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Trade Policy Analysis

CETA on the international stage

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Un grazie sincero va alle tante persone che mi hanno sostenuto, supportato e *sopportato* in questo lungo percorso.

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Grazie

Quo usque pro Europa ibis?
Ad astra
From this pale blue dot

The views and opinions expressed in this thesis are solely those of the author and do not necessarily reflect the official policy or position of the Italian Ministry of Foreign Affairs. The author bears full responsibility for the content of this thesis.

Abstract

In this dissertation we evaluate the effects of the CETA trade agreement on the international stage.

We employ a PPML methodology and analyse the effects of the FTA under three different perspectives. Trade in agricultural goods between the EU and Canada, trade in agricultural goods compared to other FTAs and investments stocks.

Two vast datasets have been built for this purpose. One, regarding the trade of agricultural goods at the chapter level of the HS classification method (24 chapters), containing bilateral observations for 225 entities and 11 years. A second, regarding the FDI stocks, containing bilateral observations for 253 entities and 24 years.

We find that CETA has had a positive impact on transatlantic trade between the EU and Canada, not only at the general level but also at the section and chapter level, although, with relevant differences within chapters.

We perform a similar evaluation in order to ascertain the effects of CETA in a dynamic contest and vis-à-vis comparable FTAs. We find CETA to remain positive and overall above average when compared with similar FTAs. We also present an hypothesis as to the differing performances of various FTAs.

Lastly, we find indications that CETA impacted positively on bilateral FDIs in the post 2017 era when compared to other BITs.

We discuss the "winners" and "losers" of international trade and present preliminary policy considerations.

Building on the most recent methodological developments this work strives to delve deeper in chapter level effects of FTAs. We obtain new insights on CETA and, potentially, the positive effects of DTAs *vis-à-vis* traditional FTAs or BITs.

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Introduction to the Thesis

On September 21st, 2017, the CETA trade agreement entered provisionally into force.

CETA is just one of a constantly growing number of DTAs. Furthermore, it is among the most important FTAs signed by the EU and its ratification process has faced constant challenges by vocal minorities both at the national and at the industry level notably, in the agricultural field.

In the following pages our aim is to answer a series of questions, with an ex-post perspective, on the effects of CETA in the transatlantic trade of agricultural products and the respective FDIs stocks. We perform several PPML analyses of trade flows addressing issues such as, but not limited to:

1. Has CETA increased agricultural trade between the EU and Canada?
2. Has this growth been consistent through time?
3. What is the causality nexus between trade and CETA?
4. Has this growth been equally spread between sections and chapters?
5. What is the relationship between the effects of the treaty and least traded goods?
6. What is the relationship between the effects of the treaty between most and least liberalized chapters?
7. How does CETA perform when compared with similar FTAs?
8. Do differences limit themselves at the aggregate level or do they delve also at the chapter level?
9. How does CETA perform at the cluster level when compared with the other treaties?
10. What was the effect of CETA on FDIs stocks?

We answer these questions in four chapters:

1. A comprehensive review of the current literature on CETA, ex-post trade analysis, the peculiarities of trade in agriculture and FDIs ex-post analysis.
2. An analysis of the CETA FTA
3. A comparative analysis of the CETA FTA *vis-à-vis* similar treaties
4. A study of the effects of CETA on FDIs stocks

For chapters 2 and 3, we developed a dataset based on three main dimensions. A temporal one, from 2012 to 2022, an entity-based one, in which we obtain bilateral data on 225 entities (countries and others) in the relevant timeframe, and, lastly, a commodity one, in which we developed aggregated data on agricultural trade at the comprehensive, section and chapter level for 24 chapters(HS2).

We than adopted a methodology based on the gravity model of trade and centred on the PPML estimator with time-origin, time-destination and origin-destination fixed effects.

In Chapter 2 we study exclusively CETA. Firstly, we analyse it at the aggregated level and perform a series of robustness controls to ascertain the value of our methodology. This control includes different declinations of the trade creation effects, a study of the direction of causality between trade creation and trade volume and lastly a study on the effects of CETA when constraining the control group.

We move than to a sub-sector analysis in which we analysed the effect of CETA firstly at the section level and subsequently at the chapter(HS2) level. Our analysis allows the identification of the sectors that benefited more of the treaty and of those that performed less well, or, that suffered from the introduction of the agreement. We compare these results with volume data to identify relevant connections between least traded goods and trade creation effects and between tariff liberalization and trade creation effects. We include an analysis of trade diversion effects when weighting trade creation by a chapter(HS2) specific tariff coefficient.

Lastly, we perform a temporal study to evaluate patterns in the effects of the treaty over time from 2017 to 2022.

Chapter 2 finds extensive results indicating a positive effect of the treaty on transatlantic trade at every level with only a few limited chapters(HS2) reporting low or negative effects. A well-documented collinearity issue between trade diversion and the fixed effects doesn’t allow us to comment on PPML results for trade diversion. Nonetheless, by weighting trade creation for the tariff variation we obtain the possibility of separating trade creation in treaty and tariff effects to better understand the role of tariff measures and NTBs. Regarding the temporal analysis, it shows that after a growth in the trade creation effects of the treaty

between 2017 and 2018, the trade creation effects tend to shrink although they remain strongly positive between 2018 and 2022.

In Chapter 3 we study CETA *vis-à-vis* a series of comparable trade agreements. After selecting 16 FTAs entered into force between 2013 and 2020 we perform our analyses, similarly to chapter two, at the aggregated, section and chapter(HS2) levels.

Our findings indicate that, with few exceptions, the FTAs contributed to the creation of trade between their parties. When performing our section and chapter(HS2) level evaluations, we find similar results as those of Chapter 2 with general positive effects safe for a selected few FTA.

In this context, CETA performs positively but within the group average.

For Chapter 4 we developed a dataset based on two main dimensions. A temporal one, from 2000 to 2023 and an entity-based one, in which we obtain data on 253 entities (countries and others) in the relevant timeframe. We use the same methodology as above by employing the PPML estimator with time-origin, time-destination and origin-destination fixed effects.

We find that, albeit the EU and Canada are not each other's main FDI partner, the CETA performed, on average, better than other FDI relationships after 2017.

In conclusion, we find ample evidence pointing to positive trade creation effects of CETA in the agricultural trade and we expect to find positive FDIs creation effects.

We also find several avenues of improvement. Chiefly, the decomposition of FDIs stocks and the extension of our analysis to other sections and chapters(HS2) or alternatively a segmentation to headings and sub-headings of the HS nomenclature would allow for far better understanding of the effects of the treaty on European and Canadian producers. At the present state, our datasets do not allow for such developments, nonetheless, the internationally available data could allow this kind of improvements on our research given ample enough computational capacity.

This thesis thus contributes to the existent literature in several ways.

Firstly, we find that analysis of FTAs at the aggregated level versus deeper levels yields varying results. Section and chapter levels present strong variations that not only are immediately observable, but, raise concerns as to the traditional

approach of aggregated trade flows analysis. This does not diminish the value of aggregated trade flows analysis but merely hints to the need for more comprehensive evaluation.

Secondly, we add to the existing literature in identifying possible avenues of research in the most vs least liberalized sectors and in the most and least traded sectors.

Thirdly, we perform, the first (to our knowledge) in depth analysis of the effects of CETA on agriculture. At the aggregate level, at the section and chapter levels and comparatively with a number of FTAs.

Fourthly, we develop two in depth datasets that contain ample data apt to analyse not only CETA but all FTAs entered into force in the post 2014 period.

Lastly, we develop a preliminary analysis of the effects of CETA as a BIT.

Chapter 1

A literature review

Abstract

In this chapter we assess the state of the art in trade policy analysis in the agricultural field, the analysis of FDIs and the expected outcomes of CETA compared with the existing literature.

We find that, from a methodological perspective, PPML is now the preferred method to perform trade policy analysis, given the inherent limitations of OLS estimation. Furthermore, we underline the peculiar nature of trade in agricultural products given the unique protections they enjoy in developed economies both under tariff barriers and non-tariff barriers, chiefly sanitary and phytosanitary ones.

We then address the peculiarities of multi-treaty and multy-sector comparisons between FTAs and DTAs.

Lastly, we take stock of the state of the literature on FDIs and their connections with the trade in goods. We find literature on this aspect of CETA to be conflicting at best and lacking the perspective of an adequate time span.

To conclude, we identify several areas of improvement in the evaluation of CETA, namely in multy-sector comparison and in the relation with least traded goods and least and most liberalized goods. Furthermore, multy-treaty comparisons of CETA have not been performed and the connections between FDIs and the trade in goods are still to be explored in stronger detail.

1. Introduction

The Comprehensive Economic and Trade Agreement (CETA), which provisionally came into force in 2017, stands as a significant trade agreement between Canada and the European Union. While most literature has focused on the treaty's negotiation, implementation, and legal mechanisms, there is a notable gap in analyzing its economic returns and impact on trade creation and FDIs.

Initially, we provide a brief overview of initial studies that have offered partial analyses of CETA, such as those by Sabau and Boksh (2017), have been narrowly focused, examining specific sectors like the fishing industry in limited geographical areas and Kutlina-Dimitrova (2023) that offered a broader analysis of key indicators before and after CETA's implementation, suggesting positive bilateral trade effects but lacking comprehensive econometric evaluation.

Deriving from these analyses, our objective is to extend beyond bilateral comparisons to assess CETA's global impacts, considering both intra-treaty and extra-treaty effects, and by employing PPML methodology as a solution to the increased awareness of the limitations of OLS.

We than focus on agricultural trade liberalization, given its challenging nature, due to barriers like sanitary and phytosanitary measures (SPS) and technical barriers to trade (TBT). We discuss recent developments in the field of least traded goods and how this opens interesting venues of research.

Furthermore, we discuss the peculiarities of multi-treaty and multi-sector comparisons in the agricultural field.

Lastly, we focus on the EU’s powers in the field of Foreign Direct Investments (FDIs), more in detail their lack thereof. The EU lacks exclusive competence in investment matters, which partly explains the protracted ratification process of CETA. We research recent literature, including works by Faith Montfaucon et al. (2023) and Larch and Yotov (2023) which highlights the efficiency of PPML estimators in FDIs analysis and the relationship between FDIs and deep FTAs.

2. Literature review of methodology and CETA

The CETA trade agreement, having provisionally entered into force in 2017[1] is a relatively young trade agreement. In its short life most of the literature on the topic has focussed on the negotiations surrounding the treaty, its implementation, the ratification procedure in the EU Member States, and the legal mechanisms it created to manage transatlantic trade.

Little to no attention has been paid to the actual economic returns of the treaty and its impact on the creation of welfare (Table 1). Sabau & Boksh (2017) have briefly tried to address similar topics, but in a very limited way. They focussed only on the impact of CETA on fish (HS chapter 03) in a detailed although extremely narrow analysis. They restricted their study both geographically, looking at the Newfoundland and Labrador provinces and economically only on the effects on the fishing industry.

Kutlina-Dimitrova (2023) has produced a broader analysis, focussed on evaluating some selected key indicators of the treaty before and after its provisional application. This work, although detailed, is a simple observation and comparison of indicators and thus does not evaluate with econometric tools the broader impact of the treaty. What Kutlina-Dimitrova (2023) found, is a general positive effect of the treaty on bilateral trade with a growth in exports for both parties. Our aim, thus, is to go beyond a bilateral comparison and consider the effects of the treaty worldwide both on its parties (intra-treaty effects) and on non-parties (extra-treaty trade).

Harada & Nishitateno (2021) and Timisina and Culas (2022) try to assess the effects of FTAs in the trade of agricultural commodities, and both make use of Poisson Pseudo Maximum Likelihood (PPML) estimations to ascertain the effects of said FTAs while, similarly, Sun & Reed (2010) analyse the trade creation and diversion effects in the agricultural market. These studies are limited by a constrained geographical dataset. Timisina and Culas (2022) with 23 countries from the Asia-pacific region, Harada & Nishitateno (2021) with 27 (mostly Asian)

[1]Notice concerning the provisional application of the Comprehensive Economic and Trade Agreement (CETA) between Canada, of the one part, and the European Union and its Member States, of the other part.

exporters and Sun & Reed (2010) with 81 countries. Harada & Nishitateno (2021) finds strong trade creation effects in the field of wine trade while Timisina and Culas (2022) find not only strong trade creation effects, but, moreover, that trade creation offsets trade diversion in the wheat trade for the countries that they take in consideration.

The traditional workhorse of ex-post analysis of trade data is the gravity model usually estimated using Ordinary Least Squares (OLS) estimator. However, this estimator appears to be extremely biased, as widely debated by authors like Santos Silva & Tenreyro (2006). The OLS estimation of the gravity model appears to have (among others) one main limitation: heteroskedasticity. Issues that have also been confronted by Harada & Nishitateno (2021) and Timsina and Culas (2022).

A first attempt at resolving these issues has been presented by Anderson & van Wincoop (2003) with the introduction of the concept of Multilateral Trade Resistance (MTR). Yet, MTR accounts for the traditional issues related with distance in the gravity model but does not address the roots of the heteroskedasticity issue. Others have tried to achieve a better understanding of the varying role of distance like Baniya et al (2020) but without overcoming the limitations of OLS regression.

Santos Silva & Tenreyro (2006) have shown that when heteroscedasticity is accounted for the OLS estimates generate biased results. Thus, they have revolutionized the estimation of the gravity model by utilizing a PPML estimator. The coefficients of the gravity model, estimated with PPML, are much more efficient and they also account for another traditional issue of OLS gravity estimation, the presence of zeroes in the data.

In the case of zeroes, PPML allows for their inclusion without damaging the robustness of the estimations. Finally, PPML can be adapted to work with endogenous regressors (Windmeijer & Santos Silva, 1997) and panel data (Wooldridge, 1999).

In our model, building on the seminal work of Santos Silva & Tenreyro (2006), and the recent developments discussed by Yotov et al. (2017), we decided to use a PPML model, further developed by the work of Correia et al (2020) on PPML regression with multiple levels of fixed effects. The use of Correia et al. (2020) allows us to reconciliate not only the improvements brought by Santos Silva with the introduction of PPML but also the work of Anderson & van Wincoop (2003) by

including MTR in the form of time-origin, time-destination and origin-destination fixed effects, accompanied by section or chapter fixed effects when appropriate. This is in line with the findings of Fally (2015) and consistent with the theory we introduced from Anderson e van Wincoop (2003).

Furthermore, in line with the recent literature we included intra-national trade flows as utilized by Dai et al. (2014), Heid et al. (2017), Fontagné et al. (2021) and Cipollina and Salvatici (2020). They strengthen the estimations by adding deeper dimensions and are in line with the theoretical foundations of Gravity.

Regarding time, and as shown in the recent work of Egger et al. (2022), we opted for yearly data, also in line with their findings on the sub-optimal nature of interval data.

Moreover, in line with recent developments such as Hou (2023) and Mattoo et al. (2020) we aim at analyzing the peculiarities of CETA as a deep trade agreement. In this regard, chapter 2 will provide distinct treaty and tariff effects estimations to assess the different effects of tariff reductions and NTBs reductions.

In conclusion, our reviews indicates a gap in trade policy analysis on the effects CETA. Thus, the literature indicates for us the possibility of deepening our knowledge when it comes both to CETA and multy-sector comparisons especially given adoption of PPML as opposed to OLS. Furthermore, the very recent evaluations on least traded goods by French and Zylkin (2024) opens novel approaches that we are keen to explore.

Table 1. *Literature review for Chapter 2*

Anderson and van Wincoop	2003	Gravity with Gravitas: A Solution to the Border Puzzle
Baier and Bergstrand	2007	Do free trade agreements actually increase members' international trade?
Baier et al.	2019	On the widely differing effects of free trade agreements: Lessons from twenty years of trade integration
Baniya et al.	2020	Trade effects of the New Silk Road: A gravity analysis
Cipollina and Salvatici	2020	On the effects of EU trade policy: agricultural tariffs still matter
Correia et al.	2020	PPMLHDFE: Fast Poisson Estimation with High-Dimensional Fixed Effects
Dai et al.	2014	On the trade-diversion effects of free trade agreements
Egger et al.	2022	Gravity Estimations with Interval Data: Revisiting the Impact of Free Trade Agreements
Fally	2015	Structural gravity and fixed effects
Fontagne et al.	2021	A General Equilibrium Assessment of the Economic Impact of Deep Trade Agreements
French and Zylkin	2024	The Effects of Free Trade Agreements on Product-level Trade
Ghosh and Yamarik	2004	Are regional trading arrangements trade creating? An application of extreme bounds analysis
Harada and Nishitateno	2021	Measuring trade creation effects of free trade agreements: Evidence from wine trade in East Asia
Heid et al.	2021	Estimating the effects of non-discriminatory trade policies within structural gravity models
Hou	2023	Deep trade agreements and trade cost
Kutlina-Dimitrova	2023	CETA: Evolution of Key Economic Indicators
Mattoo et al.	2020	Handbook of Deep Trade Agreements
Sabau and Boksh	2017	Fish Trade Liberalization Under 21St Century Trade Agreements: The Ceta And Newfoundland And Labrador Fish And Seafood Industry
Santos Silva and Tenreyro	2006	The Log of Gravity
Santos Silva and Tenreyro	2022	The Log of Gravity at 15
Sun and Reed	2010	Impacts of Free Trade Agreemets on Agricultural Trade Creation and Trade Diversion
Timsina and Culas	2022	Australia's Free Trade Agreements (FTAs) and Potentiality of Wheat Exports: A Panel Gravity Model Approach
Windmeijer and Santos Silva	1997	Endogeneity in Count Data Models: An Application to Demand for Health Care
Yotov et al.	2016	An Advanced Guide to Trade Policy Analysis: The Structural Gravity Model

Most relevant literature on methodology and the CETA

3. Literature review of multi-treaty comparison in the agricultural field

After its early utilisations, and already in 1998, as pointed out by Eichengreen and Irwin, the Gravity model had become the workhorse of empirical studies of international trade and had virtually excluded all other approaches. To this day this affirmation can be considered as true. Ex post analysis, already in various declinations, and with the refinements of methodology, is still performed with the solid foundation of the Gravity model.

Anderson et al (2013) discuss of the effects of FTAs in reducing unobservable trade barriers, and these barriers, as pointed out by Josling et all (2010) are extremely important in the case of agricultural exports, historically among the sectors that have seen higher protection. In these sectors, where barriers are usually higher before the entry into force of the treaty, their lowering tends to have a heavier impact on trade flows. In this framework Ghazalian (2017) goes as far as to indicate the presence of relatively higher elasticity of trade flows to trade barriers, when compared with other shocks. Moreover, Ghazalian argues that pre-FTA policy can be designed with domestic protection intents and thus lead to reduced pre-FTA trade magnitudes between member countries.

Grant and Lambert (2008) explain with more details the considerations that Ghazalian merely touched, although their analysis is still limited by the use of OLS estimates. They show that the impacts of FTAs are extremely different whether the analysis focusses on agricultural or non-agricultural data. They also suggest that this might in part be related to the relatively higher protection enjoyed by the agricultural sector. Thus, successful liberalization of agricultural trade can yield better results than other sectors. Although dated, to give a term of reference, in 1992 agricultural protections were fifteen times higher than non-agricultural protections according to Ingco (1995).

Furthermore, Grant and Lambert (2008) address a topic that we briefly discussed in the introduction; tariffs are only part of the picture when it comes to agriculture. Indeed, one of the main exceptions that the WTO considers to the free trade of goods is the presence of sanitary and phytosanitary measures (SPS) and technical barriers to trade (TBT). These measures strongly limit trade not only because of different food standards, but also because, in certain countries, the cost of

obtaining the necessary paperwork is exceedingly high when compared with the expected outcome of selling agricultural products in certain foreign markets. A small example of this situation is the creation of a joint Italo-Mongolian centre for trade facilitation in the field of leather and animal fibres for the textile industry. A centre sponsored by ACIMIT (the Italian association for textiles machinery) that is aimed not only at the facilitation of trade but most importantly the administrative support to obtain the necessary required certifications to allow the trade of these commodities towards the EU.

The study of the effects of trade on agriculture are varied yet inconsistent. Karemera et all (2023) discusses the effects of a limited number of FTAs on the overall agricultural exports and in relation with the GFC (Global Financial Crisis of 2008). In line with recent developments, they introduce in their analysis the PPML (Poisson Pseudo Maximum Likelihood) methodology. They borrow heavily from the work of Sun & Reed (2010), one of the first to adopt the PPML methodology, and yet limited by an approach that is focussed only on a few trade agreements. In both these papers we find a good analysis of trade flows and convincing evidence as to the positive effect of FTAs on trade flows although, in fairness, some works, such as Clausing (2001) show that in some instances trade diversion leads to negative effects on the overall outcome of a treaty for its parties.

Section or chapter(HS2) level analysis is also limited. Several works analyse the effects of trade liberalization on extremely small agricultural sectors. Though not a limitation per se, works such as Karemera et all (2015) only analyse a small part of a picture that is often more varied and lack the insights that a broader comparison can yield. Bekele and Mersha (2019) analyse the effects of coffee exports for Ethiopia, again, an interesting approach yet focussed only on a certain subsector and on a given country, although extremely important given the share that coffee exports retain vis-à-vis Ethiopian GDP and exports. Beyond this approach we find Urata & Okabe (2013) that analyse trade with a group of major trade agreements among all the SITC (Standard International Trade Classification) sections. Their work is an excellent starting point although limited by its OLS methodology.

One of the most analysed trade agreements, and one that has influenced our research, in term of its agricultural exports is the NAFTA/CUSFTA (North American Free Trade Agreement/ Canada-U.S. Free Trade Agreement). And in this instance the type of analysis we can find is twofold. In one instance we find authors that

identify exclusively aggregated trade flows, such as Koo et all (2006) and Sun & Reed (2010), furthermore with the limitations of OLS estimations for Koo et all. In other instances, such as Jayasinghe and Sarker (2008), we have a sector-based analysis with multi-year evaluations aimed at taking note of the effects of NAFTA over time. Yet, even this excellent study suffers by the limitations of OLS methodology in estimating the gravity model.

In conclusion, our reviews indicates that trade policy analysis on the effects of FTAs in agriculture is limited yet sound and with relevant policy implications. Furthermore, the literature indicates for us the possibility of filling the gap when it comes to CETA and when it comes to multy-treaty and multy-sector comparisons especially given the fact that the recent developments in methodology and the widespread adoption of PPML allows us to develop better evaluations.

Table 2. *Literature review for Chapter 3*

Anderson & van Wincoop	(2003)	Gravity with Gravitas: A Solution to the Border Puzzle
Anderson et al	(2013)	Gravity, Scale and Exchange Rates
Baier et al	(2019)	On the widely differing effects of free trade agreements: Lessons from twenty years of trade integration
Bekele & Mersha	(2019)	A Dynamic Panel Gravity Model Application on the Determinant Factors of Ethiopia's Coffee Export Performance
Bhagwati	(1995)	US Trade Policy: The Infatuation with FT As
Clausing	(2001)	Trade creation and trade diversion in the Canada - United States Free Trade Agreement
Correia et al	(2020)	PPMLHDFE: Fast Poisson Estimation with High-Dimensional Fixed Effects
Eichengreen & Irwin	(1998)	The Role of History in Bilateral Trade Flows
Ghazalian	(2017)	The Effects of NAFTA/CUSFTA on Agricultural Trade Flows: An Empirical Investigation

Grant & Lambert	(2008)	Do Regional Trade Agreements Increase Members' Agricultural Trade?
Ingco	(1995)	Agricultural Trade Liberalization in the Uruguay Round: One Step Forward, One Step Back?
Jayasinghe & Sarker	(2008)	Effects of Regional Trade Agreements on Trade in Agrifood Products: Evidence from Gravity Modelling Using Disaggregated Data
Josling et al	(2010)	Understanding International Trade in Agricultural Products: One Hundred Years of Contributions by Agricultural Economists
Karemera et al	(2023)	A re-examination of the benefits of trade agreements on agricultural exports and the impact of the 2008 great recession
Karemera et al	(2015)	Trade Creation and Diversion Effects and Exchange Rate Volatility in the Global Meat Trade
Kutlina-Dimitrova	(2023)	CETA: Evolution of Key Economic Indicators
Sabau & Boksh	(2017)	Fish Trade Liberalization Under 21St Century Trade Agreements: The Ceta and Newfoundland and Labrador Fish and Seafood Industry
Santos Silva & Tenreyro	(2006)	The Log of Gravity
Koo et al	(2006)	Regional Preferential Trade Agreements: Trade Creation and Diversion Effects
Sun & Reed	(2010)	Impacts of Free Trade Agreements on Agricultural Trade Creation and Trade Diversion

Most relevant literature on multi-treaty comparison in the agricultural field

4. Literature review of FDIs analysis

In this section we will discuss firstly the peculiarities of the EU's powers in the FDIs(Foreign Direct Investments) field and subsequently we will analyse the most relevant methodologies of FDIs analysis.

Firstly, looking at EU trade policy, a substantive caveat needs to be made. The EU has no exclusive competence in the field of investments. As a matter of fact, amongst the 5 exclusive competences of the Union[2] we find common commercial policy but not FDIs. This is, in part, the reason for the lengthy ratification process of the CETA.

Carducci (2018) stresses the complex nature of such predicament. Indeed, on the one hand the EU is recognized to have legal personality and the capacity to negotiate and enter treaties of its own making that are binding for the Member States. On the other hand, Carducci (2018) reiterates that the Union can act *solo* only within the limits of its exclusive competences, otherwise having to include Member States to a greater extent in negotiations and, more notably, in the ratification process. This happens inter alia specifically in the field of FDIs, BITs (bilateral investment treaties) and dispute settlement mechanisms. All these topics are core features characteristics of CETAs innovative nature as a deep FTA.

Moreover, deep FTAs are introducing more and more non-trade provisions that effectively restrict FDIs flows with non-parties. Di Ubaldo and Gaisorek (2022) delve into this matter and show that this is essentially contributing to trade-diversion effects of FDIs from countries that are part of such treaties and non-parties.

We now look at the methodological aspects of FDIs analysis in FTAs, and, in this instance, the literature is still divided. When looking at the evaluation of the effects of FTAs on FDIs we find that the literature is following a path that is very resembling of the traditional evolution of trade policy analysis, yet with its distinct peculiarities.

Indeed, if OLS regressors in DiD analyses of trade policy are close to be completely abandoned in the trade of goods, the same can not be said for FDIs. Yet, using

[2]Customs union, the establishing of competition rules necessary for the functioning of the internal market, monetary policy for euro-area countries, conservation of marine biological resources under the common fisheries policy and common commercial policy.

OLS estimators maintains all the issues that we have already identified in the previous sections. Heteroskedasticity, the zeros issue and more practically, the proliferation of variables that aim at capturing various dimensions of distance and societal and cultural factors. PPML overcomes this issue and we find it used in recent papers such as Faith Montfaucon et al. (2023) and Larch and Yotov (2023).

The latter is extremely relevant for our analysis indicating a detailed attempt at quantifying the relationship between FDIs and deep FTAs (such as CETA). Another welcomed improvement is that it reconciles in a single elegant methodology trade policy analysis for both trade in goods and FDIs. Their findings inform our expectations and analysis of CETA. Namely the expectation of significant effects of DTAs (deep trade agreements) on FDIs, differing effects between inward and outward FDIs and lastly a positive relation between the trade effects of DTAs and FDIs.

Furthermore, the analysis of Faith Montfaucon et al. (2023) indicates interesting findings on the differing effects of DTAs on FDIs in the various sectors of the economy building also on the findings of Laget et al. (2021) on the differing effects of DTAs on FDIs in various sectors and in relation to various dispositions. Morover, similarly to what we saw on the first section we approach the issue of the parallel trends hypothesis inspired by the work of Sun and Abraham (2021) and by Callaway and Sant Anna (2019) regarding the employment of time periods of various extensions compared to yearly data.

Lastly, we would like to discuss more broadly the literature on the effects of CETA. On this topic Larch et al. (2017) is a good source of insight. Not only the paper develops methodology broadly adopted by Faith Montfaucon et al. (2023) and Larch and Yotov (2023), but, they develop a counterfactual study indicating possible effects of CETA on world trade by stressing that the FTA combines the typical role of an FTA and that of a BIT thus reducing barriers to the flow of capital that, in turn, amplify the effects of the reduced barriers on the flow of goods and vice versa. Luckstead and Devadoss (2019), provide further insights on an, albeit limited, subsector touched by CETA and with a CGE methodology that we do not employ. However, their analysis seems to hint to different findings to Larch et al. (2017). They suggest that the relative lower cost of FDIs reduces trade volumes in the processed food market.

To conclude we find several avenues of improvement on the existing literature. Firstly, the evaluation of post CETA FDIs has been performed only with marginal data, especially in terms of time. Secondly, the results on this matter, and its relation with trade, are mixed at best with indications of the effects of BITs on FDIs and of FDIs on trade differing severely between studies.

Table 3. *Literature review for Chapter 4*

Callaway and Sant'Anna	(2021)	Difference-in-Differences with multiple time periods
Carducci	(2018)	A State's Capacity and the EU's Competence to Conclude a Treaty, Invalidate, Terminate– and ''Preclude'' in Achmea– a Treaty or BIT of Member States, a State's Consent to be Bound by a Treaty or to Arbitration, under the Law of Treaties and EU Law, and the CJEU's Decisions on EUSFTA and Achmea
Di Ubaldo and Gaisorek	(2022)	Non-trade provisions in trade agreements and FDI
Faith Montfaucon et al.	(2023)	Early Impacts of Indonesia's Investment Reform
Laget et al.	(2021)	Deep Trade Agreement and Foreign Direct Investments
Larch and Yotov	(2023)	Deep Trade Agreements and FDI in Partial and General Equilibrium
Larch et al.	(2017)	Trade Liberalization, Growth, and FDI: A Structural Estimation Framework
Luckstead and Devadoss	(2019)	Trade and Investment Liberalization in the Processed Food Market under the Comprehensive Economic and Trade Agreement
Sun and Abraham	(2021)	Estimating dynamic treatment effects in event studies with heterogeneous treatment effects

Most relevant literature on FDIs analysis

5. Conclusions

In conclusion, our reviews indicate a significant gap in trade policy analysis concerning the effects of CETA. The literature suggests a need for deeper understanding, particularly in multi-sector comparisons, facilitated by the adoption of PPML over OLS. Additionally, evaluations of least traded goods have introduced innovative approaches that we have eagerly implemented.

Furthermore, our reviews highlight the limited but sound analysis of FTAs in agriculture, revealing relevant policy implications. The literature points to the potential for filling gaps in understanding CETA and conducting multi-treaty and multi-sector comparisons, thanks to the widespread use of PPML, which enable more accurate evaluations.

Lastly, we identify areas of improvements in the evaluation of FDIs. Firstly, the evaluation of post-CETA FDIs has been based on marginal data, especially regarding time. Secondly, the results regarding the relationship between BITs and FDIs, as well as between FDIs and trade, are not definitive and in need of further research.

Chapter 2

CETA, an ex-post analysis

Abstract

We perform an ex-post analysis of the effects of the CETA trade agreement in the agricultural, farming and food transformation sectors. We find strong evidence in support of a positive trade effect of the treaty.

We also perform a series of analyses aimed at ascertaining the effects of the treaty on various subsectors. We find overall net-positive trade effects although we can clearly identify "winners" and "losers" of the treaty.

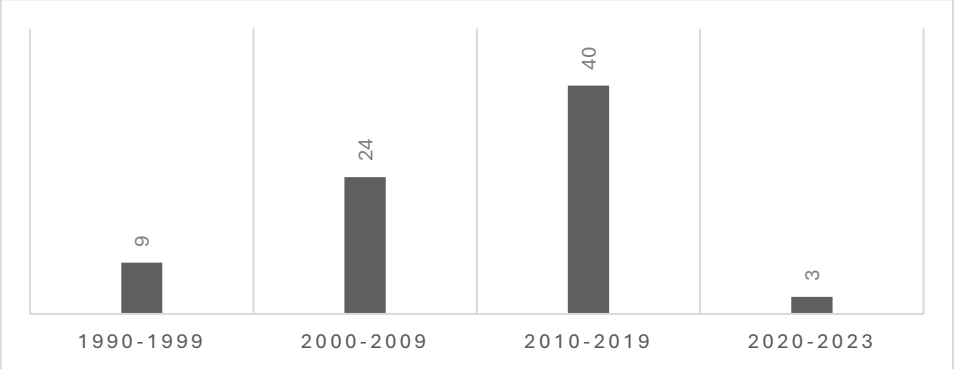
Our analyses seem to indicate a positive trade creation effect not limited to the parties. We find evidence that the increase in trade flow between the members had a net positive effect in the form of an increase in overall international trade.

We draw some preliminary policy conclusions on the effects of the treaty.

1. Introduction

The European Union (EU) is a regulatory and commercial powerhouse, but in the age of what Bhagwati (1995) calls "the spaghetti bowl phenomenon" the block has started to implement more and more bilateral and regional trade agreements to circumvent a constantly more gridlocked World Trade Organization (WTO).

Figure 1. *New EU trade agreements by decade*



From left to right we can appreciate the number of new trade agreements entered into force each decade from 1990 to 2023.

As both Mattoo et al (2022) and El Dahrawy Sánchez-Albornoz & Timini (2021) point out this spaghettification phenomenon has been constantly growing after the stall of the WTO's Doha Negotiation Round. Indeed, most of the EU's free trade agreements (FTAs) entered into force after 2005 and this is no isolated trend. At the international level the cumulative number of FTAs into force went from 50 in the early '90s to 100 in 2000, 200 in 2010 and 305 in 2020. El Dahrawy Sánchez-Albornoz & Timini (2021) makes a compelling analysis of the growth of FTAs in Latin America both within the region and between regional players and other partners. Moreover, the EU has taken a distinct approach to these new trade agreements. After 2006 as D'Erman (2020) underlines the EU adopted a new direction for its trade policy and, while reducing tariffs and quotas, it also pursued a new kind of so called "second generation trade agreements". South Korea, Colombia, Peru, and Ecuador are clear examples of FTAs that not only reduce tariffs but also non-tariff barriers (NTBs). These agreements reduce constraints on investments, public procurement and financial services while also strengthening intellectual property rights.

The Comprehensive Economic and Trade Agreement (CETA) between Canada and the EU is one of these FTAs. CETA entered provisionally into force as of the 21

September 2017, this means that most of the treaty provisions are applicable although the ratification process of the EU Member States (EUMS) is still ongoing. To this day 2/3 of EUMS have ratified CETA while the others are at various stages of the ratification process. This partial application hasn't hindered the major components of the treaty. As such only limited dispositions on investments, financial services and audiovisuals are not in place.

In looking at CETA our aim is twofold.

On the one hand, traditional economic theory studies the effects of FTAs for consumers and export-oriented firm Ghosh & Yamarik (2004) and Baier & Bergstrand (2007). Yet, literature on the effects of the CETA is sparse at best. Most relevant papers are superficial or deal on very limited sectors and or regions (i.e., the effects of the treaty on Czech automotive or on fishing industry in the Canadian eastern seaboard in Sabau & Boksh (2017)). Furthermore, the effects of FTAs vary widely Baier et al (2019) and therefore our aim is to understand the effects of the CETA with a grounded theorical and empirical methodology.

On the other hand, most of the opposition to the treaty has come from the agricultural sectors of the EUMS. Agricultural products account for a relatively small portion of EU and Canadian trade and Gross Domestic Product (GDP), in 2020 agricultural exports amount to 205 bn USD and 18 bn USD respectively, they account to 1.34% and 3.46% of the GDPs of the EU and Canada. Yet European farmers are a vocal interest group and in countries like Italy, France and Poland, they are fearful of the effects of the agreement on local productions, rural areas, food safety, the potential impact of genetically modified organisms (GMOs) on human health, and the protection of geographic indications. These issues have caused the ratification process to stall in a number of countries. Our aim is to assess, after the implementation of the treaty, how it affected agricultural trade at the industry level.

We analyse the effects of the CETA trade agreement on bilateral trade to draw lessons on how this agreement impacted the agricultural sector in general and the main commodity groups within it, not only with reference to the EU and Canada but also for the rest of the world. Our findings, obtained with the PPML methodology, show that the treaty positively impacted trade between the EU and Canada in the agricultural field, not only in the aggregated but also at the cluster and sub-sectoral level with very few exceptions.

After a brief literature review, we present a short analysis of the political background of the treaty, the source and structure of our dataset and our model. We analyse data on a 9 years period for 225 entities with an HS2 level detail. Subsequently, we provide a comparison of our results between the OLS and PPML estimation methodology at the aggregated level before presenting the results at the sectoral level and performing a temporal analysis to ascertain the evolution of the effects over time.

Our work confirms the existing literature on the positive effect of CETA and adds to the debate on the effect of trade agreements at deeper, dis-aggregated levels.

2. Political background of the treaty

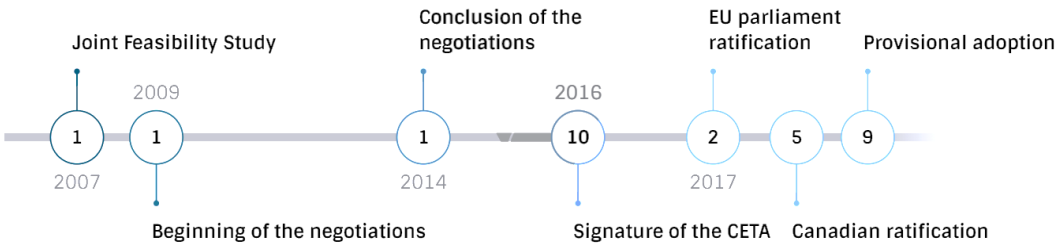
Timeline of the negotiations

In 2007, the EU and Canada agreed on the production of a joint study to assess the feasibility of a trade agreement between the parties.

After the adoption of a joint document in 2009 an intense round of negotiations started. The negotiations culminated in 2014 with the conclusion of negotiations and the beginning of a legal review, and translation, period.

The treaty was formally signed in Brussels on the 30th of October 2016. With the approval of the EU Parliament in February 2017 and of the Canadian Authorities in May 2017, the treaty entered provisionally into force for all is member parties as of September 2017.

Figure 2. *Timeline of the CETA agreement*



Provisional implementation

To avoid the potential issues deriving from the lengthy adoption processes by the national Parliaments the Council of the EU, together with the Canadian

Government has decided to implement provisionally the treaty pending the final ratifications of the EUMS. As outlined in a Notice released by the Commission in September 2017 the treaty entered into force as of the 21st of September 2017. Nonetheless some provisions have been suspended while the national Parliaments ratify the text.

The provisions concern mainly investments, the financial sector and lastly some aspects in the field of telecommunications.

Thus, for the time being, the treaty is fully operational, with the above-mentioned limitations. All member parties are implementing it even without having ratified it and we expect a limited impact of its full adoption on agricultural trade.

Legal framework

In principle the procedure of adoption of a new treaty is as follows:

The Treaty on the Functioning of the European Union establishes (article 3) that "The Union shall have exclusive competence in the following areas: […] (e) common commercial policy".

In the traditional framework of trade policy after identifying a suitable partner(s) the Council authorises the European Commission to negotiate with a "negotiating mandate" which contains the objectives and limits of the negotiation pursued by the Commission. Council and Parliament oversight the negotiations together with the active involvement of all relevant stakeholders by the Commission. The process can last several years and be subject to delays, suspensions, and all manners of modifications. After a text is agreed, finalised, and translated in all the languages of the EU plus those of the partner country(ies) it is submitted for adoption to the Council.

In the last stage the council can discuss the treaty. The Council can only adopt or reject the treaty, it is not possible to amend it. If the discussion is positive the Council adopts the decision for the signature of the treaty on behalf of the Union and the treaty is then transmitted to the Parliament for consent.

After the Parliament's consent the Council adopts the decision to conclude the agreement. Voting in the Council on trade matters is usually by majority vote, although a few areas require unanimity. In general, intellectual property, FDIs, related fields require unanimity.

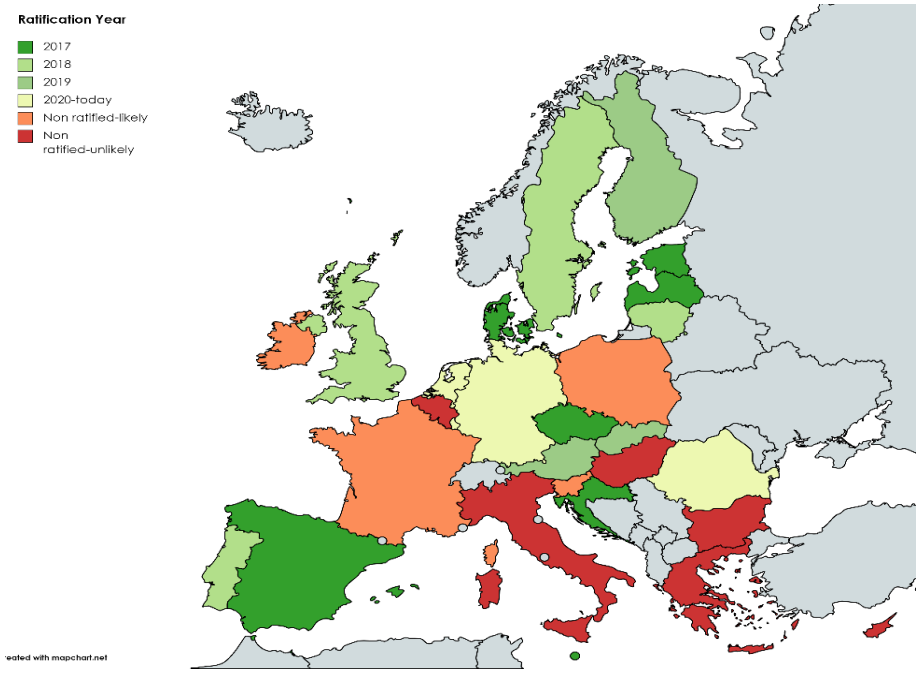
The peculiarity of the CETA regarding investments, financial services and the creation of the dispute resolution mechanism means that the agreement goes far beyond the scope of "traditional" trade agreements.

Specifically, the scope of the treaty is such as to require that not only the Union but also the individual Member States be party to it. This has created somewhat of a contentious issue given the fact that EU national Parliaments have been tasked with ratifying the treaty together with the European Parliament.

Status of the ratification process

As of October 2023, two thirds of the EU Member States have ratified the agreement.

Figure 3. *Status of the ratification process in the EU by country and year*



In dark green the EUMS that have ratified the agreement in 2017, lighter green indicates 2018 and 2019. From 2020 only 3 EUMS have ratified. In red the EUMS that are still in the ratification process subdivided by likely and unlikely.

The Member States that have not ratified the agreement are Italy, France, Belgium, Ireland, Poland, Slovenia, Hungary, Bulgaria, Greece, and Cyprus. The agreement applies to them with the same extent as it applies to the other parties. In all these countries there is a cross-cutting opposition based on themes advanced by green parties. The topic of GMOs is also used widely. Apart from this kind of issues most of the opposition is of a political nature.

Ireland, Slovenia, and Poland are the most likely to ratify in the coming years. Ireland has internal opposition, but the issues are mostly related with the internal constitutional structure of the country. Poland and Slovenia, with the recent elections that brought the countries closer to the centre of the political spectrum are also likely to ratify.

Of the remaining countries most of them base their obstruction to the ratification process in internal politics and are extremely unlikely to ratify the treaty. Nonetheless, Belgium is a notable exception. In the country coexist 4 elective bodies whose consent is required for ratification. Flanders, Wallonia, Brussels, and the Federal Legislative. The Federal level and Flanders have long since ratified the treaty while Brussels and Wallonia, a clear example of the country's internal divisions, have not.

Lastly, France has seen recent developments. In march 2024, despite the adoption of the agreement by the lower chamber, the French senate voted overwhelmingly against the treaty. Nonetheless, the French government is unlikely to communicate the rejection to the EU commission and is expected to reintroduce the treaty in the lower chamber. The recent outcome of the French elections might hinder further progress on the matter.

3. The dataset

The dataset takes data from 225 entities over a period of 11 years, from 2012 to 2023. We have three distinct levels:

a) The aggregated one where we have a single entry for all the bilateral trade in agricultural products for a given unidirectional couple in a certain year,
b) The section level where we have three entries per year obtained by aggregating HS data,
c) The industry (chapter) level where we have 24 entries per year.

To build the dataset we had available data at the Harmonized System-HS6 level. The HS is the international standard for classification of exported commodities, and we aggregated the HS6 level at the HS2 level by aggregating trade data. Thus, we selected only the first 24 HS2 codes, the ones referring to agricultural trade and this forms our biggest dataset. By further aggregating the chapter(HS2) codes

as per Table 1, we obtained the three sections and, lastly, by aggregating the three sections we obtain the total value of agricultural exports of a given country to another in a given year.

Table 1. *Synthetic structure of the sections*

Section	Chapters (HS2)	Description
1	**From 1 to 5**	**Animals & animal products**
2	**From 6 to 15**	**Vegetable products**
3	**From 16 to 24**	**Foodstuffs**

Description of the first three sections and allocation of the pertinent HS2 chapters.

We focussed on the 2012 -2022 period since, given the provisional entry into force of the treaty in 2017, we wanted to have a good number of years, prior to the treaty, to establish the baseline for our analysis.

The source of our data is the *Centre d'études prospectives et d'informations internationals* (CEPII). The centre, a French research institution, has produced the BACI dataset, an international trade database providing data on bilateral trade flows for over 200 entities at the product level (5000 products). Products correspond to the "Harmonized System" nomenclature (6-digit code). We also have data on GDP for these countries, in the form of GDP, GDP per Capita and GDP in PPP, population, distance, membership to the WTO and several other variables.

Furthermore, in line with the relevant literature we added intra-national trade data derived from the UNIDO IDSB, ISIC Revision 4 database.

To summarize we have roughly 556.875 thousand observations in the first level, 1.7 million in the second and 13.4 million in the third. As is expected in the literature, the majority of observations is comprised of zeros and in the following table (Table 2) we underline the number of zeros per dataset and their ratio when compared with the observations.

Table 2. *Zeros and observations by dataset.*

Dataset	Group	HS	Zeros	Observations	Ratio
Totals	Totals		329.166	556.875	**59,1%**
Sections	All		1.174.115	1.670.625	**70,3%**
	1	01 to 05	421.806	556.875	**75,7%**
	2	06 to 15	382.063	556.875	**68,6%**
	3	16 to 24	370.246	556.875	**66,5%**
Chapters	HS	ALL	11.474.448	13.365.000	**85,9%**

For each of our three datasets, Totals, Clusters and HS Codes we look at the number of zeros in the trade value data and the total number of observations. We provide a ratio of the two for easier comparison.

Regarding the number of zeroes in the dataset, it is quite high, in the "Totals" dataset we have roughly 60% of the dataset comprised of zeros while in the sections one and it varies from 66% to 75%. This escalates further when dealing with the industry (HS) level where it approaches 86%. Thus, the issue of zeros clearly plays a relevant role. We can see even more of this in Annexes 1 to 4. They provide a disaggregated approach to the evaluation of zeroes in the dataset and indicate that zeroes are a cross cutting issue both in terms of sections, chapters and section-time.

Table 3. *Evolution of Canada-EUMS trade between 2012 and 2020*

P	EU MS		2012			2020		%
1	**Hungary**	$	21.291	0,3%	$	45.134	0,5%	112%
2	**Latvia**	$	11.512	0,2%	$	23.399	0,3%	103%
3	**Slovakia**	$	6.134	0,1%	$	11.927	0,1%	94%
4	**Austria**	$	32.566	0,5%	$	58.862	0,6%	81%
5	**Lithuania**	$	13.221	0,2%	$	23.446	0,3%	77%
6	**Bulgaria**	$	18.387	0,3%	$	32.477	0,4%	77%
7	**Spain**	$	400.022	5,7%	$	698.680	7,6%	75%
8	**Estonia**	$	8.467	0,1%	$	14.084	0,2%	66%
9	**Ireland**	$	190.357	2,7%	$	305.619	3,3%	61%
10	**Italy**	$	1.191.793	17,0%	$	1.894.894	20,5%	59%
	Greece	$	95.020	1,4%	$	147.222	1,6%	55%
	France	$	1.072.734	15,3%	$	1.589.511	17,2%	48%
	Slovenia	$	4.924	0,1%	$	6.966	0,1%	41%

	Portugal	$	150.059	2,1%	$	204.112	2,2%	36%
	Croatia	$	12.110	0,2%	$	16.092	0,2%	33%
	Poland	$	123.993	1,8%	$	161.569	1,8%	30%
	UK	$	921.117	13,2%	$	1.104.235	12,0%	20%
	Belgium	$	527.396	7,5%	$	627.045	6,8%	19%
-10	**Luxembourg**	$	7.622	0,1%	$	8.590	0,1%	13%
-9	**Netherlands**	$	901.521	12,9%	$	1.000.859	10,8%	11%
-8	**Germany**	$	735.449	10,5%	$	815.656	8,8%	11%
-7	**Sweden**	$	99.045	1,4%	$	103.045	1,1%	4%
-6	**Czechia**	$	40.539	0,6%	$	35.301	0,4%	-13%
-5	**Denmark**	$	325.675	4,7%	$	254.906	2,8%	-22%
-4	**Finland**	$	29.129	0,4%	$	19.332	0,2%	-34%
-3	**Cyprus**	$	6.332	0,1%	$	3.718	0,0%	-41%
-2	**Romania**	$	34.255	0,5%	$	17.215	0,2%	-50%
-1	**Malta**	$	14.292	0,2%	$	3.120	0,0%	-78%
	Total	**$**	**6.994**		**$**	**9.227**		**32%**

Bilateral trade between EU Member States and Canada between 2012 and 2020. Values are in millions of dollars. From left to right we show, relative position by growth rate, country name, value of bilateral trade in 2012 and share of EU-Canada trade, value of bilateral trade in 2020 and share of EU-Canada trade, and growth rate from 2012 to 2020. Countries are arranged by trade growth rate.

Lastly, we consider briefly the economic nature of agricultural trade between Canada and the EU from 2012, our starting year and 2020, the beginning of the coronavirus pandemic and the year of Brexit. In 2012 the 3 top traders where Italy, France and the UK while the three MS trading the least where Slovenia, Slovakia and Cyprus. In 2020 the three top traders remained the same while Malta replaced Slovakia in the smallest traders.

Bilateral trade grew of 32% in the period of our analysis with the fastest growing nations being Hungary (+112%), Latvia (+103%) and Slovakia (+94%). The three least performing MS where Malta (-78%), Romania (-50%) and Cyprus (-41%). In general, 22 EUMS saw bilateral trade grow while 6 saw negative growth. Among these the biggest is Denmark with a loss of roughly 70 million euros. All major EU Economies sustained double digit growth with the (relative) worst being Germany (+11%).

From a simple observation of trade data, the EUMS, in general increased trade with Canada in the period under analysis. This growth is generalized between a great number of EU MS. Only countries representing 6,5% of Bilateral trade in

2012 saw a reduction while all other trading partners saw strong double-digit growth (with Sweden being an exception with +4%).

4. The model

The traditional equation of the gravity model is remarkably similar to Newton's Law of Universal Gravitation.

$$X_{h,f} = G\frac{Y_h Y_f}{D}\ (a) \qquad F_{1,2} = \frac{G(m_1 m_2)}{R^2}(b)(1)$$

On the right we have the latter. This equation tells us that the attraction of 2 bodies (F) depends on a certain constant (G) and is directly proportional to the product of masses (m1 and m2) divided by the square of the distance (R).

On the left we have the gravity equation of trade in one of its traditional depictions. In this equation trade (X) - be it, bilateral, exports or imports - is directly proportional to the product of the GDP (Y) of two countries and inversely proportional to trade resistance (D). The latter has been usually addressed as distance, but lately, there has been the development of new alternative measures.

Distance was, in origin, an easy instrument to account for trade resistance. It was a decent proxy and allowed simple calculations. Yet, with time, researchers grew frustrated with the limitations it posed. Distance is static and it doesn't account for other measures of trade resistance. Language, culture, currency, technology, the asymmetric improvement in infrastructure, all these limitations brought the proliferation of a number of dummies that, in an honest attempt to account for missing pieces of this puzzle, lead to inconsistencies and biased results. Several of the papers we studied proposed various dummies, brought comparisons between various dummies and, in general showed the inconsistency and arbitrariness of their usage. In an effort to address these many issues we can find the seminal work of Anderson and Van Wincoop (2003). They developed instruments to capture multilateral trade resistance that have been further transformed in what is currently being used as the gravity equation of trade.

As Yotov et a. (2016) point out, the gravity equation is indeed very similar to Newton's Law and the intuition behind the Gravity model can be found in most of the previous models of international trade, from Ricardo to Heckscher-Ohlin.

Given the fact that the gravity equation is multiplicative in nature we can easily transform it into a linear form.

$$ln(X_{h,f}) = G + b_1 ln(Y_h) + b_2 ln(Y_f) + b_3 ln(D_{h,f}) \quad (2)$$

This equation is simply a logarithmic transformation but, as rightly pointed out by Santos Silva and Tenreyro (2006), it holds as striking similarities to Newton's Law as striking differences. The mathematic relations within Newton's law are set in universal constants, the same cannot be said for the gravity equation. There is no set of variables that, if applied to a random sample can produce a perfect relation.

Thus, to account for deviations from theory, we need to use a stochastic version of the equation. We thus include an error term.

$$ln(X_{h,f}) = G + b_1 ln(Y_h) + b_2 ln(Y_f) + b_3 ln(D_{h,f}) + e_{h,f} \quad (3)$$

The main determinants of the exports $X_{h,f}$ are the GDP of the two countries Y_h and Y_f and the geographical distance between them, *D.* When it comes to the sign of the coefficients, we expect b_1 and b_2 to be positive and b_3 to be negative, the reasoning is that the bigger the countries the bigger the exchange of goods and that the longer the distance between them, the smaller the exchange of goods.

This equation has furthermore two relevant issues, the error term is traditionally assumed to be independent of the regressor and, contrary to universal gravitation, there is a strong possibility that trade be zero between distant and small countries.

Santos Silva and Tenreyro have shown that the issues briefly indicated above are inherent to the OLS testing of the gravity equation, even when including the multilateral trade resistance limitations introduced by Anderson and Van Wincoop (2003). They have therefore advanced an alternative transformation of the gravity equation. They argue that although, contrary to Newton's law, economic relations do not hold with the certainty of physical laws, we can expect them to hold *on average*. From this intuition they propose that economic models like the gravity equation produces the expected value of the dependent variable, for a given value of the independent variables. They argue that if y and x are linked by a constant-elasticity model of exponential form we can interpret the gravity equation as the conditional expectation of the trade flow given the independent variables.

We can therefore express the model in the following form:

$$X_{h,f} = \exp[\, G + b_1 ln(Y_h) + b_2 ln(Y_f) + b_3 ln(D_{h,f})] \quad (4)$$

We also have to take in consideration that even if the model holds on average this is not true for every *i,* thus we need to take in consideration a certain error term that guaranties us that on average y will be greater or equal to zero and that the expected value of the error term will be zero. The equation becomes as follows.

$$X_{h,f} = \exp[\, G + b_1 ln(Y_h) + b_2 ln(Y_f) + b_3 ln(D_{h,f})] + e_{h,f} \quad (5)$$

Furthermore, we can account for fixed effects. Literature traditionally accounts for country-year fixed effects, $\gamma_{h,t}$ and $\delta_{f,t}$ (origin-year and destination-year), as well as origin-destination fixed effects $\vartheta_{f,t}$, but in our model we went one step forward.

$$X_{h,f} = \exp[\, G + b_1 ln(Y_h) + b_2 ln(Y_f) + b_3 ln(D_{h,f}) + \gamma_{h,t} + \delta_{f,t} + \vartheta_{f,t}] + e_{h,f} \quad (6)$$

In conclusion, we perform our analysis with the PPML methodology as advocated by Santos Silva and Tenreyro thus allowing to account for the presence of zero observations and confirming that heteroskedasticity will not result in biased observations.

Moving now to the observations of the effects of FTAs with the gravity model we have to expand the typical variables of the gravity model, the two variables of main interest for this empirical analysis are trade creation and trade diversion. They are dummy variables built as follows. Trade creation is equal to 1 when both members are member of the treaty and 0 otherwise. Trade diversion will capture the trade diversion effect of the treaty, it will be 1 when only the destination is a member of the treaty and zero otherwise.

Building on the work of Santos Silva & Tenreyro (2006, 2022) and Anderson and van Wincoop (2003) we estimate this model by the PPML accounting for multiple fixed effects (FE). Specifically, as briefly mentioned above, we consider country-specific fixed effects and their interaction with time, couple specific FEs, and when appropriate we include section or chapter FEs. This model helps us solve the inherent issues of OLS estimation in several ways. First, these FE allow us to control for the presence of eventual non-absorbed heterogeneity. Second, time-origin, time-destination and origin-destination fixed effects allow to account for any potential country-specific time effects contained in the data, including multilateral trade resistance. Third, section and chapter fixed effects are to control for potential heterogeneity at sub-sectoral level.

The estimation of the model would thus be:

$$X_{h,f,t} = \exp[\, G + b_1 ln(Y_{h,t}) + b_2 ln(Y_{f,t}) + b_3 ln(D_{h,f}) + b_4 TradeCreate_{h,f,t} + b_5 TradeDivert_{h,f,t} + \gamma_{h,t} + \delta_{f,t} + \vartheta_{f,t} + \theta\,] + e_{h,f} \quad (7)$$

Table 4 provides a summary of the expected signs of the coefficients resulting from the estimation of equation (7).

Table 4. *Expected sign of the coefficients*

b_1	Positive, we expect bigger countries to export more
b_2	Positive, we expect bigger countries to import more
b_3	Negative, we expect further countries to trade less
b_4	Positive, we expect the treaty to have a positive effect on its parties
b_5	Ambiguous, leaning negative, the treaty might lead to trade diversion, nonetheless the expected effect is ambiguous since such diversion effects might be balanced by the creation of new trade

Expected sign of the coefficients and explanation

Moreover, in our analysis we identified a problem well known in the literature, that of multicollinearity for variables such as GDP and trade diversion. Cheong et al (2015) address it in their work and correctly identify that the contemporary estimation of trade creation and trade diversion together with time-origin and time-destination fixed effects causes multicollinearity. Addressing this issue at the aggregated level or at the section level is possible although exceedingly complex and would entail a degree of arbitration in the methodology that we are not confident to adopt. On the contrary, at the chapter level we employ a weighted trade creation effect that allows for the comparison of trade diversion effects in a reasonable manner, we will provide details in the appropriate section in the following pages.

On a separate but related note we would like to briefly discuss the issue of dummies in the equation, or, more specifically, their lack thereof. Bowing to the prolific literature we considered and tested several dummies that aimed at identifying various aspects commonly referred to distance. Colonial status, common language(s), common currency, shared border and continents, the status of island etc. All these dummies have, nonetheless, issues that lead us to discarding them in our final work, yet the reasoning for this choice is in need of explanation.

Firstly, on a positive note, it is relevant to point out that all these dummies aim at analysing aspects of cultural of geographic distance (or proximity) between partner countries. Obtaining information on these subjects might better inform the results of any analysis, yet, this comes at several costs.

Secondly, on a negative note, the price of this information is far too high. The literature on the gravity is filled with dummies of various natures that change wildly from one study to the other with different interpretations and utilizations, thus leading to a lack of consistency.

Thirdly, the design of these dummies is left to a certain degree of subjectivity. As an example lets consider the Republic of Korea. From a purely geographical point of view it is part of the continental mainland of the Asian continent. Yet, from a practical point of view it is impossible to access the country via land due to its northern neighbour. Thus, the RoK is a *de-facto* island. Yet, the dummy for islands applies only to geographical islands thus excluding one of the 20 richest economies in the planet from this category. This is just a small example. We could make similar inquiries about currencies (such as EURO and its connections with the CFA) or we could make discussions on the common border dummy (again here North and South Korea come to mind). All these peculiarities, and the subsequent choices that the authors of any study must undertake, make the external validity of these dummies questionable at best.

Lastly, there are also practical issues with the implementation of dummies in the PPML methodology that are not present in the OLS methodology and that render them immediately useless. Dummies of all kinds, when coupled with country-time fixed effects are immediately dropped because of collinearity thus losing all the validity of their inclusion in the model.

Because of all these reasons, despite of an extensive research and design work, in the end we opted to exclude all dummies from the model and present the version that we introduced above.

5. Initial results

Firstly, the correlation between the variables included in our main equation does not show any issue (Annex 5).

In table 5 we find strong evidence of positive effects of the treaty on bilateral trade between the EUMS and Canada.

Trade Creation is positive and significant, this indicates that the parties to the treaty have, in general, benefitted from an increase in trade in the agricultural sector taken as a whole. The interpretation of the coefficient is as follows; given that our dependent variable is not in logarithmic form while our regressors are, the coefficients represent a semi elasticity thus we have to apply the exponential function in the following form $100 * (\exp(\beta) - 1)\%$ this means that the presence of CETA increased agricultural trade between its member parties by 8,2% with a 95% IC oscillating between 4,4% and 12,4%. This is in line with existing literature on the effects of FTAs such as Magee (2017).

Trade diversion, on the other hand is more complicated. The design of the PPML test meant that the variability of Trade Diversion is completely absorbed by the origin-year and destination-year.

Furthermore, in order to evaluate the need for OLS estimations we present the results of a Breusch-Pagan Test. The Breusch-Pagan Test, which we perform on non-standard-error-robust OLS estimates, leads us to refuse the null hypothesis (the residuals are distributed with equal variance) and indicates the presence of heteroscedasticity in the data, thus hindering the validity of OLS estimations. The Probability-Chi-squared comparison is significant at a higher than 99.9% level.

Lastly, drawing from the lessons of the traditional difference-in-difference analysis we also wanted to assess one more hypothesis: that the observed effect is depending on the treaty, and, that the control group and its peculiar characteristics vis-à-vis the treatment group are not the defining characteristic of the effects of the treaty. To evaluate this consideration, we identified a series of smaller control groups with characteristics that are comparable with the countries interested by the CETA trade agreement. We than evaluate how results variate when altering the control group(s). Therefore, we selected eight groups of nations to each of whom we added the EUMS and Canada (Annex 6). With these nations as a constrain we performed our analysis and found the remaining results in Table 5. Our selection criteria are size of the sample, homogeneity of the sample (be it in the form of geographical proximity or of similar economic conditions), relations with the EU and Canada and lastly relevance to the international trade environment.

Table 5. *PPML and alternative geographical estimations*

Dependent Variable: Exports

	Baseline estimation	Former Soviet nations	Developing Nations in the Americas	Developing Nations in Asia and Oceania	Developed Nations	LDCs	LICs	High Income Devloping Countries	OECD
Trade Creation	0,079 ***	0,191 ***	0,138 ***	0,104 ***	0,067 ***	0,104 ***	0,020	0,109 ***	0,003
	(0.02)	(0.03)	(0.03)	(0.02)	(0.02)	(0.03)	(0.03)	(0.02)	(0.02)
IC 95%, upper limit	0,116	0,258	0,189	0,147	0,112	0,162	0,087	0,153	0,044
IC 95%, lower limit	0,043	0,124	0,088	0,060	0,022	0,046	-0,047	0,066	-0,038
Importer-time FE	yes	yes	yes	yes	yes	yes	yes	yes	yes
Exporter-time FE	yes	yes	yes	yes	yes	yes	yes	yes	yes
Couple FE	yes	yes	yes	yes	yes	yes	yes	yes	yes
Pseudo R-squared	0,99	0,991	0,992	0,991	0,991	0,991	0,991	0,992	0,99
Countries non-CETA	196	11	42	46	27	39	35	63	13
Countries CETA	29	29	29	29	29	29	29	29	29
Countries CETA as %	13%	73%	41%	39%	52%	43%	45%	32%	69%
Observations	228.599	96.391	130.407	143.966	113.233	135.455	126.541	137.165	102.608

The table shows the PPML (Poisson pseudo-maximum likelihood) estimation results with constrains imposed on the groups of countries analysed. The first column is the general regression as performed on the general dataset. *p < 0.1, **p < 0.05, ***p < 0.01

In general, when comparing these alternative samples, we can drive three main conclusions: varying the sample has an impact on trade creation but the direction of the effect is (in general) not questioned. Varying the sample does not hinder the significance of our regressions. And, lastly, when restricting the analysis of the effects of the treaty it appears to have produced stronger trade creation effects vis-à-vis richer countries or, in general, for countries that account more for the EU's agricultural imports. This can be most seen when looking at the different results yielded by the LICs vs the LDCs and by the Developed Nations sample and the OECD one. The removal of key EU trade partners from the sample hinders the trade creation effect almost to the point of non-significance. When the control group includes OECD countries not involved in CETA, the agreement does not have a significant impact. This could be at least partially due to the presence of positive externalities from the agreement, from which the other OECD countries in the control group also benefit. As a result, the impact of the agreement on both groups, CETA and non-CETA but OECD, becomes comparable.

Furthermore, annex 7 clearly shows two relevant factors. Most of our groups produce coefficients that are far above the baseline estimate. Similarly, the IC overlap with our baseline estimate (or its IC) in all circumstances.

Arguably this result is a confirmation of the gravity model in general. Groups of countries that are further away from the EU and Canada, both in terms of geographical and economic distance and size, dilute the effects of the CETA FTA much more than countries that are already trading with the EU and Canada substantially. Furthermore, there appear to be a distinct effect between groups that are closer to the EU and groups that are closer to Canada, with the latter underperforming. Namely, the OECD group contains Mexico, a possible explanation for the low significance of the results.

6. Causal effects evaluation and parallel trends hypothesis

In assessing the results of our analysis, we decided to ascertain more thoroughly the causal effects of our variables.

The debate on the causal effect between trade volumes and the creation of an FTA has indeed been raging for quite some time. Baier and Bergstrand (2007) indeed posed themselves the same question. After all, the traditional gravity equation, when considering the opening of an FTA considers it as an exogenous variable, which, obviously, it is not.

The question we pose is thus the following: the strengthening of the trade volumes between the EU and Canada is the reason for the FTA or the FTA is the reason for the strengthening of trade flows?

Regarding the causality nexus between trade creation and export value we performed an analysis similar to the Granger test, in concept, to confirm the validity of our findings. After creating two alternative variables to trade creation, respectively lagged one and two times, we performed our linear regression and then tested the hypothesis that their coefficients are equal to zero.

The null hypothesis will thus be that they are equal to zero while the alternative hypothesis is that they are different from zero with a t-test.

The results, chi2(2) = 5,54 and Prob>chi2 = 0,0627, seem to suggest the existence of Granger causality between the presence of the trade agreement and trade value at 10 percent of confidence level.

Furthermore, the results of our lagging experiment seem to confirm the absence of a causality nexus between trade volume and the entry into effect of the treaty. This is similarly observed by regressing trade creation on the lagged of trade creation and exports.

Our Lags, both on exports and trade creation, seem to indicate a negligible effect of previous trade volumes on the treaty.

Table 6. *PPML lagged trade creation estimates and inversion of Trade creation and exports*

Dependent Variable:	*Exports*		*Trade Creation*	
	PPML Lag on exports		*PPML Lag on Trade Creation*	
Trade Creation lag1	*2.721*	***	*7.920*	***
	(0.17)		*(0.12)*	
Trade Creation lag2	*-0.032*		*-1.000*	***
	(0.23)		*(0.14)*	
Export lag1	*4.07e-11*		*2.26e-11*	**
	(3.77e-11)		*(1.30e-11)*	
Export lag2	*2.54e-10*	***	*1.97e-11*	
	(3.91e-11)		*(1.44e-11)*	
Pseudo R-squared	*0,99*		*0,32*	
Observations	*335.821*		*8.624*	

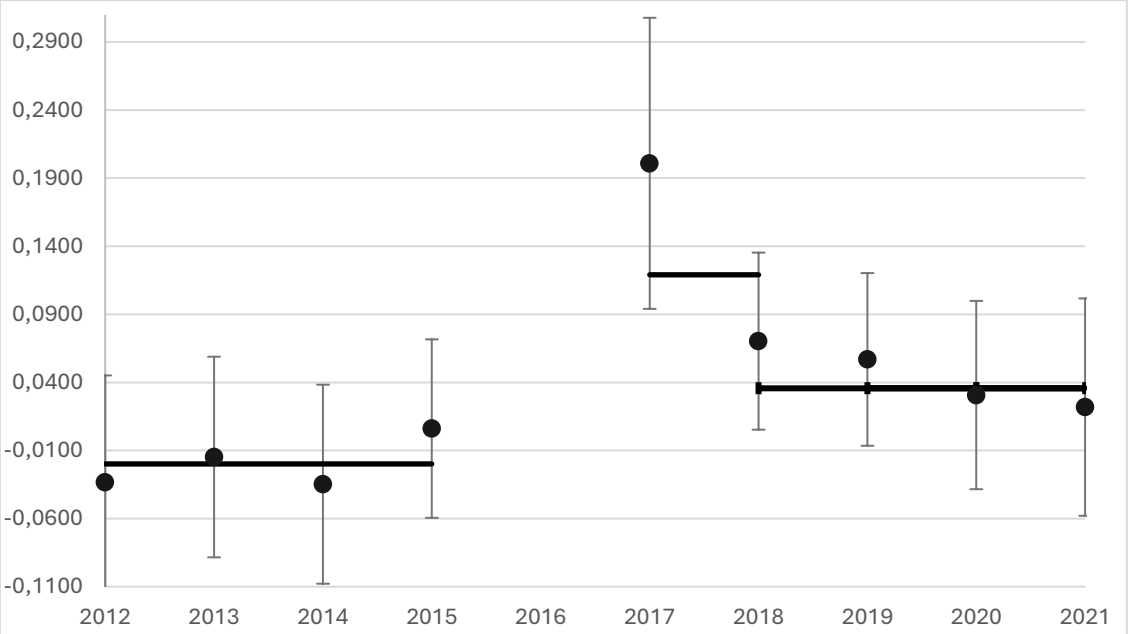
On the left our estimates of a regression where the dependent variable is exports and it is regressed on the lagged versions of trade creation and trade volumes. On the right the same equation but the dependent variable is now trade creation. Trade creation lag1 is lagged one year lag2 is lagged two years, similarly Export lag1 and 2 are lagged one and two years respectively. < 0.1, **p < 0.05, ***p < 0.01.

A different approach to this issue can be achieved by assessing the parallel trends hypothesis as in Li et al. 2023. This methodology helps us to answer to four different questions with a single test:

1. Is there validity in relaxing the parallel trends hypothesis of our model?
2. Is there evidence of a causality nexus between trade volume and the treaty?
3. Are there anticipatory effects?
4. Ex post effects are constant?

To perform this analysis we remove trade creation and develop 11 dummies that, on an yearly basis account for the membership or its lack thereof of the treaty by the indicated couple. Thus, even before 2017, if a couple is party to the treaty the dummy will assume the value of one.

Figure 4. *Testing the parallel trends hypothesis*



From left to right we have the years with the exclusion of 2016 and 2022. The three black lines indicate the overall average trends in the 2012-15, 2017-18 ad 2018-2021 time periods.

Figure 4, whose results are presented in more detail in annex 8 is a crucial tool in answering the previous questions.

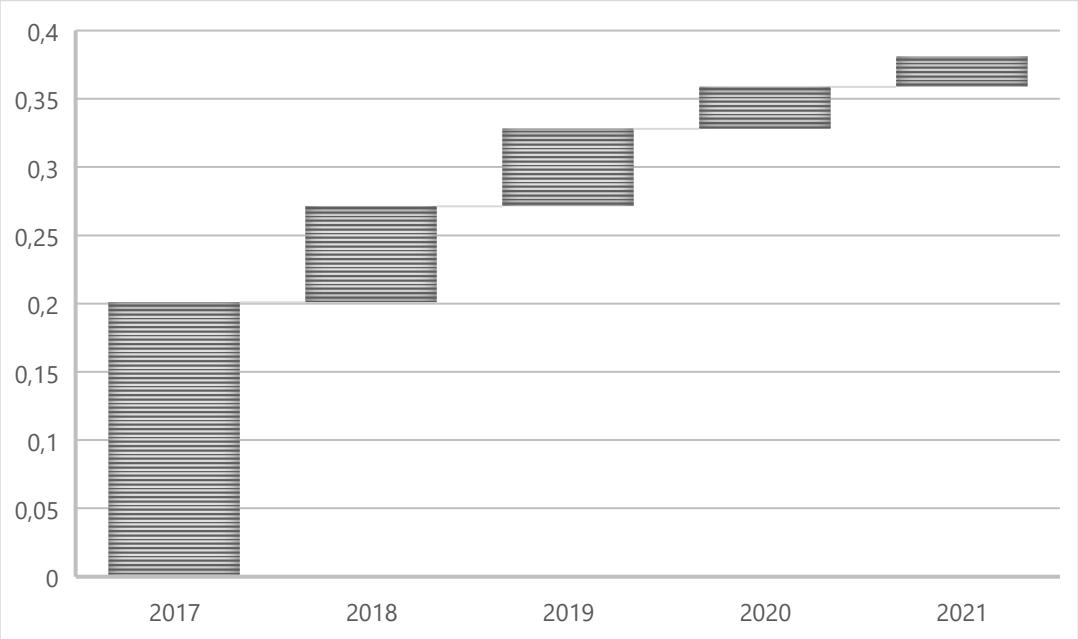
Regarding the parallel trends hypothesis, in order to assume that the trends are not, in fact, parallel we would need to see consistently the coefficient after 2017 to be significantly different from zero. This is the case only for 2017 and 2018, thus we can not reject the hypothesis of parallel trends.

Regarding the causality nexus this test strengthens our understanding of a lack thereof. It confirms our previous findings that the ex-ante trade volumes did not induce the treaty.

Regarding the presence of anticipatory effects, the test is confirmatory. The average period effect is negative with the exception of 2015 but not significantly different than zero.

Lastly, ex-post effects are definitely not constant. We see a spike in 2017 followed by a substantive reduction that from 2020 onwards is not significantly different from zero. This seems to indicate that trade liberalization is concentrated around the time of liberalization itself with only marginal effects on following year that improve the cumulative outcome but only to a very limited extent.

Figure 5. *Cumulative effect of CETA*



From left to right the yearly effects cumulated from 2017 to 2021.

7. Tariff variations in CETA

In this section we take a look at how the liberalization took place in the various tariffs levels section by section and chapter by chapter to look at the different approaches adopted by Canada and the EU as well as at the starting conditions.

Figure 6. *Tariff liberalization in section 1*

	EU				CANADA			
HS	**AVD 16**	**AVD 18**	**%**	**fully lib.**	**AVD 16**	**AVD 18**	**%**	**fully lib.**
1	1,1%	0,0%	-1,1%	1	0,2%	0,0%	-0,2%	1
2	5,4%	1,5%	-4,0%	0	1,2%	0,0%	-1,2%	1
3	5,5%	1,7%	-3,7%	0	0,0%	0,0%	0,0%	0
4	9,2%	0,0%	-9,2%	1	0,6%	0,2%	-0,4%	0
5	1,1%	0,0%	-1,1%	1	0,0%	0,0%	0,0%	0

In the first section we look at animals and animal farming. On the left we see EU liberalization and on the right Canadian liberalization. From left to right we see the average AVD in 2016 for that chapter and the average AVD in 2018 followed by the change and an indicator of complete tariff liberalization for that specific sector.

In this section we see a strong difference between the EU and Canada. Canadian liberalization in the section is almost total and benefits of an existing policy of very

low tariffs. Indeed, chapters 3 and 5 Fish and Other animal products are already fully liberalized at WTO level thus the tariffs, comparatively small and focussed mostly in chapter 2 (meat) here Canada achieves full liberalization with the EU.

The Union starts with much higher tariffs in every chapter especially dairy (4), fish (3) and meat (2). Full liberalization is achieved notably in the dairy chapter (4) while live animals (1) and other(5) also are fully liberalized. Chapters 2 and 3, albeit not fully liberalized are drastically reduced to much lower levels.

From a volume standpoint the most relevant sectors for the EU are dairy (4) meat(2) and fish (3) while Canada focusses almost all the exports of this section on fish (3).

What we see is that both Canada and the EU maintained a small tariff in the two crucial sectors respectively fish and dairy and avoiding a complete liberalization.

Figure 7. *Tariff liberalization in section 2*

	EU				CANADA			
HS	**AVD 16**	**AVD 18**	**%**	**fully lib.**	**AVD 16**	**AVD 18**	**%**	**fully lib.**
6	16,2%	0,0%	-16,2%	1	20,3%	0,7%	-19,6%	0
7	0,5%	0,0%	-0,5%	1	4,3%	4,2%	-0,1%	0
8	13,6%	0,0%	-13,6%	1	1,6%	0,0%	-1,6%	1
9	9,9%	0,0%	-9,9%	1	0,4%	0,4%	0,0%	0
10	0,1%	0,0%	-0,1%	1	143,1 %	43,5%	-99,6%	0
11	3,1%	0,0%	-3,1%	1	13,2%	10,3%	-3,0%	0
12	0,4%	0,0%	-0,4%	1	3,1%	0,2%	-2,9%	0
13	5,3%	0,0%	-5,3%	1	0,0%	0,0%	0,0%	0
14	0,0%	0,0%	0,0%	0	0,0%	0,0%	0,0%	0
15	12,4%	0,0%	-12,4%	1	4,8%	1,6%	-3,2%	0

In the second section we look at vegetable products. On the left we see EU liberalization and on the right Canadian liberalization. From left to right we see the average AVD in 2016 for that chapter and the average AVD in 2018 followed by the change and an indicator of complete tariff liberalization for that specific sector.

With the exception of chapter 14 (vegetable plaiting) whose size is meagre when compared with the other chapters in this section the EU fully liberalized all its imports from Canada with the biggest concessions happening in chapters 6 live trees, 8 fruits and nuts and 15 oils which are the biggest chapters of EU exports towards Canada. The biggest chapter in terms of EU imports (not just of this

section but in general) is surely chapter 10 (cereals) which was already almost fully liberalized.

Canada fully liberalize only chapter 8 (fruits and nuts) and the concessions, albeit massive, are so only because of the Canadian ex ante massive tariffs, especially in chapters 10 (cereals) owing to the importance of that industry in the country.

Figure 8. *Tariff liberalization in section 3*

	EU				CANADA			
HS	**AVD 16**	**AVD 18**	**%**	**fully lib.**	**AVD 16**	**AVD 18**	**%**	**fully lib.**
16	42,1%	18,7%	-23,5%	0	32,7%	20,7%	-12,0%	0
17	48,7%	0,0%	-48,7%	1	37,3%	0,0%	-37,3%	1
18	0,9%	0,0%	-0,9%	1	48,9%	3,8%	-45,0%	0
19	1,1%	0,0%	-1,1%	1	21,7%	0,0%	-21,7%	1
20	35,4%	0,0%	-35,4%	1	10,3%	0,0%	-10,3%	1
21	72,5%	0,0%	-72,5%	1	38,0%	1,4%	-36,6%	0
22	4,8%	3,0%	-1,8%	0	1,4%	0,4%	-1,0%	0
23	8,8%	0,0%	-8,8%	1	9,9%	0,0%	-9,9%	1
24	13,8%	0,0%	-13,8%	1	78,8%	0,0%	-78,8%	1

In the third section we look at Foodstuffs. On the left we see EU liberalization and on the right Canadian liberalization. From left to right we see the average AVD in 2016 for that chapter and the average AVD in 2018 followed by the change and an indicator of complete tariff liberalization for that specific sector

To conclude, in section 3 both countries had substantive ex ante tariffs and fully liberalized several chapters.

The EU imported mostly from chapters 16 (preparations of fish), 23 (animal fodder) and 21 (miscellaneous) and in these sectors tariffs were heavily reduced and fully liberalized with the exception of fish preparations (16) where they remain quite high.

Canada imported mostly from chapters 22 (beverages and spirits), 19 (preparations of cereals) and 18 (cocoa). Two of them were fully liberalized with the exception of cocoa where there still was a strong reduction.

The EU maintained comparatively high protections on fish (16) and beverages and spirits (22) while Canada maintained similarly high protections on fish (16) and cocoa (18).

To conclude, it would seem that both nations reduced substantively their tariffs, especially in sections 2 and 3. Both made gains in strategic sectors like fish, meat, dairy, cereals, fruits and spirits while maintain relatively higher tariffs on certain preparations, especially those derived from fish. It is clear that the two entities strived to maintain a certain degree of protection in crucial sectors while liberalizing heavily in others.

The EU maintains comparatively high protections in food processing but not in sectors like fishing, hinting at a defence of food processing industry jobs. Similarly, it lowered tariffs on animal fodder, a strong point of Canadian exports, while pushing for lower tariffs on dairy and meat, derivates of animal fodder.

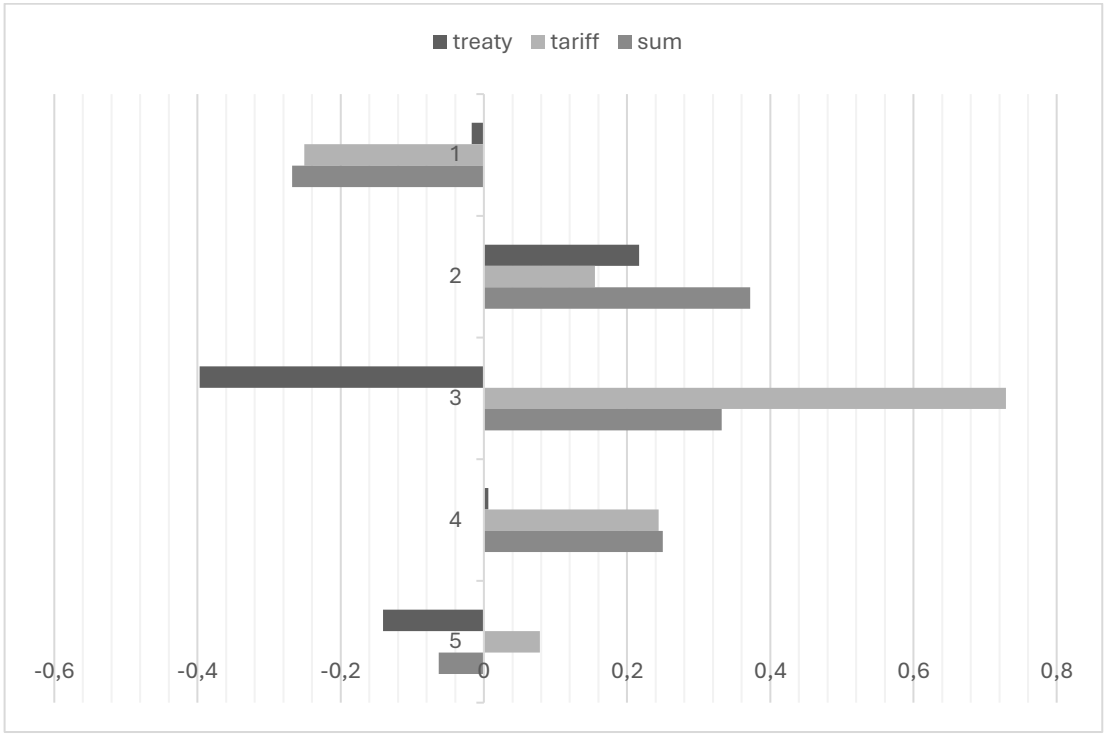
Canada protected its crucial cereals exports but conceded substantive tariff reductions especially in the beverages and spirits chapter.

8. Chapter analysis

In this section we move a step forward. We investigate separately sections and chapters trying to identify possible heterogeneous effects of the treaty on trade. In particular, we consider the three main aggregates composing the agricultural sector, namely animals and animal products, vegetables, and foodstuff, and, in addition, categories of products at an even more disaggregated level, namely the 24 groups identified by the HS codes (for a detailed description of the chapters, coefficients and significance levels, please refer to Annex 9).

Here we present a novel iteration of our original model. We divide trade creation in two effects, one, the treaty effect and a second, the tariff effect. The tariff effect is a weighted trade creation that accounts for the relative reduction in the tariffs for every single chapter and that, therefore, changes from chapter to chapter. The treaty effect is the standard trade creation. The aim is therefore to decompose the trade creation effect not only at the chapter level, but also to ascertain which whether the tariff reductions of the treaty played a bigger or lower role than the non-tariff measures now captured by the plain trade creation. Furthermore, we propose an aggregate measure of the two to show for the total effect for each chapter.

Figure 9. *Results from separated estimations at section and chapter level, comparison. Treaty, tariff and aggregated effect. Section 2*



Section 1. From up to down we show firstly the treaty effect followed by the tariff effect and lastly the aggregate effect of the two. Chapters are arranged from 1 to 5, top to bottom.

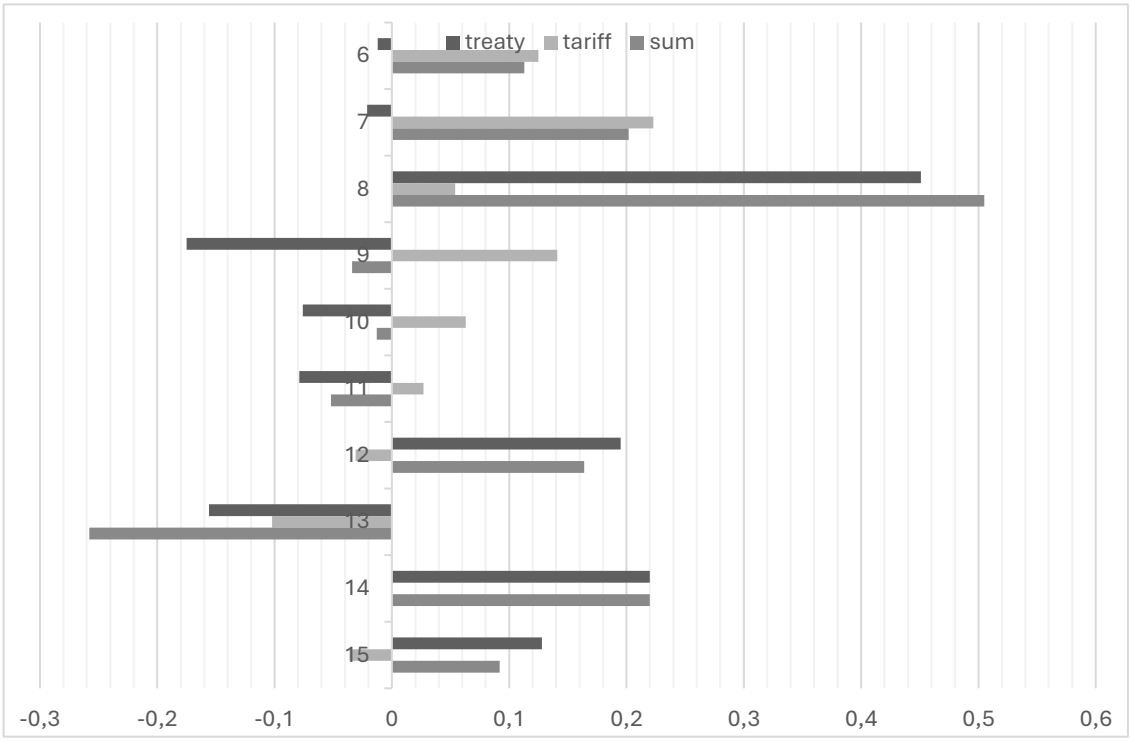
Section 1 is the smallest in terms of aggregated bilateral trade for the two entities. Chapters 1 and 5, live animals and other products (the smallest in terms of aggregate trade) appear to suffer negative effects from the treaty.

Chapter 1 shows negative effects both from the treaty and for tariff reductions. It was fully liberalized but the ex-ante tariffs were amongst the smallest, especially for the EU. Chapter 5 shows positive tariff reduction effects and negative treaty effects. It was already fully liberalized for Canada and was fully liberalized by the EU.

Chapter 3 (fish) and 4 (dairy) show strong aggregate effects and tariff effects. They are the biggest in terms of volume. Chapter 3 for Canada and chapter 4 for the EU.

In general, section 1 shows that bigger chapters that benefitted from bigger, relative, trade liberalizations benefitted more from the treaty, especially in terms of tariff effect.

Figure 10. *Results from separated estimations at section and chapter level, comparison. Treaty, tariff and aggregated effect. Section 2*



Section 2. From up to down we show firstly the treaty effect followed by the tariff effect and lastly the aggregate effect of the two. Chapters are arranged from 6 to 15, top to bottom.

Chapter 6 was the most protected for the EU and saw substantive reductions in tariffs for both the Union and Canada. The imports from the Union where substantive while those from Canada negligible. We see strong tariff creation effects while the treaty effect is slightly negative, although non-significantly different from zero.

Chapter 7, vegetables, was substantive for both, albeit more so for Canada. It was relatively protected in Canada and the liberalization has been very limited for both entities. We see, again a strong tariff creation effect and a slightly negative treaty creation effect.

Chapter 8, fruits and nuts, was substantive for both parties. It has been fully liberalized and shows strong trade creation effects both for the treaty and tariffs.

Chapter 9, coffee and tea, has been fully and substantially liberalized by the EU. Yet, EU imports from Canada are negligible. At the same time Canada didn't alter its tariffs (very small but non zero). The effects of tariff and treaty almost delete each other.

Chapter 10, cereals, saw substantive tariff reductions on both parts but Canada maintains an import tariff of more than 40%. We see a discrete tariff effect completely counterbalanced by a substantive treaty effect.

Chapter 11, milling products, was fully liberalized by the EU. Nonetheless, Canadian imports are far superior to European exports. The size of the chapter is very limited relatively to the others of this section.

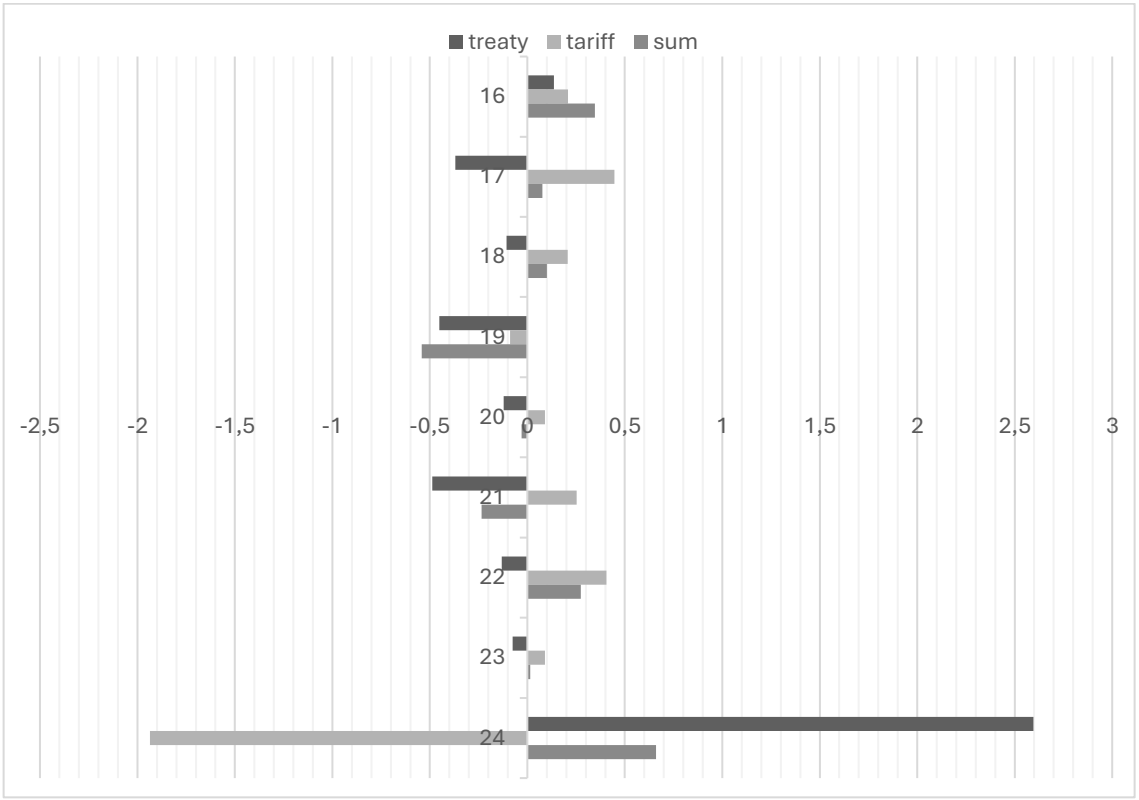
Chapter 12, oil seeds, is one of the biggest Canadian exports, second only to cereals. We see a complete liberalization from the EU and a strong reduction from Canada. The treaty effect is extremely big while the tariff effect is negative although very small.

Chapter 13, gums and resins, is the second smallest of the section, after chapter 14. It was fully liberalized. We find a generalized negative effect.

Chapter 14, vegetable plaiting, is, by far, the smallest chapter, It was already fully liberalized, hinting to the zero tariff effect and its positive effect is completely related to the treaty effect.

Lastly, Chapter 15, animal or vegetable fats, saw substantive liberalization. Nonetheless, the EU is the main exporter of the two and Canada maintained certain tariffs. The tariff effect is negative and the net effect is positive.

Figure 11. *Results from separated estimations at section and chapter level, comparison. Treaty, tariff and aggregated effect. Section 3*



Section 3. From up to down we show firstly the treaty effect followed by the tariff effect and lastly the aggregate effect of the two. Chapters are arranged from 16 to 24, top to bottom. The graph is not directly comparable with the other section given the significant difference in the x axis.

Chapter 16, preparations of meat or fish, was liberalized but still remains heavily protected, nonetheless benefits from substantive creation effects in treaty and tariffs. Furthermore it is a sector where both entities export to each other in substantive amounts.

Chapter 17, sugar, was fully liberalized, it sees strong trade and despite a negative treaty effect it sees both tariff and net growth.

Chapter 18, cocoa, was heavily liberalized for Canada. That is by far a net importer vis a vis the EU.

Chapter 19, preparations of cereals, was fully liberalized. Both entities are strong exporters. The effects are overall negative.

Chapter 20, preparations of vegetables and fruits, was fully liberalized. The aggregated effect is negative.

Chapter 21, other preparations, was heavily liberalized, it sees strong bilateral trade and a positive tariff effect.

Chapter 22, beverages and spirits, was fully liberalized , the sector represent the biggest share of EU exports and sees strong tariff creation effects and slightly negative treaty effects.

Chapter 23, animal fodder and waste, was fully liberalized. It sees strong Canada to EU flows. The net effect of the treaty and tariff was negligible.

Chapter 24, tobacco and its manufacture, was fully liberalized and massively so by Canada that is substantially a net importer from Europe. It sees deeply negative tariff effects and strongly positive treaty effects.

Again we don't see strong correlations between ex ante tariffs or flows or tariff reductions on the creation effects.

9. Conclusions

CETA appears to have had a net-positive impact on EU-Canada trade, our research shows that the presence of the treaty increased substantially bilateral trade in the years taken in consideration in the agricultural sector.

Nonetheless, the effects of the treaty have not been spread equally through all economic sectors. Animals and animal products appear to have had the biggest increase, followed closely by vegetable products and foodstuff. Almost a third of industries sow negative growth although, in the aggregate, the sectors that suffered the most are relatively smaller ones. Fish, meat, dairy, cereals, oil, fats, foodstuffs and spirits, the biggest sectors in absolute terms, saw widespread growth. Within the clusters themselves, it is possible to identify "winners" and "losers" of the treaty with a few sectors enjoying more limited growth and others enjoying much stronger trade creation effects.

Our causal effects evaluation has shown that trade creation after an initial peak in 2017-2018 has started to reduce its impact and might be directed towards a smaller, while still positive, impact on bilateral trade.

A broader evaluation of the negotiations might be useful to bridge the gap between the broad research that CETA as spearheaded in the international political economy studies with sound economic and mathematic foundations.

Our research enriches the current debate in several areas. Firstly, we provide the first comprehensive evaluation of the impacts of CETA on agricultural trade. Secondly, we provide detailed sectoral analysis of agricultural trade at the section and chapter level and we also use a comparative approach to assess the effectiveness of the treaty over time.

This research leaves room for several future options. A different dataset, broader or focussed on different sections might yield different results both to question and enrich this work (traditionally this kind of research is focussed on the manufactural sector, and it would be indeed extremely profitable to compare the results of our research with that kind of industries). A country-by-country analysis might also be beneficial. By constraining the dataset in creative ways, we could obtain the creation effects for single countries and groups of countries. We already explore with it in our robustness checks, but this could lead the way to tailor made analysis on single entities.

Furthermore, this could lead, on the one hand, to a better understanding of the treaty per se and on the other hand we could put this kind of analysis together with the abundant work on the lobbying of certain national groups within the EU to understand their impact on the treaty and, potentially, in future FTAs.

Lastly, we attempted to address the technical constrains of the PPML methodology by questioning, unsuccessfully, the parallel trends assumption. New ways in order to develop a measure of trade diversion and of possible alternative iterations of trade diversions could help to achieve a better understanding of the welfare effects of CETA and other trade agreements.

In utilizing our finding policymakers should be strengthened in the knowledge that FTAs can indeed provide economic benefits to their parties. Furthermore, given the generalised benefits of CETA for its members in almost all sectors, we advocate for certain forms of support for the sectors that suffered more from the treaty or in general redistribution from the sectors that gained more to the benefit of those that, comparatively, faired more poorly in the treaty. Lastly, although this paper focusses on an ex-post evaluation identifying prematurely the sectors negatively affected from the treaty could help in easing its negotiation and implementation.

Chapter 3

CETA in the spaghetti bowl of international trade

Abstract

We perform an ex-post analysis of the effects of the 16 trade agreements entered into force between 2012 and 2022 in the agricultural, farming and food transformation sectors. We find strong evidence in support of a positive trade creation effects of the treaties.

We also perform a series of analyses aimed at ascertaining the effects of the treaties on various subsectors. We find overall net-positive trade effects although we can clearly identify "winners" and "losers" both between and within treaties.

Our analyses seem to indicate a positive trade creation effect not limited to the parties. We find evidence that the increase in trade flow between the members had a net positive effect in the form of an increase in overall international trade.

We find the CETA trade agreement to be above the average and in general over performing when compared with trade agreements of similar characteristics independently of the estimation methodology utilised.

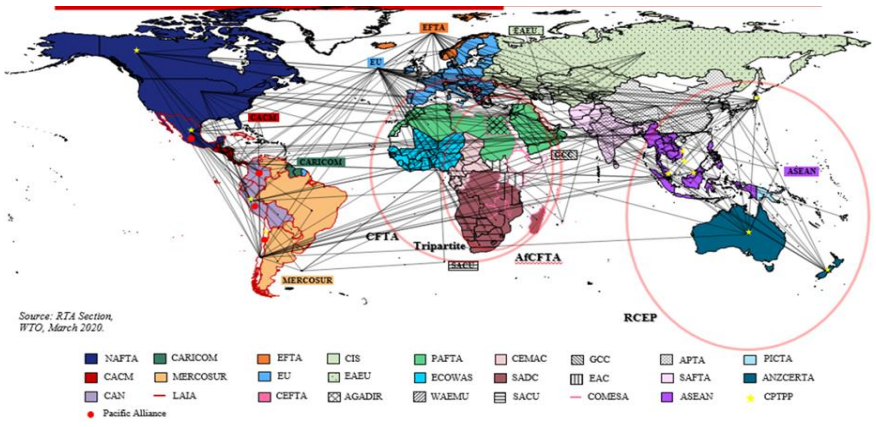
1. Introduction

Jadish Bhagwati wrote in 1995 that the definition "Free Trade Agreements" is "Orwellian newspeak", he argued that, while FTAs lowered trade barriers between their members, they also relatively increased barriers to trade between members and non-members. Furthermore, Bhagwati underlined a phenomenon that, if already growing at the time, has exploded in recent years, the proliferation of FTAs.

He also developed a name for this phenomenon, "The Spaghetti Bowl", hinting to the ever-increasing complexity of international trade relations. Thus, the spaghettification process is the progressive increase in the number of FTAs existing in the world.

Already in 1995, the year in which the GATT 94 (General agreement on tariffs and trade) entered into force and the WTO (World Trade Organization) was formally established, Bhagwati feared the abandonment of the WTO-led multilateral approach in favour of the regional approaches pursued by actors such as the EU (European Union) and the USA (United States of America) and showed unease to the effects that a regionalization of trade would impose on the world economy. Namely, trade diversion and the impossibility of clear rules of origin that would be effective in ascertain the origin of a given good.

Figure 1. *The Spaghetti Bowl of International trade*



A visual representation of the Spaghetti bowl of international trade as of March 2020. Source: WTO

With striking forward-thinkingness Bhagwati attempted to understand if the proliferation of FTAs would benefit or disrupt the WTO centred approach to world trade, several years before the relatively recent explosion in FTAs and right after

the landmark completion of the process that created the WTO itself. After 29 years and the total impasse of the Doha Round vis-à-vis the skyrocketing number of FTAs one might argue that Bhagwati's questions might have been indeed relevant.

The size of this phenomenon is also well documented. Grant and Lambert (2008) identified that in 2003 there were 250 RTAs (Regional Trade Agreements) notified to the WTO (half of them after 1995) and that only between 2004 and 2005 43 were added to this list. Already in 2005, only ten years after Bhagwati considerations, Crawford and Fiorentino (2005) underlined that the increase in FTAs meant that international trade was entering one of the most prolific periods of RTAs formation in recorded history, one that to this very day has not yet ended. In 2013 as pointed out by Urata & Okabe (2013) the notified FTAs to the WTO had reached a staggering 546 regional trade agreements.

The reasons for this phenomenon can be varied: ideology, the international impasse, political motives, and particular economic interests. The first one is presented by Bhagwati himself.

During the '90s the US government firmly believed that any push in the liberalization of trade would benefit the development of the international liberal economic system. Unilateralism, bilateralism, regionalism, multilateralism, all of these would lead to a more liberal world. Baghwati criticises this approach, yet it might explain certain among the first major trade agreements pursued by the US and, in part, various EU agreements of the past decade(s).

A different reason, in more recent years, can be interpreted as the gridlocked WTO itself. It would be thus possible to wonder whether the WTO's gridlock after the Doha's setback is derived from the proliferation of FTAs or the proliferation of FTAs is a consequence of the gridlock itself. Still, on this very argument, the discussion is very much alive. Faude (2020) points out that FTAs might be the solution to the deadlock of the WTO and not the cause. Faude argues passionately that given the limits of multilateral negotiations PTAs increase the ability of the international system to accommodate heterogeneous preferences and that they serve as complements, and not as alternatives, to the rules-based international trade order centred on the WTO.

Alternatively, the proliferation of FTAs can be interpreted as a political instrument like several others. An example of this can be the Association Agreement between the EU and Ukraine of 2014, given that, it is widely considered that its early

rejection in 2013 by President Yanukovych was the main reason for the Euromaidan protests. The agreement, according to Dimitrova and Dragneva (2022) was indeed extremely peculiar. Not only because of its broad ambition but also because of the influence that it was shaped to have on the Ukrainian legal, economic, and political environments. As the authors underline the agreement gave rise to a severe power asymmetry between the parties (given the EU's influence on Ukrainian developments). Furthermore, it was politicized by Russia and the Russian sponsored actors both in Russia but chiefly in Ukraine. A contestation that is to this very day used as one of the main arguments of Russian propaganda. Similarly, Sohn & Koo (2010) indicate how the 2007's KORUS FTA is a clear example of how countries can pursue simultaneously economic and strategic interests in trade negotiations. The KORUS, in their article, is defined as the most important FTA of the RoK (Republic of Korea) at the time of its introduction and one of the most significant for the USA after the NAFTA. For Korea, it served two distinct purposes: maximizing the returns from trade and investments and giving the RoK an hedge in the strategic uncertainties of eastern Asia economic and political relations by securing trans-pacific connections. Similarly, it gave the USA a stronger economic foothold in a region increasingly dominated by the rise of the PRC (People's Republic of China).

Lastly, certain peculiar economic or environmental reasons can be accounted for in this process. The latest renegotiations of the EU-Chile trade agreements are largely dependent on the strong European interest in the rich lithium deposits of the Andine region. While the EU-MERCOSUR (Common Market of the Southern Cone) trade agreement has faced vocal opposition from environmentalist groups criticising its relative lack of attention to the health of the Amazonas. Already in 2012, Wilson, referring to north-eastern Asia addressed the topic of resource security. In his work he advanced the compelling case that economic development, and the shift away from multilateralism to bilateralism (or plurilateralism might be argued), was based on the need to secure the supply of certain strategic commodities whose consumption figures had dramatically increased in the 2000's. This kind of considerations are now achieving new eights. Most of the developed economies have lunched, or are in the process of lunching, initiatives to increase their global share in the market of critical raw materials (CRM) indispensable to the green transition. In November 2023 the EU reached a provisional agreement on the European Critical Raw Materials Act aimed at identifying raw materials

critical to the green transition, strengthening self-reliance, and developing domestic value chains for these materials.

Given all these considerations we approach the CETA (Comprehensive Economic and Trade Agreement) trade agreement and others entered into force between 2012 and 2020 with a series of questions. From this spaghetti bowl our aim is to understand not only how CETA fared when compared with similar agreements but furthermore how and if these agreements had a positive trade creation effect for their parties both at the aggregated level and at the cluster level. Our focus on CETA is explained both by the relative lack of detailed analysis and by the comparative novelty of its dispositions.

Furthermore, we will focus on the agricultural sector for a series of reasons. Firstly, although not absent, the literature on the effects of FTAs on agriculture is much more limited than generalized studies on the trade effects of FTAs. Secondly, agriculture is, often, the most protected sector in international trade and its liberalization can potentially lead to the biggest creation and diversion effects. Thirdly and lastly, liberalization in agriculture is almost always based on a combination of a reduction of tariffs and a harmonization of non-tariff barriers, both extremely important to these products and often much more than in other sectors. In the following sections we will provide a detailed analysis of this assertions.

We analyse the effects of the several trade agreements on international trade among themselves and with the CETA trade agreement to draw lessons on how these agreements impacted the agricultural sector in general and the main commodity groups within it. Our findings, obtained with the PPML methodology, show that most treaties, with few exceptions, promote the strengthening of bilateral trade flows amongst the parties and appear to increase multilateral trade. At the cluster level we find similar positive results. CETA appears consistently to perform above the average and is, among the treaties we analyse the third for performance in terms of trade creation.

After a brief literature review, we present shortly the source and structure of our dataset and our model. We analyse data on a 11 years period for 225 entities with an HS2 chapter level detail. We analyse the effects of 16 treaties identified from those entered into force in the 2012-2020 period as reported by the WTO. Subsequently, we provide a shorth methodological framework, derived from

Chapter 2, present our PPML estimation methodology at the aggregated level before exploring the results at the sectoral level.

Our work confirms the existing literature on the positive effect of FTAs and adds to the debate on the effect of trade agreements at deeper, dis-aggregated levels. It also shows CETA to be consistently among the best performing treaties in terms of trade creation effect on bilateral trade.

2. The dataset

The dataset is largely similar to that implemented in Chapter 2. As before, we have data from 225 entities over a period of 11 years, from 2012 to 2022. We have three distinct levels:

1. The aggregated one where we have a single entry for all the bilateral trade in agricultural products for a given unidirectional couple in a certain year,
2. The section level where we have three entries per year,
3. The chapter level where we have 24 entries per year.

The source of our data is again the Centre d'études prospectives et d'informations internationals (CEPII) and to summarize we have roughly 556.875 thousand observations in the first level, 1.7 million in the second and 13.4 million in the third. The main expansion to the dataset is related to the existing FTAs. As of 2023 there are 386 RTAs that are into force according to the WTO.

Regarding the treaties the WTO states that 102 of the 386 into force as of 2023 have entered into force between 2012 and 2020. We operated a preliminary evaluation and proceeded with the removal of 4 of them given the absence of reliable data in our dataset for entities such as the Republic of China. This leaves us with 97 treaties.

Our aim was to identify a selected number of trade agreements whose characteristics where comparable with CETA. Among the selected characteristics we identified, the absolute and relative size of the parties, weather one of them was a major agricultural exporter and the relative size of agricultural exports on their GDP. Furthermore, we excluded treaties that entered into force before 2013 (included) as to have a proper timespan for our analysis.

Table 1. *Main agricultural exporters between 2012 and 2020*

	2012		2020		
Country	**Mln USD**	**% World**	**Mln USD**	**% World**	**Growth rate**
European Union	$ 137.392	10%	$ 205.258	**15%**	49%
USA	$ 141.806	11%	$ 147.767	11%	4%
Brazil	$ 82.602	6%	$ 85.649	**6%**	4%
China	$ 59.006	4%	$ 66.250	**5%**	12%
Canada	$ 47.319	4%	$ 56.934	**4%**	20%
Argentina	$ 41.957	3%	$ 35.868	3%	-15%
Thailand	$ 34.229	3%	$ 35.661	**3%**	4%
Australia	$ 33.273	2%	$ 31.581	2%	-5%
Mexico	$ 24.778	2%	$ 41.240	**3%**	66%
Indonesia	$ 31.237	2%	$ 35.298	**3%**	13%
World	**$ 1.345.407**		**$ 1.574.495**		**17%**

In this table we show the top ten agricultural exporters in 2020, with the share they occupy in world exports in the agricultural field. Data is in millions of USD. The upper part contains the top ten exporters, while the lower contains the top ten EU Member States by agricultural exports. In **Bold** *countries that lost positions amongst the top 10 exporters.*

Before moving to the identification of the treaties it is worth briefly discussing the state of agricultural trade between 2012 and 2020.

In table 2 we present data on the top 10 exporters of agricultural products in 2020 organized by cumulative exports between 2012 and 2020. The EU[3] is by far the biggest exporter of agricultural products with a growth of approximatively 49% between 2012 and 2020 and a global share that grew from 10% (2nd place in 2012 behind the US) to 15% in 2020 (1st place). In terms of growth only Mexico outperformed the EU (+66%) while Argentina went from the 6th to the 7th position with a relative decline in its global share of food exports and overall, a reduction of 15% on the value of its exports between 2012 and 2020. The other great exporters are Brazil (+4%), China (+12%) and Canada (+20%) all of whom retained their position in the top ten exporters.

[3] In this instance the EU Values are for 27 members in 2012 (thus without Croatia) and 27 Members in 2020 (thus without the UK). The data captures exclusively extra EU exports thus ensuring that we avoided issues regarding the duplication of certain data flows because of re-exports).

Table 2. *Main EU agricultural exporters between 2012 and 2020*

	2012		2020		
Country	**Mln USD**	**% World**	**Mln USD**	**% World**	**Growth rate**
European Union	$ 137.392	10%	$ 205.258	**15%**	49%
The Netherlands	$ 84.554	6%	$ 93.246	**7%**	10%
Germany	$ 79.498	6%	$ 83.265	**6%**	5%
France	$ 72.854	5%	$ 69.534	5%	-5%
Spain	$ 45.628	3%	$ 61.135	**5%**	34%
Italy	$ 38.962	3%	$ 51.095	**4%**	31%
Belgium	$ 35.252	3%	$ 40.518	**3%**	15%
United Kingdom	$ 29.881	2%	$ 30.584	**2%**	2%
Poland	$ 23.392	2%	$ 37.651	**3%**	61%
Denmark	$ 21.715	2%	$ 22.620	**2%**	4%
Ireland	$ 14.580	1%	$ 18.013	**1%**	24%
World	**$ 1.345.407**		**$ 1.574.495**		**17%**

Main EU Member states by agricultural exports. The UK is represented despite BREXIT in 2020. Trade in this instance also includes intra-bloc trade.

The EU is an agricultural powerhouse on the world stage. In 2012 the agricultural exports of the first two EU MS, Germany and The Netherlands exceeded the EU's total exports towards the rest of the world. This gives us a series of considerations. Firstly, that most of the EU's trade in agriculture is internal, secondly that there is huge re-export of agricultural products from certain Member States (The Netherlands and Belgium chiefly with French and German produce), thirdly that the EU is the single biggest exporter of agricultural products at every level. Table three clearly shows that countries such as The Netherlands, Germany and France outperform nations like Brazil, Canada and China. Nations whose surface is several times bigger and with a stronger focus in these sectors on the overall economy (Canada and Brazil).

The picture in the import of agricultural products is similar with some relevant additions. Annex 2 shows us that while the EU and US maintain their positions, in this case as first and second importers of agricultural products their share is much more contained. Furthermore, the EU is a clear net exporter in 2020 while the US is a net importer and has increasingly become more dependent on agricultural imports. The annex also indicates that countries like Japan, Korea, Russia, and Thailand are relevant importers. Canada is a net exporter while the PRC is a net

importer, and this is without considering Hong Kong (a traditional gateway to mainland China). Similarly, EU Member States are divided between net exporters (such as Netherlands and France) and net importers (like Germany).

Lastly, annex 3 indicates the main trading couples. The first three all contain the USA together with its regional partners (Canada and Mexico) followed by the EU. The remaining couples are divided in two categories; couples from three to six focussed on the PRC, and couples from seven to ten based around countries in the far east.

This evaluation clearly indicates that global agricultural trade is focussed around 4 main nodes. The North American region centred around the USA, South America and the great exporters Brazil and Argentina, the European node and the Far East with China, Japan and Korea.

Thus, we selected 16 treaties that entered into force (EiF) between 2013 and 2020 and based on the main trading partners and by the greatest exporters and importers. The treaties are, in chronological order:

1. EU (28) Enlargement
2. Korea - Türkiye
3. Korea - Australia
4. Canada - Korea
5. Chile - Thailand
6. China – Korea
7. Eurasian Economic Union (EAEU)
8. Japan - Australia
9. Korea - New Zealand
10. Canada - Ukraine
11. EU - Canada
12. Comprehensive and Progressive Agreement for Trans-Pacific Partnership (CPTPP)
13. ASEAN - Hong Kong
14. EU - Japan
15. Hong Kong- Australia
16. United States-Mexico-Canada Agreement (USMCA/CUSMA/T-MEC)

They represent a sizable majority of agricultural trade and a sizable majority of the word’s GDP.

3. The model

As per the dataset, the model we are introducing is extremely similar to that of Chapter 2. We will thus not delve excessively into it. The equation we will estimate is thus as follows:

$$X_{h,f,t} = \exp[\, G + b_1 ln(Y_{h,t}) + b_2 ln(Y_{f,t}) + b_3 ln(D_{h,f}) + b_4 TradeCreate_{h,f,t} + b_5 TradeDivert_{h,f,t} + \gamma_{h,t} + \delta_{f,t} + \vartheta_{f,t} + \theta\,] + e_{h,f} \quad (1)$$

The mathematical foundations of this approach can be found on Chapter 2 and as before we will adopt both a PPML methodology.

Nonetheless, the comparison between trade agreements is a topic we have not previously discussed. On this matter there are three alternative methods that are discussed in literature.

Firstly, in various instances a single dummy is introduced to account for all treaties and measure their effectiveness. We find this approach to be exceedingly limited, as it would not allow us to analyse the effects of the single treaties but only a cumulative measure of their impact on trade thus defying the purpose of our research. Furthermore, it would imply that all trade agreement, irrespective of their content, produce the same results. An assumption that would be exceedingly rigid in the best circumstances.

Secondly, authors like Baier et all (2019) present an approach in which for each treaty they estimate a different equation containing a trade creation and trade diversion term that are depending solely on a single trade agreement. We found only limited instances of this approach.

Thirdly and lastly several authors like, Ghosh & Yamarik (2004), Martinez-Zarzoso & Nowak-Lehmann (2003), Timsina & Culas (2022), Martínez-Zarzoso & Márquez-Ramos (2005), Carrère (2006), Sun & Reed (2010) and Karemera et al (2023) estimate a single equation in which they present all trade agreements as single dummies of trade creation and trade diversion at the same time.

Moving forward we will compare these last two approaches.

Thus, our equation will alternatively be:

$$X_{h,f,t} = \exp[\, G + b_1 ln(Y_{h,t}) + b_2 ln(Y_{f,t}) + b_3 ln(D_{h,f}) + b_4 TradeCreate_{h,f,t} + b_5 TradeDivert_{h,f,t} + \gamma_{h,t} + \delta_{f,t} + \vartheta_{f,t} + \theta\,] + e_{h,f} \quad (2, \text{Method A})$$

Repeated n times where n is the number of trade agreements considered.

Or:

$$X_{h,f,t} = \exp[\, G + b_1 ln(Y_{h,t}) + b_2 ln(Y_{f,t}) + b_3 ln(D_{h,f}) + b_a TradeCreate\_a_{h,f,t} + b_a TradeDivert\_a_{h,f,t} + \cdots \ldots + b_j TradeCreate\_j_{h,f,t} + b_a TradeDivert\_j_{h,f,t} + \gamma_{h,t} + \delta_{f,t} + \vartheta_{f,t} + \theta\,] + e_{h,f} \; (3, \text{Metod B}))$$

Where we have j trade agreements going from a to j.

4. Results

In this section we discuss our main findings. Table 3 contains the results of our regressions developed in four alternative forms.

The (- A) estimates are estimated with what we described as Method A while the (-B) are estimated with Method B.

As discussed in Chapter 2 our PPML estimates, how the name of the command suggests, account for fixed effects and in this case at the time-origin, time-destination and couple level.

Furthermore, we provide data on the entry into force and the number of member parties to the treaty. Lastly the table is subdivided into sections based on the year of entry into force.

Table 3. *PPML A and B estimates*

Dependent Variable:			*Exports*			
Treaty	**EiF**	**Parties**	**PPML-A**		**PPML-B**	
EU (28) Enlargement	2013	28#	0,088	**	0,056	**
			(0,03)		(0,08)	
Republic of Korea - Türkiye	2013	2	0,015		-0,014	
			(0,15)		(0,92)	
Republic of Korea - Australia	2014	2	0,162	*	0,163	**
			(0,08)		(0,04)	
Canada - Republic of Korea	2015	2	0,256	***	0,223	**
			(0,07)		(0,01)	
Chile - Thailand	2015	2	-0,054		-0,050	**
			(0,07)		(0,47)	
China - Republic of Korea	2015	2	-0,225	***	-0,224	**
			(0,04)		(0)	
Eurasian Economic Union (EAEU)	2015	5	0,276	***	0,271	**
			(0,07)		(0)	
Japan - Australia	2015	2	0,216	***	0,223	**
			(0,05)		(0)	
Republic of Korea - New Zealand	2015	2	0,133		0,095	*
			(0,09)		(0,28)	
Canada - Ukraine	2017	2	0,196		0,195	
			(0,11)		(0,09)	
EU - Canada	2017	28#	0,079	***	0,066	***
			(0,02)		(0,00)	
CPTPP	2018	11	0,043		0,029	**
			(0,03)		(0,28)	
ASEAN - Hong Kong	2019	11	0,096		0,095	**
			(0,05)		(0,08)	
EU - Japan	2019	28#	0,043	*	0,004	***
			(0,02)		(0,84)	
Hong Kong - Australia	2020	2	0,082		0,116	**
			(0,07)		(0,13)	
USMCA	2020	3	0,063		0,055	**
			(0,05)		(0,32)	
Importer-time FE			yes		yes	
Exporter-time FE			yes		yes	
Couple FE			yes		yes	

In this table we present our main results. From left to right we have the treaty, its entry into force, the number of its parties, the trade creation coefficients estimated with PPML and the respective Pseudo R-Squared and R-Squared. Trade Diversion was dropped in the PPML because of collinearity.

**p < 0.1, **p < 0.05, ***p < 0.01. #The EU member states are 27 in 2012, 28 between 2013 and 2020 and 27 from January 2020.*

In Table 3 we see, firstly, a comparison between method A and B in the PPML estimation. In general, the two methods seem to produce similar coefficients but they are more precisely estimated with Method B.

Let us now focus on the analysis of trade creation estimated with Method A. Looking only at the significant estimates we find five treaties that perform better then CETA. The Eurasian FTA, the RoK-Canada and the Australia-Japan FTA widely outperform CETA while the EU enlargement of 2013 and the RoK-Australia FTAs are more comparable. Lastly, CETA outperforms the EU-Japan FTA and the RoK-PRC FTA (which is the only one significantly negative).

When using method B the results are very similar, albeit much more significant while coefficients are slightly smaller. CETA outperforms 6 treaties while several others are now outperforming CETA in a significant, albeit small way.

It would seem that treaties that include a mainly agricultural party and a mainly industrial one produce better trade creation effects while treaties with mostly industrial parties have smaller effects.

5. Sub-sector analysis

We now perform a cluster analysis as that presented in Chapter 2. We adopted exclusively method B. We performed our analysis by constraining our regression by section and chapter to provide detailed results for each of them.

In general, we find strong variability in the data. This is in line with the existing literature, such as Ghazalian (2017). In his work, which analyses the implementation of the CUSFTA and NAFTA he provides a disaggregated in dept view of the effects of the treaty at the SITC 1 Level (equivalent to our section level). His findings, although limited by the evaluation of a single FTA, indicate strong heterogeneity in the results from a SITC to the other with variations that appear related to the alternative FTAs considered, a result similar to what we found in Chapter 2.

This is also confirmed by a recent paper by French and Zylkin (2024) that studies, in detail the effects of FTAs at the disaggregated level. Their findings underline the strong heterogeneity we find in our own results but provide also useful insights on a possible explanation for this phenomenon.

Indeed, they find that trade creation effects are stronger for what they call "least traded products"[4] and that thus these products enjoy faster trade growth after the introduction of FTAs.

Table 4. *Section 1*

	1		2		3		4		5	
EU (28) Enlargement	-0,350	*	0.086		0,134		0,128		0,144	
	(0.18)		*(0.11)*		*(0.08)*		*(0.11)*		*(0.11)*	
Republic of Korea - Türkiye	-0,880		12,203	***	-0,326		-1,294	***	-0,164	
	(0.55)		*(0.61)*		*(0.25)*		*(0.36)*		*(0.30)*	
Republic of Korea - Australia	0,152		0,047		0,168		-0,106		-0,275	
	(0.27)		*(0.15)*		*(0.29)*		*(0.13)*		*(0.21)*	
Canada - Republic of Korea	0,128		0,045		0,196		-0,949	***	-0,937	***
	(0.37)		*(0.15)*		*(0.13)*		*(0.19)*		*(0.25)*	
Chile - Thailand	3,021	**	0,000		-0,289	*	-1,459	***	-7,650	***
	(1.13)		*(.)*		*(0.12)*		*(0.36)*		*(1.18)*	
China - Republic of Korea	0,905	***	-1,854	*	-0,183	***	0,036		-1,594	***
	(0.23)		*(0.86)*		*(0.06)*		*(0.14)*		*(0.19)*	
Eurasian Economic Union (EAEU)	-0,553		-0,810		0,297		0,360	*	0,374	
	(0.35)		*(0.43)*		*(0.21)*		*(0.17)*		*(0.22)*	
Japan - Australia	0,669	**	0,180		-0,384		-0,171		-0,319	
	(0.21)		*(0.12)*		*(0.29)*		*(0.09)*		*(0.18)*	
Republic of Korea - New Zealand	0,625		-0,459	***	-0,874	***	-0,021		0,135	
	(0.69)		*(0.13)*		*(0.26)*		*(0.17)*		*(0.18)*	
Canada - Ukraine	-1,265	**	0,833		-0,208		-0,594		0,601	**
	(0.46)		*(0.74)*		*(0.12)*		*(0.58)*		*(0.21)*	
EU - Canada	-0,229		0,259	***	0,003		0,122	*	-0,088	
	(0.14)		*(0.06)*		*(0.04)*		*(0.06)*		*(0.05)*	
CPTPP	-0,057		0,190	**	0,066		0,060		-0,001	
	(0.15)		*(0.07)*		*(0.05)*		*(0.05)*		*(0.10)*	
ASEAN - Hong Kong	-1,162	**	0,777	**	0,063		-0,064		-0,227	
	(0.39)		*(0.26)*		*(0.11)*		*(0.19)*		*(0.28)*	
EU - Japan	-0,046		0,133	*	0,177	***	0,232	***	0,175	**
	(0.11)		*(0.06)*		*(0.04)*		*(0.05)*		*(0.06)*	
Hong Kong - Australia	1,151	***	0,621	***	-0,138		0,484		0,504	
	(0.20)		*(0.16)*		*(0.39)*		*(0.30)*		*(0.37)*	
USMCA	0,214		0,301		-0,005		-0,649	*	-0,100	
	(0.64)		*(0.17)*		*(0.12)*		*(0.32)*		*(0.20)*	

Cluster level analysis for Custer 1, Animals and animal products. The trade agreements are arranged by size of trade creation, smallest to biggest, obtained with PPML Method B. More detailed information on the results can be found in annex 4. All coefficients are significant at the 10% level or above with the exception of the EU-Japan, Chile-Thailand, CPTPP and ASEAN-Hong Kong.

Section 1 (Animals and animal products) accounts for the trade of goods of animal origin and live animals. On average, CETA is the sixth FTA by trade creation although with an only slightly positive effect. By chapter CETA outperforms the average in chapters 3, 4 and 5 while is far below the average in chapters 1 and 5.

[4] Products either not traded or traded only in small amounts.

Table 5. *Section 2*

	6		7		8		9		10		11		12		13		14		15	
EU (28) Enlargement	0,073		0,297	**	0,202		-0,053		-0,421	*	-0,060		0,370	*	-0,123		0,200		-0,040	
	(0.07)		*(0.10)*		*(0.11)*		*(0.08)*		*(0.20)*		*(0.13)*		*(0.14)*		*(0.09)*		*(0.25)*		*(0.12)*	
Republic of Korea - Türkiye	-1,196	*	1,047	***	0,391	**	-0,316	*	10,116	***	-0,867	***	0,511		0,138		12,723	***	0,369	
	(0.56)		*(0.31)*		*(0.14)*		*(0.15)*		*(0.75)*		*(0.26)*		*(0.26)*		*(0.27)*		*(0.61)*		*(0.38)*	
Republic of Korea - Australia	0,863	*	0,500	***	1,209	***	0,344	*	0,453		-0,190		0,230		-0,675	**	2,048	**	-0,430	**
	(0.42)		*(0.12)*		*(0.28)*		*(0.17)*		*(0.32)*		*(0.16)*		*(0.17)*		*(0.25)*		*(0.64)*		*(0.16)*	
Canada - Republic of Korea	0,554	*	0,298		-0,505	*	0,492	**	-0,126		-0,422	**	-0,008		0,121		1,868		0,824	***
	(0.28)		*(0.18)*		*(0.24)*		*(0.19)*		*(0.27)*		*(0.16)*		*(0.30)*		*(0.13)*		*(0.96)*		*(0.17)*	
Chile - Thailand	-0,555	*	0,786		0,379	**	0,113		0,509		0,657		-0,012		-0,311	*	-0,301		0,146	
	(0.28)		*(0.48)*		*(0.13)*		*(0.35)*		*(0.51)*		*(0.42)*		*(0.24)*		*(0.16)*		*(0.33)*		*(0.44)*	
China - Republic of Korea	-0,231	*	0,138		-0,650	***	-0,361		-0,585		-0,139		-0,055		-0,180	*	1,213	***	-0,342	
	(0.10)		*(0.14)*		*(0.13)*		*(0.27)*		*(0.40)*		*(0.15)*		*(0.10)*		*(0.09)*		*(0.20)*		*(0.24)*	
Eurasian Economic Union (EAEU)	1,330	**	0,511	**	0,049		0,803	***	0,903	***	0,230		0,413		-0,121		1,189	**	0,618	***
	(0.52)		*(0.19)*		*(0.23)*		*(0.17)*		*(0.25)*		*(0.17)*		*(0.22)*		*(0.23)*		*(0.42)*		*(0.17)*	
Japan - Australia	0,620	***	-0,038		0,222	*	0,182		0,614	***	0,207		0,136		-0,078		1,813		-0,268	
	(0.15)		*(0.17)*		*(0.11)*		*(0.19)*		*(0.18)*		*(0.12)*		*(0.20)*		*(0.20)*		*(1.10)*		*(0.16)*	
Republic of Korea - New Zealand	0,109		0,032		0,167		0,385		0,976		0,853	*	0,135		-0,793	*	-1,270	*	0,960	**
	(0.16)		*(0.18)*		*(0.17)*		*(0.30)*		*(1.19)*		*(0.42)*		*(0.15)*		*(0.39)*		*(0.57)*		*(0.30)*	
Canada - Ukraine	0,825		0,639	*	1,281	**	0,331		-0,482		0,720		-1,352	**	3,665	***	4,674	***	1,290	***
	(0.62)		*(0.26)*		*(0.48)*		*(0.36)*		*(0.65)*		*(0.42)*		*(0.51)*		*(0.86)*		*(1.12)*		*(0.39)*	
EU - Canada	0,096	*	0,113	*	0,453	***	-0,044		0,051		-0,075		0,111		-0,233	***	0,392	**	0,081	
	(0.05)		*(0.05)*		*(0.07)*		*(0.04)*		*(0.09)*		*(0.06)*		*(0.08)*		*(0.04)*		*(0.14)*		*(0.07)*	
CPTPP	0,132		-0,133	**	-0,008		0,278	***	0,314	*	-0,060		0,097		0,088		-0,067		-0,003	
	(0.08)		*(0.05)*		*(0.04)*		*(0.06)*		*(0.13)*		*(0.09)*		*(0.10)*		*(0.07)*		*(0.15)*		*(0.08)*	

ASEAN - Hong Kong	0,215		0,094		0,090		0,229		0,473	*	0,323	***	-0,256		-0,476	***	-1,151	***	0,216					
	(0.16)		*(0.14)*		*(0.15)*		*(0.14)*		*(0.23)*		*(0.10)*		*(0.14)*		*(0.11)*		*(0.24)*		*(0.16)*					
EU - Japan	-0,007		0,079		0,036		0,011		0,013		0,048		0,035		0,032		-0,495	***	0,036					
	(0.05)		*(0.05)*		*(0.04)*		*(0.05)*		*(0.09)*		*(0.06)*		*(0.08)*		*(0.05)*		*(0.15)*		*(0.06)*					
Hong Kong - Australia	-0,254		-0,461	**	-0,352	*	0,203		-0,734	*	0,295		-0,288		-0,233		-0,750	**	0,273					
	(0.38)		*(0.17)*		*(0.18)*		*(0.20)*		*(0.34)*		*(0.18)*		*(0.31)*		*(0.24)*		*(0.27)*		*(0.25)*					
USMCA	0,922	***	-0,043		0,166	**	-0,155		-0,211		0,255		-0,462	*	0,018		0,357		0,950	***				
	(0.26)		*(0.07)*		*(0.06)*		*(0.12)*		*(0.37)*		*(0.18)*		*(0.20)*		*(0.40)*		*(0.31)*		*(0.25)*					

Cluster level analysis for Custer 2, Vegetable products. The trade agreements are arranged by size of trade creation, smallest to biggest, obtained with PPML Method B. More detailed information on the results can be found in annex 4. All coefficients are significant at the 10% level or above with the exception of the EU-Japan, Chile-Thailand, CPTPP and ASEAN-Hong Kong.

Chapter 2 sees more limited variability than Chapter 1. At the aggregated level both the most and least performing treaties have smaller trade creation coefficients than those of Chapter 1.

CETA performs above average in chapters 8 and 12 while performing negatively only in sectors 9 and 12

Table 6. *Section 3*

	16	17	18	19	20	21	22	23	24
EU (28) Enlargement	0,205 *	0,221 *	0,113	-0,081	-0,071	-0,028	-0,045	0,033	0,228
	(0.09)	*(0.10)*	*(0.13)*	*(0.12)*	*(0.07)*	*(0.07)*	*(0.06)*	*(0.11)*	*(0.12)*
Republic of Korea - Türkiye	-0,318	0,456	0,941 ***	-0,242	0,217	-1,028 ***	0,236	0,067	-0,517
	(0.20)	*(0.24)*	*(0.24)*	*(0.16)*	*(0.17)*	*(0.25)*	*(0.32)*	*(0.39)*	*(0.32)*
Republic of Korea - Australia	0,053	0,594 **	1,044 **	0,042	0,541 **	-0,625 *	0,350	0,538 **	1,135 *
	(0.13)	*(0.18)*	*(0.37)*	*(0.20)*	*(0.20)*	*(0.27)*	*(0.19)*	*(0.17)*	*(0.48)*
Canada - Republic of Korea	0,342	-0,440 **	0,822 **	-0,220 *	0,832 **	0,357 ***	0,517 ***	-0,013	2,741 ***
	(0.23)	*(0.15)*	*(0.27)*	*(0.11)*	*(0.28)*	*(0.10)*	*(0.10)*	*(0.29)*	*(0.56)*
Chile - Thailand	-0,060	-0,167	12,761 ***	0,304	0,013	1,270 ***	0,081	1,609 ***	0,000
	(0.14)	*(0.51)*	*(1.28)*	*(0.20)*	*(0.13)*	*(0.25)*	*(0.18)*	*(0.40)*	*(.)*
China - Republic of Korea	-0,171	0,041	0,733 ***	-0,482 ***	-0,020	-0,440 ***	0,425 **	-1,030 ***	-0,381 *
	(0.09)	*(0.11)*	*(0.20)*	*(0.10)*	*(0.08)*	*(0.09)*	*(0.14)*	*(0.11)*	*(0.18)*
Eurasian Economic Union (EAEU)	0,036	0,812 ***	-0,670 **	0,284 *	0,344 ***	0,471 ***	0,189 *	0,863 ***	0,466 *
	(0.16)	*(0.18)*	*(0.21)*	*(0.12)*	*(0.09)*	*(0.09)*	*(0.09)*	*(0.19)*	*(0.19)*
Japan - Australia	0,143	0,889 ***	0,198	0,374 *	0,241 *	-0,135	0,154	0,127	2,555 **
	(0.12)	*(0.20)*	*(0.10)*	*(0.15)*	*(0.11)*	*(0.18)*	*(0.12)*	*(0.12)*	*(0.83)*
Republic of Korea - New Zealand	-0,074	0,477 *	0,899 ***	-0,295 *	-0,089	-0,245 *	-0,090	0,455 *	2,691 ***
	(0.12)	*(0.20)*	*(0.25)*	*(0.15)*	*(0.15)*	*(0.11)*	*(0.15)*	*(0.21)*	*(0.58)*
Canada - Ukraine	0,960 *	-2,609 ***	0,358	0,353	3,158 ***	0,962 ***	-0,427	0,324 *	4,595 ***
	(0.49)	*(0.76)*	*(0.24)*	*(0.22)*	*(0.49)*	*(0.22)*	*(0.41)*	*(0.16)*	*(0.79)* ***
EU - Canada	0,176 ***	-0,056	0,029	-0,510 ***	-0,061 *	-0,235 ***	-0,014	-0,080	0,789

	(0.04)		*(0.06)*		*(0.05)*		*(0.06)*		*(0.03)*		*(0.03)*		*(0.03)*		*(0.05)*		*(0.15)*		
CPTPP	0,180	**	0,311	**	-0,362	***	-0,313	***	-0,026		-0,487	***	0,006		0,042		0,245		
	(0.07)		*(0.11)*		*(0.06)*		*(0.07)*		*(0.04)*		*(0.05)*		*(0.05)*		*(0.10)*		*(0.28)*		
ASEAN - Hong Kong	0,227	**	0,628	***	0,103		0,015		-0,123		-0,020		-0,216		-0,091		0,277		
	(0.07)		*(0.15)*		*(0.13)*		*(0.12)*		*(0.07)*		*(0.06)*		*(0.15)*		*(0.13)*		*(0.20)*		
EU - Japan	0,232	***	0,061		0,087		-0,015		0,095	***	-0,003		0,137	***	0,175	***	-0,333		
	(0.05)		*(0.06)*		*(0.05)*		*(0.06)*		*(0.03)*		*(0.03)*		*(0.03)*		*(0.05)*		*(0.19)*		
Hong Kong - Australia	-0,850	***	-0,033		-0,038		0,076		0,078		-0,497		0,440	*	-0,342	*	-2,827	***	
	(0.23)		*(0.23)*		*(0.16)*		*(0.16)*		*(0.19)*		*(0.11)*	***	*(0.21)*		*(0.15)*		*(0.63)*		
USMCA	0,397		-0,512	*	0,136		0,044		0,099		0,317		-0,316		-0,116		1,108	**	
	(0.33)		*(0.23)*		*(0.12)*		*(0.15)*		*(0.10)*		*(0.13)*		*(0.25)*		*(0.28)*		*(0.39)*		

Cluster level analysis for Custer 3, Foodstuff. The trade agreements are arranged by size of trade creation, smallest to biggest, obtained with PPML Method B. More detailed information on the results can be found in annex 4. All coefficients are significant at the 10% level or above with the exception of the EU-Japan, Chile-Thailand, CPTPP and ASEAN-Hong Kong.

This Cluster maintains the same variability within the FTAs that we saw before. At the average chapter Level, the cluster is the second best performing. CETA performs positively although in a similar way as seen before. The only chapters where it performed above average where chapter 16 and chapter 24 while being negative or slightly negative in six of the nine chapters.

Let us now discuss how CETA has performed comparatively to the other treaties in the various clusters and at the section and chapter level. Kutlina-Dimitrova (2023) indicates, when comparing the 2014-17 period to the 2017-21, a general increase in all chapters on trade flows. The work utilises SITC data instead of HS but it is roughly comparable and indicates that Section 1 has seen a +68% increase, while Section 2 a +32% and lastly Section 3 (divided in two subsections with the SITC) saw a growth between +14% and +26%.

In general, our findings confirm Kutlina-Dimitrova (2023) and indicate that the trade creation effect has been greater than indicated by Kutlina-Dimitrova (2023). CETA has shown to be a good performer although with high variability but on average, always positive effects. At the chapter level, CETA manages to perform well in several chapter when compared with the other treaties but is never the best performer (or the worst) while only in a number of occasions being above average.

6. Discussions and Conclusions

This research indicates that FTAs increase, on average, trade between their parties. It has also shown that this positive trade creation effects vary strongly, from treaty to treaty and that sometimes an FTA can have a negative impact on trade creation among its members.

At this time, we do not have the capacity to address the reasons of these diverging findings, but an analysis of the relevant literature could provide certain insights in this situation. Furthermore, a discussion this broad would be beyond the purpose of this Chapter.

We are aware that the agricultural level is among both the most subsidised and the most protected vis-à-vis external competition in developed countries such as the USA and the EU, this has been indeed a topic of contention during all major WTO negotiation rounds. This might mean that when big agricultural producers (and exporters) enter into FTAs their elasticity to tariff reduction is bigger than comparative peers. Indeed, our results seem to indicate that FTAs that involve only agricultural exporters or comparatively smaller parties tend to have smaller trade creation effects vis-à-vis treaties that include, at the same time, relatively big importers and exporters.

This might thus depend on three concurrent explanations.

On the one hand, big exporters that enter into mutual FTAs reduce barriers on a reciprocal base thus leading to similar levels of liberalization. Nonetheless, this happens in the contest of domestic markets that are already saturated with domestic products, thus leading to small or negative gains from trade.

Similarly, when two importers enter in an FTA, given the relative lack of exports in the agricultural sector, we do not observe appreciable increases in trade.

Lastly, when a big importer (and exporter) and a big exporter enter an FTA, the reduction in tariffs and other barriers allow for an increase in trade both given the export capacity and the internal demand thus allowing the agricultural exporters to capitalise on the beneficial disposition of FTAs.

Nonetheless, our findings on these matters are not sufficient to clearly confirm that this is the case. Future research should focus on the characteristics of these FTAs and their parties in order to ascertain which of these hypotheses holds true and if there are other elements that influence trade creation.

Focussing briefly on CETA, when compared with other FTAs, it has shown to promote bilateral trade across all the sections and across several chapters although it is does not show to perform far above the average.

The evaluation of trade diversion remains a contentious issue. The multicollinearity problem of PPML between the FE and variables such as GDP and trade diversion does not allow us to utilise this estimator to ascertain the size of the trade diversion effect.

This research leaves room for several future options. Evaluating trade policy effect at a more disaggregated effect HS4 or HS6 might allow for more detailed results while extending the analysis to a longer time span and to a more numerous samples of treaties might, similarly, yield more insightful results. Furthermore, as pointed out by Baier et al (2019) regarding multilateral treaties they involve multiple countries and thus multiple pairs. Future expansion of this work might take in consideration a pair-by-pair approach or, to assist policymakers, provide a direction-specific, pair based evaluation of the FTAs. Lastly, the recent work of French and Zylkin (2024) indicates a new potential avenue of analysis in the study of the least traded products, vis-à-vis the comparatively more traded, and the different effects of FTAs' implementation on their respective trade volumes.

In utilizing our finding policymakers should be strengthened in the knowledge that FTAs can indeed provide economic benefits to their parties but that these effects do not always yield true for every FTA.

Countries that faced negative effects might want to address the negative impacts of FTAs. Scholars should also explore if these sectors were left out of the benefit of FTAs purposefully and if so for the benefit of other sectors. Nonetheless, we repeat our call for measures meant at easing the negative impacts of FTAs not only for those that yielded general average results but also, and more importantly so, for those that saw certain agricultural sectors benefit more than others.

Chapter 4

CETA as a MIT

Abstract

In this chapter we aim at investigating CETA as a Multilateral Investment Treaty. After discussing briefly the peculiarities of CETA as a MIT we will describe our model and methodology before presenting the dataset and analyzing it under various lenses.

We find preliminary evidence that CETA promoted FDIs stocks comparatively more between the EU and Canada compared to EU-other and other-EU couples.

We discuss stocks and flows of FDIs while also grappling with the data limitations that limit our analysis to aggregated data only.

1. Introduction

A Bilateral Investment Treaty is a treaty providing a framework for the facilitation of investments of one entity in another and vice versa. According to the UNCTAD as of July 2024 there are 2834 BITs of which 2221 are in force. In addition 466 treaties of other nature (mostly FTAs) have Investments provisions (such as CETA).

Mattoo et al. 2020 provide a partial list of the type of dispositions contained in a BIT. They can contain dispositions on, among others: Investments, Movement of capitals, Intellectual property rights, Competition policy, State aid, Public procurement, Dispute settlement, etc… The list is nonexclusive but it gives us a general idea of the vastness of policy areas that a BIT can touch. Even more so when it is a Deep Trade Agreement (DTA), reaching policy areas that are far from the traditional realms of investment protection and trade and aiming at harmonizing policy and reaching a level playing field.

Borrowing from the terminology on WTO treaties we would go as far as to call CETA an MIT (multilateral investment treaty) because of its peculiar nature. CETA applies from day one to all its parties independent of final ratification as we explored in chapter 2. This would differentiate it from a Plurilateral Investment Treaty because of the peculiarities of the ”package deal” approach it shows.

But what are the peculiarities of CETA as a BIT? CETA contains dispositions on Fair and equitable trade, non-discrimination of investments, regulatory cooperation and most controversially a Dispute Settlement Mechanism. The latter is the most troublesome of the dispositions for the ratification process since, together with the general subject of FDIs, it requires the ratification of the individual EUMS.

The EU has no exclusive competence in the field of investments. As a matter of fact, amongst the 5 exclusive competences of the Union[5] we find common commercial policy but not FDIs. This is, in part, the reason for the lengthy ratification process of the CETA.

Carducci (2018) stresses that the Union can act *solo* only within the limits of its exclusive competences, otherwise having to include Member States to a greater extent in negotiations and, more notably, in the ratification process.

[5]Customs union, the establishing of competition rules necessary for the functioning of the internal market, monetary policy for euro-area countries, conservation of marine biological resources under the common fisheries policy and common commercial policy.

In the next pages we will firstly describe the dataset we built based on the data provided by UNCTAD. Subsequently, we will discuss the FDIs stocks relationships of the EU and Canada with their main partners and within the Union in the last 23 years.

Lastly we will present a preliminary evaluation of the effects of CETA on FDIs stocks.

Our aim is to obtain a preliminary analysis of the effects of CETA on FDIs stocks before presenting the methodology by which we will analyze the dataset using the PPML iteration of the Gravity model applied to FDIs stock.

2. The dataset, introduction

We present a dataset composed of yearly observations on FDIs stocks for 239 entities in the period between 2000 and 2023. The data is originated from the UNCTAD database and was kindly provided by the institution.

Unfortunately, UNCTAD data is presented in two alternative forms, one is aggregated data by origin and destination, yearly and the other is aggregated data by origin (or destination) and business sector, yearly. It is not immediately possible to use the second dataset to inform the first one and presented with this complex choice we decided to limit our analysis at aggregated FDIs stocks.

Therefore, we were limited to a dataset of aggregated FDIs stocks over time.

Furthermore, owing to the relevant literature on trade and PPML such as Dai et al. (2014), Heid et al. (2017), Fontagné et al. (2021) and Cipollina and Salvatici (2020) we wanted to include intra-national FDI stocks. Nonetheless we have struggled with this further expansion of the dataset and in this version there is no intra national FDIs stock.

We obtain a total of 1.3 million observations of which 1.2 million are zeros.

The total number of countries available is increased thanks to the addition of several small entities (mostly islands or overseas entities of European nations) that play relevant roles in the FDIs market.

The usage of stocks is mandated by the PPML methodology which does not allow for negative values, thus drastically limiting the usage of FDIs flows.

3. The dataset, FDIs and Canada

For Canada, the EU, both with and without the UK, is easily the second biggest origin and destination for FDIs. The first place is held without question by the USA.

Table 1. *Main sources of FDIs in Canada 2000-2023*

	Average stock
USA	298.159
EU(no UK)	137.436
UK	45.641
Switzerland	21.073
Japan	16.832
Hong Kong	10.160
China (PRC)	9.940
Brazil	8.968
Australia	7.516
Bermuda	6.528
Argentina	4.011

Average stock of FDIs in Canada for the first 11 partner countries. Data in millions. Hong Kong and the UK are not considered parts of the PRC and EU respectively.

Europe is roughly equal to half of the USA in Canada, the other partners are former British territories and Dominions (Hong Kong, Australia and Bermuda) followed by Geographical partners like Japan, the PRC, Brazil and Argentina.

Table 2. *Main EU sources of FDIs in Canada 2000-2023*

Average stock		
EU(no UK)	137.436	
UK	45.641	
Netherlands	63.612	46,3%
Luxembourg	28.846	21,0%
France	14.646	10,7%
Germany	11.117	8,1%
Belgium	4.144	3,0%
Ireland	3.189	2,3%
Sweden	2.736	2,0%
Spain	2.336	1,7%
Italy	1.633	1,2%
Poland	1.339	1,0%
Rest of the Union	3.839	2,8%

Average stock of FDIs in Canada for the first 11 EU partner countries, relative stock size >1%. Data in millions. The UK is not part of the aggregate EU data. Rest of the Union is comprehensive of all remaining members of the EU 28.

When looking at EU sources of FDIs in Canada the Netherlands accounts for 46% of the total, followed by Luxembourg with 21% and France and Germany, around 8-10%. The other EUMS are residual.

Table 3. *Main destinations of Canadian FDIs 2000-2023*

	Average stock
USA	268.031
EU(no UK)	44.588
UK	40.491
Bermuda	34.635
Cayman Islands	26.161
Australia	19.580
Mexico	16.886
Chile	16.843
Singapore	13.855
Bahamas	10.658
China (PRC)	10.430

Average stock of FDIs from Canada for the first 11 partner countries. Data in millions. The UK is not considered parts of EU.

Regarding the destinations of Canadian FDIs we find interesting pattern. The 4th, 5th, 9th and 10th are micro states which, collectively surpass the share of the EU plus UK although they still come very short of the USA.

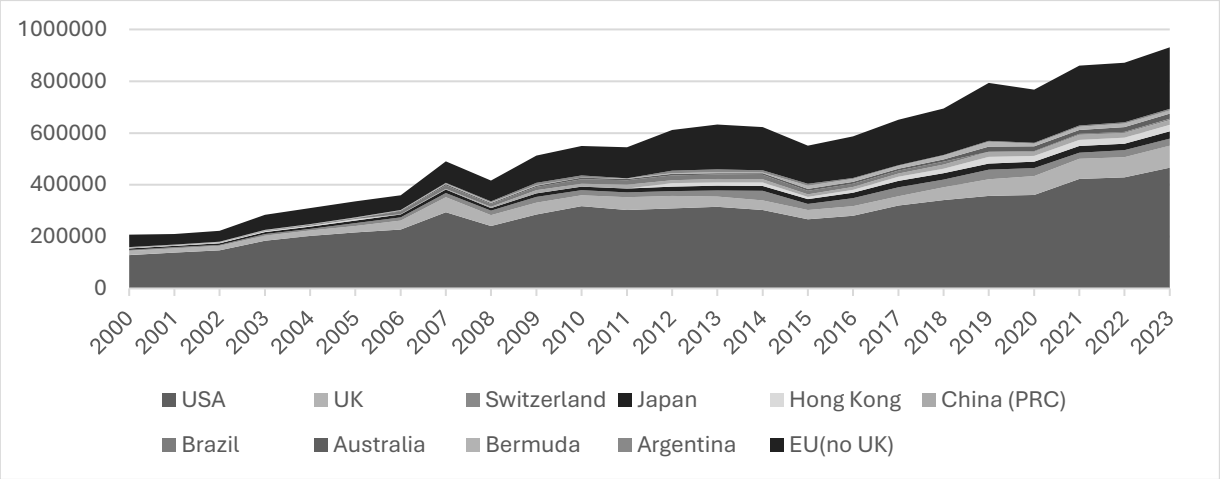
Table 4. *Main EU destinations of Canadian FDIs 2000-2023*

Average stock		
EU(no UK)	44.588	
UK	40.491	
Netherlands	10.122	22,7%
Ireland	6.133	13,8%
France	4.995	11,2%
Portugal	4.105	9,2%
Malta	3.722	8,3%
Spain	3.272	7,3%
Germany	2.814	6,3%
Austria	2.585	5,8%
Sweden	2.232	5,0%
Luxembourg	1.136	2,5%
Rest of the Union	3.473	7,8%

Average stock of FDIs from Canada for the first 11 EU partner countries, relative stock size >1%. Data in millions. The UK is not part of the aggregate EU data. Rest of the Union is comprehensive of all remaining members of the EU 28.

Regarding EU partners we see the interesting additions of Ireland, Malta and Austria. The relative shares are also much more homogeneous.

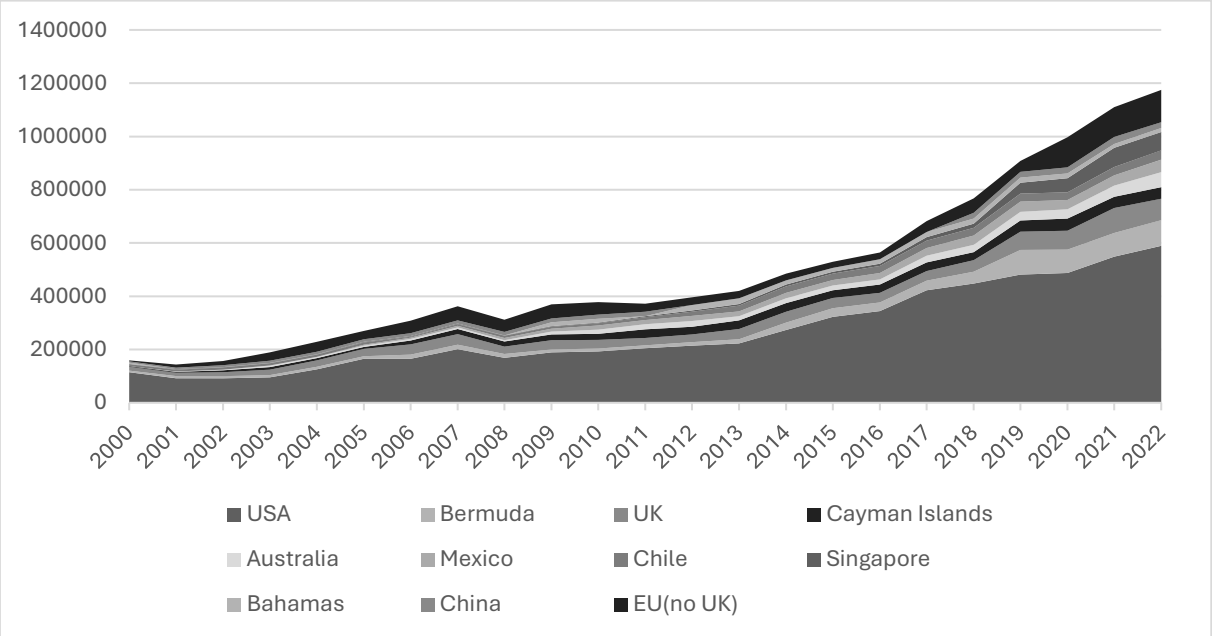
Figure 1. *FDIs in Canada 2000-2023*



Cumulative graph of FDIs in Canada. The EU is not comprehensive of the UK.

Time trends show relative stability of most investments stocks with an upward trend. The relative share of the EU has grown over the years albeit it remains smaller than the US one. It appears that EU investments increased after 2017 and CETA but in a relatively limited manner.

Figure 2. *FDIs from Canada 2000-2023*



Cumulative graph of FDIs from Canada. The EU is not comprehensive of the UK.

FDIs from Canada have started growing substantially from 2016. The US remains the preferred destination while the EU is increasingly competitive, especially, it would seem, after 2017 and the introduction of CETA.

In conclusion, we find a few patterns. Canada is a net importer of FDIs and, although the US is by far the greatest partner, the EU and UK approach the stock of FDIs in Canada of the southern neighbor. Furthermore, Canada shows investments in several smaller nations that are often discussed for peculiar taxation policies. When it comes to the EU's position in Canada it is reflective of the Continents traditional distribution of financial centers and relative economic powerhouses while, in Europe, Canada invests much more homogeneously.

CETA seems, at first glance, to have propelled relatively more Canadian investments in Europe compared to European investments in Canada.

4. The dataset, FDIs and Europe

For the EU Canada is one of the main FDIs partners but far below nations like USA, Switzerland Brazil and Russia.

Table 5. *Main sources of FDIs in Europe 2000-2023*

	Average stock
USA	624.278
UK	590.392
Switzerland	332.932
Japan	90.941
Bermuda	87.887
Russia	66.863
Norway	53.001
Canada	44.588
Jersey (UK)	30.504
Hong Kong	29.250

Average stock of FDIs in Europe for the first 10 partner countries. Data in millions. The UK is considered a third country. Jersey (UK) is not included in the UK owing to its size. Hong Kong is not comprehensive of the PRC.

Canada is the eighth origin partner for the EU trailing behind close partners like the US, geographical neighbors like the UK, Switzerland and Russia.

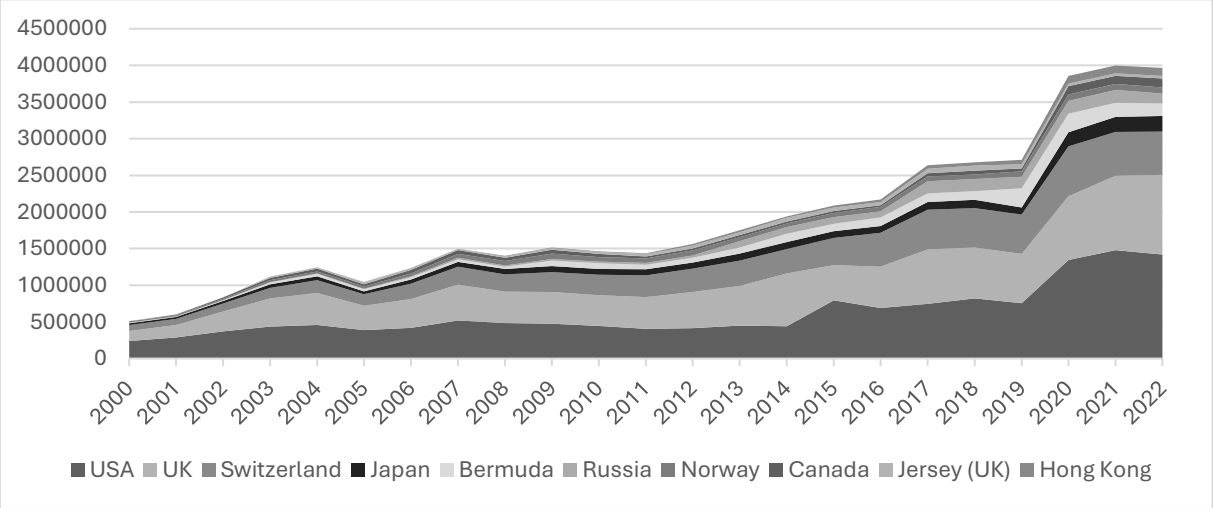
Table 6. *Main destinations of European FDIs 2000-2023*

	Average stock
USA	1.243.101
UK	642.975
Switzerland	504.522
Brasil	254.447
Russia	164.547
Canada	137.436
Mexico	132.506
Singapore	118.911
Norway	81.569
Turkiye	73.784

Average stock of FDIs from Europe for the first 10 partner countries. Data in millions. The UK is considered a third country.

In terms of destinations of EU's FDIs. Canada remains a key partner albeit only the fifth for the EU.

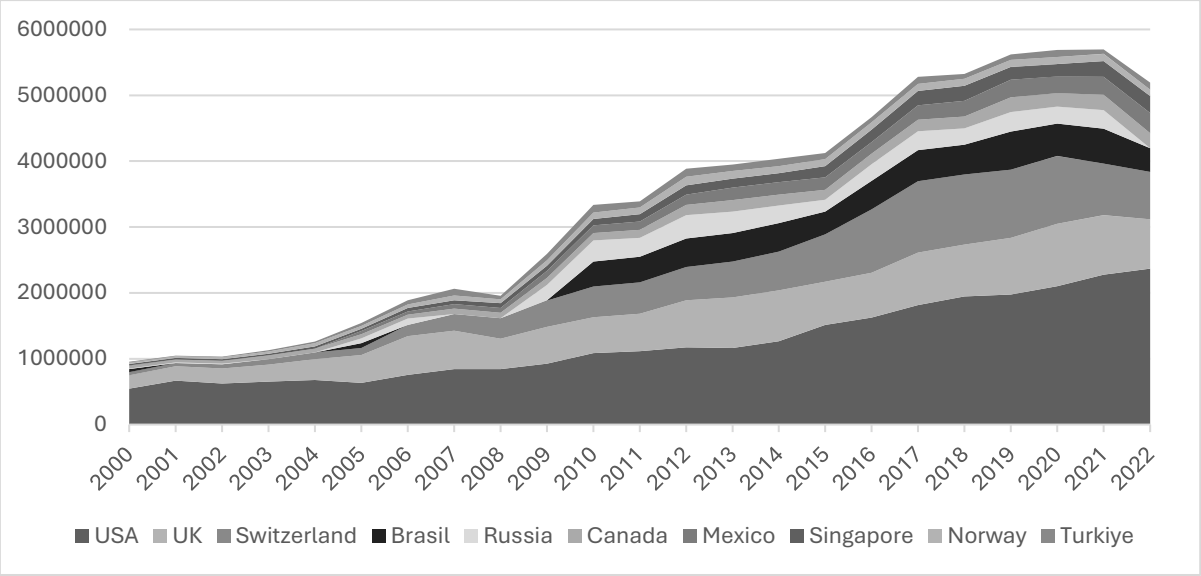
Figure 3. *FDIs in Europe 2000-2023*



Cumulative graph of FDIs in the EU. The UK is considered a third country. Jersey (UK) is not included in the UK owing to its size. Hong Kong is not comprehensive of the PRC.

Foreign FDIs in Europe have exploded after 2017 and doesn't seem to have suffered excessively from the pandemics. The Canadian Share has grown, especially after 2019, but it remains marginal when compared with the three main partners above mentioned.

Figure 4. *FDIs from Europe 2000-2023*



Cumulative graph of FDIs from the EU. The UK is considered a third country.

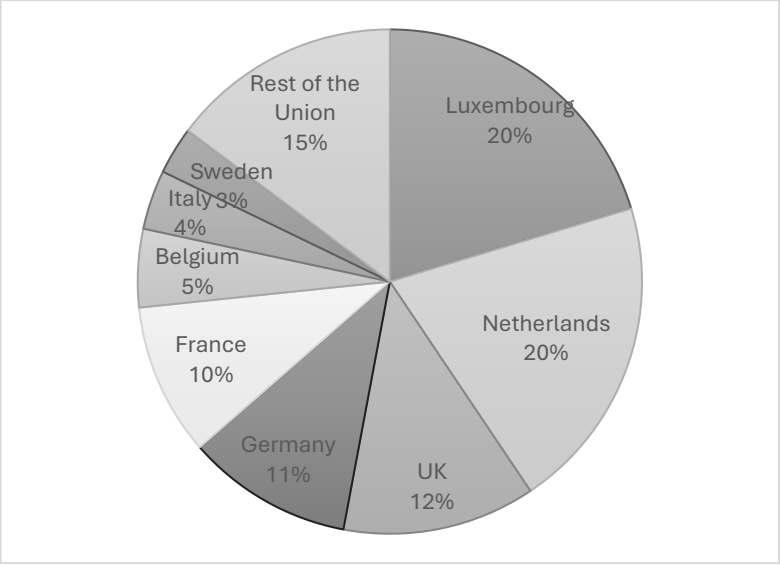
The US has seen constant growth as a destination of FDIs for the EU and the EU is a net exporter of FDIs in that country. The Canadian appears to have remained mostly constant trough time albeit with a growth after 2016. To note the collapse in EU's stocks in the Russian Federation in 2022 and an overall decrease in the years of the pandemics.

To conclude, the EU is a net exporter of FDIs in Canada. The country is relevant but falls behind closer or bigger partners like the US, Switzerland and the UK.

5. The dataset, FDIs within Europe

Intra EU FDIs greatly outnumber both outgoing and incoming stocks. Analyzing average stocks it seems clear that 5 EUMS perform the role of aggregators of flows from other EUMS. Luxembourg and the Netherlands account each for a fifth of total stocks while Germany and France for a tenth each. Even in the framework of Brexit the UK remains a key partner.

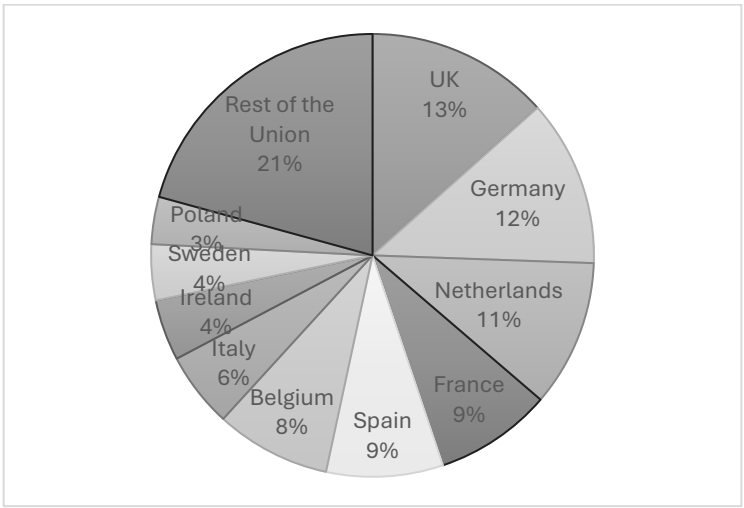
Figure 5. *Intra-EU FDIs by source*



Intra EU origins of FDIs stocks, average share from 2000 to 2023

With the exception of the UK, the main destinations of intra EU FDIs are Germany, the Netherlands, France and Spain, followed closely by Belgium and Italy.

Figure 6. *Intra-EU FDIs by destination*



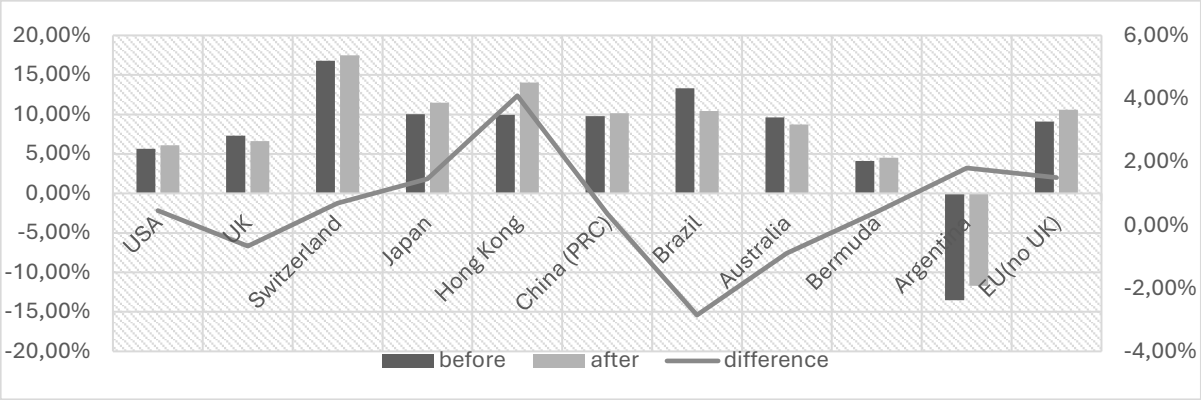
Intra EU destinations of FDIs stocks, average share from 2000 to 2023

In general, FDIs stocks are concentrated in western Europe both in terms of source and destination. Similar results were observed in the previous section as sources of EU FDIs to Canada.

6. Preliminary assessment of the effects of CETA

We now perform an ex ante – ex post analysis of average FDIs stocks to preliminary assess potential effects of the CETA FTA.

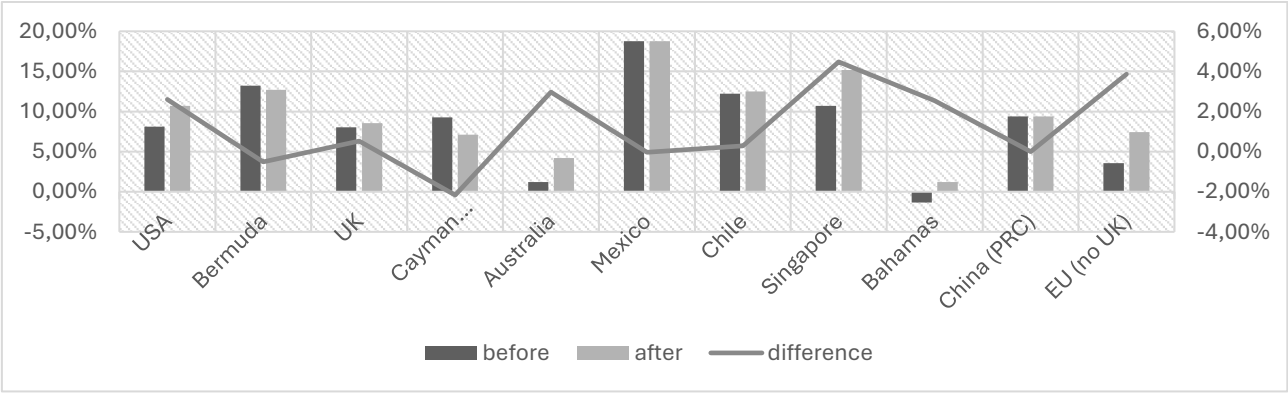
Figure 7. *Variation of FDIs in Canada before and after CETA*



From left to right the main origins of FDIs in Canada. Before is the average of FDI stocks from 2000 to 2017. After is the average of FDIs stocks from 2017 to 2023. Difference is the variation from the before to the after period.

The EU is not the entity that saw the biggest average growth from 2000 to 2017, it is by far surpassed by Hong Kong or Switzerland. Nonetheless, after 2017, and the entry into force of CETA, the EU saw the second fastest growth, hinting to possible positive effects of the treaty.

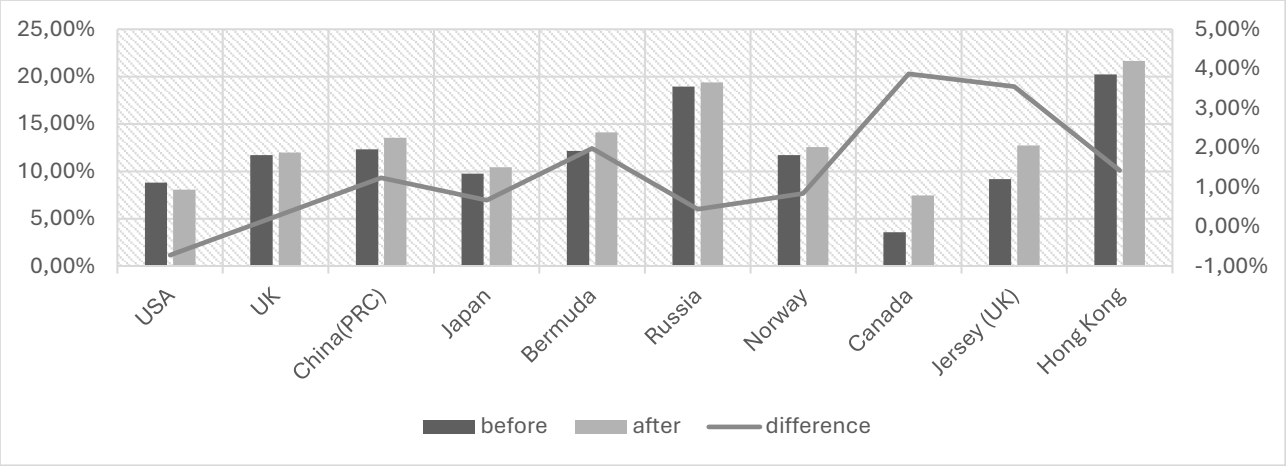
Figure 8. *Variation of FDIs from Canada before and after CETA*



From left to right the main destinations of FDIs in Canada. Before is the average of FDI stocks from 2000 to 2017. After is the average of FDIs stocks from 2017 to 2023. Difference is the variation from the before to the after period.

As an origin the story is a bit different. Here we see much stronger growth, almost 4% compared to roughly 1,5% in the previous paragraph. The value is second only to Singapore.

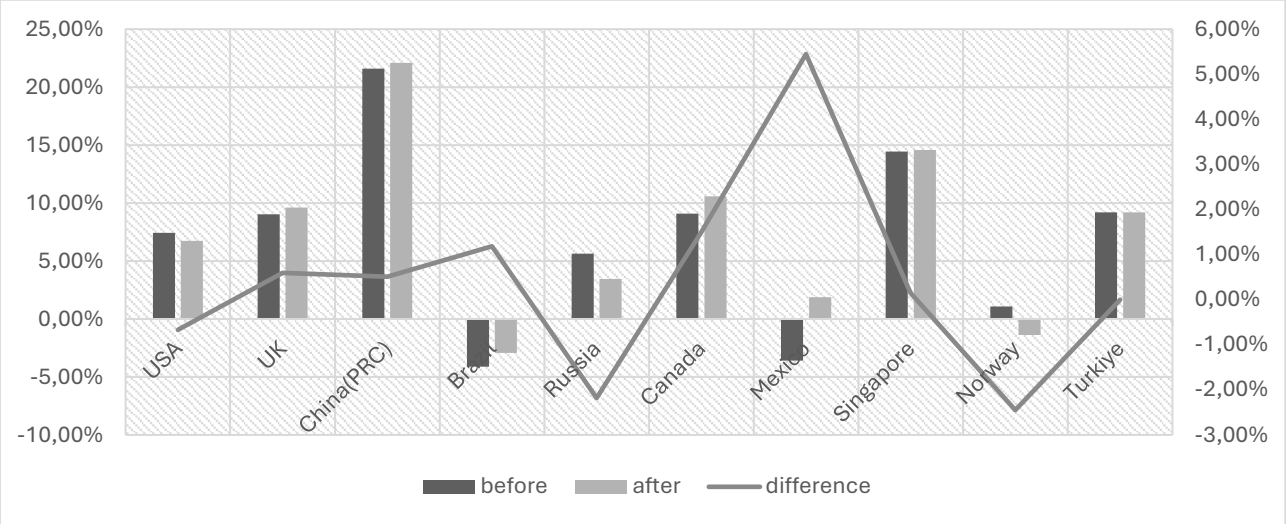
Figure 9. *Variation of FDIs in Europe before and after CETA*



From left to right the main origins of FDIs in the EU. Before is the average of FDI stocks from 2000 to 2017. After is the average of FDIs stocks from 2017 to 2023. Difference is the variation from the before to the after period.

From the EU's point of view CETA impacted strongly on FDIs imports. Canada went from an average growth of 4% to 8% becoming the nation with the strongest difference in the 2017-2023 period compared to the previous one.

Figure 10. *Variation of FDIs from Europe before and after CETA*



From left to right the main destinations of FDIs in the EU. Before is the average of FDI stocks from 2000 to 2017. After is the average of FDIs stocks from 2017 to 2023. Difference is the variation from the before to the after period.

Lastly, as a destination of EU's FDIs Canada scored a substantive 2% difference between the two periods, reaching the second place only behind Mexico.

To conclude, from a descriptive point of view, CETA seems to produce strong effects in Bilateral stocks when looking at the two entities individually but also at them in a comparative way with their major partners.

7. The model

Similarly to what we do in chapters 2 and 3 and thanks to recent developments in methodology we employ a similar model to those used before. The mathematical foundations can be found in chapter 2.

$$I_{h,f,t} = \exp[\, G + b_1 ln(Y_{h,t}) + b_2 ln(Y_{f,t}) + b_3 ln(D_{h,f}) + b_4 TradeCreate_{h,f,t} + \gamma_{h,t} + \delta_{f,t} + \vartheta_{f,t}] + e_{h,f}$$

In this instance I is the FDI stock of country h in country f while Y is their respective GDPs and D the distance. Γ, δ, ϑ, are FE respectively origin-time, destination-time and origin-destination.

We briefly considered the use of OLS regressors but these maintain several issues that we discussed in chapters 2 and 3. Heteroskedasticity, the zeros issue and the proliferation of variables that aim at capturing various dimensions of distance but that often lack internal and external validity. PPML, as presented above, overcomes this issue and we found it used in, among others, Faith Montfaucon et al. (2023) and Larch and Yotov (2023).

One limitation that we encountered in the building of the dataset was that of lack of sector-level and origin-destination data in the UNCTAD database. Faith Montfaucon et al. (2023) indicates interesting findings on the differing effects of DTAs on FDIs in the various sectors of the economy and we aim at improving the dataset in future iterations to consider this kind of developments.

Lastly, similarly to what we saw in chapter 2 we approach the issue of the parallel trends hypothesis inspired by the work of Sun and Abraham (2021) and by Callaway and Sant Anna (2019) regarding the employment of time periods of various extensions compared to yearly data.

8. Results

We performed several analyses both in the simple aggregated dataset and constraining geographical groups, however when performing the parallel trends test we were surprised by several inconsistencies between the design of the parallel trends test and our results.

In short, we believe that there may be inconsistencies in the dataset or in the design of the testing dummies which produced inconsistent results between the various tests as well as inconsistent and highly irregular results in the parallel trends test.

At this stage we have not been able to finally identify them or their lack as to present a final version of our results that is theory consistent, sound and significative. We will fully rework the dataset in the coming months and enrich this chapter consequently.

9. Conclusions

In this chapter, our aim has been to identify the FDI effects of CETA. Despite the inconsistencies in our testing results with the PPML methodology and the robustness tests we performed, we have presented preliminary findings that indicate positive effects of CETA for both the EU and Canada when comparing the pre/post-agreement periods.

Several patterns emerge from our analysis. Canada remains a net importer of FDIs, with the US as its largest partner. However, the EU and UK are approaching the US's stock of FDIs in Canada. The EU’s position in Canada reflects the traditional distribution of financial centers and economic powerhouses on the continent, while Canada invests more evenly across Europe.

CETA appears to have relatively increased Canadian investments in Europe compared to European investments in Canada. For the EU, while Canada is a significant partner, it trails behind closer or larger partners such as the US, Switzerland, and the UK.

Finally, from a descriptive standpoint, CETA seems to have strong effects on bilateral FDI stocks, both when considering the two entities individually and in comparison with their major partners.

Chapter 5

Final remarks

The conclusions drawn from these four chapters on the Comprehensive Economic and Trade Agreement (CETA) are a modest attempt at shedding light on nuanced implications of trade policies, methodological advancements, and sector-specific impacts. This synthesis integrates their insights, discussing economic and sectoral dynamics influenced by CETA, to offer a holistic understanding of its effects.

Our literature review reveals various gaps and avenues of advancements in trade policy analysis particularly under CETA, suggesting a need for deeper multi-sector comparisons using advanced methodologies like PPML. These gaps reflect the uneven benefits observed across different sectors in Chapter 2, where certain agricultural products saw significant increases, contrasted by sectors that experienced minimal or negative growth. This discrepancy underscores the need for more tailored policy measures to support lagging sectors and ensure equitable benefits from trade agreements. The variance in sectoral responses, accentuated by the protected nature of agriculture in developed economies, highlights the complex dynamics at play.

The shift towards PPML methodology marks a significant advancement over traditional OLS, providing a clearer picture of trade dynamics and policy impacts as discussed in Chapters 1 and 2 and briefly in Chapters 4 and 4. This methodological refinement is critical for dissecting the effects of CETA, albeit with strong limitations due to collinearity and multicollinearity issues. Our aims for the future wish to continue to leverage these advanced techniques to uncover less studied areas, such as the impact on lesser-traded goods and a deeper detail level as well as most and least liberalized goods.

The preliminary study in the evolution of FDIs stocks shows both the possible validity of PPML methodology in this field and that CETA is likely to have allowed bilateral FDIs stocks to grow more for Canada and the EU when compared to alternative couples. More research is needed with a focus on disaggregating FDIs data and presenting more sound results. Nonetheless, the recent methodological

developments pave an avenue for future research in the field that seems to be mirroring the developments in the trade of goods of the past decade.

The insights from the chapters call for strategic policy formulation to enhance the benefits of DTAs like CETA.

There is an evident need for supportive measures for sectors that are adversely affected by trade agreements, advocating for a redistributive approach to balance sectoral gains and losses, as mentioned in Chapter 2 and as shown in more cross-treaty detail in chapter 3.

Furthermore, the analysis suggests that identifying sectors at risk of negative impacts early in the treaty process could lead to more effective negotiations and smoother implementation both from a purely economic but also from a political point of view.

This proactive approach in policy planning and implementation could help in mitigating adverse effects and enhancing the overall efficacy of trade agreements. Especially given the troubled, and still ongoing, ratification process of CETA, whose last defeat in the French senate was motivated, partly, by misrepresented or completely counterfactual interpretations of trade flows in key sectors vis a vis a reality of widespread growth in almost all the most relevant agricultural sectors in the EU.

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Abbreviations

Abbreviation	Extended
ACIMIT	Italian association for textiles machinery
ASEAN	Association of Southeast Asian Nations
AUS	Australia
BIT	Bilateral Investments Treaty
C.A.	Central America
CAN	Canada
CEPII	Centre d'études prospectives et d'informations internationals
CETA	Comprehensive Economic and Trade Agreement
CGE	Computational General Equilibrium
CHL	Chile
CPTPP	The Comprehensive and Progressive Agreement for Trans-Pacific Partnership
CRM	Critical Raw Materials
CUSFTA	Canada-U.S. Free Trade Agreement
DTA	Deep Trade Agreement
EAEU	Eurasian Economic Union
EiF	Entry into Force
EU	European Union
EU27	EU 27 member states, after 2020 it does not include the UK, before 2013 it does not include Croatia
EU28	EU 28 member states
EUMS	EU Member States
FDIs	Foreign Direct Investments
FE	Fixed Effects
FTAs	Free Trade Agreements
GATT 94	General Agreement on Tariffs and Trade, 1994 version
GDP	Gross Domestic Product
GFC	Global Financial Crisis of 2008
GMOs	Genetically Modified Organisms
HK	Hong Kong
HS	Harmonized System
HS2	Harmonized System 2-digits level
HS4	Harmonized System 4-digits level

HS6	Harmonized System 6-digits level
JAP	Japan
KORUS	US-Korea Free Trade Agreement
MERCOSUR	Common Market of the Sothern Cone
MEX	Mexico
MIT	Multilateral Investment Treaty
MTR	Multilateral Trade Resistance
NAFTA	North American Free Trade Agreement
NTBs	Non-Tariff Barriers
NZL	New Zealand
OLS	Ordinary Least Squares
PPML	Poisson Pseudo Maximum Likelihood
PPMLHDFE	Poisson Pseudo Maximum Likelihood with multi-way fixed effects
PPP	Purchasing Power Parity
PRC	People's Republic of China
RoK	Republic of Korea
RTAs	Regional Trade Agreements
SITC	Standard International Trade Classification
SPS	Sanitary and Phytosanitary Measures
TBT	Technical Barriers to Trade
THA	Thailand
UKR	Ukraine
USA	United States of America
USD	United States Dollar
USMCA	US Mexico Canada free trade agreement
WTO	World Trade Organization

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Annexes to Chapter 2

Annex 1. *Zeros and observations by chapter and section*

Datasets	Group	Chapters	Zeros	Observations	Ratio
Totals	Totals		329.166	556.875	**59,1%**
Sections	All		1.174.115	1.670.625	**70,3%**
	1	*HS 01 to 05*	421.806	556.875	**75,7%**
	2	*HS 06 to 15*	382.063	556.875	**68,6%**
	3	*HS 16 to 24*	370.246	556.875	**66,5%**
Chapters	HS	*ALL*	11.474.448	13.365.000	**85,9%**
	1	*HS 01 to 05*	2.464.546	2.784.375	**88,5%**
	HS1		502.880	556.875	**90,3%**
	HS2		502.188	556.875	**90,2%**
	HS3		471.848	556.875	**84,7%**
	HS4		479.540	556.875	**86,1%**
	HS5		508.090	556.875	**91,2%**
	2	*HS 06 to 15*	4.813.550	5.568.750	**86,4%**
	HS6		499.599	556.875	**89,7%**
	HS7		469.253	556.875	**84,3%**
	HS8		457.133	556.875	**82,1%**
	HS9		451.123	556.875	**81,0%**
	HS10		489.981	556.875	**88,0%**
	HS11		486.478	556.875	**87,4%**
	HS12		462.260	556.875	**83,0%**
	HS13		504.858	556.875	**90,7%**
	HS14		524.721	556.875	**94,2%**
	HS15		468.142	556.875	**84,1%**
	3	*HS 16 to 24*	4.196.392	5.011.875	**83,7%**
	HS16		485.834	556.875	**87,2%**
	HS17		466.265	556.875	**83,7%**
	HS18		473.321	556.875	**85,0%**
	HS19		453.191	556.875	**81,4%**
	HS20		454.249	556.875	**81,6%**
	HS21		437.296	556.875	**78,5%**
	HS22		434.062	556.875	**77,9%**
	HS23		488.184	556.875	**87,7%**
	HS24		503.990	556.875	**90,5%**

Annex 2. *Zeros and observations by year*

Dataset	Year	Zeros	Observations	Ratio
Totals	*All*	329.166	556.875	**59,1%**
	2012	33.381	50.625	**65,9%**
	2013	31.771	50.625	**62,8%**
	2014	30.823	50.625	**60,9%**
	2015	29.810	50.625	**58,9%**
	2016	29.383	50.625	**58,0%**
	2017	28.902	50.625	**57,1%**
	2018	29.089	50.625	**57,5%**
	2019	28.987	50.625	**57,3%**
	2020	29.047	50.625	**57,4%**
	2021	28.605	50.625	**56,5%**
	2022	29.368	50.625	**58,0%**

Annex 3. *Zeros and observations by section and year*

Datasets	Group	Year	Zeros	Observations	Ratio
Sections	*All*	*All*	1.174.115	1.670.625	**70,3%**
		2012	114.529	151.875	**75,4%**
		2013	111.031	151.875	**73,1%**
		2014	108.993	151.875	**71,8%**
		2015	106.631	151.875	**70,2%**
		2016	105.640	151.875	**69,6%**
		2017	104.669	151.875	**68,9%**
		2018	104.903	151.875	**69,1%**
		2019	104.535	151.875	**68,8%**
		2020	104.606	151.875	**68,9%**
		2021	103.558	151.875	**68,2%**
		2022	105.020	151.875	**69,1%**

Annex 4. *Zeros and observations by section and year, detailed*

Datasets	Group	Year	Zeros	Observations	Ratio
Sections	*Section 1*	*All*	421.806	556.875	**75,7%**
		2012	40.327	50.625	**79,7%**
		2013	39.387	50.625	**77,8%**
		2014	38.900	50.625	**76,8%**
		2015	38.222	50.625	**75,5%**
		2016	38.085	50.625	**75,2%**
		2017	37.835	50.625	**74,7%**
		2018	37.664	50.625	**74,4%**
		2019	37.640	50.625	**74,4%**
		2020	38.006	50.625	**75,1%**
		2021	37.730	50.625	**74,5%**
		2022	38.010	50.625	**75,1%**
Sections	*Section 2*	*All*	382.063	556.875	**68,6%**
		2012	37.620	50.625	**74,3%**
		2013	36.390	50.625	**71,9%**
		2014	35.649	50.625	**70,4%**
		2015	34.818	50.625	**68,8%**
		2016	34.636	50.625	**68,4%**
		2017	33.946	50.625	**67,1%**
		2018	33.862	50.625	**66,9%**
		2019	33.791	50.625	**66,7%**
		2020	33.861	50.625	**66,9%**
		2021	33.566	50.625	**66,3%**
		2022	34.197	50.625	**67,5%**
Sections	*Section 3*	*All*	370.246	556.875	**66,5%**
		2012	36.582	50.625	**72,3%**
		2013	35.254	50.625	**69,6%**
		2014	34.444	50.625	**68,0%**
		2015	33.591	50.625	**66,4%**
		2016	33.192	50.625	**65,6%**
		2017	32.888	50.625	**65,0%**
		2018	33.377	50.625	**65,9%**
		2019	33.104	50.625	**65,4%**
		2020	32.739	50.625	**64,7%**
		2021	32.262	50.625	**63,7%**
		2022	32.813	50.625	**64,8%**

Annex 5. *Correlation Matrix*

	Exports	*distance*	*Trade Create*	*Trade Divert*	*Time-exp*	*Time-imp*	*WTO exp*	*WTO imp*	*EU exp*	*EU imp*
Exports	100,00%									
distance	-8,41%	100,00%								
Trade Creation	10,92%	-18,93%	100,00%							
Trade Divertion	0,25%	-3,53%	-2,37%	100,00%						
Time-exporter	-0,64%	-0,73%	1,50%	-0,49%	100,00%					
Time-importer	0,96%	-0,73%	1,50%	4,12%	-0,45%	100,00%				
WTO exporter	4,22%	-6,73%	6,12%	-1,97%	6,47%	-0,02%	100,00%			
WTO importer	3,69%	-6,73%	6,12%	16,78%	-0,20%	6,47%	-0,40%	100,00%		
EU exporter	5,16%	-15,07%	23,01%	-9,25%	5,87%	-0,03%	24,98%	-0,11%	100,00%	
EU importer	4,92%	-15,07%	23,01%	63,05%	-0,03%	5,87%	-0,11%	24,98%	-0,45%	100,00%

Correlation study between the main variables

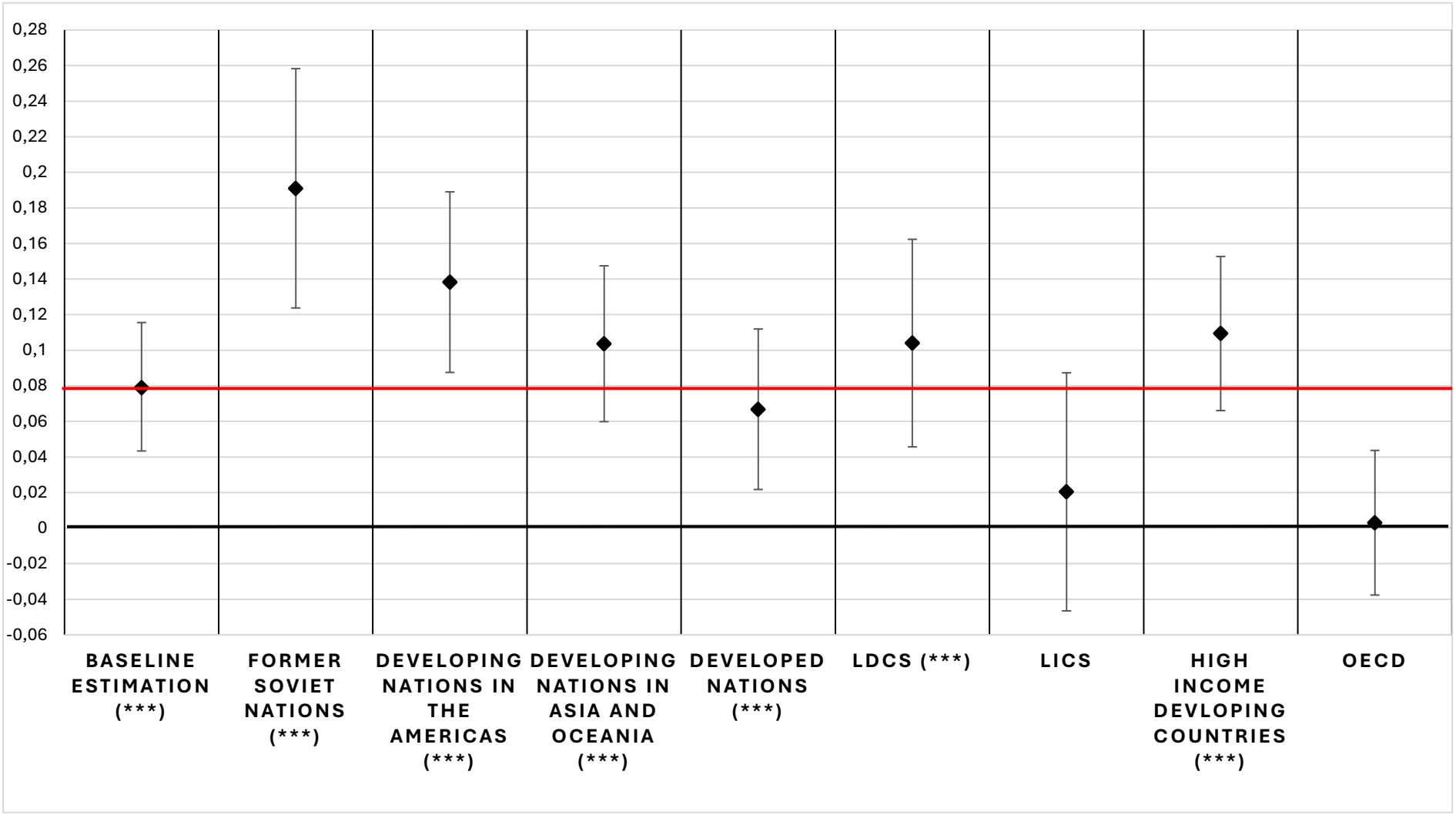
Annex 6. *Countries party to our geographical subsets*

Former Soviet nations	*Developing Nations in the Americas*	*Developing Nations in Asia and Oceania*	*Developed Nations*	*LDCs*	*LICs*	*High Income Devloping Countries*	*OECD*
Armenia	Anguila	Afghanistan	Albania	Afghanistan	Afghanistan	Anguilla	Australia
Azerbaijan	Antigua and Barbuda	Armenia	Andorra	Angola	Benin	Antigua and Barbuda	Chile
Georgia	Argentina	Azerbaijan	Australia	Bangladesh	Burkina Faso	Argentina	Colombia
Kazakhstan	Bahamas	Bahrain	Belarus	Benin	Burundi	Bahamas	Costa Rica
Kirghizstan	Barbados	Bangladesh	Bermuda	Bhutan	CAR	Bahrain	Iceland
Moldova	Bolivia	B&H	B&H	Burkina Faso	Chad	Barbados	Israel
Russia	Bonaire	Brunei	Christmas Island	Burundi	DRC	Bermuda	Japan
Tajikistan	Brazil	Buthan	Cocos Islands	Cambodia	Eritrea	Botswana	Mexico
Turkmenistan	Caiman Islands	Cambodia	Greenland	CAR	Ethiopia	Brazil	Norway
Ukraine	Chile	China	Iceland	Chad	Gambia	British Virgin Islands	South Korea
Uzbekistan	Colombia	DPRK	Israel	DRC	Guinea	Brunei	Switzerland
	Costa Rica	Georgia	Japan	Djibouti	Guinea-Bissau	Cayman Islands	Turkey
	Cuba	Hong Kong	Moldova	Eritrea	Kyrgyzstan	Chile	USA
	Curacao	Indonesia	Montenegro	Ethiopia	Lesotho	China	
	Dominica	Iran	Norfolk Island	Gambia	Liberia	Colombia	
	Dominican Rep.	Iraq	North Macedonia	Guinea	Madagascar	Cook Islands	
	Ecuador	Jordan	N.Marianas	Guinea-Bissau	Malawi	Costa Rica	
	El Salvador	Kazakhstan	Norway	Laos	Mali	Cuba	
	Folklands	Kuwait	Russia	Lesotho	Mozambique	Curaçao	
	Grenada	Kyrgyzstan	SPM	Liberia	Myanmar	Dominica	

	Guatemala	Laos	San Marino	Madagascar	Nepal	Dominican Rep.	
	Guyana	Lebanon	Serbia	Malawi	Niger	Ecuador	
	Haiti	Macao	South Korea	Mali	North Korea	Equatorial Guinea	
	Honduras	Malaysia	Switzerland	Mauritania	Pakistan	French Polynesia	
	Jamaica	Moldova	Ukraine	Mozambique	Rwanda	Gabon	
	Mexico	Mongolia	USA	Myanmar	Sierra Leone	Grenada	
	Montserrat	Myanmar		Nepal	Somalia	Guyana	
	Nicaragua	Nepal		Niger	Sudan	Hong Kong	
	Panama	Oman		Rwanda	Syria	Iran	
	Paraguay	Pakistan		Senegal	Tajikistan	Kazakhstan	
	Perù	Palestine		Sierra Leone	Tanzania	Kuwait	
	Pitcairn	Philippines		Somalia	Togo	Lebanon	
	Reunion	Quatar		South Sudan	Uganda	Libya	
	Saint Kits and Nevis	Saudi Arabia		Sudan	Yemen	Macau	
	Saint Lucia	Singapore		Tanzania	Zambia	Malaysia	
	Saint Maarten	Sri Lanka		Togo		Maldives	
	SVG	Syria		Uganda		Mauritius	
	Suriname	Tajikistan		Yemen		Mexico	
	Trinidad and Tobago	Thailand		Zambia		Montserrat	
	Uruguay	Timor Leste				Nauru	
	Venezuela	Turkiye				Netherlands Antilles	
	Virgin Islands	Turkmenistan				New Caledonia	
		UAE				Oman	
		Uzbekistan				Palau	
		Viet Nam				Panama	
		Yemen				Peru	

						Qatar	
						Saint Kitts and Nevis	
						Saint Lucia	
						SVG	
						Saudi Arabia	
						Seychelles	
						Singapore	
						Sint Maarten	
						Sint Maarten	
						Suriname	
						Thailand	
						Trinidad and Tobago	
						Turkiye	
						Turkmenistan	
						Turks and Caicos	
						UAE	
						Uruguay	

Annex 7. *Coefficient and IC comparison, significance and baseline estimations*



Annex 8. *Results from the parallel trends test*

Variable	Estimates	SE, robust	T-value	P-value	95% CI	
Pre-treaty	-0,020	0,027	-0,72	0,469	-0,074	0,034
Post-Treaty ST	0,119	0,033	3,57	0,000	0,054	0,184
Post-Treaty MT	0,036	0,029	1,25	0,210	-0,020	0,092

Variable	Estimates	SE, rob.	T-val.	P-val.	95% CI	
2012	-0,033	0,040	-0,83	0,404	-0,112	0,045
2013	-0,015	0,038	-0,39	0,694	-0,088	0,059
2014	-0,035	0,037	-0,93	0,351	-0,108	0,038
2015	0,006	0,033	0,18	0,856	-0,059	0,072
2016	(omitted)					
2017	0,201	0,055	3,68	0,000	0,094	0,308
2018	0,070	0,033	2,12	0,034	0,005	0,135
2019	0,057	0,032	1,76	0,079	-0,007	0,120
2020	0,031	0,035	0,87	0,384	-0,038	0,100
2021	0,022	0,041	0,54	0,591	-0,058	0,102
2022	(omitted)					

The upper part of the chart presents aggregated results for the pre treaty period and the short and medium term periods. The lower part of the chart presents yearly results Indicating the estimates and the other relevant results.

Annex 9. *Trade creation values by industry, detailed. Treaty effects and tariff effects.*

Sections and Chapters	*Description*	*Treaty effect*	*Tariff effect*	*P v. treaty*	*P v. tariff*
CL1 average	**Animals & animal products**	**-0,332**	**0,955**		
HS1	Live animals	-0,017	-0,251		
HS2	Meat and edible meat offal	0,217	0,155	90%	
HS3	Fish and crustaceans, molluscs, and other aquatic invertebrates	-0,397	0,729	99%	99%
HS4	Dairy produce; birds' eggs; natural honey; edible products of animal origin, not elsewhere specified or included	0,006	0,244		90%
HS5	Products of animal origin, not elsewhere specified or included	-0,141	0,078		
CL2 average	**Vegetable products**	**0,475**	**0,464**		
HS6	Live trees and other plants; bulbs, roots and the like; cut flowers and ornamental foliage	-0,012	0,125		
HS7	Edible vegetables and certain roots and tubers	-0,021	0,223		95%
HS8	Edible fruit and nuts; peel of citrus fruit or melons	0,451	0,054	99%	
HS9	Coffee, tea, mate and spices	-0,175	0,141		
HS10	Cereals	-0,076	0,063		
HS11	Products of the milling industry; malt; starches; inulin; wheat gluten	-0,079	0,027		
HS12	Oil seeds and oleaginous fruits; miscellaneous grains, seeds, and fruit; industrial or medicinal plants; straw and fodder	0,195	-0,031		
HS13	Lac; gums, resins and other vegetable saps and extracts	-0,156	-0,102	90%	

HS14	Vegetable plaiting materials; vegetable products not elsewhere specified or included	0,22	0		
HS15	Animal or vegetable fats and oils and their cleavage products; prepared edible fats; animal or vegetable waxes	0,128	-0,036		
CL3 average	**Foodstuffs**	**0,99**	**-0,322**		
HS16	Preparations of meat, of fish or of crustaceans, molluscs, or other aquatic invertebrates	0,137	0,209		
HS17	Sugars and sugar confectionery	-0,369	0,447	90%	95%
HS18	Cocoa and cocoa preparations	-0,107	0,207		
HS19	Preparations of cereals, flour, starch, or milk; pastrycooks' products	-0,452	-0,089	99%	
HS20	Preparations of vegetables, fruit, nuts or other parts of plants	-0,121	0,091	90%	
HS21	Miscellaneous edible preparations	-0,487	0,253	99%	99%
HS22	Beverages, spirits and vinegar	-0,131	0,405	90%	99%
HS23	Residues and waste from the food industries; prepared animal fodder	-0,076	0,091		
HS24	Tobacco and manufactured tobacco substitutes	2,596	-1,936	99%	99%

Section and Chapter estimations of the gravity equations with PPML methodology. Description of the Sections and Chapters, trade creation effect and P-value divided by treaty-related and tariff-related.

Annexes to Chapter 3

Annex 1. *List of treaties*

ID	Treaty	Entry into force	Parties
1	Canada - Jordan	2012	2
2	Chile - Malaysia	2012	2
3	Chile - Nicaragua (Chile - Central America)	2012	2
4	EFTA - Hong Kong, China	2012	5
5	EFTA - Montenegro	2012	5
6	EFTA - Ukraine	2012	5
7	El Salvador - Cuba	2012	2
8	EU - Eastern and Southern Africa States	2012	32
9	Japan - Peru	2012	2
10	Korea, Republic of - United States	2012	2
11	Mexico - Central America	2012	6
12	Panama - Peru	2012	2
13	Peru - Mexico	2012	2
14	Treaty on a Free Trade Area between members of the Commonwealth of Independent States (CIS)	2012	8
15	United States - Colombia	2012	2
16	United States - Panama	2012	2
17	Canada - Panama	2013	2
18	Central American Common Market (CACM) - Accession of Panama	2013	6
19	Costa Rica - Peru	2013	2
20	Costa Rica - Singapore	2013	2
21	EU - Central America	2013	33
22	EU - Colombia, Ecuador and Peru	2013	30
23	EU (28) Enlargement	2013	27
24	Gulf Cooperation Council (GCC) - Singapore	2013	7
25	Indonesia - Pakistan	2013	2
26	Korea, Republic of - Türkiye	2013	2
27	Malaysia - Australia	2013	2

28	Türkiye - Mauritius	2013	2
29	Ukraine - Montenegro	2013	2
30	Canada - Honduras	2014	2
31	Chile - Viet Nam	2014	2
32	EFTA - Central America (Costa Rica and Panama)	2014	6
33	EFTA - Gulf Cooperation Council (GCC)	2014	10
34	EU - Cameroon	2014	28
35	EU - Georgia	2014	28
36	EU - Moldova, Republic of	2014	28
37	EU - Ukraine	2014	28
38	Hong Kong, China - Chile	2014	2
39	Iceland - China	2014	2
40	Korea, Republic of - Australia	2014	2
41	Switzerland - China	2014	2
42	Australia - China	2015	2
43	Canada - Korea, Republic of	2015	2
44	Chile - Thailand	2015	2
45	China - Korea, Republic of	2015	2
46	EFTA - Bosnia and Herzegovina	2015	5
47	Eurasian Economic Union (EAEU)	2015	5
48	Eurasian Economic Union (EAEU) - Accession of Armenia	2015	4
49	Eurasian Economic Union (EAEU) - Accession of the Kyrgyz Republic	2015	5
50	Japan - Australia	2015	2
51	Korea, Republic of - New Zealand	2015	2
52	Korea, Republic of - Viet Nam	2015	2
53	Mexico - Panama	2015	2
54	Southern African Development Community (SADC) - Accession of Seychelles	2015	13
55	Türkiye - Malaysia	2015	2
56	Costa Rica - Colombia	2016	2
57	EU - Côte d'Ivoire	2016	28
58	EU - Ghana	2016	28
59	EU - SADC	2016	33

60	Eurasian Economic Union (EAEU) - Viet Nam	2016	6
61	Japan - Mongolia	2016	2
62	Korea, Republic of - Colombia	2016	2
63	Pacific Alliance	2016	4
64	Southern Common Market (MERCOSUR) - Southern African Customs Union (SACU)	2016	9
65	Türkiye - Moldova, Republic of	2016	2
66	Canada - Ukraine	2017	2
67	EFTA - Georgia	2017	5
68	El Salvador - Ecuador	2017	2
69	EU - Canada	2017	28
70	EU - Colombia and Peru - Accession of Ecuador	2017	30
71	Hong Kong, China - Macao, China	2017	2
72	Peru - Honduras	2017	2
73	Southern Common Market (MERCOSUR) - Egypt	2017	5
74	Türkiye - Singapore	2017	2
75	China - Georgia	2018	2
76	Comprehensive and Progressive Agreement for Trans-Pacific Partnership (CPTPP)	2018	11
77	EFTA - Philippines	2018	5
78	EU - Armenia	2018	28
79	EU - Pacific States - Accession of Samoa	2018	30
80	ASEAN - Hong Kong, China	2019	11
81	Chile - Indonesia	2019	2
82	EU - Eastern and Southern Africa States - Accession of Comoros	2019	32
83	EU - Japan	2019	28
84	EU - Singapore	2019	28
85	Eurasian Economic Union (EAEU) - Iran	2019	6
86	Hong Kong, China - Georgia	2019	2
87	Korea, Republic of - Central America	2019	6
88	Colombia - Israel	2020	2
89	EFTA - Ecuador	2020	5
90	EU - Pacific States - Accession of Solomon Islands	2020	30
91	EU - Viet Nam	2020	28

92	Hong Kong, China - Australia	2020	2
93	Indonesia - Australia	2020	2
94	Pacific Agreement on Closer Economic Relations Plus (PACER Plus)	2020	11
95	Peru - Australia	2020	2
96	Southern African Development Community (SADC)	2020	16
97	United States-Mexico-Canada Agreement (USMCA/CUSMA/T-MEC)	2020	3

Treaties entered into force between 2012 and 2020. Name and number of parties.

Annex 2. *Main agricultural importers between 2012 and 2020*

	2012		2020		
Country	**Mln USD**	**% World**	**Mln USD**	**% World**	**Growth rate**
European Union	$ 143.674	10,7%	$ 154.054	**11,5%**	7,2%
United States	$ 117.178	8,7%	$ 156.389	**11,6%**	33,5%
PRC	$ 87.097	6,5%	$ 157.840	**11,7%**	81,2%
Japan	$ 72.916	5,4%	$ 64.073	4,8%	-12,1%
Canada	$ 34.158	2,5%	$ 38.231	**2,8%**	11,9%
Russian Federation	$ 40.902	3,0%	$ 27.592	2,1%	-32,5%
Republic of Korea	$ 24.869	1,8%	$ 31.911	**2,4%**	28,3%
Thailand	$ 12.273	0,9%	$ 15.902	**1,2%**	29,6%
Hong Kong	$ 22.728	1,7%	$ 24.492	**1,8%**	7,8%
Australia	$ 12.563	0,9%	$ 15.881	**1,2%**	26,4%
World	**$ 1.345.407**		**$ 1.574.495**		**17,0%**
Germany	$ 92.897	6,9%	$ 100.310	**7,5%**	8,0%
The Netherlands	$ 61.724	4,6%	$ 71.511	**5,3%**	15,9%
United Kingdom	$ 60.679	4,5%	$ 66.134	**4,9%**	9,0%
France	$ 56.651	4,2%	$ 61.578	**4,6%**	8,7%
Italy	$ 47.395	3,5%	$ 48.009	**3,6%**	1,3%
Spain	$ 36.372	2,7%	$ 40.217	**3,0%**	10,6%
Belgium	$ 35.984	2,7%	$ 36.351	2,7%	1,0%
Poland	$ 17.366	1,3%	$ 25.649	**1,9%**	47,7%
Sweden	$ 13.499	1,0%	$ 14.404	**1,1%**	6,7%
Denmark	$ 13.592	1,0%	$ 14.883	**1,1%**	9,5%

Annex 3. *Main agricultural trading couples between 2012 and 2020*

	2012		2020		
Couple	**Mln USD**	**% World**	**Mln USD**	**% World**	**Growth rate**
Canada-United States	$ 44.848	3,1%	$ 51.353	**3,1%**	14,5%
Mexico-United States	$ 36.356	2,5%	$ 50.313	**3,0%**	38,4%
European Union-United States	$ 32.105	2,2%	$ 40.960	**2,4%**	27,6%
Brazil-PRC	$ 16.020	1,1%	$ 30.202	**1,8%**	88,5%
PRC-European Union	$ 14.580	1,0%	$ 30.110	**1,8%**	106,5%
PRC-United States	$ 29.067	2,0%	$ 29.177	**1,7%**	0,4%
Brazil-European Union	$ 21.435	1,5%	$ 15.858	**0,9%**	**-26,0%**
Japan-United States	$ 16.995	1,2%	$ 13.823	**0,8%**	**-18,7%**
PRC-Hong Kong	$ 7.599	0,5%	$ 11.531	**0,7%**	51,8%
Japan-European Union	$ 8.402	0,6%	$ 10.332	**0,6%**	23,0%
PRC-Thailand	$ 5.140	0,4%	$ 9.694	**0,6%**	88,6%
PRC-Japan	$ 11.188	0,8%	$ 9.584	**0,6%**	**-14,3%**
Republic of Korea-United States	$ 6.299	0,4%	$ 9.551	**0,6%**	51,6%
Canada-European Union	$ 6.995	0,5%	$ 9.227	**0,6%**	31,9%

Main trading couples in the agricultural environment arranged by cumulative trade between 2012 and 2020.

Annexes to Chapter 4

Annex 1. *Zeros and observations*

Year	Zeros	Observations	Ratio
All	1.234.147	1.370.904	**90,0%**
2000	54.582	57.121	**95,6%**
2001	54.623	57.121	**95,6%**
2002	54.444	57.121	**95,3%**
2003	54.546	57.121	**95,5%**
2004	54.146	57.121	**94,8%**
2005	53.695	57.121	**94,0%**
2006	53.774	57.121	**94,1%**
2007	53.412	57.121	**93,5%**
2008	53.417	57.121	**93,5%**
2009	51.760	57.121	**90,6%**
2010	51.208	57.121	**89,6%**
2011	50.932	57.121	**89,2%**
2012	50.687	57.121	**88,7%**
2013	50.561	57.121	**88,5%**
2014	50.315	57.121	**88,1%**
2015	50.172	57.121	**87,8%**
2016	50.026	57.121	**87,6%**
2017	49.791	57.121	**87,2%**
2018	48.515	57.121	**84,9%**
2019	48.479	57.121	**84,9%**
2020	48.798	57.121	**85,4%**
2021	45.055	57.121	**78,9%**
2022	45.424	57.121	**79,5%**
2023	55.785	57.121	**97,7%**

Annex 2. *Growth trends of FDIs in Canada*

	USA	UK	Switzerland	Japan	Hong Kong	China (PRC)	Brazil	Australia	Bermuda	Argentina	EU(no UK)
2000											
2001	7%	6%	2%	-8%	10%	7%	30%	7%	-6%		-15%
2002	6%	3%	10%	19%	6%	-10%	-9%	-20%	44%		3%
2003	26%	15%	24%	30%	39%	35%	73%	39%	24%		40%
2004	10%	5%	19%	8%	22%	-44%		36%	10%		4%
2005	7%	20%	72%	9%	20%		70%	7%	1%		0%
2006	5%	33%	12%	28%		40%		11%	-6%		-6%
2007	29%	69%	28%	20%		91%	29%		-12%		42%
2008	-18%	-27%	7%	-27%			-18%	-14%	-20%	8%	-2%
2009	19%	8%	31%	37%			7%	26%	26%		30%
2010	11%	-5%	-12%	-9%		4%	37%	17%		2%	8%
2011	-4%	14%	-4%	12%		24%	-1%	-6%			6%
2012	2%	-2%	-3%	24%		-22%	8%	-2%	10%		30%
2013	2%	-17%	29%	5%	-2%	11%	-4%	-9%	32%	2%	11%
2014	-4%	-9%	58%	4%	-4%	4%	-4%	13%	-42%	-5%	-5%
2015	-12%	-1%	-37%	0%	-36%	-26%	-19%	24%	449%	-27%	-12%
2016	5%	4%	33%	9%	35%	14%	-15%	13%	-8%	-61%	10%
2017	14%	-5%	13%	15%	47%	12%	-10%	-7%	-1%	-1%	9%
2018	6%	40%	-15%	2%	14%	24%	0%	21%	28%	-19%	2%
2019	5%	30%	22%	-4%	47%	23%			18%		24%
2020	1%	13%	-13%	5%	-18%	-16%		-10%	-43%	-2%	-8%
2021	17%	6%	-26%	9%	4%	23%	27%	-18%	29%	4%	13%
2022	1%	2%	15%	-9%	4%	-6%	-11%	29%	-2%	14%	-1%
2023	9%	8%	2%	13%	3%	0%	34%	9%	-1%	10%	3%

Annex 3. *Growth trends of FDIs from Canada*

	USA	Bermuda	UK	Cayman Islands	Australia	Mexico	Chile	Singapore	Bahamas	China (PRC)	EU (no UK)
2000											
2001	-19%	23%	-9%	37%			2%	-3%			
2002	0%	-4%	11%				13%	-7%			47%
2003	3%	14%	42%	30%			2%	-5%			
2004	31%	21%	17%	-17%	-17%		5%	15%			18%
2005	32%	-8%	15%	-8%	-12%		1%	-10%			-14%
2006	0%	63%	42%	96%	36%	16%	-54%	15%			49%
2007	22%	3%	4%	31%		10%	72%	22%			11%
2008	-16%	-8%	-31%	-3%		59%	20%	-3%		9%	-13%
2009	12%	-22%	23%	16%		38%	-8%	-2%		14%	16%
2010	2%	-3%	-7%	12%		36%	12%	29%	4%	9%	-12%
2011	7%	-9%	-11%	35%		-1%	30%	29%		6%	-36%
2012	4%	35%	0%	-11%		24%	48%	24%			-3%
2013	4%	12%	38%	12%	-31%	-2%	33%	31%	8%		-6%
2014	23%	78%	5%	-2%	24%	9%	11%	17%	-25%		-7%
2015	18%	14%	-5%	-9%	-3%	3%	-1%	13%	-13%		-7%
2016	7%	1%	-6%	6%	11%	15%	9%	9%	19%		8%
2017	22%	15%	-1%	6%	25%	18%	7%	69%	14%		62%
2018	6%	22%	22%	-10%	11%	22%	5%	20%	1%		31%
2019	8%		56%	45%	14%	13%	0%		-1%	2%	-24%
2020	1%	-5%	3%	9%	9%	-12%	2%	26%	-5%	2%	
2021	13%	2%	32%	-8%	19%	13%	7%	36%	-16%	19%	-2%
2022	7%	9%	-14%	1%	35%	20%	13%	-4%	-2%	-18%	9%
2023											

Annex 4. *Growth trends of FDIs in Europe*

	USA	UK	China(PRC)	Japan	Bermuda	Russia	Norway	Canada	Jersey (UK)	Hong Kong
2000										
2001	20%	27%	-3%	7%	-18%	13%	-2%		9%	
2002	29%	57%	37%	30%	31%	32%	63%	47%	9%	
2003	17%	42%	33%	43%		17%	21%			
2004	6%	13%	19%	12%	24%	9%	10%	18%	29%	
2005	-16%	-23%	-11%	-22%	-16%	41%	11%	-14%	37%	
2006	9%	17%	36%	34%	20%	43%	30%	49%	-12%	
2007	23%	25%	18%	12%		74%	32%	11%	-32%	
2008	-6%	-13%	-4%	15%		-6%	15%	-13%	11%	46%
2009	-2%	2%	15%	9%		36%	24%	16%	22%	4%
2010	-7%	-3%	3%	-3%		-4%	-21%	-12%	23%	8%
2011	-9%	3%	6%	7%		2%	3%	-36%		46%
2012	3%	13%	8%	4%		31%	10%	-3%	17%	
2013	8%	10%	8%	14%	26%		-15%	-6%	7%	9%
2014	-2%	34%	-4%	-5%	41%	6%	-9%	-7%	31%	-26%
2015	80%	-33%	12%	-4%	-12%	1%	15%	-7%	-3%	46%
2016	-13%	17%	25%	1%	15%	-9%	1%	8%	-20%	28%
2017	8%	31%	17%	17%	0%		11%	62%	59%	33%
2018	10%	-7%	-1%	9%	1%	-3%	-6%	31%	9%	-9%
2019	-8%	-3%	0%	-17%	121%	-1%	14%	-24%	-20%	44%
2020	78%	29%	27%	99%	-3%	8%	25%		-40%	70%
2021	10%	16%	-12%	6%	-23%	0%	-6%	-2%	5%	-1%
2022	-4%	7%	-2%	5%	-12%	-21%	-1%	9%	7%	0%
2023										

Annex 5. *Growth trends of FDIs from Europe*

	USA	UK	China(PRC)	Brazil	Russia	Canada	Mexico	Singapore	Norway	Turkiye
2000										
2001	22%	8%	4%	-100%	31%		-55%	14%	9%	
2002	-7%	5%	32%	-50%	11%		-74%	-11%		
2003	5%	11%	25%	211%			-27%	6%		
2004	4%	23%	25%	3%	-9%		-46%	27%		
2005	-7%	35%	4%					8%		
2006	19%	40%	59%	-99%	30%	-6%	12%	39%		
2007	12%	-1%	48%	-50%		42%	27%	21%		
2008	0%	-21%	23%	37%		-2%	13%	17%		-49%
2009	10%	21%	28%	1248%		30%	42%	16%		87%
2010	17%	-3%	18%	8093%		8%	7%	24%	15%	25%
2011	3%	4%	2%	4%		6%	10%	12%		-25%
2012	5%	26%	6%	11%		30%	23%	25%		
2013	-1%	8%	8%	1%	-9%	11%	23%	-3%	-10%	
2014	9%	0%	8%	0%	-18%	-5%	0%	3%	-13%	
2015	20%	-15%	22%	-20%	-32%	-12%	3%	21%	2%	
2016	7%	4%	34%	25%	40%	10%	-10%	13%	3%	
2017	11%	18%	12%	9%	14%	9%	27%	16%	-6%	
2018	7%	-2%	-1%	-5%	-13%	2%	8%	5%	-1%	
2019	1%	10%	-3%	28%	19%	24%	12%	-16%	7%	6%
2020	6%	10%	-1%	-15%	-12%	-8%	-5%	-2%	-4%	36%
2021	8%	-5%	-24%	8%	8%	13%	8%	27%	3%	-38%
2022	4%	-17%	-9%	-32%		-1%	10%	9%	-11%	58%
2023										