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EU Enlargement and Regional Trade Effects:
How have Western Balkan exports been affected by the
Croatian EU membership?

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Abstract

This thesis examines the effects of European Union integration on exports, focusing on the most recent EU enlargement involving Croatia. In addition to assessing the direct impact of EU accession on Croatian exports to the EU, the study investigates potential spillover effects on exports from the Western Balkan Six (WB6) countries relative to a control group. The empirical strategy combines fixed-effects regressions with Poisson Pseudo-Maximum Likelihood estimation to account for unobserved heterogeneity and heteroskedasticity. Event studies are also conducted to examine the dynamic effects of EU integration. The event studies also evaluate the plausibility of the parallel trend assumption which enables the difference-in-differences framework. The results indicate positive effects on exports for both Croatia and the WB6 countries relative to the control group. However, the presence of pre-treatment differences suggests that the assumption of parallel trends for Croatia should be interpreted with some caution. The findings suggest that EU enlargement has contributed to increased exports, not only for the acceding country but also for neighbouring non-member countries. These results contribute to the discussion on future EU enlargement by highlighting the potential importance of spillover effects on export performance.

Key Words: EU, Croatia, Balkan, Trade,

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1 Introduction

Since the beginning of the progress towards today's European Union, the Union has continuously expanded both in terms of members-states and policy scope. Initially, the only focus was economic cooperation through trade in certain goods and the Customs Union. This has gradually developed into deeper integration through the Single Market and increasingly harmonized regulations. Despite the larger policy scope, economic integration has remained at the core of the EU project.

EU enlargement has long been a subject of debate from political, economic, and institutional perspectives. While the potential benefits for acceding countries are often emphasized, enlargement also raises important questions regarding countries that remain outside the Union. Economic integration plays a central role in enlargement processes, particularly due to its potential to reshape trade patterns between member states and non-member countries. When the EU considers admitting new members, an important aspect of the analysis concerns the effects on neighbouring countries that are excluded from full membership.

Croatia's accession to the EU provides a particularly relevant case for studying such effects. As the most recent member state, Croatia is surrounded by countries in the Western Balkans that remain outside the EU and are still awaiting potential membership. This raises the question of how Croatia's accession has affected trade relations between the EU and these neighbouring countries. Have Western Balkan countries experienced reduced access to EU markets due to trade diversion? Or have spillover effects from Croatia's adaptation to EU trade rules contributed to increased exports?

To answer the research question, two models are constructed to investigate the effects on both Croatian and WB6 exports to the EU. Two models are created within a gravity model framework with a difference-in-difference approach. The objective is to examine changes after the Croatian EU accession which happened in 2013. In the theory section the foundation for the hypothesis is provided. The results and conclusions highlight possible effects of EU enlargement and identify potential areas for future research.

Both models displayed significant positive effects after the EU accession. It was expected that Croatian exports to the EU would increase as they entered the EU and the Single market. The positive effect on Western Balkan exports to the EU was on the other hand not as given beforehand. The results therefore implies that there could be spill-over effects from Croatia to its neighbouring countries. Spill-over effects as well as trade diversion and trade creation are discussed as potential explanations to the two results.

In addition to the two models and their outcomes, the thesis consists of a brief background outlining key aspects of EU enlargement and the union's core objectives. The background also describes the current relationship between the EU and the Western Balkan. By focusing on both a newly acceded member state and neighbouring non-member countries, this thesis contributes to the broader discussion on how EU enlargement affects regional trade patterns beyond the Union's borders.

2 The growing EU

The European Union has its origins from the second World War and has developed into a union for both political and economic policies. At the end of the second World War, Europe was in ruins and in desperate need for peace, stability and safety. The experience of two devastating wars gave rise to the idea of increased cooperation. This was necessary to safeguard Europe's economic and political stability in the future (European Union, 2025).

The beginning was the first integration that took place in 1951 as European Coal and Steel Community (ECSC). ECSC consisted of six nations which created a common market for coal and steel. The union involved (West) Germany, Belgium, the Netherlands, France, Luxembourg and Italy where all members placed their coal and steel under the same authority. The goal was to prevent conflicts, strengthen economic cooperation and reduce political rivalry. The members known as "the Six" have since the creation been a driving force of economic integration in Europe and have acted as pioneers to the present agreements of the European market (Baldwin - Wyplosz, s.8-10 2022).

Since the 1950's, the European Union has taken on different forms and has continued to expand into its present shape. Today the Union consists of 27 member states and build on several institutions that protect and formulate the political and economic framework for the union (European Council, 2025).

2.1 The Customs Union

The Customs Union serves as the core of European economic integration and is according to the European Council essential for maintaining the EU's global economic leadership. As a core function of the EU, the Customs Union ensures free trade among member states while establishing a common trade policy toward non-member countries (European Union, 2025).

The Customs Union requires all members to apply identical import tariffs on goods entering the European market. The EU has been a member of the World Trade Organization (WTO) since 1995. EU trade policy therefore must be aligned with the WTO legal framework which provides the baseline obligations. This includes principles such as "Most Favored Nation"

when implementing tariffs. In addition to EU-level membership all member states also hold individual WTO memberships (European Union, 2025).

Within the Customs Union free trade in goods prevail, meaning that no additional costs in form of tariffs are permitted between member states (European Commission, 2025). A consequence as a member of the Customs Union is that you must abandon your independent trade policy toward third countries. It's neither possible for a member-state to adopt trade regulations that conflict with EU policy (European Union, 2025).

The Customs Union represents the first step of European economic integration and provides the foundation for upcoming integration initiatives, including the Single Market. The Customs Union has primarily contributed to lower costs of trade for the member states through the removal of tariffs (Baldwin - Wyplosz, 2022, p. 19).

Countries outside the EU will because of the Customs Union face the same tariffs, independent by which EU-country you trade with (European Council, 2019). This has created the possibility for the European Union to negotiating numerous of common free trade agreements. These agreements vary in their specific content, but their general purpose is to promote trade through greater liberalization and reduced tariffs. Examples include agreements with the Western Balkan countries as well as with the United States and Canada. As noted, the agreements differ in the extent to which they create fully free trade (European Council, 2025).

2.2 The Single Market

Another core objective of the European Union is the creation and maintenance of a Single Market. A key feature of this market is the free movement of goods, services, capital, and people across member states. To make the Single Market function effectively, the EU has focused on reducing technical trade barriers. The goal is to make transactions within the Single market to be associated with lower cost (Baldwin - Wyplosz, 2022, p. 19). The Single Market is designed both to protect European companies and to deepen trade relations among member states (European Commission, 2025). Since trading within the Single Market is associated with lower costs, it is theoretically more beneficial for member-states to trade with

each other than with third countries. Since the theory is a simplification of reality this will be further investigated in the upcoming sections.

The costs that are reduced through the Single Market are mainly related to lower technical barriers to trade such as measures at the border, both documentation and crossing. In addition to that, lower costs of trade can also come from harmonized regulations through standardization within the union. This means that all countries within the Single Market have the same standards and regulations for different products. This for example lowers the cost for gathering information about a foreign market. As an exporter you can therefore export your goods to a larger number of foreign markets without adjusting it to match a market-specific standard (Baldwin - Wyplosz, 2022, p. 23).

The freedom of movement within the Single Market are also linked to the reduction of trade associated costs. Free movement for people is an example of when one of the four freedoms facilitate for the other. Free trade of goods is to a larger extent fulfilled when the transporter also is free to cross the border without extensive documentation and visas (European Commission, 2025).

Although the benefits of the Single Market are significant, gaining full access has historically been difficult for countries that are not EU members. There are however mechanisms that provide partial market access, such as the European Economic Area (EEA). The EEA today includes Norway, Iceland and Liechtenstein (Baldwin - Wyplosz, 2022, pp. 19–20).

2.3 Previous enlargements

The European Union has been growing since its creation post the WWII. The enlargement has happened in multiple clusters of different sizes with different intervals. Today the EU consists of 27 countries where the United Kingdom is the first and only country¹ that has decided to leave the union (European Union, 2025)

¹ Greenland left the European Economic Community (EEC) in 1985 after gaining home rule but are still associated to the EU through Denmark (The Danish Parliament, 2025)

Table 1: History of EU enlargements (European Union, 2025)

Year	Countries
1957	Belgium, France, Italy, Luxembourg, The Netherlands, Germany
1973	Denmark, Ireland, United Kingdom
1981	Greece
1986	Spain, Portugal
1995	Sweden, Finland, Austria
2004	Cyprus, Estonia, Latvia, Lithuania, Malta, Poland, Slovakia, Slovenia, Czech Republic, Hungary
2007	Bulgaria, Romania
2013	Croatia
2020	United Kingdom leaves (Brexit)

The process of joining the European Union is demanding for several reasons, and each enlargement reshapes both the Union itself and the countries that seek to enter it. To become a member, applicant states must fulfill all membership requirements, commonly referred to as the Copenhagen criteria. These requirements guide a three-stage procedure that determines the status of each application. Potential member states work to reform their domestic institutions and align their policies with EU standards. The current member states must also agree that the application can eventually be fulfilled (European Union, 2025). The membership process is divided into three phases: candidacy, negotiations and accession.

The candidacy phase is the first phase where all the current member-states must agree to grant the applying country candidate status. This phase is initiated when a country applies for EU- membership to the Council of the EU. The commission then perform a check on the applying country to check if it seems possible for the country to fulfill the criteria for

membership². The council then votes, and all member-states must agree on the decision of granting candidate status (European Union, 2025).

Membership negotiations are initiated if the country receive candidate status. Negotiations refer to implementation of EU law and standards. This means that the second phase is the most extensive step where the EU law starts being implemented in the applying country. This means most of the country's integration with the EU happens in this step as well as before applying for candidate status. As this process moves forward, it is monitored by the Commission which reports back to the union on how the process is working out (European Union, 2025).

Accession is the final step and can only happen if the Commission thinks that the candidate country is ready and has fulfilled the criteria for becoming a member. When the accession treaty is prepared, the European Commission, Parliament and Council must sign the treaty. The treaty will then have to be signed by all member-states as well as the candidate country before the accession is fully complete (European Union, 2025).

Throughout this process, the aim for the applying country is to strengthen political stability and begin integrating with the Union at an early stage. By the time the process is completed, the expectation is that the country will have implemented substantial reforms to meet the accession criteria and facilitate its integration into the EU. As mentioned, most domestic reforms take place during the first and second phase. At present, nine countries have been granted candidate status: Bosnia and Herzegovina, Albania, Georgia, Moldova, Montenegro, North Macedonia, Serbia and Türkiye. Kosovo has applied for membership but has not yet been granted candidate status (European Union, 2025).

² The EU membership criteria refer to the “Copenhagen Criteria” which are:

- stability of institutions guaranteeing democracy, the rule of law, human rights and respect for and protection of minorities.
- a functioning market economy and the ability to cope with competitive pressure and market forces within the EU.
- the ability to take on the obligations of membership, including the capacity to effectively implement the rules, standards and policies that make up the body of EU law (the ‘acquis ’), and adherence to the aims of political, economic and monetary union (EUR-Lex, 2025).

3 The EU & Western Balkan relationship

The six Western Balkan countries follow a somewhat different path toward EU membership than other candidates. To support their integration, the European Union has created the Stabilisation and Association Process. The purpose of this process is to encourage political and economic stability in the region. The aim is to help the Western Balkan countries to prepare for future EU accession. To reach this goal, the EU focus on providing financial support, improving access to EU markets and strengthening regional cooperation (European Union, 2025).

These goals are reflected in four pillars that form the foundation of the EU's Growth Plan for the Western Balkans. The Growth Plan places particular emphasis on economic integration and on measures that relate to functions of the Single Market. This includes reduced tariffs on certain goods that reduces costs of trade with the EU. By creating trade opportunities between Balkan and the EU, the Balkan countries have the chance to adapt to EU regulations and increase its exports. This adaptation will be necessary when fully accessing the Single Market. Together, the Stabilisation and Association Process and the Growth Plan combine political and economic measures that allow the Western Balkan countries to gradually take part in benefits normally reserved for EU members. In this way, the frameworks act as pre-accession instruments that support economic development and institutional alignment with the European Union (European Union, 2025).

3.1 Current Trade Agreements

The Balkan countries currently participate in two main trade agreements. One is the Stabilization and Association Agreement (SAA) with the European Union. The Western Balkan countries that are not EU members are also part of the Central European Free Trade Agreement (CEFTA). The countries participating in CEFTA are Albania, Bosnia and Herzegovina, North Macedonia, Moldova, Montenegro, Serbia and Kosovo (CEFTA, 2025).

CEFTA originally also included Bulgaria, Romania and Croatia, but these countries withdrew once they joined the European Union. This happened as EU membership replaced the need and possibility for CEFTA participation. The purpose of CEFTA is to promote trade and fair

competition within the region by facilitating trade. Another key objective of the agreement is to harmonize member states' trade regulations with EU standards. In this way, CEFTA can both increase trade and support the process of preparing its members for eventual EU accession (CEFTA, 2025). Through these trade agreements the Balkan countries have an opportunity to trade with lower barriers with both the EU and their neighbouring countries.

3.2 Application status for the Western Balkan

The six Western Balkan countries: Albania, Bosnia and Herzegovina, North Macedonia, Montenegro, Serbia and Kosovo have all applied for EU membership. All of them, except Kosovo, have been granted candidate status. This constitutes the first formal step in the accession process. Candidate status indicates that all current EU member states have agreed to open the accession procedure with the applicant country (European Union, 2025).

Alongside recognizing these applications, the EU has introduced several initiatives aimed at supporting and facilitating the accession process. These include political frameworks, strategic plans and cooperation agreements developed to strengthen ties between the Union and the Western Balkan states (European Union, 2025).

Despite these measures, and despite the granting of candidate status, accession remains a lengthy and uncertain process with no predetermined timeline. There is always a risk that progress may stall, as illustrated by the case of Türkiye³ (European Commission, 2025). In addition, Kosovo faces the added complexity of its disputed independence, which further complicates its path toward EU membership (EEAS, 2025).

Furthermore, the road to accession requires continuous progress in meeting the Copenhagen criteria, which cover democratic governance, rule of law, human rights and the functioning of a market economy. Candidate countries must also gradually align their legislation with the EU acquis, negotiated chapter by chapter. These demanding reforms mean that even with political commitment and EU support, the pace of integration varies considerably across the Western Balkan region (EEAS, 2025).

³ Türkiye was declared eligible to join the EU in 1995. Negotiations started in 2005 but in 2018 the council decided that negotiations were at a standstill due to backsliding in important reform areas (European Commission, 2025)

4 Previous Research

The power of the EU has from its very beginning been examined where its existence and impact are continuously evaluated and measured. The literature on the European Union is extensive, covering a wide range of perspectives. Previous research in this section will primarily focus on the effects of the EU membership, its impact on countries' trade structures, and how member states have experienced previous EU-enlargements. By adopting this focused approach, the chapter aims to clarify the central topic of the thesis and to collect relevant findings from the literature. The first section provides an overview of general trade-related effects of EU enlargements, which will later be applied to the context of Croatia's EU accession.

Studies analysing EU enlargement, generally find beneficial effects on trade flows for both the accession countries as well as the old member states. Paolo Pasimeni (2024) investigates the impact of the 2004 EU enlargement, with the aim of assessing the functioning of the Customs Union and the Single Market. The enlargement is evaluated by comparing pre-accession expectations with the real effects of EU membership. According to Pasimeni, expectations were largely met, particularly with respect to higher GDP growth, welfare gains and deeper trade integration. The main findings were found in the new member states, where accession to the EU increased bilateral trade flows. Following the 2004 enlargement, the total value of intra-EU exports and imports have increased in absolute terms where EU generally have become their primary trading partner.

Virag-Neumann (2015) examine the effects of EU enlargements on intra-EU trade and extra EU trade flows. Using the gravity model, the authors find similar results as in the study of Pasimeni (2024). EU-membership was shown as having a strong effect on both trade within and outside EU. New members and old members experienced an increase in exports, while the new members decreased imports from rest of the world.

Hagemejer, Michalek and Svatko (2021) examines the economic fallout for the new members after the EU accession in 2004 and 2007. Methodologically, the authors apply the synthetic control method (SCM) to construct counterfactual scenarios for each country. The results

indicate that EU membership is associated with positive economic effects, which the authors explain with trade liberalization, reduced costs, and increased bilateral trade flows.

Pochmara and Michalek (2023) similarly uses the SCM to examine the trade implications of the EU accession but for the countries: Czechia, Hungary, Poland, and Slovakia. The authors find a significant trade growth associated by the EU accession, when comparing with the counterfactual aggregates. With Hungary as the only exception, exports from all countries doubled, whereas imports on average increased by 51%. In conclusion, trade growth post EU accession was shown as extensive but differentiated.

Over a decade after the EU accession, empirical investigations of the Croatian post-accession development are established in the literature. To contextualize the effects relevant to this thesis, the following section summarizes selected studies on Croatia's EU accession and its impact on trade flows and economic objectives.

Holzner (2013) investigates the effects of Croatia's EU accession on regional trade patterns. It addresses how Croatia's trade structure is expected to adjust following the EU accession and how neighbouring countries is supposed to be affected. The study employs a method known as the Global Simulation Model which estimates expected effects using simulated trade data. Holzner's findings indicate that Croatian exports to the EU are expected to increase with 2.2 percentage points, while the exports to the countries within their previous trade agreements and the rest of the world was expected to decrease by 0.7 respectively 1.5 percentage points.

Kurecic and Furdi (2021) investigate how Croatia's international trade patterns and economy changed following the country's EU membership in 2013. The study examines changes in Croatia's trade structure, economic integration and economic growth following EU accession. The authors compare trade data from 2010-2012, prior to Croatia's EU accession, with post-accession data from 2014-2019. The timeseries analysis covers Croatia's economic growth rate, export and imports volumes, and total intra-EU trade shares. Their findings indicate a substantial shift in Croatia's trade structure after 2013, with export expansion emerging as the most dominant effect. Following Croatia's EU accession, trade integration with the EU deepened, both imports and exports increased as a result of reduced trade barriers. Following Croatia's EU accession, trade integration with the EU deepened, both imports and exports increased as a result of reduced trade barriers.

Jošić and Bašić (2021) extend the analysis by comparing trade pattern prior to 2013. The comparison analyses the difference from when Croatia was a part of the CEFTA agreement with developments after accession to the EU. The study is based on observed trade data from the period 2000 to 2016. Using a gravity model covering 180 of Croatia's most relevant trading partners, the authors find that CEFTA and EU membership had distinct effects on Croatia's trade patterns. The study shows that CEFTA membership was substantially associated with trade creation, whereas Croatia's EU accession was associated with trade diversion. EU membership is suggested to have an effect of trade diversion in cases of imports and exports, where total trade flows increased by trade creation.

In conclusion, the findings consistently suggest that economic integration within the EU cause, or is associated with trade liberalization, increased intra-EU trade and reduced trade costs. When investigating the impact of EU accession, Croatia represents a particularly relevant case. It's interesting since it's the latest member state entering the Union and is located in a region characterized by countries serving as EU candidates. This setting makes it especially interesting to extend the analysis by examining Croatia's EU accession from both a national and a regional perspective.

5 Theoretical Framework

5.1 PTA analysis of the Customs Union

The accession to the EU places Croatia in a new institutional trade environment. Entry into the EU Single Market and Customs Union can be interpreted as an extensive form of trade liberalization aimed at reducing trade costs (Baldwin - Wyplosz, 2022, p.128-130). While trade costs appear in many forms, tariffs are often central in discussions of trade liberalization and play a key role in trade negotiations. Based on this interpretation, the theoretical framework on preferential trade agreements provides guidance for anticipating the consequences of such integration for all parties involved. The purpose of this baseline theoretical discussion is therefore to illustrate the economic effects of EU membership for the acceding country, in this case Croatia, as well as for the remaining countries. The predicted outcome according to the theory is increased trade between the members of the agreement (Baldwin - Wyplosz, 2022, p.128-131).

The analysis starts with a world market price that occur with completely free trade for all markets. We then add a Most Favoured Nation (MFN) tariff that applies to all countries that the EU trade with. The analysis then continues with the adjustment of prices to get different outcomes from the graphs in the charts. To make the analysis simpler to display, the XS curve that represents quantity of exports for different prices is identical for both the Balkan countries as well as Croatia. The MD curve represents the import demand for different prices while MS is the aggregated export supply or import demand for the world market (Baldwin - Wyplosz, 2022, p.122-123).

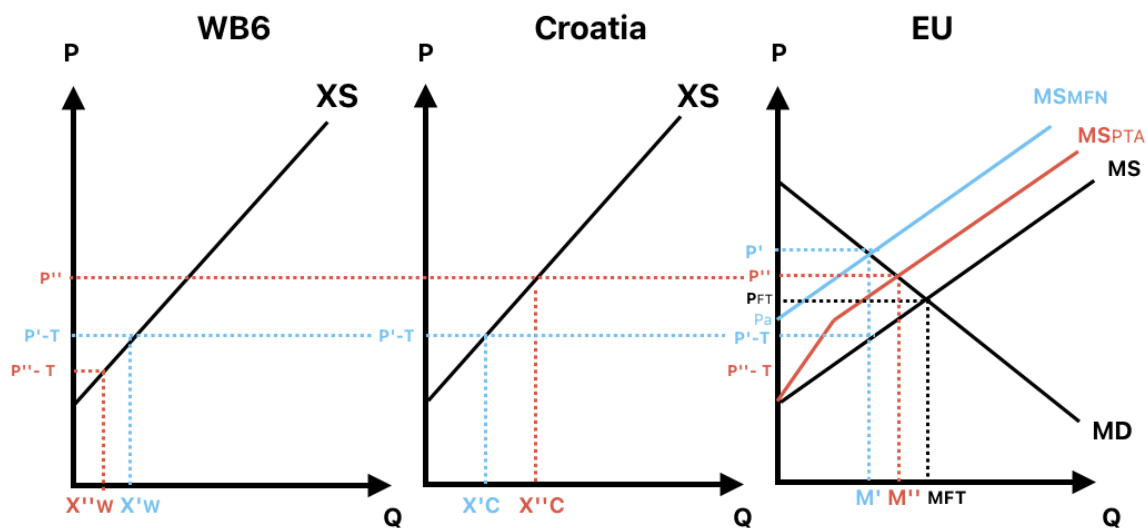


Figure 1: PTA analysis of Croatia, European Union and the WB6 (Baldwin & Wyplosz, 2022)

Let's carefully go through the mechanisms that drive the effects displayed in Figure 1. Initially, the EU enters a PTA with a partner country which in this case is Croatia entering the EU. This means that Croatia now can trade with the EU at a lower cost. This cost reduction can be caused by removed tariffs or other trade barriers that creates costs for exports. In the model, this is illustrated with an increased border price $P'-T$. The border price is the price that Croatian exporters are getting paid for their goods on the EU market. For the countries that remain outside the agreement, the border price decreases since there is new and lower domestic price (P''). With $P''-T$ serving as the new border price, the Balkan countries in our case are not willing to export the same quantity. As a result, the partner country Croatia will therefore increase their exports to the EU since they now will be paid at a higher price. This supply switch is called trade diversion and will be further examined in the upcoming sections (Baldwin - Wyplosz, 2022, p.122-125).

To summarize what happened in Figure, we can see that Croatian exports are expected to increase to the EU from $X'C$ to $X''C$. For countries that remain outside the preferential trade agreement, exports are predicted to decrease from $X'W$ to $X''W$ according to the model. The main mechanism behind these changes is the effect of lower costs on trade and changed border prices. After integration, Croatian exporters receive the EU border price. Exporters from the WB6 face less favourable price conditions and may obtain higher returns by exporting to alternative markets (Baldwin - Wyplosz, 2022, p.128-131).

In terms of welfare the partner gains a producer surplus while WB6 loses producer surplus. The EU in our case gain consumer surplus at the expense of producer surplus. In terms of tariff revenue, the EU loses some of its revenue due to the PTA and keep some since the WB6 still exports some quantities. Therefore, the overall welfare effects could not be determined since it depends on the sizes of the gains and losses of welfare (Baldwin - Wyplosz, 2022, p.126-127).

5.2 Trade diversion & Trade creation

As stated by the theory above it is reasonable to predict an increase in Croatian exports to the EU following their EU membership. The theoretical framework also suggests that the WB6 may experience a relative decline in exports to the EU. To further deepen the analysis, it is important to examine the mechanisms behind these predictions. In this context trade creation and trade diversion are key concepts. This helps explain how preferential trade agreements redistribute trade patterns both within and outside the participating economies (Baldwin - Wyplosz, 2022, p.126-127).

This framework raises the question of whether preferential integration leads to trade creation or trade diversion as described by Jacob Viner (1950). Both concepts capture different outcomes of discriminatory trade liberalization. Trade creation refers to the liberalizing effect of integration. When trade barriers are reduced between member countries, trade becomes less costly and more efficient. Consumers in the importing country benefit from lower prices because production in the exporting country is relatively more efficient (Baldwin - Wyplosz 2022 p. 135).

Trade diversion reflects the discriminatory side of preferential agreements. Countries that remain outside the agreement face greater difficulty competing with member states. This is because the same tariff continues to apply to their exports. Even when an external exporter is more efficient, consumers may instead purchase goods from a less efficient producer within the preferential area due to lower tariffs. This can result in higher prices than under non-discriminatory trade liberalization (Baldwin - Wyplosz 2022 p. 135).

In the context of EU enlargement these mechanisms can be applied to both Croatia and the Western Balkan countries following Croatia's accession to the Single Market and the Customs Union. Trade between Croatia and the EU is therefore expected to change through either trade creation or trade diversion. Once Croatia entered the European market it gained access to zero internal tariffs which strengthened its competitiveness relative to non-member countries. Croatian exports to the EU are therefore expected to increase as a direct consequence of participation in the Customs Union and the Single Market.

The Western Balkan countries may experience the effects of Croatia's EU accession primarily through trade diversion. After accession, EU importers may substitute imports from Western Balkan countries with Croatian goods. Croatia benefits from tariff free access within the Single Market and the Customs Union. This improves Croatia's relative competitiveness in the EU market even when Western Balkan producers are equally or more cost efficient. As a result, exports from the Western Balkans to the EU may be partially replaced by increased Croatian exports.

If this theoretical framework were fully applicable to the relationship between the EU, Croatia and the WB6 this would likely be the expected outcome in the present analysis. The model provides a useful baseline understanding of how trade flows may change following preferential integration. It is although worth noting that it does not capture the full complexity of this specific case. This is largely due to the special relationship between the EU and the WB6 which has been discussed in the previous chapters.

5.3 Spill-over effects

Before finalizing the hypothesis for effects on WB6's exports, it is necessary to discuss their connection to the union and the agreements that are in place. It is also important to consider potential spill-over effects that could have an impact on trade. Since the EU has extensive integration programs for the Balkan countries there is a will from both parties to close ties with each other. As candidate countries, there is a pressure to integrate with the Union when it comes to regulations and harmonization (Baldwin - Wyplosz 2022 p. 130-132).

When Croatia entered the EU, the Balkan countries were not entirely excluded. This is an important aspect that is not captured by the basic theoretical framework. Their existing relationship with the EU and their ambition to become members may have positive effects on trade. If regulations are harmonized and trade preferences for certain goods are granted, Croatia's accession could increase trade flows. This because Balkan exporters could potentially already have adjusted to EU regulations and established trade relationships with Croatia prior to accession. This could be seen as spill-over effects.

These factors suggest that the negative effects predicted by the basic model may be overstated and that the effects could be reduced. Given their shared borders, Croatia is likely an important trading partner for the Balkan countries. This supports the idea that regulatory harmonization with the EU helps the Balkans maintain trade with Croatia while also advancing the integration process.

It is reasonable to expect an increase in Croatian exports to the EU based on the initial theoretical model. For the Western Balkan countries' exports to the EU the expected outcome is less clear. Several effects are likely to occur but with different magnitudes. This makes it interesting to investigate through the models introduced in the upcoming chapter.

6 Empirical Strategy

This thesis examines the impact of Croatia's accession to the European Union and how it has influenced exports from Croatia and the Western Balkan countries to the EU. The empirical strategy applies a difference-in-difference approach within a gravity model framework to analyse export patterns over time. The following chapter will introduce the thesis' empirical strategy containing model specifications, followed by evaluation of the data sample and econometric considerations.

6.1 Empirical approach: The Gravity Model and the DiD method

The gravity model originates from international trade theory where it is most commonly used in the literature to explain bilateral trade flows between countries. According to the model there are two main forces that drive trade. These forces are distance and size of economy which is usually measured in GDP. The model predicts that the size of these measures drives trade in opposite directions. Trade between two countries is positively related to their economic size and negatively related to the distance between them (Shepherd et al, 2019, pp. 4-6).

Furthermore, the gravity model can be used further and is not only limited to explain bilateral trade flows of goods and services. It can also be applied as a powerful empirical tool to evaluate the effects of trade-related policies. Therefore, the model can provide a flexible and widely used framework for research of various trade policy issues and their impact on international trade flows. Through extensions of the traditional gravity specification, the model can be employed to examine effects of cross-border policies including tariffs, FTA's and other institutional or regulatory measures. Other model specifications are therefore also allowed within the framework of the gravity model besides alternative estimators as the data could come in various forms (Shepherd et al, 2019, pp. 2-5). The model specification employed in this study therefore represents an extension of the traditional gravity model, in which the model serves not only as a theoretical framework but also as an empirical approach within the methodology structure.

The empirical model of this thesis is built on the traditional gravity model while incorporating a difference-in-difference (DiD) component. The reason is to identify the causal treatment effect on bilateral trade flows after the EU enlargement. DiD is a method commonly used to isolate the treatment effect by comparing the changes in outcomes over time between two groups. This is done with the affected population serving as the treatment group and the control group as the non-affected population. The difference-in-difference framework assumes equal trends where the treatment and control group exhibit parallel trends before the treatment period. Constructing the control group therefore require careful consideration which is described in the chapter of control group evaluations. By combining gravity model specifications with a Difference-in-Differences analysis, the models are able to isolate the treatment effects (The World Bank, 2023).

6.2 Empirical model

This thesis employs regression analysis to examine the 2013 EU enlargement and its effects on export flows from Croatia and the Western Balkans countries. To capture changes in export flows and to separate the enlargement's effects on Croatia and the Western Balkan countries, this analysis is conducted using two separate models. Since the empirical strategy relies on a difference-in-difference approach, the final models are derived from a canonical DiD framework. In its original form, the DiD model can be written as:

$$Export_{i,j,t} = \beta_0 + \beta_1 EU - Croatia_{i,j} + \beta_2 Post2013_t + \beta_3 \ln GDP_{i,t} + \beta_4 \ln GDP_{j,t} + \beta_5 (EU - Croatia_{i,j} \times Post2013_t) + \varepsilon_{i,j,t}$$

$$Export_{i,j,t} = \beta_0 + \beta_1 EU - BalkanPair_{i,j} + \beta_2 Post2013_t + \beta_3 \ln GDP_{i,t} + \beta_4 \ln GDP_{j,t} + \beta_5 (EU - BalkanPair_{i,j} \times Post2013_t) + \varepsilon_{i,j,t}$$

In the specification above, the treatment effect is captured by the relevant country-pair and the Post2013 variable. When introducing bilateral and time fixed effects, the treatment variables drop since they are absorbed by the fixed effects. The final models employed in the thesis are specified as follows:

$$Export_{i,j,t} = \exp(\beta_0 + \beta_1 \ln GDP_{i,t} + \beta_2 \ln GDP_{j,t} + B_3 (EU - Croatia \times Post2013) + \alpha_{i,j} + \delta_t) + \varepsilon_{i,j,t} \quad (1)$$

$$Export_{i,j,t} = \exp(\beta_0 + \beta_1 \ln GDP_{i,t} + \beta_2 \ln GDP_{j,t} + B_3 (EU - Balkan pair \times Post2013) + \alpha_{i,j} + \delta_t) + \varepsilon_{i,j,t} \quad (2)$$

The first model (1) captures specifically Croatia's exports to the European Union and examines how these exports have changed relative to the control group after 2013. The second model (2) investigate export flows from the Western Balkan countries to the EU. This to identify whether trade involving the WB6 states, and the EU have changed in a systematic way after Croatia entered the EU. Using two models allows the analysis to distinguish between the direct effects for Croatia and the indirect effects for the Western Balkan countries. The first model primarily serves as a benchmark analysis of the direct trade effects for Croatia following EU accession, while the second model will further be used to address the main research question.

The two models share the same structure and contain the dependent variable $Export_{i,j,t}$, measured in euros, representing the exported trade volume between country pairs i and j in year t . The explanatory variables consist of the variable $\ln GDP$ representing each countries' GDP per capita in logarithmic terms. Additionally, the two models consist of an interaction term consisting of two dummy variables. The variable $EU - Croatia$ in model (1) identifies the relevant country pairs, consisting of the EU together with either Croatia or a control country. If the country pair involves EU and Croatia, it will take the value equal to 1 otherwise it's equal to 0. The variable $EU - Balkan\ pair$ from model (2) represent country pairs containing EU together with either one of the six Western Balkan countries or one country of the control group. The variable will be equal to 1 for country pair including the EU and Western Balkan otherwise it's equal to 0 since the control group serves as the baseline.

Since Croatia acceded to the European Union in 2013, an additional time dummy variable ($Post2013_t$) is included in both models. The variable takes the value 1 for years after 2013 and 0 for the years prior to accession. To identify the post-accession effects, the model includes an interaction term between the treatment indicator and $Post2013_t$. This interaction captures the DiD treatment effect, measuring the impact on trade between the EU and the Western Balkan after the Croatian accession.

The models also contain fixed effects for country pairs $\alpha_{i,j}$ and year specific effects δ_t to control unobserved heterogeneity. Fixed effects aim to capture the variation that is constant over time within country pair or trends across all countries given a specific time. Fixed effects of country pairs $\alpha_{i,j}$ capture all time-invariant characteristics, specific to each trading pair that

may systematically influence bilateral trade flows. Such characteristics include common language, cultural norms, historical bindings or geographical distance. As a consequence, some standard variables of the gravity model are not included since these effects are captured by the fixed effects. Year fixed effects δ_t control time specific events where all countries in the same year are affected. It captures all kinds of time specific events such as global shocks, economic cycles, international policy shifts or price changes. Allowing these types of effects to be absorbed by the fixed effects enables the models to isolate the effect of time-varying explanatory variables and obtain more credible causal estimates. It also enables the model to control for unobserved heterogeneity by capturing factors that would otherwise be captured in the error term.

6.3 Expected outcomes

The aim of this thesis is as known to capture the effects on volumes of exports after Croatia entered the EU, especially how the trade flows of Croatia and the Western Balkan countries have been affected. Based on the outcome that the theoretical framework provided it is most reasonable to believe that Croatia will experience increased exports to the EU which will be the hypothesis for the first model.

For the second model it is not as straight forward theoretically as for the first model. According to the baseline framework that was provided in the previous sections, the Balkan countries that remain outside the EU can possibly see a fall in exports to the EU. On the other hand, it's not possible to rule out the impact of the already established relationship between EU and the Balkan countries. It's necessary to consider spill-over effects and its impact on the possibility to export to the EU. One additional aspect that also has relevance for this is the use of a control group. The results that we will get from the model shows the effect relative to the control group. It is worth to note that it's not the total change in exports but the change in comparison with the control group. The hypothesis will be, according to the theoretical outcome, that the WB6 will experience decreased exports but will not be considered as given as for model 1.

6.4 Evaluation of the control group

When constructing the control group, several criteria was considered. The countries included as “control countries” must be similar to the treated units in relevant aspects, particularly in terms of their economic structure and overall level of development. It is also essential that the selected countries are not members of the European Union, since EU membership itself would influence trade patterns and thereby confound the comparison. Another key requirement is that the countries in the control group should not be expected to be affected by Croatia’s accession to the European Union. Only countries that remain uninfluenced by this event can provide a valid comparison for identifying its impact. If these criteria are met, it is possible to believe that the control group and the treatment group share parallel trends which is necessary for difference-in-difference analysis.

The process of creating the control group needs to involve a lot of caution. Since the European Union has been growing over the years, it is harder to find countries that fulfilled the requirements and are not already members of European Union. After careful evaluation, Georgia, Moldova and Ukraine were selected as the control group. When investigating for control countries we found these three as suitable for multiple reasons. All three countries, as seen in Figure 2, follows the overall trend of GDP per capita as the rest of the Western Balkan. This is essential when investigating for potential effects after 2013. If the economic trend is similar before the enlargement, potential effects of the EU membership after 2013 will be easier to identify.

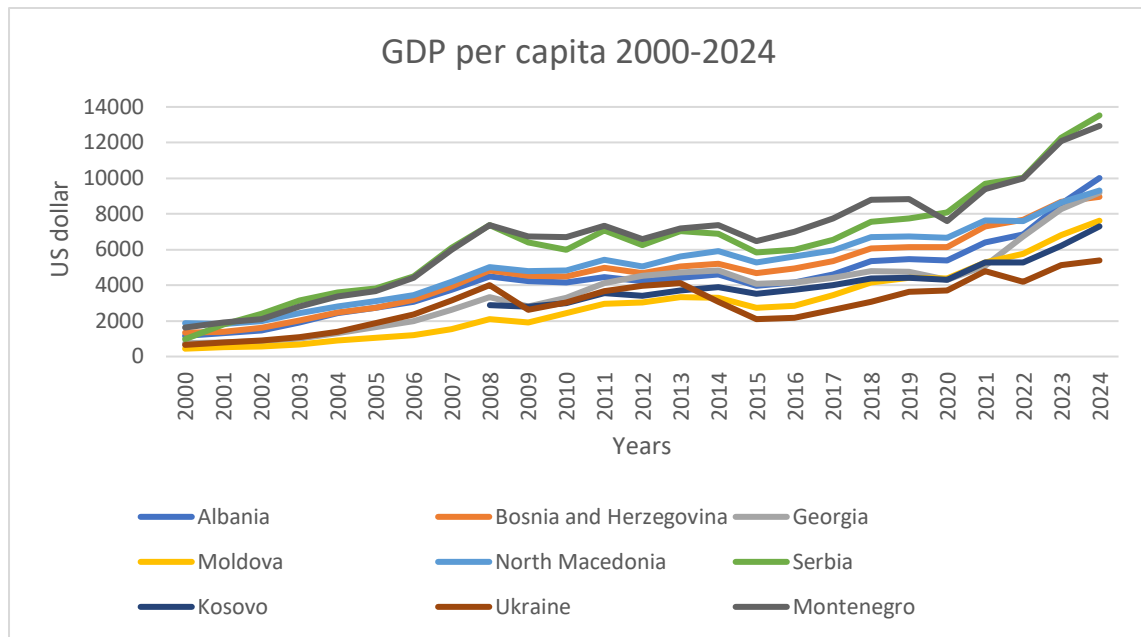


Figure 2: GDP per capita, 2000-2024 in current US dollars (World Bank, 2024).

The three control countries share several important similarities with the Western Balkan states in terms of their relationship with the European Union. All three have, just like five of the six Western Balkan countries, been granted EU candidate status as part of their accession process. In addition, Moldova is a member of CEFTA alongside the Western Balkan states. This further underline their shared established trade connections with Europe. These shared institutional links signal that the EU has a strategic interest in maintaining and deepening economic relations with these countries. This is an important consideration when constructing a suitable control group. The relation to EU can also be reflected by the trade flows displayed in Figure 2. As shown the control group shares a similar trend for exports to EU.

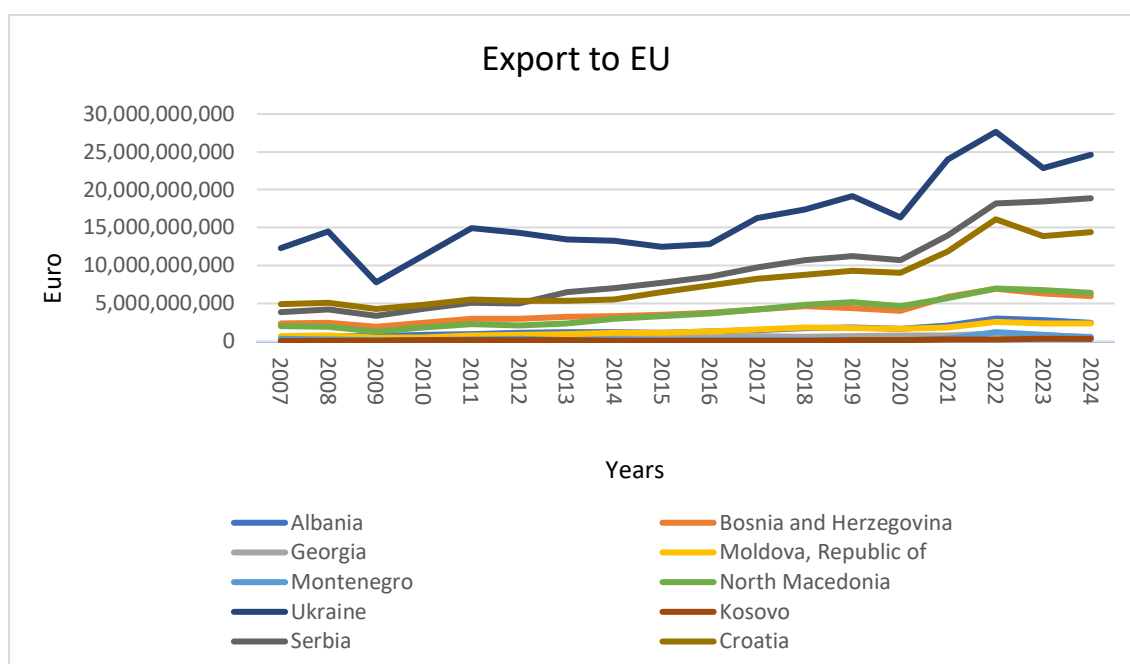


Figure 3: Export to EU from non-EU countries 2007-2024 (Eurostat, 2025)

The selection of Georgia, Moldova and Ukraine as the control group naturally raises questions about their comparability. No country fully mirrors the Western Balkans, and a perfectly matched counterfactual does not exist. These control countries also differ in several ways: their historical ties to Russia and the war in Ukraine could for example constitute external shocks that are unrelated to Croatia's EU accession. It also cannot be fully excluded that Croatia's membership could generate any indirect effects.

Despite these limitations, we argue that these countries represent the most suitable available control group. They share key structural and institutional similarities with the Western Balkans which is positive. At the same time their geographical distance and lack of direct cultural or economic links reduce the likelihood of indirect effects. In line with the gravity model, distance dampens trade interactions, and all countries studied are small relative to the major EU economies. It is reasonable by the presented figures that there could be parallel trends which promotes a difference-in-difference analysis. This will later be statistically tested to provide to what extent parallel trends could be assumed or not.

6.5 Data & Sample evaluation

The sample consists of the six Western Balkan countries that are not yet members of the European Union: Bosnia and Herzegovina, North Macedonia, Montenegro, Kosovo, Albania and Serbia (WB6). As mentioned, the sample includes three additional non-EU countries that function as the control group and provides the baseline for comparison: Ukraine, Moldova and Georgia. Croatia is also included in the dataset mainly for the first model as its accession to the EU in 2013 represents the policy change that the study aims to evaluate.

The period covered extends from 2007 to 2024. This starting point is chosen because reliable and comparable trade data for all the countries in the current Western Balkan region exist from 2007 onward⁴. The sample consist of one missing-data point which is Kosovo's GDP for 2007. After consideration we will state that this missing data will not drive any results since the main point of study are related to the treatment interaction term. The trade data is collected from the European Union's statistical bureau Eurostat. We consider this as a highly credible source since they provide statistics that the EU bases their decision on.

6.6 Econometric considerations

The model will be using the estimator Poisson Pseudo Maximum Likelihood (PPML) which is a common approach in modern trade research within the framework of the gravity model. One of its main strengths is its robustness to zero trade flows, which are highly prevalent in international trade data (Shepherd et al., 2019, p. 46-47). The frequency of zero values is particularly pronounced in global trade datasets, as not all countries trade with one another, especially not with all variations of goods.

An essential advantage of PPML is that it doesn't require logarithmic transformations of the dependent variable, comparing to other efficient estimators like OLS. Logged zero values are considered as problematic since they are undefined. This means that these observations will

⁴ The intention of this thesis is not to engage in discussions regarding the legitimacy of borders or statehood. Instead, the analysis follows the internationally recognized states as they are defined today. This approach allows the study to categorize trade flows in a way that reflects the current geopolitical structure of the region. This increases the explanatory power of the empirical analysis, particularly in relation to future EU enlargements.

be dropped and could create sample selection bias. PPML avoids these issues by modelling trade flows in levels, allowing zero observations to be retained and properly incorporated into the estimation process. This supports the application of PPML, since it eliminates potential biases and efficiency losses associated with excluding zero trade flows (Shepherd et al., 2019, p. 47).

As in all econometric approaches, several assumptions must be satisfied to ensure reliable estimates. One key issue is heteroskedasticity, which is a particular concern in OLS models. PPML is inherently more robust to heteroskedasticity than standard OLS, making it better suited for trade data (Shepherd et al., 2019, p. 48). Heteroskedasticity arises when the variance of the error term is not constant, which can lead to unreliable and inconsistent standard errors. To account for heteroskedasticity, robust standard errors are used to get the correct statistical inference.

Another major concern in econometric models is unobserved heterogeneity, which can bias the estimated coefficients if it is correlated with the explanatory variables. In gravity models, such heterogeneity is typically related to country-pair-specific characteristics that do not vary over time. Such characteristics refers to historical ties, cultural similarities, geographical frictions or persistent institutional differences. To address this issue, the model includes both country-pair fixed effects and time fixed effects. Country-pair fixed effects account for all unobserved time-invariant factors that influence trade between two countries. This in order to ensure that these characteristics do not confound the estimated impact of Croatia's EU accession. Time fixed effects capture global shocks or common trends such as macroeconomic cycles, EU-wide policy changes or global trade developments that affect all countries in the sample simultaneously. Together, these fixed effects substantially reduce the risk of omitted variable bias arising from unobserved heterogeneity. PPML therefore provides a consistent estimator in the presence of fixed effects (Shepherd et al., 2019, p. 47).

7 Empirical Results

This chapter presents the results from the two regressions that were specified in the previous Empirical Strategy section. The results are presented and discussed alongside relevant robustness tests to strengthen the credibility of the estimated effects.

7.1 Baseline results

Table 2: Results for Croatia's exports from model (1)

Variables	Model I	Model II	Model III	Model IV
EU-Croatia	0.784 (0.897)	1.638 (1.513)	0 (omitted)	
Post2013	0.364** (0.183)	0 (omitted)	0.176*** (0.04)	
EU-Croatia *Post2013	0.205** (0.086)	0.069 (0.162)	0.246*** (0.046)	0.227*** (0.057)
lnGDP	0.065 (0.883)	-0.622 (1.315)	1.094*** (0.054)	0.773*** (0.100)
Constant	21.767*** (7.638)	27.955** (11.399)	13.414*** (0.472)	17.524*** (0.684)
Time Fixed Effects	No	Yes	No	Yes
Country-pair FE	No	No	Yes	Yes
Pseudo R ²	0.182	0.277	0.986	0.994
No. Obs	179	179	179	179

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$. Robust standard errors are reported in parentheses.

Table 2 summarize the results from four different model specifications were Model IV presents the results of the final model employed to answer the research question. The table present developments up until the final model. The results of Model I represent the output of the simplest canonical DiD model, not including any fixed effects. By including two types of fixed effects, the treatment variables EU-Croatia and Post2013 drops. In the final model, these

effects are captured in the interaction term (EU-Croatia * Post2013). Presenting multiple model specifications, as in Table 2, allows the analysis to identify what drives the results.

The results of Model (1) examine the Croatian EU accession's effect on Croatia's exports specified as Model IV and displayed in Table 2. The results are shown as expected, where the Croatian accession exhibit a positive effect on the observed export value. Both the DiD and GDP variables are positive and significant at the level of 1%. The significant coefficient EU-Croatia is associated with a positive effect on Croatia's EU exports. The coefficient of 0.227 is interpreted as: Croatian exports to EU have increased by approximately 25 % compared to the control group. Since the employed model is estimated by PPML using a log link function, the DiD coefficient is conducted as $100 \times (e^{0.227} - 1) \approx 25.5$. Among the two variables, GDP per capita exhibits the largest effect. The GDP effect on Croatia's export is illustrated by the coefficient 0.773 which indicates there is a positive relation between economic growth and the value of exports. It can be interpreted as 1 % increase of GDP is associated by an increase of 0.773 % in Croatian export value.

Table 3: Results for Western Balkan countries exports from model (2)

Variables	Model I	Model II	Model III	Model IV
EU-BalkanPair	-0.962 (0.636)	-0.971 (0.618)	0 (omitted)	
Post2013	0.241* (0.133)	0 (omitted)	0.241*** (0.080)	
EU-BalkanPair *Post2013	0.138 (0.158)	0.143* (0.156)	-0.018 (0.123)	0.166** (0.083)
lnGDP	0.509 (0.434)	0.410* (0.494)	1.086*** (0.061)	0.646*** (0.082)
Constant	18.546*** (4.216)	19.608*** (4.769)	13.479*** (0.555)	16.327*** (0.886)
Time Fixed Effects	No	Yes	No	Yes
Country-pair FE	No	No	Yes	Yes
Pseudo R ²	0.301	0.331	0.984	0.995
No. Obs	179	179	179	179

*** p < 0.01, ** p < 0.05, * p < 0.10. Robust standard errors are reported in parentheses.

Table 3 summarize results from four different model specifications. Model IV refers to the result of Model (2) which examine the Croatian EU accession's effect on the WB6's exports to the EU. Both treatment variables are positive and statistically significant at the level of 5%. The GDP variable is also significant at 1%. The coefficient of the interaction term (EU-Balkan) 0.166 suggests that exports from the WB6 to the EU increased following the 2013 enlargement. This implies an increase in exports of approximately 18.1% relative to non-treated country pairs serving as the control group. The percentage effect is conducted as $100 \times (e^{0.166} - 1) \approx 18.1\%$. The GDP per capita shows the largest effect on WB6's exports to the EU. The significant coefficient of 0.646 indicates that a 1 % increase in GDP per capita is associated with an increase in exports of approximately 0.646%.

7.2. Event study

An event study is conducted to visually assess the dynamic effects of EU integration on exports to the EU relative to the control group. The event study framework allows estimation of year-specific treatment effects before and after the treatment year. This provides a graphical assessment of the parallel trend assumption validating the difference-in-differences approach. In this analysis, effects are examined for up to five years before and after Croatia's EU accession in 2013.

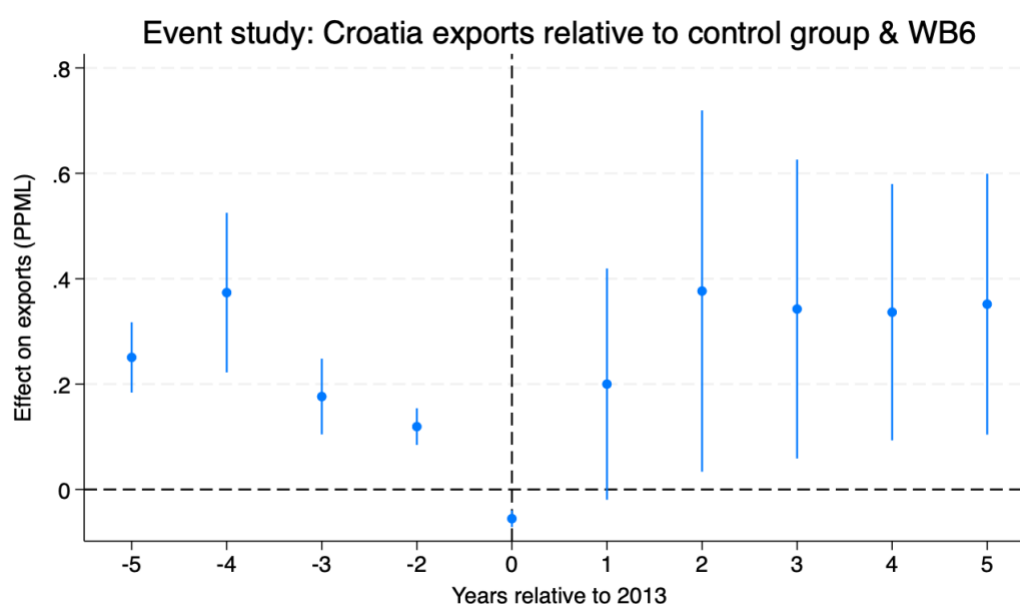


Figure 4: Event study on Croatia's exports to the EU relative the control group

Figure 4 presents the event study estimates for Croatia. The post-treatment coefficients are predominantly positive. This indicates that Croatian exports to the EU developed more favourably relative to the control group following EU accession. However, the pre-treatment coefficients are also positive and do not fluctuate closely around zero and no clear systematic pre-trend is observed. The presence of level differences in the pre-period suggests that the parallel trends assumption for Croatia should be interpreted with caution. This positive pre-treatment effect can also be interpreted as that the positive effect on export is also observed prior to the accession. This means that the positive effect was present even before Croatia became EU members. This could validate that the integration process in itself has a positive effect on exports.

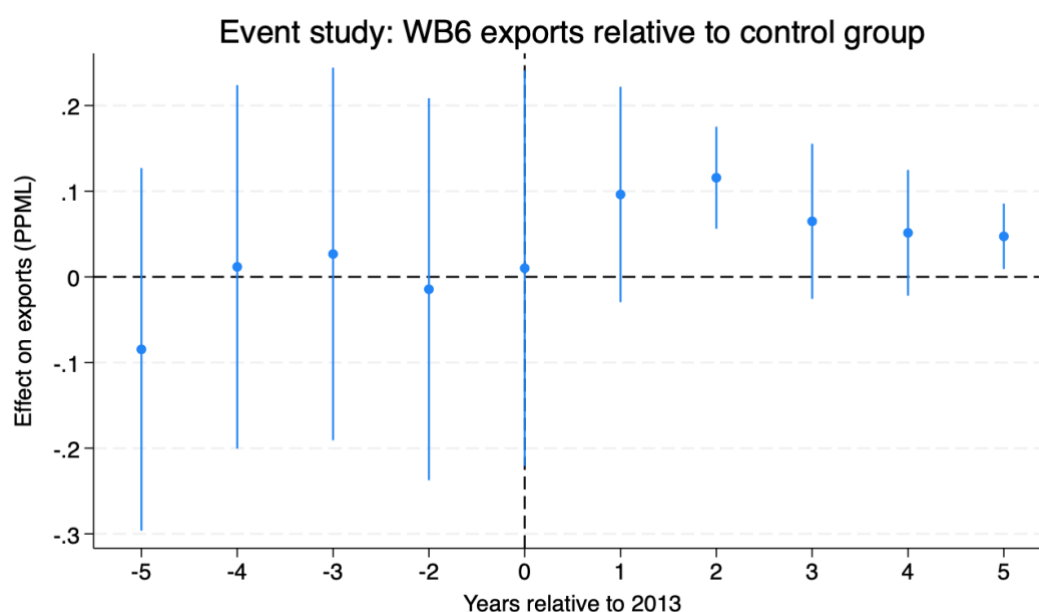


Figure 5: Event study on WB6's exports to the EU relative the control group

Figure 5 displays the corresponding event study for the WB6 countries. In contrast to Croatia, the pre-treatment coefficients for the WB6 are centred around zero and exhibit no systematic pattern prior to 2013. This provides visual support for the parallel trend assumption. Following 2013, the estimates remain positive which is consistent with the baseline DiD results. This indicates increased exports to the EU for the Western Balkan countries after the policy change.

The event study analysis reinforces the baseline findings while highlighting important differences in pre-treatment dynamics between Croatia and the WB6 countries. It also gives

credibility to the control group especially for Model (2). The developments effect can display how the effect increases or decreases over time. For Croatia it was displayed that the effect was positive all examined years prior to the treatment year. This could be transferred to the WB6 case where close to all countries are potential future candidates for membership. This is what in previous sections has been discussed as spill-over effects.

7.3 Robustness Analysis

To further assess the reliability of the empirical results, this section presents two robustness tests including a placebo-test and alternative estimators. These tests are designed to examine the stability of the estimated effects and to evaluate whether the results remain consistent across different empirical approaches.

7.3.1 Placebo- test

To strengthen the credibility of the estimated treatment effect a placebo test was conducted. The placebo test examines whether an effect can be detected before the actual treatment year. In both models, the treatment year is set to 2013 since this is the year Croatia entered the EU. By creating a placebo treatment variable and estimating the same regression with an alternative treatment year. The test allows us to examine whether the estimated effect appears already before 2013.

The placebo test was conducted by setting the placebo treatment year to 2011. This implies that the test still captures multiple years prior to the placebo treatment, while remaining relatively close in time to the true treatment year. If the placebo test does not yield a statistically significant effect, it increases the credibility that the estimated effect in the baseline model is linked to the actual treatment year rather than to pre-existing trends.

Table 4: Placebo test for Model (1): Croatia's exports (fake treatment year = 2011)

Variables	Model (1): Croatia's exports
Placebo (EU-Croatia * Post2013)	0.136** (0.069)
lnGDP	0.773*** (0.152)
Time Fixed Effects	Yes
Country-pair FE	Yes
Pseudo R ²	0.993
No. Obs	179

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Standard errors in parentheses.

For Model (1) a statistically significant effect is detected before 2013, although the magnitude of the coefficient is smaller than in the original regression. This suggests that Croatian exports may already have been relatively large compared to other countries in the sample prior to EU accession. This could mean that the positive effect was already there but intensified after Croatia became an EU member. This is an interesting aspect to the analysis of spill-over effects. A potential interpretation is that the candidate status and the integration process itself may have had a positive impact on trade even before formal accession. While this mechanism is not further examined in this thesis, it represents an interesting avenue for future research.

Table 5: Placebo test for Model (2): WB6's exports (fake treatment year = 2011)

Variables	Model (2): WB6's exports
Placebo (EU-BalkanPair * Post2013)	0.076 (0.091)
lnGDP	0.691*** (0.154)
Time Fixed Effects	Yes
Country-pair FE	Yes
Pseudo R ²	0.993
No. Obs	179

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Standard errors in parentheses.

For Model (2), the placebo test for does not indicate a statistically significant effect when the placebo treatment year is set to 2011. This result strengthens the credibility of the baseline estimate for Model (2) which shows a significant treatment effect after 2013. It also supports the chosen control group. No significant difference in export growth between the WB6 countries and the control group is observed prior to 2013. This finding provides evidence in favour of parallel trends. Parallel trends constitute a key assumption in the difference-in-differences framework, and the placebo test therefore serves as an important robustness check.

7.3.2 Alternative estimators

This section provides further robustness tests. By modifying the baseline specification and introducing one element at a time, each component of the chosen model is systematically evaluated. This aims to increase the credibility of the chosen estimator.

Table 6: Summary of Gravity Model estimations for Croatia across four estimators

Model	Estimator	DID coefficient	Std. error	p- value	Significance	Fixed effects	Model fit
1	OLS	1.684	0.343	0.001	***	None	R ² = 0.131
2	FE (xtreg)	0.533	3.59 ⁻⁹	0	***	Country pair FE	R ² = 0.131
3	OLS + both FE	0.06	0.057	0.316	No	Country pair & Year FE	R ² = 0.005
4	PPML	0.227	0.057	0	***	Country pair & Year FE	Pseudo R ² = 0.994

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.

Table 6 presents a comparative overview of four different estimators to check the robustness and to evaluate which estimator is the most suitable. Model 1 use the estimator of OLS with no additional fixed effects. The DiD coefficient of the model is shown as 1.684 and is significant at the level of 1%. The R squared value of 0.131 suggest that the model has limited explanatory power. Model 2 also relies on the estimator of OLS but incorporates country-pair fixed effects. When introducing this fixed effect, the DiD coefficient of 0.553 remain positive and significant at the level of 1%. However, the R squared continues as low.

Model 3 use the OLS estimator incorporating both fixed effects, involving country pair and year fixed effects. The DiD coefficient is find at 0.06 but is shown as insignificant. In addition, the R squared of the model is substantially low. Model 4 uses the estimator of PPML, including both fixed effect and is used as the preferable estimator of this thesis. The DiD coefficient of 0.227 is shown as positive and significant at the level of 1%. The relatively high R square of 0.994 highlight the model's strong ability to capture variation in the

dependent variable. This is strengthening the discussion of using the estimator of PPML and including both fixed effects of country-pairs and time specific effects.

Table 7: Summary of Gravity model estimations for WB6 across four estimators

Model	Estimator	DID coefficient	Std. error	p- value	Significance	Fixed effects	Model fit
1	OLS	-0.164	0.177	0.355	No	None	$R^2 = 0.028$
2	FE (xtreg)	0.181	0.050	0.007	***	Country pair FE	$R^2 = 0.881$
3	OLS + both FE	0.103	0.030	0.001	***	Country pair & Year FE	$R^2 = 0.993$
4	PPML	0.166	0.083	0.045	**	Country pair & Year FE	Pseudo R^2 = 0.995

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.

Model 1 is using the OLS estimator with no fixed effects, resulting in a negative insignificant coefficient of -0.164. The R square at 0.028 captures the models fit and confirms its explanatory power as low. Model 2 uses OLS but including fixed effects of country pairs, having a positive and significant coefficient of 0.181. The relatively high R square of 0.881 illustrate the model's ability to capture the variation for country-pairs over time. This is strengthening the discussion of including time invariant fixed effects of country-pairs.

Model 3 is using the OLS estimator and enlarge the model by introducing time invariant and time specific fixed effects. The DiD coefficient remain positive and significant at the level of 1% and shows a marginally smaller treatment effect at 0.103. The R squared parameter remains stable and increases further with inclusion of both fixed effects. This pattern suggests that part of the estimated effect in Model 2 may reflect variation driven by common time trends rather than the treatment effect. Model 3 can be interpreted as providing a more reliable and robust estimate of the treatment effect. Despite Model 3 producing highly significant results, Model 4 is chosen as the preferred specification estimated using PPML. The treatment effect remains positive and significant at the level of 5 %, supporting the choice of PPML. PPML also incorporates robustness against heteroskedasticity which is not the case in the other three models examined.

8 Summary and Conclusions

This thesis examines the effects of Croatia's accession to the European Union on exports from Croatia and the Western Balkan countries. To better understand the dynamics of international trade and to empirically address the research question, the gravity model of trade is introduced and employed. Two models were developed, the first model analyse the impact of EU membership on Croatia's exports, while the second model investigates the effect on exports from the neighbouring Western Balkan countries. By incorporating these two models, the study is able to assess the implications of Croatia's EU membership both from a national perspective for Croatia and from a regional perspective for the WB6.

The results of the first regression indicate that Croatia's EU membership is positively associated with increased exports to the EU. The results are aligned with the hypothesis, showing that Croatian exports associated with its EU accession increased by approximately 25% compared to the control group.

Interestingly, the positive coefficient associated with Croatia's EU accession suggests that the 2013 enlargement had a favourable impact on exports not only from Croatia but also from the neighbouring WB6 countries. This result establishes an interesting dimension to the analysis, as the expected result of the second model was slightly uncertain. While previous research together with the theoretical framework suggests an increase in Croatia's exports, the implications for the West Balkans remained ambiguous. The hypothesis for the Western Balkan allows two alternative directions. A decrease in exports, indicating an effect of trade diversion, or an increase, suggesting spillover effects. The positive effect on exports from the Western Balkan countries, associated with Croatia's EU accession, therefore suggests that these export changes are more likely driven by spillover effects rather than trade diversion.

Future research could expand this analysis further by investigating the export value in greater detail. It would be interesting to analyse the exports from Croatia and the Western Balkan countries by dividing it into different regions or sectors. This would deepen the analysis and could provide further insights into the discussion why both Croatia and the Western Balkans countries have experienced increasing export values associated with the EU enlargement of 2013.

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10. Statement on Use of Generative AI

The AI- tool that has been used in this thesis is ChatGPT. The AI tool has been used as support to write commands in STATA and to address errors that occurred when working with the econometric model. ChatGPT has also been used to help with rephrasing and spell-checking on text written by the authors.