Lund University
Department of Economics

Exchange Rate Regimes and Trade in the Western Balkans

Clara Falkenek

Bachelor Thesis
June 2023
Supervisor: Maria Persson

Abstract

The choice of exchange rate regime is believed to affect countries' trade levels. Currency unions and currency pegs reduce exchange rate volatility and create greater price transparency in foreign trade compared to a flexible exchange rate regime. This paper analyzes the interplay between the choice of exchange rate regime and export levels by looking at the Western Balkans. A region with considerable variation in countries' exchange rate policies. Western Balkan countries share a contentious history and the prospect of becoming EU members, enabling a focus on the effects of the exchange rate regime on exports to the Eurozone. The relationship between exchange rate regimes and exports is empirically estimated through a gravity model of trade using panel data for the six Western Balkan countries' exports to the early Eurozone members. The results of the study indicate a statistically significant positive association between the euro-peg currency regime and Western Balkan exports to the Eurozone. Conversely, results for the unilateral adoption of the euro indicate the exchange rate regime to be negatively associated with exports for Western Balkan countries.

Keywords: Exchange Rate Regimes, Euro, Western Balkans, Gravity Model, Trade

List of Abbreviations

BoA	Bank of Albania
CBBH	Central Bank of Bosnia and Herzegovina
CBGC	Central Bank of Montenegro
CBK	Central Bank of The Republic of Kosovo
EU	European Union
ERR	Exchange rate regime
NBRNM	National Bank of the Republic of North Macedonia
NBS	National Bank of Serbia
OLS	Ordinary Least Squares
PPML	Poisson Pseudo-Maximum Likelihood

Table of Contents

1. Introduction

Since the end of the Yugoslav Wars, the Western Balkan countries[1] have been on a trajectory toward European integration. The Balkan reconstruction after the Yugoslav wars has been characterized by economic integration with the EU through the promotion of exports from the Western Balkans to the EU. Western Balkan exports to the EU have increased by over 145% in the past decade, and the EU is the region's most prominent trade partner (European Commission, 2022). However, upon gaining independence from Yugoslavia, the Western Balkan countries took different routes regarding European economic integration in terms of exchange rate regimes. Montenegro and Kosovo have unilaterally adopted the euro as a de facto currency. Bosnia and Herzegovina and North Macedonia pegged their respective national currencies to the euro. Albania and Serbia, unlike the rest of the region, do not have a euro-anchored currency, instead keeping a flexible exchange rate. (Dabrowski and Myachenkova, 2018). However, the way in which different exchange rate regimes in the Western Balkans have affected the countries' exports to the EU is a previously unstudied relationship.

The Western Balkans is a suitable region to study the effects that the choice of exchange rate regime may have on trade as there is considerable variation in exchange rate policy within this small region. The region also largely shares the same history, challenges of ethnic tension, and the prospect of becoming EU members, making it possible to focus on the effects of exchange rate policy on trade.

The aim of this thesis is to investigate the relationships between different exchange rate regimes and export levels. More specifically, it analyzes how a euro-anchored currency, either through unilateral euro adoption or a euro peg, is associated with Western Balkan countries' export levels to the Eurozone. Hence, this study aims to answer the following research question using the empirical application of Western Balkan countries' exports to the Eurozone members[2]:

- ➢ *What characterizes the relationship between export levels and the exchange rate regimes of euro-pegging and unilaterally adopting the euro?*

[1] The Western Balkan countries in this paper are defined as: Albania, Bosnia and Herzegovina, Montenegro, North Macedonia, Kosovo, and Serbia in accordance with the definition of the European Commission (2023a)

[2] For a full list of exporting and importing countries, please see appendix 1.

Theory on exchange rate regimes suggests that a country that pegs to or adopts the currency of its main trading partner is to have higher export levels to that trading partner than countries with a flexible exchange rate. The eliminated or reduced exchange rate risk is to positively impact trade. Currency unions are theoretically more advantageous than pegs as the exchange rate regime is deemed more credible and because prices in both trading countries are given in the same currency (de Nardis and Vicarelli, 2003). Hence two hypotheses are developed. First, having a euro-anchored currency is more positively associated with exports than a floating exchange rate. Second, that the positive association with exports is larger for euro adoption than a currency peg.

Empirical research is ambiguous as to how the theoretical implications of exchange rate regimes on trade stands to reality. Early research finds that currency unions can increase bilateral trade threefold and that currency unions indeed have a greater positive effect on trade than currency pegs (Rose, 2000). However, newer studies suggest that these are considerable overestimations, and find a positive trade effect of between 3-50% (Bun and Klaassen, 2007);(Glick and Rose, 2016). Following advances in the gravity model estimation method with extensive control for unobserved heterogeneity, some studies even manage to estimate the effect of exchange rate regimes on trade to be statistically insignificant (Larch et al., 2019). Whether currency sharing is associated with higher levels of bilateral trade than a currency peg is also ambiguous in empirical research.

To test what is true in the empirical case of the Western Balkans and answer the research question, the gravity model of trade is augmented with two different exchange rate regime (ERR) variables. To separate the effects of unilateral euro adoption and of a euro-pegged currency, one variable for each of the exchange rate regimes is constructed. Albania and Serbia, which have flexible exchange rate regimes, are used as a reference group. Because of the lack of time-series variation in the exchange rate regimes for the Western Balkan countries not allowing for full control of unobserved heterogeneity, the study will find associations between export levels and the different exchange rate regimes rather than causal effects.

The disposition of this paper begins with a historical overview and outline of the exchange rate regimes in the respective Western Balkan countries. The Western Balkan countries' trade relations and economic integration with the EU are also described. Thereafter follows a review of previous research concerning the effects on bilateral trade of sharing a common currency and currency pegging. Part four of the paper presents the theory of a common currency, currency peg, and flexible exchange rate's effect on trade. Subsequently, in the fifth part of the paper, the empirical strategy is described, including the modeling of the gravity model. In part six, the study's empirical results are presented, as well as a discussion regarding the results and their implications. In the seventh and final part, the study's conclusions are given.

2. Regional Overview and Exchange Rate Regimes

2.1 Western Balkan History and Trade Ties with the EU

The six Western Balkan countries (WB6) have a complex and contentious history. Out of the collapse of Yugoslavia, following the Yugoslav Wars of the 1990s, Bosnia and Herzegovina, Kosovo, North Macedonia, Montenegro, and Serbia emerged as independent states along with Slovenia and Croatia[3]. Albania, which never was part of Yugoslavia but rather an independent state since 1912, emerged from international isolation having been the most closed economy in Europe in 1990 (Cvijanović and Uvalić, 2018).

North Macedonia[4] achieved independence from Yugoslavia in 1991, followed by Bosnia and Herzegovina in 1992. The then two remaining republics of Yugoslavia; Serbia and Montenegro, formed the Federal Republic of Yugoslavia in 1992. However, Montenegro declared its independence in 2006, leading Serbia to declare independence soon thereafter. Lastly, the southern province of Serbia, Kosovo, unilaterally declared independence in 2008. Kosovo still remains a disputed territory[5]. The ethnic tension at the root of the Yugoslav wars forming these successor states persists. Ethnic conflicts have been mounting and subsiding intermittently throughout the past two decades in Bosnia and Herzegovina, Kosovo, Montenegro, North Macedonia, and Serbia. (Prelec, 2017).

Figure 1. Map of the Western Balkans (CSIS, 2023)

[3] Slovenia, and Croatia have joined the EU and hence are no longer targeted by the EU's Western Balkan strategy. Consequently, they are no longer included in the Western Balkan group of countries and are not part of this study.

[4] At the time of independence, North Macedonia held the official name of the Former Yugoslav Republic of Macedonia and then The Republic of Macedonia. The name was changed to The Republic of North Macedonia in 2018 following an agreement with Greece after a long dispute regarding the country's name.

[5] Five EU member states do not recognize the independence of Kosovo - Cyprus, Greece, Hungary, Slovakia and Spain. Greece and Spain are importing countries part of this study.

The Western Balkan states began a path toward EU integration following Yugoslavia's dissolution. The EU's Stabilization and Association Process (SAP) was launched in 1999 as an enlargement framework for the Western Balkans to foster regional stability and cooperation (Elbasani, 2008). The EU has since 2000 further granted all the Western Balkan countries autonomous trade preferences, allowing nearly all exports to enter the EU without customs duties or limits on quantities. Autonomous trade preferences cover about 95% of their exports (Qorraj and Jusufi, 2018). Sugar, wine, and certain beef and fisheries products are exemptions from the autonomous trade preferences and enter the EU under preferential tariff quotas. These trade preferences for the Western Balkans were most recently extended in December 2020, remaining in place until 31 December 2025 (European Commission, 2020). At the EU's Thessaloniki Summit in 2003, EU accession commitments were also made to all the Western Balkan countries (Bugajski, 2019).

As part of the SAP framework, in addition to the autonomous trade preferences granted to all WB6 countries, the EU has adopted Stabilization and Association Agreements (SAA) with the individual WB6 countries. The SAAs are tailored to each Western Balkan country and establish a reciprocal, bilateral free trade agreement with the EU[6] (European Commission, 2023b). In this study, a dummy variable controls for the effect of the FTAs in place. Today, all Western Balkan Countries are EU candidate countries except Kosovo, which is recognized as a 'potential candidate country' (European Union, 2023a).

The free access to the EU internal market through autonomous trade preferences and SAAs has significantly increased the exports as intended (Ognjenović and Branković, 2011). Exports from the Western Balkan countries to the EU have increased by over 145% in the past decade, and the EU is the region's most prominent trade partner accounting for over two-thirds of its total trade (European Commission, 2022). Today, the WB6 countries are similar on a macroeconomic basis, as seen in *Table 1*, with relatively high levels of unemployment, current account deficits, and exports accounting for a large part of GDP.

[6] The period for which the FTAs have been in force for the different Western Balkan countries can be found in appendix 3.

Table 1. Selected Macroeconomic Indicators 2019[7]

Country	**GDP per capita** (US $)	**GDP growth** (annual %)	**Inflation** (annual %)	**Current account** (% of GDP)	**Exports** (% of GDP)	**Unemployment** (% of total labor force)
Albania	5,396	2.1	1.4	-7.9	31.3	11.5
Bosnia and Herzegovina	6,011	2.8	0.6	-2.6	40.6	15.7
Kosovo	4,416	4.8	2.7	-5.7	29.3	25.7
Montenegro	8,909	4.1	0.4	-14.4	43.8	15.1
North Macedonia	6,070	3.9	0.8	-3.0	62.4	17.4
Serbia	6,070	4.3	1.8	-6.9	51.0	10.4

Sources: World Bank (2023a); KAS (2020) for Kosovo unemployment rate 2019.

2.2 Exchange Rate Regimes in the Western Balkans

After their independence, the Western Balkan countries took different routes toward European economic integration regarding exchange rate regimes. Kosovo and Montenegro employ the euro as their currency, while Bosnia and Herzegovina and North Macedonia peg their national currencies to the euro. Albania and Serbia rather have flexible exchange rate regimes with inflation-targeting frameworks. (Dabrowski and Myachenkova, 2018). The exchange rate regimes are specified below in *Table 2* as having a euro-anchor or not. A further explanation of the three different exchange rate regimes of the WB6 countries follows in the next sections.

Table 2. Exchange Rate Regimes in the Western Balkans

Euro-anchored exchange rate				**Inflation targeting framework**	
Kosovo	Montenegro	Bosnia and Herzegovina	North Macedonia	Albania	Serbia
No separate legal tender	*No separate legal tender*	*Currency peg*	*Currency peg*	*Free float*	*Managed float*
unilateral adoption of the euro	*unilateral adoption of the euro*	*currency board arrangement*	*exchange rate targeting*		

[7] 2019 is chosen as later years' data are not representative because of the Covid-19 pandemic and the Russian innovation of Ukraine.

2.2.1 Unilateral Adoption of the Euro

A unilateral currency union is defined as the adoption by one country of the currency of another, without consent or an agreement. The country adopting the other's currency is only a passive partner and abandons the stabilization role of a sovereign monetary policy. (Angeloni, 2004). Kosovo and Montenegro have adopted the euro unilaterally per this definition (European Commission, 2023c).

Kosovo

Although not yet having gained independence, Kosovo withdrew from using the Yugoslavian Dinar and changed to the German Mark in 1999. Following Germany's adoption of the euro in 2002, Kosovo also unilaterally adopted the euro as its legal tender (CBK, 2022). The Central Bank of the Republic of Kosovo (CBK) does not issue its own currency. The euro adoption in Kosovo has generated macroeconomic stability with low inflation in line with that of the Eurozone. There is also a stronger confidence in banks in Kosovo as over 95% of the banking sector's balance sheet is denominated in euro. (Mustafa, 2017). Because of Kosovo's use of the euro, it has benefited from lower interest rate loans than its neighboring countries as the euro usage makes it a safer place for investors (Hajdari, 2020).

Montenegro

Although not yet a sovereign state, Montenegro effectively ended economic ties with Serbia in 1999, first adopting the German Mark as a parallel currency and then as the sole legal tender. When Germany then implemented the euro, Montenegro unilaterally adopted the euro as well in 2002. (Bieber, 2003). Montenegro is a small, open economy with large foreign trade with the EU, making for the successful implementation of the euro (Fabris et al., 2004). The Central Bank of Montenegro (CBGC) claims that the facilitation of goods and services turnover and international communication were important reasons for the unilateral euro adoption (Belke and Zenkić, 2007). The euro adoption has created predictable business conditions and imported monetary policy credibility (Fabris et al., 2004). The inflation in Montenegro has since euro adoption in the long term been in line with the inflation rate in the Eurozone with small deviations for individual years (Fabris, 2015a).

Issues of Unilateral Euro Adoption

In 2007, The Council of the European Union pointed out that the unilateral adoption of the is not in compliance with the Maastricht Treaty, which sets out the convergence criteria for joining the EU and the Eurozone. The treaty states that a prospective member country must maintain a stable exchange rate of the domestic national currency for two years before officially entering the Eurozone. Kosovo and Montenegro may therefore have to implement a national currency for two years before officially being able to join the Eurozone. However, the implications of the Maastricht Treaty for the special cases of Montenegro and Kosovo will be set at the start of accession negotiations. (Żuk, 2019).

2.2.2 Currency Peg

A currency peg is defined as when a currency's value is controlled to stay at a particular level in relation to another currency (Cambridge, 2023). It is a fixed exchange rate regime with another currency as an anchor. Currency pegs can be implemented differently in terms of how tight the fixed exchange rate is and how large reserves of the foreign currency central banks are required to maintain. Bosnia and Herzegovina and North Macedonia have a fixed exchange rate regime but pegs to the euro through different arrangements.

Bosnia and Herzegovina

Bosnia and Herzegovina maintains a currency board arrangement, a rigid pegged exchange rate with full foreign-exchange backing, and guaranteed convertibility of The Bosnian convertible mark (KM) to the euro (Kamhi and Dehejia, 2006). Bosnia and Herzegovina used the Yugoslav Dinar as its currency until 1992 when the country became independent. The Central Bank of Bosnia and Herzegovina (CBBH) issues the KM. In 2001, the CBBH pegged the KM to the euro with the exchange rate set at 1.955830 KM = 1 EUR (CBBH, 2021). The fixed exchange rate has not been altered since it was adopted (CBBH, 2023). The CBBH states that executing monetary policy goals such as low inflation and economic growth is attributed to the KM's euro-peg (CBBH, 2021).

North Macedonia

Like Bosnia and Herzegovina, North Macedonia implemented a euro peg in 2002 following a German Mark peg in 1995 (Dodevski et al., 2018). However, the fixed exchange rate regime in North Macedonia is less rigid than the currency board arrangement in Bosnia and

Herzegovina. Full convertibility of the national currency, the Macedonian Denar to the euro is not guaranteed. The National Bank of the Republic of North Macedonia (NBRNM) instead maintains a fixed exchange rate regime in terms of exchange rate targeting (NBRNM, 2017). The exchange rate target is set at *61 MKD = 1 Euro,* which has been stable for the past two decades and maintained at parity (Fehlinger, 2021);(Naumovski, 2022). The fixed exchange rate regime was initially launched to curb inflation and improve economic growth. Now it is also a tool for faster nominal convergence of the North Macedonian economy with the Eurozone. (Petreski, 2007).

The euro-anchoring fixed exchange rate regimes of Bosnia and Herzegovina and North Macedonia are in line with the convergence criteria of the Maastricht Treaty, stating that a country's exchange rate should be stable for at least two years to join the Eurozone.

2.2.3 Flexible Exchange Rate Regimes

A flexible, also called a floating exchange rate, entails that the exchange rate is determined by the supply and demand of the currency on the foreign exchange market rather than anchored to any other currency. A flexible exchange rate determined by supply and demand but also, to some extent, controlled by a government or central bank intervening in the foreign exchange market is characterized as a managed float exchange rate (Policonomics, 2023). Both Albania and Serbia have flexible exchange rate regimes. Serbia however, operates a managed float.

Albania

Albania never used the Yugoslav Dinar like the other Western Balkan countries. The Bank of Albania (BoA) issues and maintains the national currency, Lek. BoA maintains a free-floating exchange rate regime (Bank of Albania, 2018). The BoA holds an inflation target of 3%, which it has largely delivered on (della Valle et al., 2018).

Serbia

The National Bank of Serbia (NBS) operates a managed float exchange rate regime of the national currency, the Serbian Dinar, which replaced the Yugoslavian Dinar. The NBS may intervene in the foreign exchange market to ease excessive short-term volatility of the exchange rate and maintain price and financial stability. (NBS, 2023a). The NBS is not

expected to act against market forces and refrain from intervention in trend movements (Marinković, 2014). The NBS regularly intervened in the foreign exchange rate market until 2006, when inflation targeting was launched (Chailloux et al., 2010). More recently, the Serbian Dinar has been very stable, and the NBS is selling euro reserves (Ralev, 2020). Serbia's inflation-targeting monetary policy which has been in place since 2006 sets the inflation target based on expected macroeconomic movements. The most recent inflation target was set at 3%. (NBS, 2023b). However, Serbia has largely failed to achieve its past inflation targets (Fabris, 2015b).

Currency Hedging

In countries with flexible exchange rate regimes, currency hedging is a common tool for economic actors to mitigate the risk of exchange rate volatility when participating in foreign trade. However, currency hedging is not common in Albania and Serbia. Commercial banks in Albania do not generally offer forward contracts, and businesses lack knowledge of the necessity of hedging (Tufi Heta and Mulleti, 2013). In Serbia, currency hedging through forward, swap, and options contracts have been infrequent and almost used exclusively by multinational companies. (Đordevic and Vojnovic, 2011). The NBS allows the use of FX swaps. However, these have failed to have any significant stabilization of the Serbian Dinar exchange rate (Živanović and Jolović, 2012). Even though there is exchange rate volatility, the unclear regulations and companies' inadequate awareness of the hedge possibility against exchange risk are reasons why Serbian companies do not use hedging instruments. (Barjaktarović, 2012).

3. Previous Research

3.1 Currency Unions and Trade

Before the *Economic Policy* paper published by Rose in 2000, few empirical results suggested that a fixed exchange rate or a common currency affected the real economy. The conventional wisdom said that currency-sharing had little effect (Persson, 2001). Rose challenged the consensus with his study analyzing panel data of bilateral trade between 186 countries between 1970 and 1990 with the gravity model of trade. Rose's study suggested that sharing a common currency increased trade threefold. The large effect on international trade stemming from a common currency is referred to as the "Rose effect" (Baldwin, 2006). However, in Rose's study, only about one percent of the observed countries were part of a currency union. The Eurozone had notably not come into existence at the time of the study.

Persson (2001) raises criticism regarding Rose's empirical strategy, arguing that the characteristics that form costs of trade differ largely for countries that do and do not share a common currency. Persson instead applied a propensity score matching approach to simulate a controlled experiment to remove the bias he believed to be present in Rose's study. Persson instead suggests a possible range for a common currency's effect on trade to be between 13% and 66%, although the estimates are not statistically significant. Rose (2001) confirms the issues raised by Persson but shows that even using a new larger data set with his original linear regression model, Persson's matching approach and the fixed effects technique all confirm Rose's earlier results.

Rose and Wincoop (2001) further identify national currencies as a barrier to trade. Their study without country-specific effects indicates that the sharing of a common currency is associated with an almost 400% increase in trade. When adding country-specific effects, the result is still statistically significant and shows a trade increase of 230%. Glick and Rose (2001) utilize a similar gravity model specification as this study, although their sample includes time-series variation in the dependent variable, to investigate the effect of joining and leaving a currency union. Their data sample included 217 countries between 1948 and 1997. The findings included that countries that were part of currency unions had twice as much trade when in the currency union compared to after leaving.

However, there is no full empirical consensus on a currency union's positive effect on trade. There is a large gap in empirical results regarding the currency-union trade effect for euro adoption and the Rose effect. Where Rose found a tripling of trade of currency unions, Micco, Ordoñez, and Stein (2003) found that countries adopting the euro between 1999 and 2002 increased bilateral trade by an estimated 5 to 10%. Micco et al. utilized a similar empirical model as this paper, augmenting the traditional gravity model by adding a dummy variable for euro adoption.

Bun and Klaassen (2007) state that much of the literature on currency unions' effect on trade is overestimations. They suggest that previous studies utilizing the standard panel gravity models for the level of trade have an upward bias in their estimated euro effect because the residuals exhibit upward trends for euro countries. To correct the upward bias, Bun and Klaassen include a time trend resulting in the effect on the sharing of the euro only having an estimated impact of 3%. Frankel (2008) also investigates the gap between the large effect found by Rose and the smaller euro adoption effect. Frankel finds that the endogeneity of the decision to adopt the euro cannot explain the discrepancy between the Rose effect and the more modest 15% effect found on trade for euro adoption. Frankel instead reports that the discrepancy possibly stems from the sample size.

Glick and Rose (2016) confirm the results of Frankel (2008) in that the effect of the Eurozone is smaller than that of other currency unions in its impact on trade intensity. Glick and Rose reassess their study described above (2001). This paper analyzes bilateral trade between 200 countries between 1948 and 2013. Through a range of gravity model applications, they find that the Eurozone currency union has boosted bilateral trade by an estimate of 50%. Hence, it can be summarized as the empirically estimated trade effect of euro adoption is smaller than Rose estimated for currency unions in general.

The studies described above are largely similar to the estimation method used in this study. However, there are newer studies utilizing advances in gravity model estimation, advances which are not totally applicable to this study due to the lack of time-series variation in exchange rate regimes in the Western Balkans not allowing for the full use of fixed effects. The modern gravity model estimations properly control for unobserved heterogeneity and use non-linear estimators such as the PPML to find that currency unions do not significantly

impact trade. Campbell and Chentsov (2017) and Larch et al. (2019) find that the euro does not promote trade when considering high-dimensional fixed effects and clustered standard errors with PPML instead of the linearized model.

3.2 Currency Peg and Trade

Rose (2000) finds a robust positive effect on trade which is smaller for currency pegging than for sharing a common currency. He proposes that hedging against exchange rate risk might be more complicated than generally believed and that a common currency's financial integration might promote more trade in goods and services. Nonetheless, Nicita (2013) states that the significant availability of financial instruments to hedge against exchange rate risk limits the importance of exchange rate volatility on trade. The study by Nicita analyzes how the exchange rate affects international trade through a gravity model with fixed effects on bilateral trade flows for 95 countries between 2000 to 2009. Nicita concludes that positive trade effects due to reduced exchange rate volatility are indirect and rather due to the stability of long-run commitments such as currency pegging.

Klein and Shambaugh (2006), show that a fixed exchange rate regime significantly affects bilateral trade between a country and a country that pegs to it. Through a fixed exchange rate series in a gravity model with controlling dummies, the study shows that pegging appears to increase bilateral trade by 35%. Mosteanu (2017a) also finds through analyzing macroeconomic indicators that countries pegging national currencies to the euro positively impact that country's exports and trade. This relationship is especially distinct between a country with low production costs and a country with a stronger currency.

Santana-Gallego and Perez-Rodriguez (2019) estimate the gravity model by PPML like this thesis to study how different exchange rate regimes relate to international trade. They found that having a currency peg increases trade by an estimated 11% compared to a flexible exchange rate regime. However, the effect of a currency union was even larger at 14.3%. Both these exchange rate regimes had larger positive effects on trade than the floating exchange rate regime, which is used as the reference regime in this thesis. However, Stoykova (2021) finds that a currency union does not provide higher bilateral trade values than a fixed exchange rate regime when controlling for trade openness, trade partner importance, and government debt and borrowing.

3.2 The Case of the Western Balkans

There is no previous research on the particular effects of euro adoption and euro pegging in the case of all Western Balkan countries. Hence this section presents some studies that share similarities with this thesis' empirical application.

Mosteanu (2017b) conducted a study with a qualitative study of macroeconomic indicators correlated to the exchange rate regime in countries that have pegged their national currency to the euro - Bulgaria, Czechia, Denmark, Hungary, Romania, and Bosnia and Herzegovina, the latter being of interest for this thesis. Mosteanu infers that the countries' euro peg creates a stable trading environment for exporters. Cieślik et al. (2012) use the gravity model on Slovenia and Slovakia, countries close to the Western Balkans, using three estimations: fixed effects, random effects, and Hausman-Taylor show that eliminating exchange rate volatility resulted in trade expansion for the countries. However, the accession to the Eurozone did not significantly affect exports of Slovakia or Slovenia.

Klimczak (2014) further conducted a case study of the Western Balkans. Using the gravity model, the paper investigates variables such as common border, war, and the presence of ethnic minorities that affect trade. The study finds that issues of communication, cultural and historical ties, and post-war effects significantly affect bilateral trade within Western Balkan countries.

Rajkovic et al. (2020) further studied the relationship between exchange rates and foreign trade imbalance for Central and Eastern European (CEE) countries, including all WB6 countries except Kosovo. The study demonstrates that more underdeveloped countries which use the euro as their legal tender face higher trade deficits regardless of whether it faces an economic crisis. However, this empirical finding consisted of a sample of only one country using the euro while being a non-EU member country, Montenegro. This study suggests that Montenegro is under a double burden as it cannot improve its trade balance through its exchange rate. Simultaneously, the exchange rate is not adjusted to the economy. However, the study finds that countries using their own currencies cannot adjust their trade deficit substantially through their exchange rate when facing an external shock. The study concludes that Western Balkan and CEE countries that applied a fixed exchange rate experienced faster

adjustment after the global economic crisis. They improved their trade balances through increased exports and not through restrictions on imports.

4. Theoretical Framework

4.1 Currency Peg (Fixed Exchange Rate) and Trade

Currency pegs can theoretically ease trade by allowing importers and exporters to know the exact exchange rate they can expect for future transactions, limiting the need for information seeking. Klein and Shambaugh (2006) write that the facilitation of trade is a classic theoretical argument for a fixed exchange rate. Pegging to a vehicle currency[8], such as the euro, is expected to promote bilateral trade with all countries using the euro and with all other countries with a euro peg. Klein and Shambaugh further state that this line of argumentation is most relevant for countries whose currencies do not have hedging possibilities in forward markets, such as Albania and Serbia, described in section 2.2.3.

McKinnon (1963) states that small countries using a national currency are better off under a fixed exchange regime to keep liquidity value in the domestic currency. When a small open economy lets its domestic currency float against the currency of its large trading partner, the exchange rate volatility is likely to undermine the domestic currency in its monetary functions.

Baldwin et al. (2005) suggest that decreasing exchange rate volatility can increase trade in two non-mutually exclusive ways: increasing exports per exporting firm and increasing the number of firms engaged in exporting. Baldwin et al. present a theoretical model of this convex relationship between exchange rate volatility and trade volume to further convey these impacts on trade. The solid curve in *Figure 2* illustrates the convex link, whereas empirical models have assumed a linear link between volatility and trade per the dashed line. The convexity stems from the idea that smaller firms are more affected by exchange rate volatility than larger firms. Hence, when the initial group of exporting firms includes more small firms (as expected by the negative relationship between minimum firm size and exporting), the marginal impact of less volatility will be significant.

[8] A vehicle currency is a large, international currency that is used for both domestic and international public and private transactions as a unit of account, a means of exchange, and a store of value.

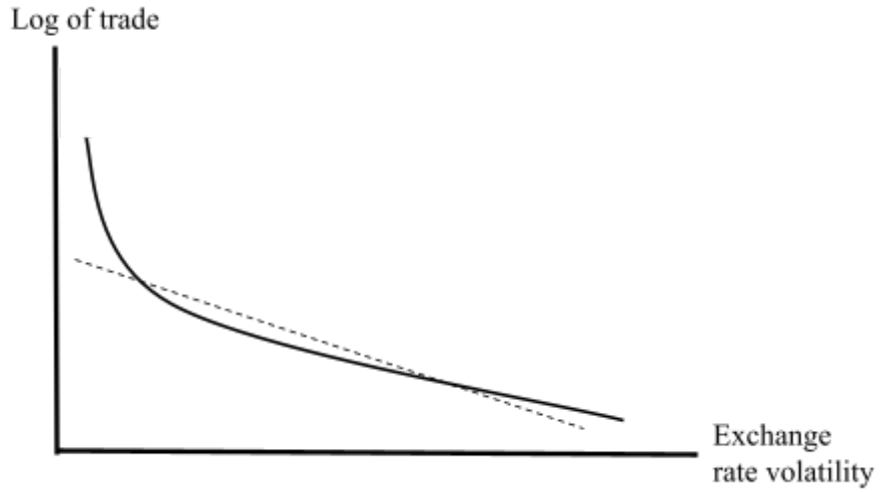

Figure 2. Convexity of Trade Volume And Exchange Rate Volatility as described by Baldwin et al. (2005).

Cieślik et al. (2012) further the theoretical argument of Baldwin et al. by similar reasoning as Klein and Shambaugh, eliminating exchange rate volatility is especially important for countries lacking forward markets. They also build on the argument that lowering the transaction costs followed by eliminating currency risk is important for countries with a strong concentration of trade with one large country or group of countries sharing a common currency.

Jurzyk and Fritz-Krockow (2004) also suggest that for countries that export to one main trade partner, a currency peg to the currency of that trade partner can be beneficial as it entails economic efficiency through lower transaction costs and currency risk. However, the possible trade-creating effect of the currency peg might be undermined if the real exchange rate is misaligned[9]. The possibility that the currency peg might be abandoned or that the currency might be re- or devalued can also diminish the positive trade effect of the currency peg. Hence more long-term exchange rate regimes, such as a currency union, might have a more significant trade effect, as explained below.

[9] A misaligned exchange rate is an exchange rate which is priced faulty in relation to the country's balance of payments. If a national currency is priced too high, exports are unattractive on foreign markets while imports are excessively attractive on the domestic market, and vice versa for an underpriced currency. (Oxford Reference, 2023)

4.2 Currency Union and Trade

Currency unions eliminate exchange risk through countries using the same currency. The theoretical framework presented above regarding a fixed exchange rate regime's facilitation of trade through the elimination of exchange rate risk largely overlaps with that of sharing a common currency. However, the additional economic integration associated with sharing a common currency has further theoretical implications on trade.

de Nardis and Vicarelli (2003) write that the common usage of a single currency zeros the transaction costs of having different currencies and exchange rate uncertainty, increasing cross-border transactions and economic integration between the countries. However, this is not the main aspect of a currency union's effect on trade, according to de Nardis and Vicarelli. Sharing a common currency offers more benefits than eliminating currency uncertainty as it is qualitatively different from a fixed exchange rate regime. Economic agents are offered higher transparency through a currency union when prices are given in the same currency in both countries. Furthermore, a currency union's commitment (it is harder to revoke than the rate at which a currency is pegged) also offers greater transparency and certainty of expectations. This may cause a sizable amount of the countries' foreign trade using a common currency to be perceived by economic actors as equivalent to domestic trade.

Alesina and Barro (2002) note, like de Nardis and Vicarelli, that currency unions facilitate trade in goods and services. Also, a currency union is a more credible exchange rate regime than a fixed-rate arrangement. Adopting a national currency again is more costly than altering the exchange rate parity. Alesina and Barro point out that currency unions are most costly in the complete loss of monetary independence. The country can no longer alter monetary policy for trade purposes nor adjust for economic shocks.

4.3 Floating Exchange Rate and Trade

Flexible exchange rate regimes give a country monetary independence. However, it allows for exchange rate uncertainty. A depreciation of the national currency because of a rise in the exchange rate can stimulate exports by making national products cheaper in foreign markets, improving exporters' competitiveness.

Clark (1973) developed an early model of a solely exporting firm under a flexible exchange rate regime where the firm is paid in a foreign currency. The exporting firm produces one homogenous commodity under perfect competition without imported inputs. The price of the product which the firm exports is exogenous. Hedging against currency risk is limited, hence the uncertainty of the future exchange rate makes for uncertainty for future revenue in its domestic currency. The firm must therefore consider the exchange rate uncertainty when deciding its production levels. Clark presents a quadratic function for the expected utility of the exporting firm in terms of profits in its domestic currency:

$U(\pi) = a\pi + b\pi^2$ risk aversion: $b < 0$

The first order condition requires the marginal revenue to exceed marginal cost. Then, the firm must be compensated for its currency risk, and the supply curve contracts as a risk-averse firm wants to reduce its currency risk. Hence, for the exporting firm to increase its utility, it reduces its sales. The expected profits and the variance of profits then decline, but the expected utility increases. (Clark, 1973 cited in Côté 1994).

Baron (1976 cited in Côté 1994) presents a theoretical case regarding the effect of exchange rate risk with respect to the invoicing currency. As Clark addresses, when a firm invoices in a foreign currency, the firm faces a price risk. Under a contract period, prices, as well as demand, are known. However, revenues and profits are unknown due to the uncertainty of future exchange rates. If the firm instead invoices in its domestic currency, it faces a quantity risk as the demand might fluctuate when the price facing the importer is not assured. In this case, both revenues and costs of production become uncertain simultaneously. When the firm invoices in a foreign currency, a risk-averse firm would increase its price, and the supply curve would shift upwards. This would reduce expected profits but increase the firm's expected utility. If the firm invoices in its domestic currency, Baron states that the firm response depends on the demand in the foreign market. He proposes that prices are lowered if the demand function is linear, resulting in an increased demand but the profit margin declines along with the expected profits. In another paper by Baron (1976), the trade level is unaffected by exchange rate risk if there is a perfectly functioning forward market with hedging instruments. Then the level of trade is only affected by the price of hedging

instruments. However, the exchange rate volatility affects the forward market, affecting trade levels.

On the contrary to Clark and Baron, De Grauwe (1988) suggests a theory where even risk-averse exporting firms may increase trade as an effect of exchange rate volatility. If an income effect is present, the exporting firm must offset the reduced expected utility of the exchange rate uncertainty by increasing trade. However, De Grauwe also suggests that a substitution effect can reduce trade as the currency risk is deterring. With high risk-aversion, the substitution effect is dominant.

In summary, the theoretical framework of the thesis comprises adopting or pegging to the currency of a main trading partner to increase a country's exports to that trading partner in comparison to a floating exchange rate regime. This is mainly due to the reduced exchange rate volatility, which lowers the currency risk exporting firms must be compensated for. The presence of a currency union with a main trading partner is also theoretically better than a currency peg for countries' ability to export. Currency adoption offers stronger credibility of the exchange rate regime as well as price transparency between trading countries. Economic actors then perceive much of a country's foreign trade as domestic trade, stimulating exports.

5. Empirical Strategy

The empirical analysis of the study employs the gravity model of trade expanded by variables controlling for the influence of a euro-peg and euro adoption. The estimation is carried out using a data sample of the Western Balkans countries' export to the 12 early adopters of the Eurozone[10] covering 2005-2022. The gravity model is estimated with Ordinary Least Squares (OLS) and Poisson Pseudo-Maximum Likelihood (PPML) estimation techniques, both with time-fixed effects.

5.1 The Gravity Model

The gravity model is the standard methodological approach to measuring different effects on trade flows. The model is based on Newton's law of universal gravitation, where the gravitational pull between two objects is determined by the mass of the objects and the distance between them. The former positively increases the gravitational pull, while the latter decreases the pull. The gravity model of trade then uses Newton's gravity model analogously to explain trade flows between countries. The gross domestic product (GDP) of countries is used as a proxy for mass (Bacchetta et al., 2012), and the distance between countries is most often measured as the distance between capitals. The gravity model of international trade is commonly used to study the exchange rate effect on trade (Kepaptsoglou and Karlaftis, 2010).

The original gravity model for international trade can typically look like this:

$$M_{ijt} = C\frac{GDP_{it}^{\beta_1} GDP_{jt}^{\beta_2}}{Dis_{ij}^{\beta_3}} \quad (1)$$

M_{ijt} stands for exports between country i and j, GDP_{it} and GDP_{jt} represents the economic mass coefficients of country i and j, and Dis_{ij} is the distance between country i and j, commonly defined as the distance between capitals.

[10] For a full list of importers and exporters, see appendix 1. For the time of importers' Eurozone membership, please see appendix 2.

The model implies that two countries with higher GDPs and being closer geographically located will have a larger bilateral trade flow. This is because countries with larger GDPs also have higher purchasing power, leading to higher levels of imports. If the country is an exporting country, a large GDP implies large levels of exports as exports are part of GDP. The negative relationship between trade flow and distance between trade partners can be explained by the greater transportation costs as well as other potential costs associated with this trade.

In order to easier estimate the gravity model of trade equation (1), it is common to transform the exponential formulation to a log-linearized model. By logarithmizing all continuous variables, the model can be estimated using the ordinary least squares (OLS) regression. The log-linearized model of equation (1) then looks like this:

$$ln\left(M_{ijt}\right) = \beta_0 + \beta_1 ln\, GDP_{it} + \beta_2\, ln\, GDP_{jt} + \beta_3\, ln\, Dis_{ij} + \varepsilon_{ijt} \quad (2)$$

The gravity model in equation (2) accounts for some bilateral trade resistance (BTR), which is the size of trade barriers between countries *i* and *j* in the form of GDP and distance. This is the version of the gravity model used by Rose (2000), along with some country-specific dummy variables. Alterations have been made to the basic gravity model to also account for multilateral trade resistance (MTR). MTR refers to the barriers to trade that each of *i* and *j* face will all trading partners. (Adam and Cobham, 2007). The inclusion of MTR in the gravity model constitutes the new, modern version of the gravity model developed by Andersson and van Wincoop (2003), who created the "gravity with gravitas" model. Baier and Bergstrand (2009) suggest a model relying on a first-order Taylor series approximation of countries' full set of bilateral resistance terms, including their internal trade resistance. There is, however, no standard method to deal with multilateral trade resistance for panel data (Olivero and Yotov, 2012). This paper uses a commonly employed technique to control for multilateral trade resistance (Bachetta et al., 2012), stated below in equation (3).

$$Remoteness_i = \sum_j \frac{Dis_{ij}}{GDP_j / GDP_w} \quad (3)$$

$Remoteness_i$ then measures a country's average weighted distance from its trading partners where weights are the trading partners' share of world GDP. This technique holds some criticism as it only accounts for distance in terms of barriers to trade. However, the inclusion of the variable for remoteness makes the study more theoretically grounded and in line with the modern literature on the application of the gravity model of trade.

5.2 Specification of the Exchange Rate Regime Augmented Gravity Model

To estimate the relationship between exchange rate regimes in the Western Balkan countries and their export levels to the Eurozone, country-specific exchange rate regime (ERR) variables are added to the gravity model. These are tested with Albania and Serbia as a reference group, which have floating exchange rates. Non-ERR-related variables are also introduced to increase the degree of explanation of the variation in exports.

To test the gravity model augmented for exchange rate regimes using a log-linearized equation (4) is defined:

$$ln\, Exp_{ijt} = \beta_0 + \beta_1 ln\, GPD_{it} + \beta_2 ln\, GPD_{jt} + \beta_3 ln\, Dis_{ij} + \beta_4 Bor_{ij} + \beta_5 FTA_{it} + \beta_6 Euro_i + \beta_7 EuroPeg_i + \beta_8 ln\, Remoteness_i + \mu_t + \varepsilon_{ijt} \quad (4)$$

The dependent variable Exp_{ijt} represents the export value in EUR for each Western Balkan country (i) to the 12 importing Eurozone countries (j). The time interval t is monthly and runs from June 2005 to December 2022.

The traditional economic variables of the gravity model, GDP of the importing and exporting countries are included as GPD_{it} and GPD_{jt}. Both GDP variables are annual measurements of the countries' GDP in million EUR. The variables are expected to positively affect exports as a larger GDP for an importing country is expected to lead to higher demand and higher GDP for the exporting country is expected to lead to a larger supply.

The variable Dis_{ij} represents the geographical distance between importing and exporting countries' capitals and is like GDP, a traditional gravity model variable. It is included in the

equation to account for the transportation costs and potential other costs of trade stemming from a greater distance between trading parties. The variable is hence expected to have a negative impact on exports as the further away countries are from each other, the less they are expected to trade with each other.

Measuring the distance between two capitals is not a flawless measure of distance. The distance between the capitals can be a misleading indicator of the distance between the countries. The capitals, for example, can be very close to the border of states that border each other, or vice versa, lie on the other side of the country. Hence, the dummy variable Bor_{ij} for trading countries sharing a common border is introduced as a supplementary variable of the distance measure. The fact that the WB6 country borders an importing country means that fewer borders need to be crossed when exporting. This typically means that fewer customs duties and quality and standard controls must be passed, which entails decreased costs. A positive effect on exports is hence expected if the WB6 country borders the importing Eurozone country.

The dummy variable FTA_{it} is included in the equations to account for an expected positive effect of the FTAs concluded between individual WB6 countries with the EU lasting between five and ten years[11].

One of the two ERR variables, which are the main variables of interest in this study, is the $Euro_i$ dummy variable which takes the value one if the exporting WB6 country uses the euro as its de facto currency and takes the value zero otherwise. The dummy variable aims to demonstrate the relationship between a common currency with the importing countries and export levels. There is no time-series variation for the $Euro_i$ dummy variable as the exchange rate regimes do not change for the countries in the sample. The euro dummy variable is expected to be positive as a common currency eliminates exchange rate uncertainty and deeper integration.

$EuroPeg_i$ is the second central ERR variable of the study. It takes the value one in the case that the WB6 country has pegged its national currency to the euro, otherwise it takes the

[11] For specification of the time intervals of the bilateral FTAs, see appendix 3.

value zero. The variable is expected to have a positive impact as the fixed exchange rate stemming from the euro peg limits the uncertainty of the exchange rate. The implication for the regression is that *Euro Peg* captures the part of exports that depend on a fixed exchange rate while the *Euro* dummy variable captures the part of exports that depend on the deeper degree of currency integration. There is no time-series variation present for this ERR variable like the $Euro_i$ variable. None of the WB6 countries have changed their exchange rate regime since the countries' independence and hence no time-series variation in terms of ERR is present in the sample.

The $Remoteness_i$ variable described in equation (3) is included in the model to account for multilateral trade resistance in order to make the study's augmented gravity model more theoretically grounded. It also deals with some unobserved heterogeneity among exporting countries.

The model also includes a set of time-fixed effects, μ_t[12].

It is common in gravity models to include dummy variables for trading countries sharing a common language or colonial history. These dummy variables are, however, not part of the equations as they are not applicable to the linguistic or historical realities of the importing and exporting countries in this study.

5.3 Estimation Method and Issues

5.3.1 Estimation Techniques

The OLS and PPML estimators are used to test the gravity model augmented for exchange rate regimes specified in equation (4). Both estimation techniques are recognized methods of testing the gravity model and provide different econometric characteristics. OLS is widely used in the gravity model literature, making it a reliable estimation method and comparable to previous studies.

[12] When estimating the model with OLS, the time-fixed effects are defined on a month x year basis. The subsequent PPML estimations, time-fixed effects are also defined on a month x year basis, but due to the limitations of the PPML Stata command, these are included as a set of month and year dummy variables.

Santos Silva and Tenreyro (2006) proposed that the PPML estimator is more reliable than the traditional OLS as it is robust to heteroscedasticity. Santos Silva and Tenreyro (2011a) further found that the PPML estimator is reliable even when there are zero values in the dependent variable, unlike the OLS estimator. The Stata model developed by Santos Silva and Tenreyro (2011b) is used in addition to the OLS estimator in this study. The dependent variable Exp_{ijt} is not logarithmized when using the PPML estimation technique in line with the literature on gravity estimation with PPML.

5.3.2 Estimation Issues

Firstly, using the log-linearized model of the gravity model can result in inconsistent estimates in the presence of heteroscedasticity (Santos Silvia and Tenreyro, 2006). The variance of the error term is then not constant for all observations, making the OLS estimates inefficient. Data samples with a large range are prone to heteroscedasticity. Robust standard errors are hence applied to the OLS estimation. Using the non-linear PPML estimator for the gravity model is further a solution to the issue of heteroscedasticity as it controls for heteroscedasticity by using robust standard errors.

Another standard problem when estimating the gravity model is the occurrence of zero trade observations (Hoekman and Nicita, 2011). The issue of zero-trade flows could be of both estimation and measurement nature as the zero flow could be of either trade flows actually being zero or because of missing data. Either way, zero-trade flows present a problem when estimating the gravity model using a log-linear model, as the natural logarithm of zero is undefined and undefined observations will be dropped from the estimation.

The presence of zero-trade flows is limited in the sample of this study, as non-zero trade flows occur in 90% of observations. However, the zero-trade flow observations are likely indeed true zero values because of there being no trade between small Western Balkan nations such as Kosovo and small European countries such as Luxembourg at certain months. It is therefore an impediment to the validity of the study for these zero-value observations to be dropped as they reflect reality - an estimation without them would produce biased results. To account for the zero-trade flows in the data sample, OLS estimates are produced when replacing zero values with one to ensure these observations are not dropped from the regression. Unlike the log-linearized model, the PPML estimator uses actual levels of exports

and not logarithmized values. Hence the zero values are not disregarded and do not present an estimation issue for this estimator (Bacchetta et al., 2012).

Endogeneity is also a commonly occurring issue when estimating effects on trade with the gravity model (Bacchetta et al., 2012) and a probable issue of the study's estimation models. Endogeneity occurs when the error term in a model is correlated with a predictor variable (endogenous variable) (Lynch & Brown, 2011). Endogeneity may arise because of (1) measurement errors (Dougherty, 2011) as well as (2) simultaneous equation bias, and (3) omitted variable bias (Lynch & Brown, 2011).

In the model of study, the euro and the euro-peg variables are likely to suffer from endogeneity because of the possibility of simultaneity of the policies of a euro-anchored exchange rate regime and exports to the Eurozone (Shepherd, 2016). Countries with an already export-oriented economy with high trade levels may have the incentive to implement more liberal trade-oriented policies such adoption of the euro or euro-peg. Hence, the variables may be codetermined and correlated to the error term because unobserved characteristics have explanatory value for some countries' higher export values. It is also possible that the FTA variable suffers from endogeneity in the model for similar reasons. WB6 countries with already high trade flows are more likely to sign FTA agreements with the EU. It is also likely that endogeneity arises in the study's estimations because of omitted variable bias where possible determinants of trade, such as democracy and functionality of the justice system, are not part of the regression.

When dealing with panel data, unobserved heterogeneity can be an issue as part of the effect on the dependent variable is attributed to unobserved differences between countries. Unobserved heterogeneity must then be accounted for in the error term, making the error term non-independent. The presence of unobserved heterogeneity results in incorrect estimates and precludes causal inference (Gormley and Matsa, 2014). To overcome the problems of unobserved heterogeneity, fixed effects for time are included in the model. The remoteness variable, which is country-specific for the WB6 countries, also aids in dealing with unobserved heterogeneity for the exporting countries. However, this does not fully solve the problem of unobserved heterogeneity, as time-invariant heterogeneity among exporters is still present.

The use of country or country-pair fixed effects is often a solution to deal with unobserved heterogeneity. However, because the study deals with exchange rate regimes and no time-series variation in the ERR variables is present, using individual/country-pair fixed effects is not possible. Using the euro as a de facto currency and euro pegging are bilateral time-invariant variables as the exchange rate regimes have not changed during the period of study. An estimation using fixed effects would hence not be viable because of perfect collinearity (Bacchetta et al., 2012). It is important to keep the possible unobserved heterogeneity in mind when interpreting the results of the model estimations.

5.3.3 Method of Estimation - Dealing with Estimation Issues

The estimation issues of the OLS estimator is partly solved by adjusting for zero-trade flows by replacing the zero in the dependent variable with one, a common way in empirical research to avoid biased results of the OLS estimator. Robust standard errors are also included to account for heteroscedasticity. The PPML estimator is used in order to compare OLS estimates and produce further results for analysis. The PPML methodology also accounts for many of the shortcomings of the log-linear model as it eliminates the inconsistencies created by heteroscedasticity and zero-trade flows.

Robustness tests including additional variables are further conducted because of the probable omitted variable bias. Both OLS and PPML estimations deal with unobserved heterogeneity through time-fixed effects. Including time-fixed effects only partially solves the problem of unobserved heterogeneity. It would benefit the study to include country- or country-pair fixed effects. This would have controlled for the time-invariant country and country-pair heterogeneity. However, this is not possible due to the lack of time-series variation in the sample for the exchange rate regime variables.

5.4 Sample and Data

5.4.1 Sample

The data sample in this study consists of monthly export values from the WB6 countries to the Eurozone countries over the time period 2005-06 - 2022-12. This time period was chosen because export data from Montenegro and Kosovo to the EU started being recorded and

available in the Eurostat database from 2005-06. The 12 Eurozone countries part of the sample were chosen as they had all adopted the euro before 2005, enabling testing of the relationship between exports and a common currency/currency peg throughout the sample period.

5.4.2 Data

The export and GDP data are retrieved from the Eurostat database (Eurostat, 2023). Import statistics are commonly preferred to export statistics due to their greater reliability. The dependent variable, exports of goods from WB6 countries, are hence measured by the recorded import value in nominal EUR of the 12 early members of the Eurozone from the WB6 countries.

The variable for distance Dis_{ij} was computed in kilometers between country capitals as a beeline distance (the shortest distance between two points) using a distance calculator of latitudinal and longitudinal measures. The Bor_{ij} variable was self-constructed using the Google Maps Platform to identify common borders between Western Balkan countries and the Eurozone countries part of the sample. The FTA_{it} variable was assembled using the European Commission's compilation of trade agreements and the EU legislation regarding the respective WB6 countries' SAAs (European Commission, 2023d).

The $Euro_i$ and $EuroPeg_i$ variables were also manually created using the source compilation found under sections 2.1, 2.2, and 2.3 mainly stemming from the Western Balkan countries' central banks definition of their respective exchange rate regime (CBK, 2022); (Bieber, 2003); (European Commission, 2023c); (CBBH, 2023); (NBRNM, 2017); (Bank of Albania, 2018); (NBS, 2023a).

The $Remoteness_i$ variable was manually calculated using the World Bank's database (World Bank, 2023a) for the GDP values for the included countries and world GDP. The distance component is the same as described for the Dis_{ij} variable.

6. Empirical Results and Analysis

To estimate the relationship between exchange rate regimes in the Western Balkan countries and their export levels to the early Eurozone members, the OLS and PPML estimators are employed. The regressions of equation (4) are first presented, followed by six robustness tests involving countries' business environment, level of corruption, and opinion towards the EU. These robustness tests are included in the study since it is not econometrically possible to control for unobserved heterogeneity using country or country-pair fixed effects due to the lack of time-series variation in the material regarding exchange rate regimes. The robustness tests aim to control for unobserved heterogeneity and omitted variables bias by including more plausible trade determinants in the regressions. Because of the estimation issues described above, more weight is given to the sign of the coefficients rather than their exact value.

6.1 Baseline Regressions

Table 3 shows the results of the baseline regressions. The baseline model for equation (4) using OLS and time-fixed effects can be found in column (a). However, it is clear that the presence of zero-trade flows matters and that the results shown in column (a) are biased. There is a large discrepancy in the number of observations between (a) and (b), which shows the OLS regression adjusted for zero-trade flows. Therefore, the OLS estimate using time-fixed effects and adjusting for zero-trade flows in (b) will be used as OLS baseline estimates along with the PPML time-fixed effects estimates presented in column (c). Furthermore, the OLS estimates adjusting for zero-trade flows and the PPML time-fixed effects estimates converge in terms of signs of coefficients, motivating the use of OLS adjusted for zero-trade flows to present unbiased results.

The baseline estimates of the traditional gravity model variables, the GDP of exporters and importers, and the distance between trading countries are all consistent with the gravity model intuition. The presence of a common border between exporting and importing countries also has a positive coefficient estimate, as expected. The FTA dummy variable returns a positive effect on export levels for both baseline regressions, although the PPML baseline estimate for the presence of an FTA is not statistically significant.

Table 3. OLS and PPML Baseline Estimations

Exports	**(a)**	**(b)**	**(c)**
GDP Exporters	**2.375*****	**2.894*****	**1.576*****
	(0.042)	(0.062)	(0.039)
GDP Importers	**1.492*****	**2.047*****	**1.101*****
	(0.010)	(0.024)	(0.014)
Distance	**-2.972*****	**-3.964*****	**-1.859*****
	(0.023)	(0.051)	(0.024)
Common Border	**1.145*****	**1.222*****	**0.411*****
	(0.043)	(0.064)	(0.040)
FTA	**0.146*****	**0.233*****	**0.011**
	(0.041)	(0.057)	(0.031)
Euro	**0.299*****	**-0.329*****	**-0.572*****
	(0.071)	(0.106)	(0.074)
Euro peg	**1.275*****	**1.814*****	**0.880*****
	(0.040)	(0.057)	(0.047)
R^2	0.6954	0.6889	0.6577
Observations	13 659	15 191	15 191
Time FE	Yes	Yes	Yes
Remoteness	Yes	Yes	Yes

** p<0.05, ** p<0.01, *** p<0.001* *Robust standard errors in parentheses.*
All continuous variables are logarithmized.

The results for the exchange rate regime dummy variables in the baseline regressions in columns (b) and (c) estimate a positive impact on exports of the euro-peg per the hypothesis that a euro-anchored currency positively affects exports. The PPML estimate suggests that countries with the euro-peg export 141% more than the reference group not having a euro-anchored currency regime ($e^{0.880}$-1). This result is in line with theory but a considerably larger effect than the empirical result of the study by Klein and Shambaugh (2006) which estimated that a fixed exchange rate increases bilateral trade by 35%. The larger impact found in the baseline regressions than that of previous empirical research is likely due to the lack of proper controls for unobserved heterogeneity in the estimation method of this study.

Contrary to expectation, the impact of using the euro as a de facto currency is estimated to be negative. The baseline PPML estimate result can be interpreted as a country having the euro as its currency exports 43% less than the countries without a euro-anchor in the Western

Balkans ($e^{-0.572}$-1). The baseline estimates for the unilateral euro adoption diverge from the empirical research stating that currency sharing tends to increase trade (Rose, 2000) as well as research finding that currency sharing shows a stronger positive impact on trade than a fixed exchange rate regime (Santana-Gallego and Perez-Rodriguez, 2019).

The takeaway is that having the euro as a de facto currency is associated with lower export levels to the Eurozone than not having a euro-anchored exchange rate regime for WB6 countries. There is a positive relationship between countries maintaining a pegged exchange rate regime and export levels compared to countries with a floating exchange rate regime. These results do not align with the two hypotheses that a euro-anchored exchange rate regime should be more positively associated with trade than a floating exchange rate as they show a negative relationship between unilateral euro adoption and exports. These results simultaneously show estimates speaking against the second hypothesis of euro adoption to be more positively associated with exports than a euro peg. As it is likely that these results are biased and suffer from unobserved heterogeneity a multitude of robustness tests follow to test the persistence of these baseline estimates of the euro adoption and peg.

6.2 Montenegrin and Kosovan Independence; Robustness Test 1

Montenegro declared its independence in 2006 and Kosovo in 2008. Hence, the countries had not gained independence at the start of the time period of this study. This likely has a negative impact on the export levels of these countries, both because of measurement issues as they were part of Serbia and because trade links were disturbed at the time of independence. To exclude this effect from the study, a robustness test is conducted for the time period 2013-2022, presented in *Table 4*. The start of the sample is 2013, allowing for the turbulence of independence to have settled, as well as the financial and European debt crises.

The estimations of the robustness test shown in column (d) for the OLS estimates and (e) for the PPML estimates in *Table 4* align with the baseline estimates. Unilateral euro adoption is still associated with lower export levels than the reference group even though the two countries holding this exchange rate regime, Montenegro and Kosovo, exercised self-government throughout all the tested years. However, it is important to note that Serbia and the importing countries Greece and Spain still dispute the independence of Kosovo. This may still negatively affect trade for Kosovo, which could be a variance in the export data

which is captured by the euro variable as a variable for internal turbulence is not included nor country-specific effects.

Table 4. Adjusting for Montenegrin and Kosovan independence; Robustness test 1

Exports	**(d)** OLS	**(e)** PPML
GDP Exporters	**2.969*****	**1.661*****
	(0.076)	(0.054)
GDP Importers	**1.823*****	**1.155*****
	(0.025)	(0.017)
Distance	**-3.600*****	**-1.801*****
	(0.062)	(0.032)
Common Border	**1.080*****	**0.496*****
	(0.069)	(0.054)
FTA	**-0.073**	**0.022**
	(0.062)	(0.047)
Euro	**-0.132**	**-0.678*****
	(0.128)	(0.103)
Euro Peg	**1.675*****	**0.930*****
	(0.066)	(0.066)
R^2	0.7030	0.6512
Observations	8 639	8 639
Time FE	Yes	Yes
Remoteness	Yes	Yes

** p<0.05, ** p<0.01, *** p<0.001* *Robust standard errors in parentheses.*
All continuous variables are logarithmized.

6.3 Exclusion of Greece; Robustness Test 2

Greece is the only country in the sample with a common border with Western Balkan countries. Therefore, the export flows to Greece are likely to differ from those to the other Eurozone members further away. Hence, a robustness test is conducted to understand the effect of the exchange rate regime when exports need to travel further, and the common border effect is excluded.

Robustness test two, shown in *Table 5*, returned similar estimates as the baseline regressions where there is a negative relationship between the unilateral adoption of the euro and export levels. Also similar to the baseline estimates in *Table 3*, the countries with currency peg

exchange rate regimes export more. This reinforces the baseline findings as the estimates stand even when taking away the probable positive trade effect for countries bordering Greece.

Table 5. Excluding Greece; Robustness test 2

Exports	**(f)** OLS	**(g)** PPML
GDP Exporters	**2.860***** (0.073)	**1.497***** (0.060)
GDP Importers	**2.073***** (0.024)	**1.168***** (0.020)
Distance	**-3.834***** (0.055)	**-1.739***** (0.026)
FTA	**0.169*** (0.064)	**-0.063** (0.039)
Euro	**-0.377**** (0.117)	**-0.839***** (0.073)
Euro Peg	**2.219***** (0.079)	**1.178***** (0.086)
R^2	0.6963	0.6297
Observations	13 925	13 925
Time FE	Yes	Yes
Remoteness	Yes	Yes

** p<0.05, ** p<0.01, *** p<0.001* *Robust standard errors in parentheses.*
All continuous variables are logarithmized.

6.4 Accounting for Corruption and EU Opinion; Robustness Tests 3 and 4

Corruption is a widespread problem for all Western Balkan countries (Bak, 2019). Corruption levels are commonly viewed as a trade determinant, constituting robustness test four to control for more variance in export levels beyond the baseline regressions. The literature on corruption's effect on trade shows both a trade-promoting and trade-hindering effect. Corruption can promote economic activity in countries with internal barriers and impediments (Tanzi, 1998). However, corruption is also found to significantly reduce international trade, where corruption acts as friction in the economy (Anderson and Marcouiller, 2002). To test the baseline regressions with the inclusion of a corruption variable, the World Bank's Control of Corruption index is used (World Bank, 2023b). The index is on a scale between -2.5 and 2.5, where -2.5 indicates little control of corruption and 2.5 is a high control of corruption. The index is transformed to only consist of positive values

and where a high value indicates a high level of corruption rather than a low level of corruption[13]. This is done to logaritmize the index numbers and interpret the results of the estimations more easily. If the trade-hindering effect of corruption is dominant, the variable $Corruption_{it}$ is expected to be negative.

Along with corruption, the sentiment towards the EU in the Western Balkan countries may also be a possible determinant of trade. The public attitude towards the EU differs between the WB6 countries. It can hence be indicative of how willing firms in Western Balkan countries are to invest in exporting to the European market. There is no available literature on the link between public opinion on the EU in the Western Balkan countries and EU trade. Hence, the variable $EUopinion_i$ is manually constructed using The Balkan Barometer (RCC, 2022), a public opinion survey conducted annually in the WB6 countries. The question: "Do you think that EU membership would be a good thing, a bad thing, or neither good nor bad for your economy?" and the answer "A good thing" is used as a proxy for a positive attitude towards the EU[14]. The average value for the surveyed years are calculated for each WB6 country. The variable can be expected to positively impact export levels as a more positive opinion of the EU might motivate more interest in investing in exporting to the EU market.

As shown in *Table 6,* the estimate of the corruption variable is negative: a 1% increase in the corruption score tends to decrease exports by about 0.4% according to the OLS estimate, and 0.1% for PPML. These estimates align with the literature where corruption is trade-hindering. The results for the exchange rate regime variables hold the same signs as the baseline regressions even when controlling for corruption, strengthening the relationships found between the different euro-anchoring currency regimes and exports.

As seen in *Table 7,* both OLS and PPML estimators show a negative relationship between a more favorable public view of the EU and exports - contrary to the intuition that a high positive public opinion of the EU would positively affect exports to the Eurozone. As Serbia is the country with the lowest public opinion of the EU in the WB6 countries, it is possible that also the EU opinion variable is a proxy for other variables not included in the study that would explain its higher trade levels, such as production base. This could also explain why, in

[13] For the used index numbers, see appendix 4.
[14] For the used percentage numbers, see appendix 5.

robustness test four, the sign for the $EuroPeg_i$ variable changes for the PPML estimate. The lower trade levels of countries that have unilaterally adopted the euro but high public opinion of the EU can now be captured by the $EUopinion_i$ variable.

Table 6. Corruption; Robustness test 3

Exports	**(h)** OLS	**(i)** PPML
GDP Exporters	**3.074***** (0.065)	**1.500***** (0.132)
GDP Importers	**2.046***** (0.024)	**1.101***** (0.073)
Distance	**-3.967***** (0.051)	**-1.860***** (0.024)
Common Border	**1.197***** (0.063)	**0.409***** (0.058)
FTA	**0.300***** (0.045)	**0.001** (0.029)
Euro	**-0.391***** (0.109)	**-0.742***** (0.074)
Euro Peg	**1.743***** (0.061)	**0.797***** (0.056)
Corruption	**-0.407***** (0.024)	**-0.099**** (0.036)
R^2	0.6935	0.6565
Observations	15 191	15 191
Time FE	Yes	Yes
Remoteness	Yes	Yes

** p<0.05, ** p<0.01, *** p<0.001*

Table 7. EU opinion; Robustness test 4

Exports	**(j)** OLS	**(k)** PPML
GDP Exporters	**2.196***** (0.083)	**0.138** (0.094)
GDP Importers	**2.046***** (0.024)	**1.100***** (0.013)
Distance	**-3.969***** (0.051)	**-1.863***** (0.025)
Common Border	**1.191***** (0.063)	**0.397***** (0.041)
FTA	**0.254***** (0.046)	**-0.037** (0.031)
Euro	**-1.068***** (0.126)	**-2.305***** (0.107)
Euro Peg	**1.286***** (0.064)	**-0.088** (0.069)
EU opinion	**-1.974***** (0.110)	**-1.705***** (0.108)
R^2	0.6937	0.6623
Observations	15 191	15 191
Time FE	Yes	Yes
Remoteness	Yes	Yes

Robust standard errors in parentheses.
All continuous variables are logarithmized.

In robustness tests one, two, and four, the variable for the presence of a free trade agreement changes signs for the different estimates. As seen in *Table 4*, *Table 5*, and *Table 7*, the majority of these estimates lack statistical significance and the rest are of very low statistical significance. It is not unreasonable that the presence of an FTA is of little significance to explain export levels as all the Western Balkans countries are granted autonomous trade preferences by the EU regardless of FTAs. However, the changing of signs for the FTA coefficients can point to a presence of unobserved heterogeneity as the unobserved

heterogeneity can be captured by the FTA variable, as well as the other variables, and hence provide incorrect estimates.

6.5 Business environment: Robustness test 5

In a final attempt to find possible determinants of exports and improve the explanatory value of the exchange rate regime variables, a robustness test is conducted to account for the country-specific business environment (domestic trade costs). The literature concludes that domestic trade costs and the business environment are barriers to international trade (Rousslang and To, 1993). To measure the effect of domestic trade costs, the World Bank's Doing Business score[15] (World Bank, 2023c) is used as a proxy for country-specific business environments. For methodological consistency[16], the tests are divided into two time spans: 2010-2014 and 2016-2020. The $BusinessEnvironment_{it}$ variable is the closest the study comes to controlling for country-specific effects as it controls for some internal heterogeneity across the WB6 countries. The variable is expected to positively impact export levels as lower domestic trade costs, thereby a higher Doing Business score, supposedly facilitate trade.

As shown in *Table 8*, the $BusinessEnvironment_{it}$ variable has a positive effect on exports. The baseline regressions in terms of the sign of coefficients also hold in this robustness test when resistance to trade is controlled for both domestically and multilaterally through the remoteness control variable included in all regressions. This robustness test comes the closest to controlling for heterogeneity among WB6 countries and hence strengthens the findings of the baseline regressions.

[15] Doing Business records all procedures officially required, or commonly done in practice, to start up and formally operate an industrial or commercial business, as well as the time and cost to complete these procedures (World Bank, 2023c)

[16] Data for Kosovo is first available after 2010 and the World Bank has changed its methodology for its Doing Business score between 2014 and 2016. Hence the test is divided into two periods, 2010-2014 and 2016-2020, where the scoring procedure has been consistent within the periods.

Table 8. Controlling for country-specific business environment; Robustness test 5

	2010 - 2014		2016 - 2020		Average	
Exports	**(l)** OLS	**(m)** PPML	**(n)** OLS	**(o)** PPML	**(p)** OLS	**(q)** PPML
GDP Exporters	**2.685***** (0.110)	**1.231***** (0.080)	**2.264***** (0.176)	**1.222**** (0.179)	**2.475**	**1.227**
GDP Importers	**2.105***** (0.029)	**1.020***** (0.019)	**1.787***** (0.032)	**1.159***** (0.024)	**1.946**	**1.090**
Distance	**-4.503***** (0.060)	**-2.016***** (0.039)	**-3.443***** (0.056)	**-1.769***** (0.045)	**-3.973**	**-1.893**
Common Border	**0.415***** (0.110)	**-0.034** (0.059)	**1.152***** (0.079)	**0.378***** (0.072)	**0.784**	**0.172**
FTA	**0.232**** (0.073)	**0.157*** (0.074)	**0.228*** (0.110)	**0.120** (0.096)	**0.230**	**0.139**
Euro	**-1.785***** (0.186)	**-0.794***** (0.127)	**-1.262***** (0.250)	**-1.997***** (0.235)	**-1.524**	**-1.396**
Euro peg	**1.484***** (0.105)	**0.542***** (0.086)	**0.947***** (0.129)	**0.579***** (0.147)	**1.216**	**0.561**
Business Environment	**5.819**** (0.646)	**1.995**** (0.605)	**6.392***** (0.811)	**2.491**** (0.765)	**6.106**	**2.243**
R^2	0.6896	0.7401	0.7095	0.6530		
Observations	4 319	4 319	4 319	4 319		
Time FE	Yes	Yes	Yes	Yes		
Remoteness	Yes	Yes	Yes	Yes		

** p<0.05, ** p<0.01, *** p<0.001* *Robust standard errors in parentheses.*
All continuous variables are logarithmized.

6.6 Summary of Estimation Results

In conclusion, OLS and PPML estimates point towards a negative relationship between unilateral euro adoption and export levels to the Eurozone compared to countries maintaining a floating exchange rate in the Western Balkans. The results are statistically significant at the 0.1% level, withstanding the robustness tests where some results are at lower levels of statistical significance. These estimates are not in line with the theory-based hypotheses that the euro anchor in the form of unilateral euro adoption is positively associated with export levels nor that euro adoption is to be more positively associated with exports than a euro peg.

However, the estimation results show that the euro-anchored fixed exchange rate regimes are positively associated with higher export levels to the Eurozone than those of countries with flexible exchange rates. These results are in line with theory and empirics on a fixed exchange rate regime's positive effect on trade. They are also statistically significant at the 0.1% level and hold true throughout the robustness tests except for when including a variable for public opinion of the EU. The FTA variable also changes in terms of being positive or negative between OLS and PPML estimates for some robustness tests. These results point to a presence of unobserved heterogeneity, which is why the euro peg variable changes sign for robustness test five when further variables are included. It is likely that the determinants of trade still excluded from the study could explain more variance in the trade flows, which is now captured by the exchange rate regime variables but not actually speaking to the effect of the euro-anchoring's impact on trade. It is also important to note that due to the study's inability to properly control for unobserved heterogeneity the exchange rate regime dummy variables are not capturing a causal effect. Instead, they may work as proxies for the general trade propensity of the countries with these exchange rate regimes.

7. Summary and Conclusions

The purpose of this thesis has been to analyze the relationship between the choice of exchange rate regime and Western Balkan exports to the Eurozone, a previously unstudied relationship. The hypothesis that countries having a euro-anchored currency either through unilateral adoption of the euro or pegging to the euro would have a positive relationship with export levels was empirically tested using the gravity model of trade. Time-fixed effects OLS and PPML estimators were applied to data from the six exporting Western Balkan countries to the importing 12 first members of the Eurozone.

The support for the first hypothesis that the study provides is ambiguous. In line with theory and previous empirical research of a country with a pegged exchange rate to the currency of its main trading pattern, the study's results found statistically significant support for a positive relationship between the euro-peg currency regime and export level to the Eurozone. The positive association was also statistically significant when controlling for trade determinants such as domestic trade costs and corruption.

Unlike the euro peg, the study found unilateral euro adoption negatively associated with export levels. This result shows support against the second hypothesis of euro adoption having a stronger positive association with export levels than a euro peg. The results also contradict the theory and existing literature on the positive trade effects of currency unions. It can be suggested that the unilateral adoption of the euro in the Western Balkans does not have the equivalent positive trade effect of multilaterally formed currency unions. This may be the case for Kosovo and Montenegro because their unilateral euro adoption is not in line with the Maastricht Treaty, and they may need to abandon the euro currency. Euro adoption, as per the case of Kosovo and Montenegro, might not then provide the credibility of a currency union and subsequent positive trade effect de Nardis and Vicarelli (2003) suggest.

However, these results are found when only controlling for time-fixed effects, multilateral trade resistance, and the common gravity model variables, but not for country-specific heterogeneity due to the lack of time-series variation of the exchange rate regime variables. Without such controls for unobserved heterogeneity, the exchange rate regime dummy variables are not capturing a causal effect. The exchange rate regime variables instead function as proxies for the general propensity of trade of the WB6 countries that have these

exchange rate regimes. Time-series variation in the variables would alleviate some of the drawbacks of this paper and aid in identifying causal effects. Empirical research of exchange rate regimes in the Western Balkans does not allow for this because of the constancy of the WB6 countries' exchange rate regimes since their independence from Yugoslavia.

Further investigation on how Western Balkan countries' export levels have been affected by the choice of exchange rate regimes at independence could include the then constituent republics of Yugoslavia's export levels. There would then be time-series variation in the data as the countries' exchange rate regimes change from that of the Yugoslav Dinar to those adopted at independence from Yugoslavia. The availability and reliability of data could, however, be of issue for this kind of study, as data for many of the WB6 countries before the sample period of this thesis is not readily available.

The contribution of this paper concerns the previously non-existing empirical literature on how countries' using euro-anchored exchange rate regimes stand in comparison to floating exchange rate regimes in terms of trade in the Western Balkans. Although causal effects are not identified, countries that have unilaterally adopted the euro are seemingly associated with lower export levels, and countries with a euro peg are associated with higher export levels than those of countries with a flexible exchange rate in the case of the Western Balkans.

References

Adam, C., and Cobham, D. (2007). Modelling Multilateral Trade Resistance In A Gravity Model With Exchange Rate Regimes, CDMA Conference Paper Series, no. 0702, Centre for Dynamic Macroeconomic Analysis.

Alesina, A., and Barro, R. J. (2002). Currency Unions, *The Quarterly Journal of Economics*, vol. 117, no. 2, pp. 409–436

Anderson, James A., and Douglas Marcouiller (2002). Insecurity and the Pattern of Trade: An Empirical Investigation, *The Review of Economics and Statistics*, vol. 84, no. 2, pp. 342–352.

Andersson, J. E., and Wincoop, E. (2003). Gravity with Gravitas: A Solution to the Border Puzzle, *American Economic Review*, vol. 93, no. 1, pp. 170–192

Angeloni, I. (2004). Unilateral and Multilateral Currency Unions: Thoughts from an EMU Perspective, in V. Alexander, G. M. von Furstenberg and J. Mélitz (eds), *Monetary Unions and Hard Pegs: Effects on Trade, Financial Development, and Stability,* Oxford: Oxford University Press, pp. 41–50

Bacchetta, M., Beverelli, C., Cadot, O., Fugazza, M., Grether, J., Helble, M., Nicita, A., and Piermartini, R. (2012). A Practical Guide to Trade Policy Analysis, WTO and UNCTAD

Baier, S. L., and Bergstrand, J. H. (2009). Estimating The Effects Of Free Trade Agreements On International Trade Flows Using Matching Econometrics, *Journal of International Economics*, vol. 77, no. 1, pp. 63–76

Bak, M. (2019). Western Balkans and Turkey: Overview of Corruption and Anticorruption, U4 Anti-Corruption Resource Centre, Available Online: https://www.u4.no/publications/overview-of-corruption-and-anti-corruption-in-the-western-balkans-and-turkey#background [Accessed 10 May 2023]

Baldwin, R. (2006). The Euro's Trade Effect, working paper, no. 594, European Central Bank

Baldwin, R., Skudelny, F., and Taglioni, D. (2005). Trade Effects of the Euro: Evidence from Sectoral Data, working paper, no. 446, European Central Bank

Bank of Albania. (2018). Official exchange rate, Available online: https://www.bankofalbania.org/Markets/Official_exchange_rate/ [Accessed 10 May 2023]

Barjaktarović, L. (2012). Importance of Forward Contracts in the Financial Crisis, *Journal of Central Banking Theory and Practice,* vol. 2, pp. 75–96

Baron, D. P. (1976). Flexible Exchange Rates, Forward Markets, and the Level of Trade, *The American Economic Review*, vol. 66, no. 3, pp. 253–266

Belke, A., and Zenkić, A. (2007). Exchange-rate Regimes and the Transition Process in the Western Balkans, *Intereconomics*, vol. 42, no. 5, pp. 267–280

Bieber, F. (2003). Montenegrin politics since the disintegration of Yugoslavia, in F. Bieber (ed), *Montenegro in Transition Problems of Identity and Statehood,* Baden-Baden: Nomos Publishing House, pp. 11–42

Bugajski, J. (2019). The Western Balkans, Available Online: https://www.oxfordbibliographies.com/display/document/obo-9780199743292/obo-9780199743292-0094.xml#obo-9780199743292-0094-div1-0005 [Accessed 20 May 2023]

Bun, M. J. G., and Klaassen, F. (2007). The Euro Effect on Trade Is Not as Large as Commonly Thought, *Oxford Bulletin of Economics and Statistics*, vol. 69, no. 4, pp. 473–496

Cambridge. (2023). Pegged Currency, Available Online: https://dictionary.cambridge.org/dictionary/english/pegged-currency [Accessed 20 May 2023]

Campbell, D. L., and Chentsov, A. (2023). Breaking Badly: The Currency Union Effect on Trade, *Journal of International Money and Finance,* vol. 136, no. 102840

CBBH. (2021). 20 years of KM peg to the euro, Available Online: https://www.cbbh.ba/press/ShowNews/1385?lang=en [Accessed 10 May 2023]

CBBH. (2023). Exchange Rates. Available Online: https://www.cbbh.ba/press/edukacija/886?lang=en [Accessed 10 May 2023]

CBK. (2022). Kosovo‘s Experience In Euroisation Of Its Economy, Available Online: https://bqk-kos.org/banking-operations-3/currency-in-circulation/kosovos-experience-in-euroisation-of-its-economy/?lang=en [Accessed 10 May 2023]

Center for Strategic & International Studies (CSIS). (2023). Reimagining U.S. Policy toward the Western Balkans, Available Online: https://www.csis.org/programs/europe-russia-and-eurasia-program/projects/european-security-politics-and-economics-1 [Accessed 19 May 2023]

Chailloux, A., Ohnsorge, F., and Vavra, D. (2010). Euroisation in Serbia, working paper, no. 120, European Bank for Reconstruction and Development

Cieślik, A., Michałek, J. J., and Mycielski, J. (2012). Euro and Trade Flows in Central Europe, 3, *Equilibrium. Quarterly Journal of Economics and Economic Policy*, vol. 7, no. 3, pp. 7–25

Clark, P. (1973). Uncertainty, Exchange Risk, and the Level of International Trade, *Economic Inquiry*, vol. 11, no. 3, pp. 302–313

Côté, A. (1994). Exchange Rate Volatility and Trade: A Survey, working paper, no. 94-5, Bank of Canada

Cvijanović, V., and Uvalić, M. (2018). Towards A Sustainable Economic Growth and Development in the Western Balkans, *A New Economic Agenda for Southeast Europe*

Dabrowski, M., and Myachenkova, Y. (2018). The Western Balkans on the road to the European Union, *Brugel Policy Contribution*, no. 4

De Grauwe, P. (1988). Exchange Rate Variability and the Slowdown in Growth of International Trade, Staff Papers, IMF, vol. 35, no. 1, pp. 63–84

de Nardis, S., and Vicarelli, C. (2003). Currency Unions and Trade: The Special Case of EMU, *Review of World Economics / Weltwirtschaftliches Archiv*, vol. 139, no. 4, pp. 625–649

della Valle, G., Kota, V., Veyrune, R., Cabezon, E., and Guo, S. (2018). Euroization Drivers and Effective Policy Response: An Application to the Case of Albania, working paper, no. 18/21,

IMF

Distance Calculator. (2023). Available Online: https://www.distancecalculator.net/ [Accessed 10 May 2023]

Dodevski, A., Koceska, N., and Koceski, S. (2018). Forecasting Exchange Rate Between Macedonian Denar and Euro Using Deep Learning, *Journal of Applied Economics and Business,* vol. 6, no. 2, pp. 50-61

Đordevic, N. L., and Vojnovic, M. (2011). F/X Hedging: Dealing with Foreign Exchange Risk in Serbia, *Lexology*, Available Online: https://www.lexology.com/library/detail.aspx?g=af130d96-d582-480f-9c14-11bac7764900 [Accessed 10 May 2023]

Dougherty, C. (2011). Introduction to Econometrics, 4th edn, Oxford: Oxford University Press

Elbasani, A. (2008). The Stabilisation and Association Process in the Balkans: Overloaded Agenda and Weak Incentives?, working paper, no. 2008/03, EUI

European Commission. (2020). EU extends trade preferences for the Western Balkans for 5 more years, Available online: https://policy.trade.ec.europa.eu/news/eu-extends-trade-preferences-western-balkans-5-more-years-2020-12-21_en [Accessed 11 May 2023]

European Commission. (2022). Western Balkans, Available online: https://policy.trade.ec.europa.eu/eu-trade-relationships-country-and-region/countries-and-regions/western-balkans_en [Accessed 11 May 2023]

European Commission. (2023a). Western Balkans; Policy background, Available online: https://research-and-innovation.ec.europa.eu/strategy/strategy-2020-2024/europe-world/international-cooperation/western-balkans_en [Accessed 11 May 2023]

European Commission. (2023b). Stabilisation and Association Agreement, Available online: https://neighbourhood-enlargement.ec.europa.eu/enlargement-policy/glossary/stabilisation-and-association-agreement_en [Accessed 11 May 2023]

European Commission. (2023c). The euro outside the euro area, Available online: https://economy-finance.ec.europa.eu/euro/use-euro/euro-outside-euro-area_en [Accessed 11 May 2023]

European Commission. (2023d). EU Trade Agreements, Available online: https://policy.trade.ec.europa.eu/eu-trade-relationships-country-and-region/negotiations-and-agreements_en [Accessed 11 May 2023]

European Union. (2023a). Joining the EU, Available Online: https://european-union.europa.eu/principles-countries-history/joining-eu_en [Accsesed 20 May 2023]

European Union. (2023b). Countries Using the Euro, Available Online: https://european-union.europa.eu/institutions-law-budget/euro/countries-using-euro_en [Accessed 11 May 2023]

Eurostat. (2023). EU trade since 1988 by HS2-4-6 and CN8, (ds-045409), Available Online: https://ec.europa.eu/eurostat/databrowser/product/view/DS-045409 [Accessed 10 May 2023]

Fabris, J. (2015b). Inflation Targeting in Serbia, *Journal of Central Banking Theory and Practice*,

Central bank of Montenegro, vol. 4, no. 2, pp. 59–74.

Fabris, N. (2015a). Monetary policy framework of Central bank of Montenegro, in E. Nowotny, D. Ritzberger-Grünwald, and H. Schuberth, *The Challenge of Economic Rebalancing in Europe*, Cheltenham: Edward Elgar Publishing, pp.222–232

Fabris, N., Vukajlović-Grba, D., Radunović, T., and Janković, J. (2004). Economic Policy In Dollarized Economies With A Special Review Of Montenegro, working paper, no. 1, The Central Bank of Montenegro

Fehlinger, G. (2021). The Euro for Albania and North Macedonia, *The Institute For Security Studies And Development-North Macedonia,* Available Online: https://cssd-ngo.org/the-euro-for-albania-and-north-macedonia/ [Accessed 10 May 2023]

Frankel, J. A. (2008). The Estimated Effects of the Euro on Trade: Why Are They Below Historical Effects of Monetary Unions Among Smaller Countries?, working paper, no. 14542, National Bureau of Economic Research

Glick, R., and Rose, A. K. (2001). Does a Currency Union Affect Trade? The Time Series Evidence, working paper, no. 8396, NBER

Glick, R., and Rose, A. K. (2016). Currency Unions And Trade: A Post-Emu Reassessment, *European Economic Review*, vol. 87, pp. 78–91

Gormley, T. A., and Matsa, D. A. (2014). Common Errors: How to (and Not to) Control for Unobserved Heterogeneity, *The Review of Financial Studies,* vol. 27, no. 2, pp. 617–661

Hajdari, V. (2020). Completing the Enigma: Should Kosovo be in or Out the Euro Area, *Acta Universitatis Danubius,* vol. 16, no. 5, pp. 220–239

Hoekman, B., and Nicita, A. (2011). Trade Policy, Trade Costs, and Developing Country Trade, *World Development*, vol. 39, no. 12, pp. 2069–2079

Jurzyk and Fritz-Krockow. (2004). Will You Buy My Peg? The Credibility of a Fixed Exchange Rate Regime As a Determinant of Bilateral Trade, working paper, vol. 2004, no. 165, IMF

Kamhi, N. and Dehejia, V. H. (2006). An Assessment of the Currency Board Regime in Bosnia and Herzegovina, *Emerging Markets Finance & Trade*, vol. 42, no. 6, pp. 46–58

Kepaptsoglou, K., and Karlaftis, M. (2010). The Gravity Model Specification for Modeling International Trade Flows and Free Trade Agreement Effects: A 10 Year Review of Empirical Studies, *The Open Economics Journal,* vol. 3, pp. 1–13

Klein, M. W., and Shambaugh, J. C. (2006). Fixed Exchange Rates and Trade, *Journal of International Economics*, vol. 70, no. 2, pp. 359–383

Klimczak, L. (2014). The gravity model as a tool for the international trade analysis – a case study of the Western Balkans, *Proceedings of the 8th Professor Aleksander Zelias International Conference on Modelling and Forecasting of Socio-Economic Phenomena,* Zakopane: Poland

Kosovo Agency of Statistics (KAS). (2020). Labour Force Survey 2019, Available Online: https://ask.rks-gov.net/media/5412/labour-force-survey-2019.pdf [Accessed 19 May 2023]

Larch, M., Wanner, J., Yotov, Y. V., and Zylkin, T. (2019). The Currency Union Effect: A PPML Re-Assessment with High-Dimensional Fixed Effects, working paper, no. 6464, CESifo

Lynch, S. M., and Brown, J. S. (2011). Chapter 8 - Stratification and Inequality Over the Life Course, in R. H. Binstock and L. K. George (eds), *Handbook of Aging and the Social Sciences (Seventh Edition)*, San Diego: Academic Press, pp. 105–117

Marinkovic, S. (2014). Non-Parametric Sign Test and Paired Samples Test of Effectiveness of Official FX Intervention, *Economic Annals*, vol. 59, no. 202, pp. 107–130

McKinnon, R. I. (1963). Optimum Currency Areas, *The American Economic Review*, vol. 53, no. 4, pp. 717–725

Micco, A., Ordoñez, G., and Stein, E. (2003) The Currency Union Effect on Trade: Early Evidence from EMU, *Economic Policy,* vol. 18, no. 37, pp. 315–356.

Mosteanu, N. R. (2017a). Currency Pegged To A Foreign Currency- Gcc And Europe Models, *The Business and Management Review*, vol. 9, no. 1

Mosteanu, N. R. (2017b). Home Currency Pegged Into Euro – Possible Solution For Romanian's Economy, *EcoForum*, vol. 6, no. 3, pp. 1–32

Mustafa, A. (2017). Financial Stability Under Unilateral Euroization: The Case of Kosovo, in G. Della Valle, E. Themeli and R. Veyrune (eds), *Negative Euro Area Interest Rates and Spillovers on Western Balkan Central Bank Policies and Instruments,* Tirana: Bank of Albania, pp. 93–105

Naumovski, N. (2022). Economic Integration Between North Macedonia and the Euro Area: Costs of Joining the EU, Central European University, Vienna

NBRNM. (2017). Design of Monetary Policy, Available online: https://www.nbrm.mk/postavienost_na_monietarnata_politika-en.nspx [Accessed 11 May 2023]

NBS. (2023a). Governor Tabaković for Biznis.rs portal about "increasing resurgence of the idea of a fixed exchange rate", Available Online: https://nbs.rs/en/scripts/showcontent/index.html?id=16945 [Accessed 11 May 2023]

NBS. (2023b). Inflation Targeting, Available Online: https://nbs.rs/en/ciljevi-i-funkcije/monetarna-politika/inflacija/ [Accessed 11 May 2023]

Nicita, A. (2013). Exchange Rates, International Trade and Trade Policies, *International Economics*, vol. 135–136, pp. 47–61

Ognjenović, K., and Branković, A. (2011). Changes in the Structure of Commodity Trade between the Western Balkan Countries and the European Union over the Previous Ten Years, in S. B. Salej, D. Eric, S.Redzepagic and I. Stosic (eds), *Contemporary Issues in the Integration Processes of Western Balkan Countries in the European Union.* Ljubljana: International Center for Promotion of Enterprises

Olivero, M. P. & Yotov, Y. V. (2012). Dynamic Gravity: Endogenous Country Size and Asset Accumulation, *The Canadian Journal of Economics / Revue canadienne d'Economique*, vol.

45, no. 1, pp.64–92

Oxford Reference. (2023). Misaligned Exchange Rate, Available Online: https://www.oxfordreference.com/display/10.1093/oi/authority.20110803100200993;jsessionid=286434B6F3C08B94D3835F0B58C3B414#:~:text=An%20exchange%20rate%20which%20is,an%20unsustainable%20current%20account%20deficit. [Accessed 5 May 2023]

Persson, T. (2001). Currency Unions and Trade: How Large Is the Treatment Effect?, *Economic Policy*, vol. 16, no. 33, pp. 435–448

Petreski, M. (2007). Exchange Rate Regimes and Convergence Criteria for Accession Economies: The Case of Macedonia and Croatia, *SSRN*, Available Online: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=999051 [Accessed 5 May 2023]

Policonomics. (2023). Exchange rate regimes: Managed Float, Available Online: https://policonomics.com/lp-exchange-rate-regimes-managed-float/ [Accessed 10 May 2023]

Prelec, M. (2017). New Balkan Turbulence Challenges Europe, Available Online: https://www.crisisgroup.org/europe-central-asia/balkans/macedonia/new-balkan-turbulence-challenges-europe [Accessed 10 May 2023]

Qorraj, G., and Jusufi, G. (2018). The EU Stabilisation and Association Agreement for the Western Balkans: Between Challenges and Opportunities, 81, *Croatian International Relations Review*, vol. 24, no. 81

Rajković, M., Bjelić, P., Jaćimović, D., and Verbič, M. (2020). The Impact of the Exchange Rate on the Foreign Trade Imbalance during the Economic Crisis in the New EU Member States and the Western Balkan Countries, *Economic Research-Ekonomska Istraživanja*, vol. 33, no. 1, pp. 182–203

Ralev, R. (2020). Serbia's Dinar to Be Among World's Most Stable Currencies in 2020 - Erste, Available Online:https://seenews.com/news/serbias-dinar-to-be-among-worlds-most-stable-currencies-in-2020-erste-704980 [Accessed 10 May 2023]

RCC. (2022). Balkan Barometer Publications, Available Online: https://www.rcc.int/balkanbarometer/publications [Accessed 10 May 2023]

Rose, A. K. (2000). One Money, One Market: The Effect of Common Currencies on Trade, *Economic Policy*, vol. 15, no. 30, pp. 9–45

Rose, A. K. (2001). Currency Unions and Trade: The Effect Is Large, *Economic Policy*, vol. 16, no. 33, pp. 449–461

Rose, A.K., and Wincoop, E. (2001). National Money as a Barrier to International Trade: The Real Case for Currency Union, *American Economic Review*, vol. 91, pp. 386–390

Rousslang, D. J., and T. To. (1993). Domestic Trade and Transportation Costs as Barriers to International Trade, *The Canadian Journal of Economics,* vol. 26, no. 1, pp. 208–221

Santana-Gallego, M., and Pérez-Rodríguez, J. V. (2019). International Trade, Exchange Rate Regimes, and Financial Crises, *The North American Journal of Economics and Finance*, vol.

47, pp. 85–95

Santos Silva, J.M.C., and Tenreyro, S. (2006). The Log of Gravity, *The Review of Economics and Statistics*, vol. 88, no. 4, pp. 641–658

Santos Silva, J.M.C., and Tenreyro, S. (2011a). Further Simulation Evidence On The Performance Of The Poisson Pseudo-Maximum Likelihood Estimator, *Economic Letters,* vol. 112, no. 2, pp. 220–220

Santos Silva, J., and S. Tenreyro. (2011b). Poisson: Some Convergence Issues, *Stata Journal*, vol. 11, no. 2, pp. 207–212.

Shepherd, B. (2016). The Gravity Model of International Trade : A User Guide (An Updated Version), *ESCAP*

Stoykova, O. I. (2021). How To Increase The Value Of Bilateral Trade? Currency Union Versus Fixed Exchange Rate Regime, *Entrepreneurial Business and Economics Review*, vol. 9, no. 2, pp. 21–38

Tanzi, V. (1998). Corruption Around the World: Causes, Consequences, Scope, and Cures, staff paper, vol. 45, no. 4, IMF, pp. 559–594.

Tufi Heta, K., and Mulleti, B. (2013). The Exposure of Albanian Firms to the Exchange Rate Risk and Its Hedging, *Academic Journal of Interdisciplinary Studies*, vol. 2, no. 9

World Bank. (2023a). World Bank Open Data, Available Online: https://data.worldbank.org [Accessed 10 May 2023]

World Bank. (2023b). Control of Corruption, Available Online: https://databank.worldbank.org/databases/control-of-corruption [Accessed 10 May 2023]

World Bank. (2023c). Doing Business, Available Online: https://databank.worldbank.org/source/doing-business# [Accessed 10 May 2023]

Živanović, B., and Jolović, A. (2012). The Evolution of Serbian Forex Through NBS FX Swaps, *Institute of Economic Sciences*, vol. 45, pp.14–30.

Żuk, P. (2019). Montenegro's Experience with Unilateral Euroization, Available Online: https://www.obserwatorfinansowy.pl/in-english/macroeconomics/montenegros-experience-with-unilateral-euroization/ [Accessed 10 May 2023]

Appendix

Appendix 1. List of Importers and Exporters

Importers	**Exporters**
Austria	Albania
Belgium	Bosnia and Herzegovina
Finland	Kosovo
France	Montenegro
Germany	North Macedonia
Greece	Serbia
Ireland	
Italy	
Luxembourg	
Netherlands	
Portugal	
Spain	

Appendix 2. Eurozone Membership

Year	**Country**
1999	Austria
	Belgium
	Finland
	France
	Germany
	Ireland
	Italy
	Luxembourg
	Netherlands
	Portugal
	Spain
2002	Greece

Source: European Union (2023b)

Appendix 3. Free Trade Agreements with the EU (Eurozone)

Exporter	**Time period**	
Albania	2009-04 - 2019-04	Maximum length of FTA 10 years
Bosnia and Herzegovina	2015-06 - 2020-06	Maximum length of FTA 10 years
Kosovo	2016-04 -	Still in force
Montenegro	2010-05 - 2015-05	Maximum length of FTA 5 years
North Macedonia	2004-04 - 2014-04	Maximum length of FTA 10 years
Serbia	2013-09 - 2019-09	Maximum length of FTA 6 years

Source: European Commission (2023d)

Appendix 4. Corruption Level

The corruption variable is the additive inverse of the World Bank's Control of Corruption estimate multiplied by ten to logaritmize the variable.

Year	Albania	Bosnia and Herzegovina	Kosovo	Montenegro	North Macedonia	Serbia
2005	8,13	2,33	5,27	3,54	4,88	4,06
2006	7,91	3,01	5,14	3,84	4,03	2,78
2007	7,07	3,74	7,35	3,81	3,94	3,42
2008	6,05	3,61	6,49	2,40	2,11	3,02
2009	5,45	3,80	5,85	2,19	1,47	3,18
2010	5,32	3,36	6,15	2,54	0,93	3,19
2011	7,02	3,27	6,18	2,23	1,07	2,99
2012	7,79	3,09	6,53	1,30	0,51	3,57
2013	7,51	2,44	6,50	2,87	0,56	3,28
2014	5,86	3,00	4,86	0,75	0,32	2,47
2015	5,21	3,91	5,34	0,95	2,39	2,93
2016	4,49	4,62	4,15	0,53	2,72	3,59
2017	4,58	5,29	5,02	0,56	3,02	4,12
2018	5,24	5,83	5,04	0,12	3,68	3,74
2019	5,43	6,25	5,19	0,04	4,34	4,29
2020	5,52	6,20	4,40	0,19	4,71	4,29
2021	5,56	6,44	3,19	0,20	3,52	4,37
2022	5,42	6,89	3,08	0,16	3,44	4,39

Source: World Bank (2023b)

Appendix 5. Positive Opinion of the EU (%)

Year	Albania	Bosnia and Herzegovina	Kosovo	Montenegro	North Macedonia	Serbia
2015	84	30	89	35	41	24
2016	81	33	83	38	47	21
2017	81	31	90	44	54	26
2018	83	45	84	53	59	29
2019	86	47	69	51	52	32
2020	87	56	75	54	57	26
2021	84	42	91	51	53	50
2022	89	50	73	57	56	38
Average	**84,375**	**41,75**	**81,75**	**47,875**	**52,375**	**30,75**

Source: RCC, Balkan Barometer 2015-2022

Appendix 6. Data and Sources

Variables	Sources and Definitions
GDP Exporters	***Source:*** Eurostat. ***Definition:*** GDP of exporting countries in nominal EUR.
GDP Importers	***Source:*** Eurostat. ***Definition:*** GDP of importing countries in nominal EUR.
Distance	***Source:*** Distance Calculator (Website). ***Definition:*** Distance between the trading countries' capital cities.
Common Border	***Source:*** Google Maps (Website). ***Definition:*** Dummy variable which takes the value 1 if trading countries share a common border; otherwise, 0.
Free Trade Agreements	***Source:*** European Commission. ***Definition:*** A dummy variable taking the value 1 when WB6 country has a Free Trade Agreement with the EU, otherwise 0.
Euro	***Source:*** European Commission. ***Definition:*** Dummy variable which takes the value 1 if WB6 country has adopted the euro; otherwise, 0.
EuroPeg	***Source:*** CBBH and NBRNM. ***Definition:*** Dummy variable which takes the value 1 if WB6 country has a euro peg; otherwise, 0.
Corruption	***Source:*** World Bank Control of Corruption. ***Definition:*** Index measuring the level of corruption.
EU Opinion	***Source:*** RCC, Balkan Barometer. ***Definition:*** Percentage answering that EU membership would be a good thing for one's WB6 country economy.
Business Environment	***Source:*** World Bank. ***Definition:*** Doing Business Score which includes domestic trade costs such as infrastructure, business regulation, and bureaucracy.
Remoteness	***Source:*** World Bank and Distance Calculator. ***Definition:*** Control variable for multilateral trade resistance.