}|X_i, a_i\right) = Var(u_{it}) = \sigma_u^2$, for all $t = 1,\ ...,\ T$.

6. Assumption FE6

   For all $t \neq s$, the idiosyncratic errors are uncorrelated (conditionally on all explanatory variables and a_i): $Cov\left(u_{it}, u_{is}|X_i, a_i\right) = 0$.

Under assumptions FE1 – FE6, the Fixed Effects estimator $\widehat{\beta_{FE}}$ is best linear unbiased estimator (BLUE).

7. Assumption FE7

   Conditional on X_i and a_i, u_{it} are independent and identically distributed normal random variables.

Under FE7, the FE estimator is normally distributed. We can utilize t and F statistics, which have t and F distributions, respectively.

For gravity models, the use of country fixed effects is a simple way how to obtain unbiased estimation of gravity equations. The method differs according to type of data. For cross-sectional data, country fixed effects (i.e. dummy variables on the exporter and importer side) can be used, as the unit of observations in gravity models is not a country, but a pair of countries. Therefore, while in a cross section are n^2 observations, there will be n country dummy variables on the exporter side and n country dummies on the importer side using a total of $2n$ degrees of freedom, which is obviously less than n^2. Nevertheless, we are not able to estimate coefficients of country-specific variables such as GDP due to perfect collinearity. For panel data, time effects should be included in gravity equations, since we can then control for global economic effects (e.g. booms in the global economy). Time-varying fixed effects are perfectly collinear with time-varying country-specific variables. It follows that time-invariant effects for the exporter and the importer have to be omitted due to multicollinearity with intercept. Moreover, in a panel section, using of fixed effects can fix the problem with endogeneity.

We use fixed effects in order to deal with Multilateral Resistance Terms, in order to avoid biasedness, as described by Baldwin & Taglioni (2006). We define country-pair dummy variables, in our models named as CP, and time dummy variables, which we called T.

To summarize our methods, we specify time dummies, and country-pair dummies. After these specifications, we run the estimations using Ordinary Least Squares (OLS) and Pseudo-Poisson Maximum Likelihood (PPML). The OLS must satisfy the assumptions FE1-FE4 (Shepherd (2013)).

Chapter 6

Empirical Results

This chapter offers results from our main models, for which we used data and methods from previous two chapters, and later a discussion and possible explanation of the data.

6.1 Results

First, a set of Pooled Ordinary Least Squares (OLS) regressions and Poisson Pseudo Maximum Likelihood (PPML) estimations are performed[1] for every studied country. The results are shown in Tables 6.1 and 6.2. For better orientation, we do not include year and country-pair dummies into the tables.

In order to understand our findings, we have to explain how our results can be interpreted. We will focus on the results from PPML models. Our results for PPML fit our initial predictions, whereas OLS estimation show low significance for most of the variables, which we want to focus on. We assume an error in the methodology of estimating OLS and further analysis would be in place. This analysis, however, goes beyond the reach of this paper.

The coefficients of GDP of the exporting countries are significant for all of our studied countries and positive, which we expected. When we want to interpret the results from PPML estimation, we have to use the formula $\%\Delta y = \beta_i \%\Delta x$, because we interpret the coefficients of continuous variables as simple elasticites (Silva & Tenreyro (2006)). This means that on the example of Mexico, where $\beta = 1.160$, if we increase GDP by 1%, the trade will increase by 1.160%.

The indicator variables, which in our case includes the variable fta_wto,

[1] All our calculations were performed using Stata 12.

Table 6.1: Fixed effects estimation with importer fixed effects Controlling for Time Effect

OLS	Argentina	Brazil	Chile	Colombia	Mexico
(Intercept)	11.040	8.220	17.99***	-2.062	0.853
	(6.363)	(4.507)	(3.991)	(3.863)	(6.136)
GDP_o	0.101	0.213	-0.328	0.157	0.450*
	(0.240)	(0.206)	(0.205)	(0.200)	(0.192)
eu_fta	0.174	-1.757	0.066	0.197	0.189
	(1.401)	(1.360)	(0.332)	(0.554)	(0.340)
fta_wto	0.087	2.113	0.880***	0.020	0.034
	(1.379)	(1.334)	(0.253)	(0.432)	(0.305)
tra	0.0450*	0.0414**	-0.028	0.119**	0.0286***
	(0.019)	(0.015)	(0.018)	(0.041)	(0.008)
inv	-0.0767***	-0.027	0.0650***	0.0177*	0.0201*
	(0.020)	(0.034)	(0.016)	(0.009)	(0.008)
mon	-0.016	-0.003	0.001	0.0467**	-0.028
	(0.011)	(0.003)	(0.010)	(0.015)	(0.077)
fin	0.0638***	0.021	0.023	-0.014	0.0627*
	(0.013)	(0.011)	(0.017)	(0.022)	(0.026)
Observations	1502	1661	1387	1612	1138

Note: *p<0.1; **p<0.05; ***p<0.01

are a little more complex to interpret, as they need to be transformed into elasticities by using the formula: $\%\Delta y = 100 \cdot \left(e^{\beta_i} - 1\right)$. This means, that if we use again the example of PPML estimation from Table 6.2, only this time on the example of Colombia, we have the fta_wto coefficient $\beta = 0.450$, which means that FTA with European Union increases the trade with Mexico by 56.8%.

The aim of our paper, however, is to study the effect of the free trade agreements (FTAs) with European Union (EU). For that, we have to look at the effect produced by the variable eu_fta and fta_wto. For all our studied countries, the coefficient of eu_fta is negative. As the variable fta_wto is also included in our model, we can conclude that the effect of the FTA with the EU does not have negative effect on trade, only that the effect is lower than the average effect of other FTAs. For example, for Columbia, the fta_wto tells us that having an FTA with Colombia increases the trade by 56.83%, while the coefficient of eu_fta reduces this number by 52.90%. This means that the agreement between EU and Colombia increases their mutual trade by 3.93%.

It is important to mention the presence of distance in the model, despite

Table 6.2: PPML estimation with fixed time effects

PPML	Argentina	Brazil	Chile	Colombia	Mexico
(Intercept)	-10.30*	-2.639	2.341	-8.261	-7.276*
	(4.204)	(2.412)	(1.451)	(4.761)	(3.172)
GDP_o	0.923***	0.899***	0.838***	0.934***	1.160***
	(0.024)	(0.017)	(0.025)	(0.025)	(0.034)
distw	0.538	-0.152	-0.805***	-0.267	-0.332**
	(0.423)	(0.182)	(0.083)	(0.139)	(0.113)
eu_fta	-3.432***	-2.243***	-0.836***	-0.753**	-0.365**
	(0.659)	(0.238)	(0.150)	(0.264)	(0.114)
fta_wto	3.358***	2.100***	0.810***	0.450*	-0.217
	(0.734)	(0.229)	(0.196)	(0.175)	(0.129)
colony	-0.060	0.166	0.467**	-1.032***	-0.086
	(0.269)	(0.316)	(0.176)	(0.218)	(0.166)
comlang_ethno	0.280	-0.092	-0.037	0.492**	0.470**
	(0.276)	(0.297)	(0.121)	(0.154)	(0.144)
comrelig	0.625***	-0.155	-0.013	0.808***	-0.264
	(0.182)	(0.156)	(0.189)	(0.171)	(0.138)
tra	0.010	0.0170**	-0.010	0.030	-0.002
	(0.019)	(0.006)	(0.016)	(0.045)	(0.006)
inv	-0.0347**	-0.048	0.030	0.0205*	0.011
	(0.013)	(0.025)	(0.018)	(0.010)	(0.006)
mon	-0.015	0.002	-0.004	0.015	-0.014
	(0.009)	(0.001)	(0.009)	(0.014)	(0.048)
fin	0.0343**	0.0292***	0.007	-0.007	0.007
	(0.011)	(0.007)	(0.015)	(0.033)	(0.017)
Observations	1818	1820	1779	1817	1764

Note: *p<0.1; **p<0.05; ***p<0.01

the fact that we used fixed effects that should omit this variable. After a closer examination of our data, we find that during the collection of them, different methods were used, which caused minor differences in the values. Thus, the distance is present. In further studies, it is advised to correct for it. Furthermore, a potential improvement of the methodology is using a lagged changes in trade agreements, as it usually takes some time for the agreement to have an impact (Baier & Bergstrand (2004)).

The results show high trade enhancement by FTAs for both studied Mercosur members, Argentina and Brazil. This is the result of close cooperation between Mercosur members. The positive effect of 2,773%, which is based on the Argentinian model, seems rather high. As we discussed in Chapter 3, our results are similar to those of McCallum (1995), meaning that we have probably ran into border effect problem. In order to correct for it, we should apply methods used by Anderson & Van Wincoop (2003). Therefore, we run the PPML estimation again, only now we include the variable on contiguity, which should deal with the border effect. The results are in Table 6.3.

The results now show lower impact of the agreements, which corresponds with the solution of McCallum border puzzle. We will, therefore, base our results presented in the Table 6.3. We also included contiguity variable into the the OLS estimation, however, the results are equally unsatisfying. The results of this estimation are shown in Appendix in Table A.1.

6.2 Discussion of the results

In this chapter, we look at the results and we try to explain their magnitudes based on our studies and based on the literature used in this paper.

The negative result of FTA between EU and Mexico are surprising, however, as we explain in Chapter 2, European Union is negotiating updates of the agreement. These results may support the process of update, as it, based on our models, does not have positive impact. For other countries, the effect of the FTAs is positive and mostly significant. It is important to mention that the values for Argentina fit better, after the inclusion of contiguity.

The addition of contiguity variable seems to be a good step. It reduced the coefficients with fta_wto, but it is an important variable for all studied countries with the exception of Mexico. This phenomena can be explained by the cooperation of the first four countries via several trade agreements and ties

Table 6.3: PPML with fixed time effects and contiguity

PPML	Argentina	Brazil	Chile	Columbia	Mexico
(Intercept)	-10.773**	-3.801	-3.345	-9.574*	-6.602*
	(3.57)	(2.49)	(2.15)	(4.85)	(3.07)
GDP_o	0.922***	0.905***	0.878***	0.945***	1.171***
	(0.02)	(0.02)	(0.03)	(0.03)	(0.04)
distw	0.592	-0.044	-0.336*	-0.073	-0.432**
	(0.33)	(0.19)	(0.14)	(0.17)	(0.13)
eu_fta	-0.126	-1.999***	-0.944***	-0.785**	-0.351**
	(0.21)	(0.19)	(0.15)	(0.27)	(0.12)
fta_wto	0.055	1.902***	0.763***	0.573**	-0.236
	(0.22)	(0.18)	(0.17)	(0.19)	(0.13)
comlang_ethno	0.302	0.062	-0.08	0.609***	0.528***
	(0.19)	(0.14)	(0.12)	(0.14)	(0.12)
comrelig	0.621***	-0.188	0.549***	0.497**	-0.351*
	(0.17)	(0.16)	(0.16)	(0.17)	(0.17)
tra	0.009	0.017**	-0.008	0.024	-0.002
	(0.02)	(0.01)	(0.01)	(0.04)	(0.01)
inv	-0.036**	-0.048*	0.027	0.019	0.011
	(0.01)	(0.02)	(0.02)	(0.01)	(0.01)
mon	-0.014	0.002	-0.004	0.012	-0.014
	(0.01)	(0.00)	(0.01)	(0.01)	(0.05)
fin	0.034**	0.029***	0.009	-0.008	0.007
	(0.01)	(0.01)	(0.01)	(0.03)	(0.02)
contiguity	3.404***	0.520***	1.141***	0.756***	-0.208
	(0.64)	(0.13)	(0.30)	(0.22)	(0.25)
Observations	1818	1820	1779	1817	1764

Note: *p<0.1; **p<0.05; ***p<0.01

with their neighbour countries. Columbia is a member of Andean Community, Brazil and Argentina are part of Mercosur, for which Chile and Colombia are associated members. Mexico's largest partner are the United States, however, it does not share border with its next four largest trading partners.

The high variability of the results, however, shows a potential for further studies of the trade agreements. As mentioned in Chapter 4, we assume that inclusion of depth of the agreements could improve our models significantly. Our models put all of the agreements at the same level and do not allow for distinction between them. This improvement, however, is beyond the scope of this paper.

The effect of GDP of the exporting countries is, for all our models, high and significant. This result was expected, as countries with higher economic power

have more incentives for international trade then countries with low GDP. As for the institutional dummy variables, their overall effect is low. However, we can see that in five cases, there are significant variables of Market openness, the trade freedom, the financial freedom and the investment freedom. Foreign countries have higher tendency to trade with countries, where they have higher entrepreneurial opportunities and where there are low restrictions on the movement of capital.

Chapter 7

Conclusion

The aim of the thesis was to show the effect of Free Trade Agreements on trade between European Union and five Latin American countries (LAC5): Argentina, Brazil, Chile, Colombia and Mexico.

For the analysis, we applied gravity models for which we used panel data set, which contained information of trade flows between 193 countries over the time period between 1995 and 2014. We chose this time period, as most of the trade agreements between European Union and the five Latin American countries were signed during this period, specifically Argentina and Brazil have their agreement with EU via its agreement with Mercosur, where they both are its members, since 1999; Mexico signed its agreement in 2000; EU-Chile agreement was signed in 2003; and Colombia in 2013. We observed whether the exports from European Union to these countries is affected by their agreements, assuming a positive and significant effect.

The estimation was done by using the Ordinary Least Squares (OLS) estimation and Poisson Pseudo Maximum Likelihood (PPML) estimation, while using fixed effects for country-pairs and time variables. The results showed a very positive effect of Free Trade Agreements on trade of these selected countries with the exception of Mexico, which showed negative, but insignificant, results. The effect of the agreements with the EU show that the effect is positive, but it has the effect below other agreements.

The approach of this thesis was very straight-forward, and it had a very clear technique to observe the effect of free trade agreements with the European Union. However, future studies could offer more explaining results, if it included variable on depth of the agreements, as each of the studied countries have agreements with the European Union on a different level. Another possible

improvement is the use of lagged effects of the FTAs, as these often effect the trade with time delay. Furthermore, closer examination of data is advised to correct for complications with distance.

From the results we can conclude that the effect of the agreements is positive, however, there is a space for improvement. The European Union should continue its current trade policy, and possibly consider expanding or renegotiating current agreements, so the new features of global trade relations are fully accounted for and in order to improve its position as a large trading partner for Latin American countries.

Bibliography

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

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

Appendini, K. & S. Bislev (2016): *Economic integration in NAFTA and the EU: Deficient institutionality*. Springer.

Ayuso, A. & S. Gratius (2018): "The economic agenda between brazil and the eu: Prospects for a bilateral and global upgrading." *IAI papers* .

Baccini, L. & A. Dür (2012): "The new regionalism and policy interdependence." *British Journal of Political Science* **42(1)**: pp. 57–79.

Baier, S. & J. Bergstrand (2010): "Approximating general equilibrium impacts of trade liberalizations using the gravity equation." *The Gravity Model in International Trade* pp. 88–134.

Baier, S. L. & J. H. Bergstrand (2001): "The growth of world trade: tariffs, transport costs, and income similarity." *Journal of international Economics* **53(1)**: pp. 1–27.

Baier, S. L. & J. H. Bergstrand (2004): "Do free trade agreements actually increase members' international trade?" *Journal of international Economics* **71(1)**: pp. 72–95.

Baldwin, R. & D. Taglioni (2006): "Gravity for dummies and dummies for gravity equations." *Technical report*, National bureau of economic research.

Barrau, A. (1999): "Union européenne et mercosur: mariage ou union libre?(rapport d'information déposé par la délégation de l'assemblée nationale

pour l'union européenne sur les relations entre l'union européenne et mercosur)." *Les documents d'information- Assemblée nationale* .

Bergstrand, J. H. (1985): "The gravity equation in international trade: some microeconomic foundations and empirical evidence." *The review of economics and statistics* pp. 474–481.

Bergstrand, J. H. (1990): "The heckscher-ohlin-samuelson model, the linder hypothesis and the determinants of bilateral intra-industry trade." *The Economic Journal* **100(403)**: pp. 1216–1229.

Broinowski, A. (2016): *ASEAN into the 1990s*. Springer.

Brown, A. G. (2009): *Reluctant partners: a history of multilateral trade cooperation, 1850-2000*. University of Michigan Press.

Cardamone, P. (2007): "A survey of the assessments of the effectiveness of preferential trade agreements using gravity models." *Technical report*.

Chase, K. A. (2009): *Trading blocs: States, firms, and regions in the world economy*. University of Michigan Press.

De Brito, A. B., C. G. Enríquez, & P. Aguilar (2001): *The politics of memory: transitional justice in democratizing societies*. OUP Oxford.

De Groot, H. L., G.-J. Linders, P. Rietveld, & U. Subramanian (2004): "The institutional determinants of bilateral trade patterns." *Kyklos* **57(1)**: pp. 103–123.

De Melo, J. & A. Panagariya (1995): *New dimensions in regional integration*. Cambridge University Press.

Deardorff, A. (1998): "Determinants of bilateral trade: does gravity work in a neoclassical world?" In "The regionalization of the world economy," pp. 7–32. University of Chicago Press.

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

Felbermayr, G. J. & F. Toubal (2010): "Cultural proximity and trade." *European Economic Review* **54(2)**: pp. 279–293.

Fidrmuc, J. & J. Fidrmuc (2016): "Foreign languages and trade: Evidence from a natural experiment." *Empirical Economics* **50(1)**: pp. 31–49.

Gelderblom, O., A. De Jong, & J. Jonker (2013): "The formative years of the modern corporation: The dutch east india company voc, 1602–1623." *The journal of economic history* **73(4)**: pp. 1050–1076.

Gowa, J. (1995): *Allies, adversaries, and international trade*. Princeton University Press.

Grossman, G. M. (2016): "The purpose of trade agreements." In "Handbook of commercial policy," volume 1, pp. 379–434. Elsevier.

Hawking, S. W. & W. Israel (1989): *Three hundred years of gravitation*. Cambridge University Press.

Head, K. & T. Mayer (2002): *Illusory border effects: Distance mismeasurement inflates estimates of home bias in trade*, volume 1. Citeseer.

Head, K., T. Mayer, & J. Ries (2010): "The erosion of colonial trade linkages after independence." *Journal of international Economics* **81(1)**: pp. 1–14.

Holland, M. (2002): *The European Union and the third world*. palgrave New York.

Irwin, D. A., P. C. Mavroidis, & A. O. Sykes (2008): "The genesis of the gatt." .

Katada, S. N. & M. Solís (2008): *Cross Regional Trade Agreements: Understanding Permeated Regionalism in East Asia*. Springer Science & Business Media.

Leamer, E. E. (1974): "The commodity composition of international trade in manufactures: An empirical analysis." *Oxford Economic Papers* **26(3)**: pp. 350–374.

Van der Leer, Y. & J. Yau (2016): "China's new silk route: The long and winding road." *PwC's Growth Markets Centre, February* .

Linnemann, H. (1966): *An econometric study of international trade flows*. 42. North-Holland Pub. Co.

Lohmann, J. (2011): "Do language barriers affect trade?" *Economics Letters* **110(2)**: pp. 159–162.

Magee, C. S. (2003): "Endogenous preferential trade agreements: An empirical analysis." *Contributions in Economic Analysis & Policy* **2(1)**.

Martínez-Zarzoso, I. & F. Nowak-Lehmann (2003): "Augmented gravity model: An empirical application to mercosur-european union trade flows." *Journal of applied economics* **6(2)**: pp. 291–316.

McCallum, J. (1995): "National borders matter: Canada-us regional trade patterns." *The American Economic Review* **85(3)**: pp. 615–623.

Mercurio, B. (2009): *Bilateral and Regional Trade Agreements: Case Studies*. Cambridge University Press.

Miller, T. & A. B. Kim (2015): "Principles of economic freedom." *Heritage Foundation* .

Moravcsik, A. (1998): *The Choice for Europe: Social Purpose and State Power from Messina to Maastricht*. Cornell University Press.

Oh, C. H., W. T. Selmier, & D. Lien (2011): "International trade, foreign direct investment, and transaction costs in languages." *The Journal of Socio-Economics* **40(6)**: pp. 732–735.

Preis, L. (2019): "Proměny španělské zahraniční politiky vůči latinské americe po pádu frankistického režimu." *Univerzita Karlova, Fakulta sociálních věd* .

Ravenstein, E. (1889): "The laws of migration." *Journal of the royal statistical society* **52(2)**: pp. 241–305.

Rawlinson, H. G. (2001): *Intercourse Between India and the Western World: From the Earliest Times of the Fall of Rome*. Asian Educational Services.

Shepherd, B. (2013): "Gravity model of international trade: a user guide."

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

Stack, M. M., R. Ackrill, & M. Bliss (2018): "Sugar trade and the role of historical colonial linkages." *European Review of Agricultural Economics* **46(1)**: pp. 79–108.

Stoyanov, A. (2009): "Trade policy of a free trade agreement in the presence of foreign lobbying." *Journal of International Economics* **77(1)**: pp. 37–49.

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

Trebilcock, M., R. Howse, & A. Eliason (2005): *The regulation of international trade*. Routledge.

Urwin, D. W. (2014): *The community of Europe: A history of European integration since 1945*. Routledge.

Valladão, A. G. (1999): *Le triangle atlantique: l'émergence de l'Amérique latine dans les relations Europe-États-Unis*. Institut français des relations internationales.

Winters, L. A. (1993): "Expanding ec membership and association accords: recent experience and future prospects." .

Woodward, E. L. & L. Woodward (1962): *The age of reform, 1815-1870*, volume 13. Oxford University Press.

Álvarez, I. C., J. Barbero, A. Rodríguez-Pose, & J. L. Zofío (2018): "Does institutional quality matter for trade? institutional conditions in a sectoral trade framework." *World Development* **103**: pp. 72–87.

Appendix A

Appendix

Table A.1: OLS with fixed time and country specific effects including contiguity variable

OLS	Argentina	Brazil	Chile	Colombia	Mexico
(Intercept)	-296.700	79.081	0.646	-231.125	-10.249
	(546.990)	(104.410)	(10.570)	(262.670)	(37.650)
GDP_o	0.101	0.213	-0.328	0.157	0.450*
	(0.240)	(0.210)	(0.210)	(0.200)	(0.190)
GDP_d	4.013	-3.472	0.749	13.304	0.432
	(5.250)	(6.400)	(0.620)	(14.900)	(1.390)
eu_fta	0.174	-1.757	0.065	0.197	0.189
	(1.400)	(1.360)	(0.330)	(0.550)	(0.340)
fta_wto	0.087	2.113	0.880***	0.020	0.034
	(1.380)	(1.330)	(0.250)	(0.430)	(0.300)
tra	-1.288	-0.892	0.031	-0.570	-0.014
	(2.810)	(1.060)	(0.100)	(0.720)	(0.040)
inv	0.691	0.238	0.011	-0.021	0.006
	(1.410)	(0.360)	(0.040)	(0.040)	(0.030)
mon	-0.197	-0.012	0.036	-0.708	-0.031
	(0.480)	(0.130)	(0.060)	(0.870)	(0.070)
fin	0.617	-0.035	-0.106	-0.024	0.026
	(1.330)	(0.080)	(0.080)	(0.030)	(0.110)
educ	322.551	126.738	4.412	-21.725	9.294
	(675.520)	(225.870)	(28.530)	(38.760)	(10.310)
Observations	1310	1462	1203	1414	994
R^2	0.094	0.095	0.080	.0141	.0.292

Note: *p<0.1; **p<0.05; ***p<0.01