

ERASMUS UNIVERSITY ROTTERDAM

Erasmus School of Economics

Master Thesis [International Economics]

Title thesis: Is the Southern Common Market the Key to the Expansion of MERCOSUR Soybean Exports?

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Date final version: Wednesday, 2nd August 2023.

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ABSTRACT

This paper investigates the internal trade creation effects of membership in the Southern Common Market and the external trade creation effects of associate membership and trade agreements with the Southern Common Market on MERCOSUR soybean exports. This paper uses a fixed effects gravity model panel regression to analyse data on annual soybean exports from MERCOSUR member countries for the 1989-2021 time period. The main conclusion is that MERCOSUR has resulted in significant internal trade creation among members. However, there are no significant external trade creation effects for associate members and the countries that have trade agreements with MERCOSUR.

SECTION 1: INTRODUCTION

According to the Observatory of Economic Complexity, soybeans were the 42nd most traded product in the world in 2021 and soybeans are “the most economically important bean in the world “ (Britannica, 2023). This is because soybeans are the most important source of plant-based protein for both humans and animals. Regarding the uses of soybeans, there are two major uses which are: animal feed and human food. Over 75%% of soybeans are used for producing animal feed for livestock such as cows and chickens. On the other hand, around 7% of soybeans are used for producing human food such as tofu and tempeh (Ritchie & Roser, 2021).

Among the largest soybean producers in 2021, four of them are located in Southern America: Brazil, Argentina, Paraguay and Uruguay (Food and Agricultural Organization of the United Nations, 2021). These four countries also comprise the members of the Southern Common Market (MERCOSUR) which is a trade bloc that was created in 1991 (Council on Foreign Relations, 2023). Due to high soybean production among MERCOSUR member countries, in 2021 soybean was MERCOSUR’s most exported product at a value of \$44.9 billion, as estimated by the Observatory of Economic Complexity.

Many factors determine global soybean trade on both the demand and supply sides, such as economic, geographical and political factors (Baldwin, 1979). To illustrate the importance of political factors, the Washington-Beijing trade war resulted in China imposing a 25% tariff on American soybean exports in response to the tariffs imposed by the USA on Chinese imports (Tan, 2019). This resulted in increased trade diversion as China imported more from South

American markets whereas the USA had to expand exports to alternative markets such as Egypt and The European Union. These factors are simpler to analyse by focusing on bilateral soybean trade.

The gravity model, developed by Tinbergen in 1962, is one of the most significant economic models for analysing bilateral trade volume and uses two main factors: Gross Domestic Product and distance. The gravity model details that the three determinants of the volume of bilateral trade are the GDP of the importing country, GDP of the exporting country, and the distance between both countries. According to the model, the GDP of the exporting country has a positive relationship with the trade volume. This is because the exporting country's GDP represents the country's production capacity. Consequently, as the production capacity of the exporting country increases, the country has more produced goods or services to trade and a higher trade volume.

Similarly, the gravity model details that the GDP of the importing country has a positive relationship with trade volume. This is because the importing country's GDP represents the country's purchasing power. As a result, when the purchasing power of the importing country increases, the country has more income to spend on foreign goods and services resulting in a higher trade volume. This model can be further modified by the inclusion of other factors to account for other trade determinants such as political factors. Political factors are used to determine the political terms of a bilateral trade relationship. Therefore, political factors can be analysed by studying the trade creation effects of trade agreements.

Therefore in this paper, the main question is:

“What are the internal and external trade creation effects of the formation of the Southern Common Market on the soybean exports of member countries and how have these effects changed over time according to the gravity model?”

This topic investigates the internal and external trade creation effects of MERCOSUR on the bilateral soybean exports of MERCOSUR member countries. Trade creation occurs when a more efficient exporter who is a member of the regional trade agreement (RTA) replaces a less

efficient exporter (Viner, 1950). Internal trade creation in this thesis refers to trade creation among the members of MERCOSUR. External trade creation in this thesis refers to trade creation with non-members of MERCOSUR such as through trade agreements and associate member countries.

Trade creation and diversion effects measure the political determinants of trade Viner (1950). Political factors determine how trade is conducted between countries, thereby affecting the ease of facilitating trade. This is because political relations affect the trading partners of countries through trade agreements, verbal agreements, or political climates within countries (Krueger, 1997). Trade agreements are used because they are tangible to measure and affect the prices and options that consumers are faced with regarding traded products. The effect of the MERCOSUR trade agreement can be analysed using the Viner (1950) framework which focuses on their trade creation and trade diversion effects.

Trade diversion in the context of a regional trade agreement (RTA) occurs when a less efficient exporter who is a member of the RTA replaces a more efficient exporter. Therefore, trade diversion effects can only be studied when imports from member countries to non-member countries are also included. For this reason, trade diversion effects are not considered as the focus is on exports.

This topic is scientifically relevant because it improves upon the framework established by the empirical literature. Firstly, previous empirical literature tends to focus solely on the effects of the creation of the Southern Common Market in 1991 as portrayed by Garcia et al (2013). This thesis improves on this by providing evidence for the differences in the trade creation effects of the establishment of the Southern Common Market in 1991 and the trade creation effects of its conversion to a customs union in 1995.

Secondly, within the literature, the impact of trade agreements often focuses on the effects on the trade of full member countries and non-member countries. To illustrate, Chang and Winters (2002) study how regional trade agreements affect non-member countries by focusing on the price effects of MERCOSUR. Although MERCOSUR also has associate member countries that

face different tariff rates and also have different access to the Southern Common Market in comparison to non-member countries, the authors do not separate the effect on non-member countries from the effect on associate member countries. This thesis improves on this by separating the trade creation and diversion effects of associate member countries from the effect on non-member countries. Additionally, this thesis also accounts for the effects of MERCOSUR on the exports of associate member countries.

This topic is socially relevant because soybean is a very important source of protein, oil and food (Pagano & Miransari, 2016). Trade in soybeans is projected to increase even more during the coming years, therefore it is important to understand the facilitators and barriers to soybean trade by the main world producer, MERCOSUR. To illustrate, MERCOSUR has signed a trade agreement with the European Union in 2019, after almost 20 years of negotiations between the trade blocs (Marques da Silva, 2023).

This agreement has the potential to significantly improve MERCOSUR global integration because the European Union is the second largest trade partner of MERCOSUR accounting for 16.2% of MERCOSUR trade in 2021 (Aarup, 2023). By understanding the potential trade creation effects that stem from external trade agreements with MERCOSUR, governments can be provided with tangible rationale for ratifying the trade agreement.

Additionally, this topic is also socially relevant to determine if there is a rationale for MERCOSUR to become a common market and increase its global integration. This is because there is often internal division within the bloc members relating to the issue of global integration. For example, the newly elected president of Brazil, Luiz Lula da Silva, is pushing for a more open and liberalized foreign policy (Harris, 2022). This is in opposition to Argentina which often prefers protectionist measures, especially regarding agricultural commodity trade (Iglesias, 2021). Therefore, research from this paper can provide support for increased global integration of MERCOSUR, by providing evidence of the positive effects of trade agreements for MERCOSUR agricultural exports.

In order to analyse this research question, this thesis uses data on annual soybean exports of the MERCOSUR countries in the time period 1989 to 2021. The time period 1989 to 2021 is chosen because it allows for a wide range of data both before and after the creation of MERCOSUR. Additionally, it allows for the measurements of the short-term effects of the creation of the MERCOSUR trade bloc and the long-term effects of the conversion of MERCOSUR to a customs union. It is important to note that given that exports of a specific commodity are the variable of interest, data on annual soybean exports are only available from 1989 from the United Nations Commodity Trade Statistics Database.

Exports from MERCOSUR countries are focused on in order to study the trade creation and trade diversion effects on soybean exports. Furthermore, the panel also contains data on exports of the associate member countries to provide a more comprehensive view on the effect of the trade bloc on associate members. Additionally, the sample contains 130 countries, of which 5 are full Mercosur member states, 7 are associate members and the remaining countries are all the countries that imported soybeans from the MERCOSUR member countries in the time period.

For the empirical analysis, the gravity model is used with annual soybean exports as the main dependent variable. The main independent variables of interest are MERCOSUR membership and MERCOSUR external free trade agreements. In addition, control variables commonly used in the trade literature are added which are: Gross Domestic Product of the export and importing country, bilateral distance, common language, common land border and landlocked country. The analysis uses exporter-fixed effects, importer-fixed effects and year-fixed effects with standard clustering at the dyad level. The robustness of the results is checked by employing alternative empirical model specifications, use of alternative variable measurements and a larger panel accounting for the exports of associate member countries.

The first main finding of this thesis is that there was significant trade creation among the member countries of the Southern Common Market. Despite this, the trade creation effects were asymmetric among members with Paraguay benefitting the most. The second main finding is that there is no significant trade creation for associate members and countries that sign trade agreements with MERCOSUR. Furthermore, there are no anticipation effects associated with

associate membership or having trade agreements with MERCOSUR. The third main finding is that MERCOSUR soybean exports experienced higher trade creation effects in the period after MERCOSUR became a customs union, in comparison to when MERCOSUR was a free trade area. The fourth main finding is that being a landlocked country and sharing an official language are the most important control variables when determining soybean exports.

The thesis is organized as follows. Firstly, in the next section, a synopsis is provided on the history of the Southern Common Market and key issues currently faced by the trade bloc. In Section 3 the theoretical framework is discussed with a focus on literature relating to the gravity model, agricultural commodity trade and regional trade agreements. Section 4 details the methodology and data by explaining the empirical strategy, the data description and data sources. Afterward, the results will be discussed in Section 5, followed by the conclusion and areas for further research in Section 6.

SECTION 2: BACKGROUND

2.1 Brief History Of The Southern Common Market (MERCOSUR)

The Southern Common Market is an economic and political bloc that was established in 1991 by Brazil, Argentina, Paraguay and Uruguay (Council on Foreign Relations, 2023). The bloc was established during a period when economic rivals, Argentina and Brazil were working towards improved economic cooperation. In order to achieve this, member countries eliminated tariffs among each other, despite this change tariffs still exist on certain goods among members such as automobiles and sugar (Castillejo et al., 2022). The main goal of MERCOSUR is the establishment of a South American common market similar to that of The European Union (Council on Foreign Relations, 2023).

The bloc officially became a customs union in 1995 with the implementation of the Amendment of the Treaty of Ouro Preto by member countries in December 1994 (Council on Foreign Relations, 2023). This was done by the application of a common external tariff on outside imports of 35% in 1995 (Kureth, 2022). Although this rate is currently reduced to an average of

13%, this external tariff is relatively one of the highest globally. This in turn poses a significant barrier to MERCOSUR trade.

The main benefit of the customs union for member countries is “preferential access to a larger market” Garcia et al. (2013). There is significant variation in population size and economic size among member countries, with Brazil having the highest population size and economic size Garcia et al. (2013). Smaller countries tend to face increase vulnerability when opening to international trade. As a result, MERCOSUR decreases the risk to smaller members because it increases the market size that can be accessed under free trade. Therefore, there will be asymmetries in the value external relationships for each member country.

MERCOSUR currently functions as a customs union and free trade area, however, the bloc has faced difficulty in establishing itself as a common market. (Patrick, 2023). This is due to the fractious relationship among members regarding the subject of integration and protectionism. Brazil and Uruguay prefer to have increased global integration and reduced protection whereas, Argentina and Paraguay prefer increased protectionism and reduced global integration (Bello, 2021). To illustrate, Brazil is working on Free Trade Area negotiations for MERCOSUR with Canada and Singapore, which have been impeded due to internal disputes among MERCOSUR members (Ribeiro, 2023). This has further resulted in Uruguay currently pursuing a trade deal with China outside of the trade bloc which is a breach of the bloc solidarity (Patrick, 2023). Consequently, the dispute over global integration and protectionism has prevented MERCOSUR from achieving its goal of a common market.

The seven associate members of MERCOSUR and the year they joined are Bolivia (1996), Chile (1996), Peru (2003), Colombia (2004), Ecuador(2004), Guyana (2013), and Suriname (2013) (MERCOSUR, 2022). These countries face reduced tariff reductions with member countries, however these countries do not have full voting rights or free market access to member countries. Mexico and New Zealand are the only observer states of MERCOSUR which provides them with limited participation within the trade bloc. Venezuela was an associate member and became a full member in 2012, however, its membership was suspended in 2016 because it did not adhere to bloc regulations (Cascione, 2017).

The trade bloc also has free trade agreements signed with Egypt, India, Israel, and the Southern African Customs Union which includes Botswana, Eswatini, Lesotho, Namibia, and South Africa. Additionally, MERCOSUR and the European Union recently signed a trade agreement in 2019, but this agreement is not yet ratified by all EU member countries (European Commission, 2019). Currently, MERCOSUR is one of the world's largest economic bloc with a combined GDP of over \$2.2 trillion dollars and over 295 million people among the member countries in 2022 (World Bank, 2022).

SECTION 3: THEORETICAL FRAMEWORK

In this chapter, the theoretical foundations required for this research paper will be explored. This paper uses a gravity model to estimate the trade creation effects of a trade agreement on an agricultural commodity. The theoretical framework similarly focuses on gravity model literature, agricultural commodity literature and trade agreement literature. with a focus on literature relating to the gravity model, agricultural commodity trade, and regional trade agreements.

Firstly, the literature on the gravity model is discussed to highlight the progress that has been made in the empirical specification of the gravity model and to justify the different control variables used in this thesis. Secondly, the literature on agricultural commodity trade is examined to establish how agricultural commodities are accounted for and to portray the different considerations that are required when focused on an agricultural commodity as opposed to non-agricultural commodities. Finally, the literature on trade agreements is studied to determine the potential effects that the formation of MERCOSUR can have on the soybean exports of member countries. Additionally, trade agreements literature provides the basis for the empirical strategy used in this paper.

3.1 Gravity Model Literature

Tinbergen (1962) derives the gravity model for international trade with Newton's gravity equation. Newton's gravity theory explains that planets are attracted to each other in proportion to their distance and sizes. Similarly, the international gravity model proposes that the bilateral

trade volume between countries is directly proportional to the product of the Gross Domestic Product of both countries and indirectly proportional to the distance between these countries. Poyhonen (1963) also uses the gravity model to analyse bilateral trade in order to determine an empirical form for the gravity model.

Melitz (2008) investigates the different channels through which sharing of a common language can promote bilateral trade. He uses the gravity model accounting for different language channels which are open-circuit communication and direct communication. Open-circuit communication measures when at least twenty percent of the population speaks the language or that it is the official language of the country. Direct communication measures the percentage of people in both countries that can communicate directly, by speaking the same language and Melitz uses 4% as the minimum.

The author also uses a different empirical specification to account for country-specific linguistic variables including linguistic diversity. Melitz finds that direct communication significantly increases trade in comparison to indirect communication. Regarding, open circuit communication, the author concludes that English does not have a significant positive effect on trade however, other European languages have a significant positive effect on trade. In this paper, the effect of sharing an official language is investigated in the empirical strategy.

Melitz adopts the view of Grimes (2000) that the linguistic variables change slowly and can therefore be viewed as constant over time. This same perspective is adopted in this paper, as the common language variable varies among the bilateral trade relationships however the value is stable for that relationship over the time period.

3.2 Agricultural Commodity Literature

Jayasinghe and Sarker (2008) analyse trade creation and trade diversion impacts of the North American Free Trade Agreement (NAFTA) on agrifood products trade. The authors use a bilateral trade gravity model using the generalized least squares method and pooled data. They focus on six agrifood products for the time period 1985-2000. The authors find that there has been a significant increase in trade among NAFTA members for four of the agricultural

commodities, however, there has been reduced trade with non-NAFTA members for these commodities.

On the other hand, the authors find that the NAFTA members have only increased their trade with non-NAFTA members only in the case of oilseeds. Additionally, the authors found that the factors in the gravity model had a much higher magnitude than expected during this period. They also found that this bias was higher for red meat and vegetables, in comparison to other commodities. They conclude that NAFTA has increased trade among members however it has reduced their openness to the rest of the world.

Koo and Karemera (1991) repurpose the gravity model to apply to a single agricultural commodity, wheat. By doing so, the authors are able to account for factors specific to wheat trade as opposed to when using the gravity model for aggregate goods. For example, there is a high use of export promotion programs in wheat trade consequently, the authors account for different types of export promotion programs in their model.

This is highly relevant as this paper will take the same approach by including factors specific to soybean trade. According to the United States Department of Agriculture (2023), MERCOSUR countries mainly transport soybeans by sea freight, therefore being a landlocked country could pose a relatively more important trade barrier as opposed to when the good is transported by rail freight or air freight. As a result, in this paper, the effect of being landlocked is accounted for in the empirical strategy.

Additionally, Koo and Kamera (1991) use time series and cross-sectional data which they find is more effective for parameter estimation as opposed to only using cross-sectional data. This is because using cross-sectional data is more likely to result in misspecification because it is not able to account for exporter-fixed effects, importer-fixed effects, and time-fixed effects. As a result, in this paper, panel data will also be used for a more effective empirical estimation.

Volrath et al. (2009) use the gravity model to determine the factors that influence bilateral trade in land-intensive agriculture and labor-intensive clothing. The authors find that sharing a common border does not always lead to improvements in trade, except among certain products such as oilseed products. Given that soybean is an oilseed product, the effect of sharing a common land border will be tested in this paper.

Regarding cultural linkages, the authors find that having a similar colonial history provides a more significant trade advantage in comparison to sharing a common language. This effect will be tested on the specific commodity level in this paper by accounting for sharing of a common language in the empirical strategy and testing the sensitivity of the empirical results when having a shared colonizer is used instead. Both variables cannot be used simultaneously in the empirical estimation because they share a strong correlation.

Volrath et al. (2009) also find that bilateral free trade agreements have a reduced positive impact on agricultural trade, but a significant impact on trade diversion. Similarly, in this paper, the significance of trade diversion and trade creation for MERCOSUR soybean exports will be investigated.

3.3 Trade Agreements Literature

Trade agreements define the conditions by which countries trade with each other and can also detail how member countries trade with non-member countries. Viner (1950) is one of the most influential papers regarding regional trade agreements and described the economic framework for analysing the benefits and drawbacks of preferential trade agreements. In his work, he explained that the welfare effects of preferential trade agreements are dependent on the trade creation and trade diversion the agreement generates. Using his economic framework, economists have investigated these effects because it suggests that there is the potential for these trade agreements to be either harmful or beneficial depending on how much trade diversion is created.

Krueger (1997) examines the differences between a free trade area and a customs union. The author aimed to compare the welfare effects between the two types of trade agreements, from which he found that a customs union is always Pareto-superior to a free trade area. The main

difference between a customs union and a free trade area is that in a customs union, members apply a common external tariff to non-members, however in a free trade area members can unilaterally decide on external tariffs for non-members.

The author finds that free trade agreements result in more trade diversion than what is found in a customs union. Similarly, in this thesis the differences in trade creation between a free trade area and a customs union will be investigated. This is because MERCOSUR was a free trade area, before it converted to a customs union. Therefore, a difference-in-difference strategy will be used to compare the trade creation effects under both trade agreements.

Grant and Lambert (2005) investigate the effectiveness of regional trade agreements in trade creation and trade diversion among agricultural commodities in the time period, 1985-2002. They wanted to answer two main questions: to what degree have regional trade agreements resulted in trade creation among agricultural goods and to what degree did the trade creation occur at the cost of trade diversion? The authors use a semi-logarithmic specification of the gravity model with added dummy variables for a common land border, landlocked, common language, trade creation, and trade diversion.

Grant and Lambert find that the strength of the trade creation coefficient is much higher in agricultural trade than in non-agricultural trade. This is because agricultural trade often has high protection in comparison to non-agricultural trade, therefore trade creation would have a higher effect. However, trade diversion had a less dominant effect except in the case of the EU-15 agreement, MERCOSUR and the African agreement. Grant and Lambert provide evidence that the beneficial effects of MERCOSUR estimated in other papers that focus on aggregated exports can underestimate the effects for agricultural commodities. As a result, this thesis investigates the internal and external trade creation effects on MERCOSUR soybean exports.

The paper by Ghosh and Yamarik (2005) investigates whether regional trade agreements indeed cause trade creation or if the conclusion of their trade creation effects are due to prior beliefs of the researcher. The authors use an extreme bounds analysis to test the fragility of trade creation estimates. Although this paper provides evidence for the lack of trade creation effects, the paper

also suffers from omitted variable bias. This is because the paper does not control for the timing of the trade agreements regarding the year of signature and year of entry into force. This will be controlled for in this paper by using the year of entry into force as the definitive period of the start of an agreement and also accounting for potential trade creation and trade diversion anticipatory effects.

Baier & Bergstrand (2007) study the importance of free trade agreements (FTA) in the gravity equation, in which the authors find that free trade agreements double bilateral trade between members. The authors were able to account for the endogeneity of the FTAs by using a panel data approach. This is because, trade integration can also affect free trade agreements, for example, countries with higher trade volume might have increased access to other countries affecting their free trade agreements. The panel data approach will be used in this thesis as well by using annual data from 1989 to 2021 to account for the endogeneity of MERCOSUR trade agreements with non-member countries.

Magee (2008) investigates how regional trade agreements affect trade flows when accounting for country pair, importer-year, and exporter-year fixed effects. The estimation procedure used is a comparison between the actual trade levels in a regional trade agreement to a hypothesized counterfactual in which there is no regional trade agreement. In order to do this, Magee uses an altered specification of the gravity model in which there are dyad fixed effects that allows the removal of factors that are specific to each country pair but time-invariant such as common land border and common language. Additionally, in this specification, the author adds a dynamic component to capture changes in the effects of regional trade agreements over time.

Magee finds that there are significant anticipatory effects of regional trade agreements in the four years before the agreement is entered into force. In other words, there is a significant increase in trade in the immediate time period before the agreement starts. Similarly, in this paper, the anticipatory effects of trade diversion and trade creation will be examined using the methodology provided by Magee. The author also concludes that trade diversion effects are much smaller than trade creation effects and that these effects vary depending on the model

specification. Therefore in this paper, the sensitivity of empirical estimates to model specification will be tested in the robustness checks.

The empirical strategy used in this paper is based on Garcia et al. (2013). The authors use a gravity model analysis to examine the determinants of bilateral trade among MERCOSUR member countries. The main aim of their paper was to determine the potential trade creation and trade diversion effects that MERCOSUR had on the aggregate exports of different countries. They use data on the annual bilateral exports between 75 countries within the 1980 to 2008 time period.

The authors use a semi-logarithmic specification of the gravity model with added binary variables for a common land border, landlocked and common language. Furthermore, to capture the MERCOSUR effects the authors include two other binary variables. The first binary variable takes the value 1 when either country in the dyad is a member of MERCOSUR. The second binary variable takes the value 1 when both countries in the dyad are members of MERCOSUR. The authors find that MERCOSUR has had a significant positive effect on trade creation between its members. However, they also find that this effect is asymmetric for the member countries, with the effect being large for Brazil and Argentina and smaller for Paraguay and Uruguay. The authors do not find evidence for trade diversion from non-member countries, but their analysis suggests import substitution of Brazil and Paraguay.

This thesis improves on this paper in three main ways. Firstly, this paper focuses on a longer time period after the establishment of MERCOSUR which allows for the investigation of the long-term effects of MERCOSUR on soybean exports. Secondly, this thesis employs a difference in difference strategy to distinguish between the effects of MERCOSUR becoming a free trade area in 1991 and a customs union in 1995. Thirdly, as this thesis focuses only on MERCOSUR soybean exports, the effects of the free trade agreements MERCOSUR has with other countries can also be investigated to determine the trade creation impacts of the trade agreements with non-member countries.

SECTION 4: METHODOLOGY AND DATA

4.1 Empirical Strategy

The aim of this paper is to analyse the effect of the MERCOSUR trade agreement on the soybean exports of member countries. As a result, the gravity model is used to . This thesis follows the methodology used by Garcia et al. (2013) to investigate the internal and external effects

Firstly, the basic gravity model as described by Tinbergen (1962):

$$T_{ij} = A * \frac{GDP_i^a * GDP_j^b}{D_{ij}^c}$$

Where i is the export nation (or region); j is the import nation (or region); T_{ij} is the trade volume from nation i to j ; A is a constant term as determined by the regression model; GDP_i is the Gross Domestic Product of nation i ; GDP_j is the Gross Domestic Product of nation j ; D_{ij} is the bilateral distance between country i and j ; a , b and c are exponents chosen to fit the model, however, in theory, these values tend to be stable and close to 1.

In words, the gravity model details that the volume of a bilateral trade relationship is a function of the product of the GDPs of both nations or regions divided by the distance between both nations or regions. The GDP of the exporting country represents their production capacity and the GDP of the importing country represents its purchasing power. As a result, countries with higher GDPs are expected to have higher purchasing power, increased production capacity and to trade more. On the other hand, distance represents an important barrier to trade. This is because, as transportation costs increase, the costs of trading also increase, thereby decreasing the benefits from trade.

The constant term A is chosen to fit the model, depending on the sample used. More accurately, in a regression setting A is the constant coefficient or the average of the model. The exponents a , b and c represent the beta coefficients estimated in the regressions. From the estimates usually found in the gravity model literature, there is a general consensus that these values tend to be close to 1 (Anderson, 1979; Bergstrand 1985).

Previous papers always use a logarithmic transformation to convert the gravity model in order to use it for empirical analysis. Therefore, the base model specification is:

$$(1) \ln T_{ijt} = \alpha + \beta_1 \cdot \ln GDP_{it} + \beta_2 \cdot \ln GDP_{jt} + \beta_3 \cdot \ln D_{ij} + \varepsilon_{it}$$

where T_{ijt} is the total soybean export volume from country i to country j in year t ; GDP_{it} is the GDP of country i in year t ; GDP_{jt} is the GDP of country j in year t ; D_{ij} is the bilateral distance between country i and j ; ε_{it} is the error term.

The base model in equation (1) has to be extended to account for other trade determinants in order to determine the effect of MERCOSUR on soybean exports. Garcia et al. (2013) include cultural trade determinants, MERCOSUR trade determinants, and additional geographical trade determinants. This is because the basic gravity model is not enough to account for the determinants of trade flows and will result in omitted variable bias. Additionally, this thesis deviates from Garcia et al. by including separate channels for the effect of having a trade agreement with MERCOSUR and the effect of being an associate member.

The extension of the base specification in equation (1) is based on Garcia et al. (2018) and is a two-way fixed effects model:

$$(2) \ln T_{ijt} = \alpha + \beta_1 \cdot \ln GDP_{it} + \beta_2 \cdot \ln GDP_{jt} + \beta_3 \cdot \ln D_{ij} + \beta_4 \cdot LandBorder_{ij} + \beta_5 \cdot Landlock_{ij} + \beta_6 \cdot OfficialLanguage_{ij} + \beta_7 \cdot MERCOSUR_{ijt} + \beta_8 \cdot TradeAgreement_{ijt} + \beta_9 \cdot AssociateMembers_{ijt} + \theta_i + \theta_j + \theta_t + \varepsilon_{it}$$

where $LandBorder_{ij}$ is equal to 1 if a common land border is shared between country i and j ; $Landlock_{ij}$ is equal to 1 if either country i or j are landlocked; $OfficialLanguage_{ij}$ is equal to 1 if country i and j have the same official language; $MERCOSUR_{ijt}$ equals 1 if country i and j belong to MERCOSUR in the year t ; $TradeAgreement_{ijt}$ equals 1 if country i exports to a country j which MERCOSUR has a trade agreement with in year t ; $AssociateMembers_{ijt}$ takes the value 1 when country j is an associate member country of MERCOSUR in year t ; θ_i are exporter-fixed effects; θ_j are importer-fixed effects; θ_t are year-fixed effects, and other variables are the same as in equation (1).

In order to identify if there are asymmetric effects for the MERCOSUR member countries, the variable MERCOSUR is substituted for four variables ($MERBRA_{ijt}$, $MERARG_{ijt}$, $MERPAR_{ijt}$, $MERURU_{ijt}$ in equation (3). These variables take the value 1 when the exporter is a specific MERCOSUR member country and they export to another MERCOSUR member country. For example, $MERARG_{ijt}$, takes the value 1 when Argentina is the exporter and it exports to Brazil, Uruguay or Paraguay.

$$(3) \ln T_{ijt} = \alpha + \beta_1 \cdot \ln GDP_{it} + \beta_2 \cdot \ln GDP_{jt} + \beta_3 \cdot \ln D_{ij} + \beta_4 \cdot LandBorder_{ij} + \beta_5 \cdot Landlock_{ij} + \beta_6 \cdot OfficialLanguage_{ij} + \beta_7 \cdot MERBRA_{ijt} + \beta_8 \cdot MERARG_{ijt} + \beta_9 \cdot MERPAR_{ijt} + \beta_{10} \cdot MERURU_{ijt} + \beta_{11} \cdot TradeAgreement_{ijt} + \beta_{12} \cdot AssociateMembers_{ijt} + \theta_i + \theta_j + \theta_t + \varepsilon_{it}$$

where $MERBRA_{ijt}$ equals 1 if country i is Brazil and country j belongs to MERCOSUR in the year t ; $MERARG_{ijt}$ equals 1 if country i is Argentina and country j belongs to MERCOSUR in the year t ; $MERPAR_{ijt}$ equals 1 if country i is Paraguay and country j belongs to MERCOSUR in the year t ; $MERURU_{ijt}$ equals 1 if country i is Uruguay and country j belongs to MERCOSUR in the year t ; and other variables are the same as defined in equation (2).

It is possible that there are anticipation effects of joining a trade agreement as portrayed by Magee (2008). Similarly, there could be anticipation effects associated with becoming a MERCOSUR associate member. For the purpose of estimating these anticipation effects, two binary variables are added in equation (4). The first variable is $TradeAnticipation_{ijt}$ which takes the value 1 in the four-year year period before the importing country has a trade agreement with MERCOSUR. The second variable is $AssociacteAnticipation_{ijt}$ which takes the value 1 in the four-year period before when the importing country is an associate member of MERCOSUR. The empirical regression is:

$$(4) \ln T_{ijt} = \alpha + \beta_1 \cdot \ln GDP_{it} + \beta_2 \cdot \ln GDP_{jt} + \beta_3 \cdot \ln D_{ij} + \beta_4 \cdot LandBorder_{ij} + \beta_5 \cdot Landlock_{ij} + \beta_6 \cdot OfficialLanguage_{ij} + \beta_7 \cdot MERCOSUR_{ijt} + \beta_8 \cdot TradeAnticipation_{ijt} + \beta_9 \cdot TradeAgreement_{ijt} + \beta_{10} \cdot AssociacteAnticipation_{ijt} + \beta_{11} \cdot AssociateMembers_{ijt} + \theta_i + \theta_j + \theta_t + \varepsilon_{it}$$

where $TradeAnticipation_{ijt}$ is a binary variable that equals 1 if country i exports to country j in the four years before country j signs a trade agreement with MERCOSUR; $AssociateAnticipation_{ijt}$ equals 1 if country i exports to country j in the four years before country j becomes an associate member of MERCOSUR; and all other variables are the same as defined in equation (2).

In order to distinguish between the effects of MERCOSUR forming a free trade agreement in 1991 and becoming a customs union in 1995, a difference in difference strategy is used in equation (5):

$$(5) \ln T_{ijt} = \alpha + \beta_1 \cdot \ln GDP_{it} + \beta_2 \cdot \ln GDP_{jt} + \beta_3 \cdot \ln D_{ij} + \beta_4 \cdot LandBorder_{ij} + \beta_5 \cdot Landlock_{ij} + \beta_6 \cdot OfficialLanguage_{ij} + \beta_7 \cdot D_{1991 \leq t \leq 1994} \cdot MERCOSUR_{ijt} + \beta_7 \cdot D_{t \geq 1995} \cdot MERCOSUR_{ijt} + \beta_8 \cdot TradeAgreement_{ijt} + \beta_9 \cdot AssociateMembers_{ijt} + \theta_i + \theta_j + \theta_t + \varepsilon_{it}$$

Where $D_{1991 \leq t \leq 1994}$ is a binary variable that equals 1 if the year is between 1991 to 1994; $D_{t \geq 1995}$ is a binary variable that equals 1 if the year is between 1995 and 2021; and all other variables are the same as defined in equation (2).

A difference in difference strategy is not used for the effects of trade agreements or being an associate member because the first trade agreement entered into force in 2009 and the first associate member joined in 1996.

4.2 Data Introduction

In this section, there will be a description of the data used for the empirical analysis. The data used are annual soybean export data for the MERCOSUR countries in the time period 1989 to 2021 which allows for both cross-sectional and time-series analysis. The sample contains 130 countries, of which 5 are full members of MERCOSUR, 7 countries are MERCOSUR associate members and 118 countries are the countries that imported from MERCOSUR in the 32-year time period. A comprehensive list of each country and their number of observations are provided in Table 8.1 in the Appendix. Given the wide range of countries, the sample contains countries

from different regions of the world and at different development stages. The final data set is an unbalanced panel with 3002 observations.

The time period considered was chosen to examine the short-term and long-term effects of the creation of MERCOSUR on soybean exports. The 32-year time period also allows for the consideration of the effects of different exogenous shocks that happened within the time period. For example, South American countries were undergoing a period of immense trade liberalization in the 1990s (Birdsall & Wheeler, 1993). Therefore, it is possible that the trade creation effects are much higher in that time period due to the simultaneous trade liberalization by other Latin American countries in comparison to later time periods. It is also important to note that, soybean export data for the MERCOSUR countries are only available from 1989 and there is limited availability on soybean exports before 1990 in the United Nations Commodity Trade Statistics Database.

The member countries of the Southern Common Market were chosen because the aim of this study is to investigate the internal and external trade creation effects of MERCOSUR. Table 4.1 provides information on the number of exporting observations for the MERCOSUR member countries.

Table 4.1 Exporting and Importing Observations for the Soybean Exports of the Members of the Southern Common Market in 1989-2021

Country	Exporting Observations	Importing Observations
Brazil	1,299	73
Argentina	861	66
Paraguay	602	65
Uruguay	239	85
Venezuela	1	48

**Note: Venezuela is included because it was a member country between 2012 and 2016.

As evident from the above table, Brazil has the highest number of exporting observations at 1299. This is at least twice as much as the observations of Paraguay consequently, it is important to test the sensitivity of the results to the inclusion of Brazil. This is further reinforced by the fact

that Brazil is the top global exporter of soybeans in 2021 (Observatory of Economic Complexity, 2022). Regarding importing observations, Uruguay has the highest amount however, the importing observations of the other countries are in a similar range. Venezuela is the only exception with a smaller number of observations of 48.

4.3 Data Description

The descriptive statistics for each variable used in the regressions are provided in Table 4.2.

Table 4.2 Descriptive Statistics of Variables Used in the Empirical Regression

Variable	Observations	Mean	Standard Deviation	Minimum	Maximum
lnSoybeanExportValue	3,002	15.328	3.430	2.303	24.028
lnGDPExport	3,002	26.325	1.699	22.283	28.593
lnGDPImport	3,002	26.400	1.890	19.263	30.780
lnDistance	3,002	8.954	0.854	5.732	9.892
LandBorder	3,002	0.132	0.339	0	1
Landlock	3,002	0.256	0.437	0	1
OfficialLanguage	3,002	0.149	0.356	0	1
MERCOSUR	3,002	0.112	0.316	0	1
TradeAgreement	3,002	0.0187	0.135	0	1
AssociateMember	3,002	0.066	0.249	0	1
Associate Anticipation	3,002	0.006	0.077214	0	1
Trade Anticipation	3,002	0.011	0.109	0	1

4.3.1 Trade Volume

The dependent variable for trade volume is the measure of the annual export trade value of soybeans in current United States Dollars for each individual country. The data is provided by the United Nations Commodity Trade Statistics Database (UN Comtrade Database). The UN Comtrade Database provides data on international commodity trade and protectionist measures. The database has two main contributors which are: The World Bank and The United Nations Conference on Trade and Development (UNCTAD). The database also works with other partners such as the International Trade Center in order to ensure its accuracy and reliability. In the UN Comtrade Database, soybean; whether or not broken, is classified under the Harmonized System (HS) HS 6-Digit Code 120100.

The Harmonized System Nomenclature is “an international multipurpose nomenclature which was elaborated under the auspices of the World Customs Organization”(European Commission). The Nomenclature classifies 5000 commodity groups into 6 digit codes and 8 digit codes according to a predetermined structure to allow for ease of international interpretation. For some of the countries in this study, there are missing observations if the country did not export soybeans in that year. Additionally, the trade value for some observations are 0, in order to estimate these values in a logarithmic transformation, the Heckman sample selection correction technique is used.

It is important to note that the UN Comtrade Database also provides data on annual export trade value in quantity (kilograms). The dollar value is preferred because there are missing values for the quantity variable, especially in earlier years.

4.3.2 Gross Domestic Product

The model uses the Gross Domestic Product (GDP) of the exporting country and the importing country. The GDP of each country approximates their national income for each year. Data on annual GDP is from the World Bank Database and the GDP is in current US Dollars. The World Bank Database provides a variety of developmental data and information for countries in the world. The GDP is used because it is an accurate measure of the exporting country’s production capacity and the importing country’s purchasing power and according to the gravity model

literature, the GDPs of both countries should have a positive relationship with trade. The first hypothesis is that a higher GDP of the exporting country will cause a higher increase in soybean export value. The second hypothesis is that a higher GDP of the importing country will cause a higher increase in soybean export value.

4.3.3 Distance

Distance is a measure of the physical proximity between both countries engaged in bilateral trade. In this paper, distance is used as a proxy measure of transportation costs because as distance increases, transportation costs also tend to increase. Distance between countries is provided by the Centre d'Études Prospectives et d'Informations Internationales (CEPII) Database. CEPII provides reliable information on the world economy such as on trade flows, distance, and more.

The main distance variable is measured as the population-weighted distance between the geographical coordinates of the most densely populated cities of both countries in kilometers. The most densely populated cities are used because these cities are assumed to have the highest demand for exports within each country and to be the center of economic activity. Additionally, this variable is specifically measured by CEPII for gravity model analysis to account for sensitivity to trade flows, which are not used in the other CEPII distance measures. Therefore, the third hypothesis is an increased distance will cause a decrease in soybean export value.

4.3.4 Common Land Border

Land Border is defined as a geographic line (real or artificial) that is used to demarcate two geographic areas (National Geographic, 2023). A common land border is also a measure of geographical proximity between countries in a bilateral trade relationship. In this study, countries have a common land border if they share borders with each other. The CEPII Database provides data on if both countries are contiguous in terms of a dummy variable. A common land border is theorized to promote trade because there are fewer physical borders between both countries, hereby facilitating easier trade. Therefore, the fourth hypothesis is that countries that share a common land border in a dyad will have an increased soybean export value in comparison to countries in a dyad that do not share a land border.

4.3.5 Landlocked Country

A landlocked country is a country that does not have direct access to an ocean (National Geographic, 2023). This is a measure of a geographical trade barrier, because landlocked countries experience an additional difficulty because they have to gain indirect access to the seaports of neighboring countries. This factor is important because MERCOSUR countries mainly transport soybeans by sea freight (USDA, 2023). This variable takes the value 1 if either of the countries in the bilateral trade relationship is a landlocked country. The CEPII Database provides data on whether a country is landlocked or not. Consequently, the fifth hypothesis is that having a landlocked country in a dyad will reduce soybean export trade value in comparison to when both countries in a dyad are not landlocked.

4.3.6 Common Language

Common language is the measure of cultural proximity between both countries. The CEPII Database also provides data on whether both countries share a common language in terms of a dummy variable. The main variable defining common language measures if both countries have the same official language. Although sharing of an official language is an accurate measure of a common language between both countries, this variable can ignore the linguistic diversity of countries. This can be very important in certain cases such as Brazil, where the official language is Portuguese however a good portion of the population also speaks English (8,500,000 people) Spanish (6,380,000 people), or German (2,130,000 people) (Tilti, 2022).

The second variable defining common language measures if a language is spoken by at least 9% of the population in both countries. This measure covers a broader measure of cultural proximity and will be used to test the robustness of the results to how the common language is defined. Common language is also theorized to promote trade because it allows for easier communication between members of both countries. As a result, the sixth hypothesis is that countries in a dyad that share a common language will have a higher soybean trade value in comparison to countries in a dyad that do not share a common language.

4.3.7 MERCOSUR

MERCOSUR is the measure of internal trade creation among MERCOSUR member countries. This is a binary variable that takes the value 1 when both countries in the bilateral trade relationship are members of MERCOSUR. Data on MERCOSUR memberships comes from the World Trade Organization Regional Trade Agreements Database. The Database provides information on the terms of a trade agreement, the signatories, the year of signature, and the year of entry into force for all WTO member countries. All MERCOSUR countries are WTO member countries, therefore this database provides sufficient information for all the countries. The information from the WTO Database is also cross-checked with the foreign ministry information for each country in the study.

A positive sign of this variable means that MERCOSUR leads to internal trade creation among MERCOSUR member countries. The sixth hypothesis is that when countries in a dyad are members of MERCOSUR, there will be an increase in soybean export trade value in comparison to when one of the countries in the dyad is not a MERCOSUR member.

4.3.8 Trade Agreement and Trade Agreement Anticipation Effects

Trade Agreement is a measure of political cooperation between countries engaged in bilateral trade and it is defined as the increased trade value when two or more countries enter into a trade agreement. In this study, trade agreement is a dummy variable that takes the value of 1 when the importing country has a trade agreement with MERCOSUR from the year the agreement entered into force.

The year of entry into force is used as opposed to the year the agreement is signed because the year of entry into force is when the trade terms are legally followed by all countries in the agreement. Although, the year of signature informs of when the countries are satisfied with the conditions of the agreement, using this year would result in biased results because this is not the year when the terms are actually put in place. Similar to MERCOSUR, data on trade agreements comes from the World Trade Organization Regional Trade Agreements Database.

This variable measures the trade creation effects based on the resulting sign of the estimate. If the variable is positive, then trade creation occurs because trade is increased with the countries

that have signed trade agreements with MERCOSUR. On the other hand, if the variable is negative, then it means that the trade agreements are not trade-enhancing. The seventh hypothesis is that importing countries that have trade agreements with MERCOSUR will have reduced soybean export value in comparison to countries that do not have a trade agreement with MERCOSUR.

Furthermore, trade agreement anticipation effects are studied in this thesis. Trade agreement anticipation effects is a variable that measures if there are significant changes in the imports of a country in the immediate period before the country signs a trade agreement with MERCOSUR. This variable takes the value 1 in the four years before the country signs a trade agreement with MERCOSUR.

4.3.9 Associate Member and Associate Member Anticipation Effects

Associate member is a variable that measures the benefits of being an associate member of MERCOSUR. As a result, the variable takes the value of 1 when the importing country is an associate member of MERCOSUR. This variable measures the trade creation effects based on the resulting sign of the estimate.

Data on this variable comes from the Southern Common Market Database, which provides information on the membership status of full members, associate members and observer members. Additionally, the database provides information on the regulations, procedures and different statistics relating to the MERCOSUR trade bloc.

If the variable is positive, then trade creation occurs because trade is increased with the countries that are associate members of MERCOSUR. On the other hand, if the variable is negative, then it means being an associate member of MERCOSUR is not trade-enhancing. The seventh hypothesis is that importing countries that are associate members of MERCOSUR will have increased soybean export value in comparison to importing countries that are not associate members of MERCOSUR.

Additionally, in this study associate member anticipation effects are estimated. Associate member anticipation effects is a variable that measures if there are significant changes in the imports of a country in the immediate period before the country becomes an associate member of MERCOSUR. This variable takes the value 1 in the four years before the country becomes an associate member of MERCOSUR.

SECTION 5: EMPIRICAL RESULTS

Section 5.1 Basic Model Results

In this section, the results for the basic model estimation with and without fixed effects will be discussed. The basic model estimates that bilateral trade volume is determined only by the GDP's of the importing country, exporting country GDP, and bilateral distance. The results of the basic model with and without fixed effects are presented in Column 1 and Column 2 in Table 5.1.

In Column 1, all variables are insignificant except for the GDP of the importing country, which is significant at the 1% level. The GDP of the importing country is positive which means that on average, an increase in the GDP of the importing country is associated with an increase in the value of soybean exports, all factors remaining constant. Therefore a 1% increase in the GDP of the importing country is associated with a 0.569% increase in soybean exports, *ceteris paribus*.

Table 5.1 Empirical Estimates of the Trade Creation Effects of the Southern Common Market on the Annual Soybean Exports of Member Countries in the time period 1989-2021

VARIABLES	(1) Basic Model	(2) Basic Model with Fixed Effects	(3) Extension Model	(4) Extension Model with Asymmetric Effects	(5) Extension Model with Anticipation Effects	(6) Difference in Difference Model
lnGDPExport	-0.00644 (0.106)	0.224 (0.484)	0.222 (0.483)	0.225 (0.484)	0.211 (0.482)	0.216 (0.475)
lnGDPImport	0.569*** (0.106)	0.419 (0.307)	0.402 (0.314)	0.385 (0.314)	0.405 (0.314)	0.373 (0.316)
Indistance	0.132 (0.220)	-2.287*** (0.841)	-1.506 (0.953)	-2.838*** (1.062)	-1.512 (0.955)	-1.428 (0.968)
LandBorder			-1.364	-1.595	-1.396	-1.301

			(1.152)	(1.079)	(1.161)	(1.164)
Landlock			-1.729**	-1.698**	-1.717**	-1.737**
			(0.790)	(0.861)	(0.788)	(0.784)
OfficialLanguage			1.434*	1.323*	1.424*	1.456*
			(0.816)	(0.779)	(0.817)	(0.817)
MERCOSURBrazil				2.864***		
				(1.030)		
MERCOSURArgentina				-0.465		
				(1.201)		
MERCOSURParaguay				3.377***		
				(0.897)		
MERCOSURUruguay				-0.660		
				(2.008)		
TradeAgreement			-0.250	-0.251	-0.439	-0.233
			(0.640)	(0.641)	(0.866)	(0.639)
AssociateMember			0.276	0.279	0.588	0.352
			(0.846)	(0.850)	(0.922)	(0.862)
MERCOSUR			7.337**		10.37	
			(3.380)		(16.12)	
TradeAnticipation					-0.404	
					(0.717)	
AssociateAnticipation					0.608	
					(0.639)	
D _{1991 ≤ t ≤ 1994} X MERCOSUR						0.893
						(0.717)
D _{t ≤ 1995} X MERCOSUR						2.390***
						(0.806)
Constant	-1.510	13.61	2.750	19.74		8.264
	(4.166)	(15.78)	(16.12)	(16.84)		(15.91)
Observations	3,002	3,002	3,002	3,002	3,002	3,002
Number of dyads	308	308	308	308	308	308
Importer FE	NO	YES	YES	YES	YES	YES
Exporter FE	NO	YES	YES	YES	YES	YES
Year FE	NO	YES	YES	YES	YES	YES

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

On the other hand, the GDP of the exporting country is negative, implying a negative relationship with the value of soybean exports in column 1. The bilateral distance variable is positive which implies a direct relationship with the value of soybean exports. Although the sign of these two variables are contradictory to the predetermined hypotheses, the variables are statistically insignificant.

When fixed effects are accounted for in Column 2, the bilateral distance variable becomes negative and statistically significant at the 1% level. This suggests that countries that are closer in distance will have a higher soybean exports value, which is identical to the hypothesis. Therefore a 1% increase in distance is associated with a 2.287% reduction in the value of soybean exports, *ceteris paribus*.

The GDP of the exporting country and the GDP of the importing country are positive in Column 2. This suggests that on average, an increase in the GDP of the importing or exporting country will result in an increase in the value of soybean exports. Although this is identical to the prediction of the hypothesis, the variables are statistically insignificant.

The changes in the estimates from Column 1 to Column 2 highlight the importance of fixed effects as all the variables in Column 2 have the right sign, despite the insignificance of the GDP variables. This is because fixed effects account for multilateral resistance terms that present barriers to trade but cannot be estimated by the model. Multilateral resistance includes factors such as institutions, economic shocks specific to the importer or exporter, business practices or other factors that could impede trade. These factors are often difficult to measure, hence by including fixed effects they can be accounted for in the model.

Section 5.2 Extension Model Results

In this section the empirical results of the extended model in Columns 3 to Column 6 of Table 5.1 will be discussed.

Firstly, in Column 3 the extended model accounting for trade agreement, associate member effects and MERCOSUR membership effects are estimated. The estimate of landlocked is negative and statistically significant at the 1% significance level. This means that there is a reduction of 1.792% of soybean exports in a trade relationship where one country is landlocked or both countries are landlocked in comparison to a trade relationship where neither country is landlocked. This is in accordance with the hypothesis that being a landlocked country will have a reductive effect on the value of soybean exports.

On the contrary, the estimate of official language is positive and statistically significant at the 10% level in column 3. This also conforms to the hypothesis that a trade relationship between countries that share an official language will increase the value of soybean exports. Therefore, a dyad where both countries share the same official language will have a 1.434% increase in soybean exports in comparison to a dyad where both countries do not share the same official language.

In column 3, the effect of MERCOSUR membership are positive and statistically significant at the 1% significance level. This means that both countries in a dyad being full members of MERCOSUR is associated with a 7.33% increase in the value of soybean exports in comparison to a dyad where both countries are not full members of MERCOSUR. This is in line with the hypothesis and is also the largest point estimate in the model. Consequently, this implies that there has been significant trade creation among the MERCOSUR member countries due to the creation of the trade bloc.

The other estimates in column 3 are statistically insignificant, however the signs of the estimates are in line with the hypothesis, except for the estimate of a shared land border. The shared land border estimate is negative meaning that soybean exports are reduced between countries that share a land border in comparison to when countries do not have a land border. The estimate for trade agreement is negative which implies that countries that have trade agreements with MERCOSUR import less soybeans than countries that do not have trade agreements with MERCOSUR. This could be because majority of the trade agreements MERCOSUR has are with low-income or developing countries with the exception of the trade agreement it has with Israel (OECD, 2021). Therefore, these trade agreements in the case of soybean exports do not appear to be strategic as they do not enhance trade.

The estimate of associate membership is positive which means that on average countries that become associate members of MERCOSUR import more from MERCOSUR. The magnitude of this effect however is quite low in comparison to the effect of MERCOSUR membership. This in turn makes intuitive sense because the associate members have limited access to the Southern Common Market in comparison to full members.

Secondly, in column 4 the extended model is estimated to account for asymmetric effects for the MERCOSUR member countries. The asymmetric effects of MERCOSUR for Brazil and Paraguay are positive and statistically significant at the 1% level. This means that when Brazil exports to another MERCOSUR country, there is a 2.864% increase in the value of soybean exports, in comparison to when Brazil exports to a non-MERCOSUR country, *ceteris paribus*. Similarly, when Paraguay exports to another MERCOSUR country, this is associated with a 3.377% increase in the value of soybean exports, compared to when Paraguay exports to a non-MERCOSUR country, all factors remaining constant.

The positive sign of the estimates means that MERCOSUR has resulted in internal trade creation for the soybean exports of Paraguay and Brazil. The estimate for Paraguay is relatively larger than the estimate for Brazil, suggesting that Paraguay significantly benefits more from the internal trade creation of MERCOSUR in comparison to the other MERCOSUR countries. This could be because MERCOSUR provides access to a larger market than Paraguay can access without the trade bloc. Furthermore, this could explain why Paraguay has larger asymmetric effect when compared to Brazil, given that Brazil is a much larger country (World Data, 2023).

On the other hand, the estimates for the asymmetric effects for Argentina and Uruguay are negative and statistically significant. This in turn suggest that when either Argentina or Paraguay exports to MERCOSUR member country there is a decrease in the value of soybean exports in comparison to when either country exports to a non-MERCOSUR country. The variables for landlocked and official language remain statistically significant and have the same sign as in Column 3. The variable of bilateral distance is negative and statistically significant at the 1% level. All other variables are statistically insignificant and have the same sign as in column 3.

Thirdly, in column 5, anticipation effects of trade agreements and associate membership are estimated. To begin with, both anticipation effects are statistically insignificant. The anticipation effect of trade agreements is negative which implies that in the four year time period before the country signed a trade agreement with MERCOSUR, it slightly decreased its soybean exports. The anticipation effects of associate membership are positive, suggesting that in the four year

period before a country became an associate MERCOSUR member, there was a slight increase in their soybean exports.

Although these effects are insignificant, they are in line with the estimates from column 3 where having a trade agreement with MERCOSUR had a decreasing effect on soybean export value and being an associate member of MERCOSUR had an expansionary effect on the soybean export value. This further solidifies that the trade agreements of MERCOSUR are not strategic as the trade agreements appear to reduce trade.

Fourthly, in column 6 a difference-in-difference model is estimated to separate the effects of the creation of MERCOSUR and its conversion to a customs union. The interaction effect between MERCOSUR membership and the period when MERCOSUR was a free trade area is statistically insignificant and positive. This suggests that within the period MERCOSUR was a free trade area, there was no significant effect of MERCOSUR membership on soybean exports.

The interaction effect between MERCOSUR membership and the period where MERCOSUR became a customs union is positive and statistically significant at the 1% level. This in turn means that on average if both countries in the dyad were MERCOSUR member and it was within the time period after MERCOSUR became a customs union, there is a 2.39% increase in soybean exports in comparison to before it became a customs union and both countries are not members of MERCOSUR. This estimate is significantly larger than the previous interaction effect, which could mean that there are more benefits of MERCOSUR membership due to its conversion to a customs union. This is in line with the literature because a customs union allows for greater integration of the economies involved and greater economic cooperation in comparison to a free trade area (Krueger, 1997). For example, a customs union has to negotiate trade agreements as a single entity, in comparison to a free trade area where countries are free to negotiate individually. Therefore, a customs union would provide more benefits than a free trade area, especially when the countries involved are smaller.

Despite the statistical insignificance of the importing country's GDP coefficient, exporting country's GDP coefficient and bilateral distance coefficient (except in column 3) in columns 3 to

6, these variables remained relatively stable and their sign is in line with the literature and the hypotheses.

In conclusion, from the above results it is evident that MERCOSUR had significant positive effects on internal trade creation. However, these effects were asymmetric among member countries with positive estimates for Brazil and Paraguay and negative estimates for Argentina and Uruguay. Additionally, there were no significant anticipation effects of trade agreements and associate membership, suggesting that these factors do not result in external trade creation. The difference-in-difference model portrayed that a customs union is more effective at internal trade creation in comparison to a free trade area. Lastly, from the control variables, being a landlocked country and sharing an official language appear to be the most important control variables when determining soybean exports.

SECTION 5.3: Robustness Checks

In these section, four main robustness checks are implemented to ensure the consistency of the empirical estimates. The three robustness checks are: alternative variable choices, alternative sample choices and alternative model specifications.

To begin with, alternative variable choices are used to measure the robustness of the empirical estimates to choice of variables. A different common language variable which is a dummy variable that takes the value 1 if a language is spoken by at least 9% of the population in both countries. This measure covers a broader measure of cultural proximity and will be used to test the robustness of the results to how the common language is defined. Secondly, the quantity measurement of soybean exports is used as the dependent variable, to test the sensitivity of the results to the choice of trade value in comparison to trade volume.

Regarding, alternative sample choices, two robustness checks are implemented. The first check includes the exports of associate member countries during the 1989-2021 time period. The second robustness check excludes Brazil, in order to test if Brazil is the main driver of the internal trade creation effects. The results of the estimates of the alternative variable choice and alternative sample robustness checks are presented in Table 5.2

Table 5.2 Empirical Estimates for the Robustness Checks relating to Alternative Variable Choices and Alternative Sample Selection

VARIABLES	(1) Common Language 9%	(2) Soy Exports in Quantity	(3) Inclusion of Exports of Associate Members	(4) Excluding Brazil Exports
lnGDPExport	0.221 (0.483)	0.142 (0.501)	0.334 (0.366)	0.196 (0.929)
lnGDPImport	0.399 (0.313)	0.443 (0.340)	0.288 (0.302)	0.480 (0.340)
Indistance	-1.386 (0.921)	-0.947 (0.901)	-2.216*** (0.598)	0.366 (1.417)
LandBorder	-1.265 (1.127)		-0.742 (0.724)	0.874 (1.038)
Landlock	-1.737** (0.796)	-1.919** (0.863)	-1.484* (0.758)	-1.784* (0.953)
Language 9%	1.629** (0.767)			
MERCOSUR	7.586** (3.344)	6.860 (16.31)	-1.724* (1.008)	-7.859 (27.23)
TradeAgreement	-0.247 (0.640)	-0.346 (0.732)	-0.248 (0.633)	0.183 (0.760)
AssociateMember	0.273 (0.846)	0.240 (0.985)	-0.0387 (0.621)	0.963 (0.941)
OfficialLanguage		2.033*** (0.788)	0.472 (0.786)	2.087 (2.633)
Constant	1.662 (16.05)		15.78 (13.12)	
Observations	3,002	2,957	3,585	1,703
Number of dyads	308	308	418	192
Importer FE	YES	YES	YES	YES
Exporter FE	YES	YES	YES	YES
Year FE	YES	YES	YES	YES

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

In Column 1, the common language variable is positive and statistically significant at the 5 % level. The variable is slightly larger than the estimate found in the Section 5.2. This is to be expected because this variable has a looser condition for shared common language between

countries. Additionally, there are no significant changes in the other coefficients, therefore, the estimates are robust to the choice of common language variable.

In Column 2, when soy exports in quantity are the main independent variable, the observations are reduced to 2957 due to the missing observations for this variable. The variables for landlock and official language are slightly increased in comparison to when the dependent variable is the value of soybean exports. An important deviation is that the MERCOSUR coefficient is statistically insignificant. This could mean that there has not been significant increases in the soybean quantities traded between MERCOSUR countries. It is important to note that this variable is still positive. It is evident that the estimates are not robust to the choice of dependent variable.

In Column 3, the exports of the associate member countries are included which increases the observations to 3585. The only deviation is that the effect of MERCOSUR is negative and statistically significant at the 10% level. This means that when exports of the associate members are accounted for, exports between MERCOSUR member countries are reduced in comparison to when the exports are not between MERCOSUR member countries. Therefore, the results are not robust to the inclusion of the exports of associate member countries.

However, this is to be expected because this model was created to determine the effects of MERCOSUR on MERCOSUR exports, in order to account for associate member exports, additional explanatory variables are required. One of these variables could be a separate variable accounting for the trade agreements the associate member countries have with the countries importing from them.

In Column 4, the model excludes exports from Brazil which results in the reduction of the observations to 1703 and also significantly reduces the explanatory power of the model. The coefficient for MERCOSUR is statistically insignificant and negative. This suggests that countries with MERCOSUR membership trade less with each other than with non-member countries. The results are not robust to the exclusion of Brazil, which could suggest that Brazil is the main driver of the internal trade creation effects found in the empirical results.

Alternative model specifications tests the sensitivity of the empirical results to different models which are Ordinary Least Squares, random effects model and the Poisson Pseudo-Maximum Likelihood Estimator. Additionally, the Hausman test compares the fixed effects regression with a random effects regression and determines which model provides the most consistent and efficient estimate. The results for these tests are presented in Table 5.3.

Table 5.3 Empirical Estimates for the Robustness Checks relating to Alternative Model Specifications of the Annual Soybean Exports of MERCOSUR Countries in 1989-2021

VARIABLES	(1) Ordinary Least Squares	(2) Random Effects	(3) Poisson Pseudo-Maximum Likelihood Estimator
lnGDPExport	0.0465 (0.473)	0.0664 (0.120)	0.00283 (0.0301)
lnGDPImport	0.254 (0.317)	0.533*** (0.114)	0.0184 (0.0195)
Indistance	-1.955** (0.906)	0.783* (0.468)	-0.133** (0.0576)
LandBorder	-1.740 (1.116)	-0.223 (0.879)	-0.121 (0.0748)
Landlock	-2.856*** (0.763)	0.559 (0.400)	-0.200*** (0.0492)
OfficialLanguage	1.056 (0.763)	1.372** (0.588)	0.0691 (0.0482)
MERCOSUR	1.604 (3.356)	1.144 (0.903)	1.259*** (0.199)
TradeAgreement	-0.294 (0.675)	-0.513 (0.612)	-0.0218 (0.0434)
AssociateMember	0.265 (0.820)	0.209 (0.797)	0.0244 (0.0601)
Constant	21.53 (14.91)	-8.745* (5.307)	1.982** (0.849)
Observations	3,002	3,002	3,002
R-squared	0.452		0.456
Importer FE	YES	NO	YES
Exporter FE	YES	NO	YES
Year FE	YES	NO	YES
Number of dyads		308	a

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

In column 1, the Ordinary Least squares for landlocked and bilateral distance are larger than the estimates in the empirical results. This could be because OLS does not allow for heteroskedastic standard errors which can also explain why the standard errors in Column 1 are larger than those in Column 2 and Column 3. Therefore the OLS method would not provide consistent estimates for this empirical study.

In Column 2, the main deviations are a positive effect of the distance variable and a statistically significant positive effect of the GDP of the importing country variable. A random effects model is not preferred because it cannot account for country specific shocks and time specific shocks that could affect soybean exports.

The Poisson Pseudo-Maximum Likelihood Estimator (PPML) is used because it can better account for frequent 0s often found in panel trade data (Martin & Pham, 2020). This is because it is highly probable that countries do not trade with each other in each year. The PPML estimates are more conservative than the estimates found in the empirical results. The signs and the significance of the variables in Column 3 are very similar to those found in the empirical results, with the exception of the statistical significance of the bilateral distance variable. In conclusion, the choice of empirical specification is robust as the results found in the alternative models are very similar to those of the empirical results.

SECTION 6: DISCUSSION AND CONCLUSION

In conclusion, this paper finds that there was significant trade creation in the soybean exports of the Southern Common Market member countries. However, there are also significant asymmetries of the trade creation effects among the MERCOSUR members. The results portrayed that Paraguay and Brazil benefit the most, whereas trade is not enhanced for Argentina and Uruguay.

Secondly, this thesis does not find evidence for external trade creation effects for associate members and countries that sign trade agreements with MERCOSUR. This in turn means that regarding MERCOSUR exports of soybeans, there are no significant benefits to having a trade

agreement or being an associate member of MERCOSUR. Additionally, there are no anticipation effects associated with associate membership or having trade agreements with MERCOSUR.

Thirdly, this thesis provides evidence that a customs union is Pareto-superior to a free trade area. This is because, MERCOSUR soybean exports experienced higher internal trade creation effects in the period after MERCOSUR became a customs union, in comparison to when MERCOSUR was a free trade area.

Regarding the gravity model determinants of trade, in this study being a landlocked country and sharing an official language were the most important control variables when determining soybean exports. Landlocked country had a significant negative effect on trade which was in accordance with the hypothesis. This is because MERCOSUR countries mainly export soybeans by sea freight (United States Department of Agriculture, 2023). Consequently, it should be expected that landlocked countries will experience increased difficulty to access the soybean exports.

Similarly, the effect of shared official language was also in line with the hypothesis. This resulted in a significant positive effect on soybean exports. This effect was also robust when a different measure of shared language was used, which further justifies its importance as a trade determinant in the gravity model.

This research has important implications. To begin with, the results suggest that the trade agreements that MERCOSUR currently do not create trade for the soybean exports of member countries. The only developed country that MERCOSUR currently has a trade agreement with is Israel (OECD, 2023). MERCOSUR does not seem to have strategic trade agreements that positively affect soybean trade. Consequently, it is important that MERCOSUR increases the trade agreements it has, while ensuring these agreements are strategic for the different goods they export.

In addition, associate membership does not result in any significant trade creation effects. Therefore, it could be advisable that MERCOSUR aims to convert the associate membership

countries to full membership countries. This would allow for increased internal trade creation effects. Another mechanism would be for MERCOSUR to change the terms of associate membership in order to promote more trade between associate member countries and full member countries.

Despite the positive internal creation effects, there were significant asymmetries among members. Additionally, when Brazil was excluded from the sample, there were no significant internal trade creation effects. This in turn suggests that Brazil exports were the main driver for the internal trade creation effects found in this thesis. The significant asymmetries could provide rationale for the internal division within MERCOSUR regarding the issue of global integration (Harris, 2022).

Given the positive internal creation effects for Brazil, Brazil's pursuit of liberalized foreign policy is in line with the findings of this thesis. Similarly, Argentina's preference for protectionist measures is rational based on the findings of this thesis that were not significant positive internal trade creation effects for Argentina (Iglesias, 2021). These asymmetries could be the result of institutions, governmental policies or other factors that reduce the benefits of MERCOSUR membership for other countries within the bloc. As a result, it is important, that future research investigates the factors that lead to trade creation asymmetries within MERCOSUR.

Firstly, it is important that future research explore the trade creation effects on other commodities that are of economic importance to MERCOSUR such as iron ore which was the 2nd most exported good of MERCOSUR in 2021 (of Economic Complexity, 2022). Additionally comparative studies can be done among different commodities in order to determine how MERCOSUR can adjust its trade agreement strategies or membership to strategies to capitalize on trade creation effects.

Secondly, in this paper only trade creation effects were studied given that the study focused on exports. Subsequent studies can focus on the trade diversion effects of MERCOSUR on specific

commodity choices. Comparative studies can also be done here to measure the difference between the trade creation by MERCOSUR and the trade diversion it causes.

Thirdly, given the importance of presence of a common language for trade, future research could explore the dynamic effects of a common language. This is because in this study, common language was assumed as a time-invariant variable. However, this is not always the case as the language distribution within countries change over time due to factors such as migration and globalization (Aitchson, 2005). As a result it could be interesting to study how the changes in the language distribution of a country over time affect trade.

In addition, the recent MERCOSUR-EU trade agreement presents an interesting opportunity for empirical analysis. This is because the MERCOSUR-EU trade agreement would be the most economically beneficial trade agreement MERCOSUR currently has (Aarup, 2023). This in turn means that there could be significant changes in the internal creation effects on MERCOSUR exports. As a result, future analysis can examine the impact of this agreement on the internal creation effects on MERCOSUR exports.

In conclusion, this paper aimed to examine the internal and external trade creation effects of the Southern Common Market on the soybean exports of member countries. Although this paper finds significant positive effects of internal trade creation, there is no evidence suggesting that there are significant effects of external trade creation.

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SECTION 8: APPENDIX

Table 8.1 Comprehensive list of all the countries and their importing and exporting observations for the main regression panel of exports of the full members of the Southern Common Market

Country	Exporting Observations	Importing Observations
Afghanistan	0	1
Algeria	0	9
Angola	0	22
Argentina	861	66
Aruba	0	1
Australia	0	3
Austria	0	1
Bahamas, The	0	11
Bahrain	0	2
Bangladesh	0	40
Belgium	0	44
Belgium-Luxembourg	0	22
Belize	0	1
Benin	0	1
Bermuda	0	13
Bolivia	0	61
Bosnia and Herzegovina	0	1
Brazil	1229	73
Cambodia	0	1
Cameroon	0	2
Canada	0	37
Cape Verde	0	4
Chile	0	49
China	0	70
Colombia	0	40

Congo, Dem. Rep.	0	3
Congo, Rep.	0	4
Costa Rica	0	11
Cote d'Ivoire	0	3
Croatia	0	11
Cuba	0	30
Curaçao	0	1
Cyprus	0	10
Denmark	0	25
Dominican Republic	0	3
Ecuador	0	4
Egypt, Arab Rep.	0	64
El Salvador	0	1
Equatorial Guinea	0	3
Estonia	0	2
Ethiopia(includes Eritrea)	0	1
Finland	0	16
Fm Sudan	0	3
France	0	54
Gambia, The	0	1
Georgia	0	3
Germany	0	86
Ghana	0	6
Greece	0	58
Guatemala	0	18
Guyana	0	7
Hong Kong, China	0	12
Hungary	0	1
Iceland	0	2
India	0	10

Indonesia	0	46
Iran, Islamic Rep.	0	43
Ireland	0	28
Israel	0	43
Italy	0	88
Japan	0	85
Jordan	0	1
Kenya	0	3
Korea, Dem. Rep.	0	5
Korea, Rep.	0	44
Latvia	0	1
Lebanon	0	15
Liberia	0	3
Lithuania	0	5
Luxembourg	0	5
Madagascar	0	1
Malaysia	0	65
Malta	0	2
Marshall Islands	0	3
Mauritius	0	2
Mexico	0	45
Morocco	0	34
Mozambique	0	10
Myanmar	0	1
Namibia	0	1
Nepal	0	6
Netherlands	0	92
Netherlands Antilles	0	3
New Zealand	0	3
Nicaragua	0	1

Nigeria	0	15
Norway	0	37
Oman	0	2
Other Asia, nes	0	60
Pakistan	0	13
Panama	0	23
Paraguay	602	65
Peru	0	37
Philippines	0	36
Poland	0	8
Portugal	0	59
Romania	0	28
Russian Federation	0	43
Saudi Arabia	0	14
Senegal	0	9
Serbia, FR(Serbia/Montenegro)	0	2
Sierra Leone	0	1
Singapore	0	30
Slovak Republic	0	3
Slovenia	0	4
South Africa	0	46
Spain	0	77
Sri Lanka	0	2
St. Lucia	0	16
Sudan	0	1
Suriname	0	1
Sweden	0	23
Switzerland	0	60
Syrian Arab Republic	0	20

Tajikistan	0	1
Thailand	0	66
Tunisia	0	33
Turkey	0	67
Turks and Caicos Isl.	0	5
Uganda	0	1
Ukraine	0	4
United Arab Emirates	0	24
United Kingdom	0	71
United States	0	100
Uruguay	239	85
Uzbekistan	0	3
Venezuela	1	48
Vietnam	0	45
Zambia	0	1
Zimbabwe	0	1

Table 8.2 Comprehensive list of all the countries and their importing and exporting observations for the regression panel of exports of the full members and associate members of the Southern Common Market

Country	Exporting Observations	Importing Observations
Afghanistan	0	1
Algeria	0	9
Angola	0	23
Argentina	861	93
Aruba	0	6
Australia	0	3
Austria	0	6

Bahamas, The	0	12
Bahrain	0	2
Bangladesh	0	40
Belgium	0	56
Belgium-Luxembourg	0	22
Belize	0	1
Benin	0	1
Bermuda	0	16
Bolivia	162	64
Bosnia and Herzegovina	0	1
Brazil	1299	85
Cambodia	0	1
Cameroon	0	2
Canada	0	75
Cape Verde	0	6
Chile	196	70
China	0	71
Colombia	72	85
Congo, Dem. Rep.	0	3
Congo, Rep.	0	4
Costa Rica	0	12
Cote d'Ivoire	0	3
Croatia	0	11
Cuba	0	30
Curaçao	0	5
Cyprus	0	10
Czech Republic	0	1
Denmark	0	25
Dominican Republic	0	5
Ecuador	60	32

Egypt, Arab Rep.	0	65
El Salvador	0	1
Equatorial Guinea	0	3
Estonia	0	2
Ethiopia(includes Eritrea)	0	1
Finland	0	17
Fm Sudan	0	3
France	0	79
Gambia, The	0	1
Georgia	0	3
Germany	0	98
Ghana	0	6
Greece	0	58
Guatemala	0	24
Guyana	16	9
Hong Kong, China	0	13
Hungary	0	6
Iceland	0	2
India	0	12
Indonesia	0	47
Iran, Islamic Rep.	0	43
Ireland	0	28
Israel	0	43
Italy	0	128
Japan	0	97
Jordan	0	1
Kenya	0	4
Korea, Dem. Rep.	0	5
Korea, Rep.	0	44
Latvia	0	1

Lebanon	0	15
Liberia	0	3
Lithuania	0	5
Luxembourg	0	5
Madagascar	0	1
Malaysia	0	68
Malta	0	2
Marshall Islands	0	3
Mauritius	0	2
Mexico	0	45
Morocco	0	34
Mozambique	0	10
Myanmar	0	1
Namibia	0	1
Nepal	0	6
Netherlands	0	120
Netherlands Antilles	0	5
New Zealand	0	3
Nicaragua	0	1
Nigeria	0	15
Norway	0	38
Oman	0	2
Other Asia, nes	0	63
Pakistan	0	13
Panama	0	29
Paraguay	602	66
Peru	75	77
Philippines	0	36
Poland	0	8
Portugal	0	60

Romania	0	30
Russian Federation	0	43
Rwanda	0	1
Saudi Arabia	0	14
Senegal	0	10
Serbia, FR(Serbia/Montenegro)	0	2
Sierra Leone	0	1
Singapore	0	31
Slovak Republic	0	3
Slovenia	0	4
South Africa	0	47
Spain	0	104
Sri Lanka	0	2
St. Lucia	0	16
Sudan	0	1
Suriname	2	2
Sweden	0	24
Switzerland	0	65
Syrian Arab Republic	0	20
Tajikistan	0	1
Thailand	0	68
Tunisia	0	33
Turkey	0	69
Turks and Caicos Isl.	0	5
Uganda	0	1
Ukraine	0	4
United Arab Emirates	0	25
United Kingdom	0	81
United States	0	198

Uruguay	239	90
Uzbekistan	0	3
Venezuela	1	66
Vietnam	0	46
Zambia	0	1
Zimbabwe	0	1