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Corruption and Trade in the Western Balkans

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Abstract

Corruption has for long been considered a major constraint on economic growth and international trade. In protectionist countries however, it has been shown that corruption can have a trade enhancing effect. By measuring corruption's influence on the trade levels of the countries in the Western Balkans, I have in this thesis aimed to test the extent to which corruption hinders trade, and whether corruption's negative effects amplify when countries lower their level of trade protection. In connection to this, I also account for how much the countries of Western Balkans could gain in trade value if they managed to lower their levels of corruption.

This relationship was estimated empirically by using panel data covering 27 importers and 17 exporters across years 2002 to 2012. My baseline regression was estimated with the OLS estimator and includes time and importer fixed effects. Other techniques have also been applied as robustness tests.

My results imply that corruption has a significant negative effect on trade levels, a result significant in all of my regressions. I also find that once countries sign Free Trade Agreements, corruption's negative effects become significantly larger. These results are however less robust and should be interpreted with care. Finally, the results imply that the countries of the Western Balkan region would gain much by committing to fight corruption.

Key words: *Corruption, Gravity model, International trade, Western Balkans*

List of Abbreviations

CC – Control of Corruption Indicator
CEFTA – Central European Free Trade Agreement
CPI – Corruption Perception Index
EBRD – European Bank for Reconstruction and Development
EU – European Union
EU27 - Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Poland, Portugal, Romania, Slovak Republic, Slovenia, Spain, Sweden and the United Kingdom
FE – Fixed effects
FTA – Free Trade Agreement
PPML – Poisson Pseudo Maximum Likelihood
SAA – The Stabilization and Association Agreement
SFR Yugoslavia – *The Socialist Federal Republic of Yugoslavia,* including the countries of: Bosnia and Herzegovina, Croatia, Kosovo, Macedonia, Montenegro, Slovenia and Serbia
Western Balkans – a region including the countries of: Albania, Bosnia and Herzegovina, Croatia, Kosovo, Macedonia, Montenegro and Serbia
WB – Western Balkans

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1 Introduction

In the public opinion, corruption is rarely, if ever, perceived to be positive. Corruption distorts economic activities through multiple channels, and besides contributing to economic losses of countries, it leaves a statistically negative impact on long-term economic growth (World Bank, 2016a). Further, research shows that corruption comes with high social costs as it is the poor who pay the highest percentage of their incomes to bribes, why the World Bank Group's President Jim Yong Kim declared corruption as: "*the public enemy number one in developing countries*" (World Bank, 2016b).

This public enemy is further believed to be distorting the levels of international trade, effects which are directly damaging small countries that trust in exports in order to achieve sustainable economic growth. Through increasing uncertainty in an economy and by thus raising the overall trade costs, corruption acts as a "hidden tax" on trade and can constrain trade to the same extent as tariffs do, if not more so. However, in countries which are subject to protectionist trade policies, countries which also tend to be characterized by higher corruption levels, corruption can have trade enhancing effects by allowing the trading actors to surpass the trade tariffs and avoid regulations. This two-fold effect of corruption has been recognized by a range of researchers, among which Dutt and Traca (2010) acknowledge that the level of tariffs in a country determines when these effects interchange.

With this thesis, my aim has been to shed further light on corruption's effect on international trade while simultaneously testing for the interplay between the trade enhancing and trade hindering mechanisms of corruption.

This has been done by closely examining the effects corruption has had on trade in the countries of the Western Balkan[1] region. What made these countries suitable for the cause is the fact that they have all been characterized by high corruption levels and protectionist trade policies in the early 2000's. However, although corruption and red tape still continue to hamper economic activity in the region, through EU's launch of the Stabilization and Association Agreements (SAA), the countries have now signed Free Trade Agreements with the EU thus abolishing trade tariffs and allowing nearly all goods to be exported without quantity-limits.

The economic circumstances of the region thus allow me to separate for the multi-faceted effects of corruption through applying a two-step procedure when estimating the

[1] Western Balkan region includes: Albania, Bosnia and Herzegovina, Croatia, Kosovo, FYR of Macedonia, Montenegro and Serbia.

corruption's effects on trade levels. First step involves testing the hypothesis that corruption has significant negative effects on international trade levels. Second step has been to test the hypothesis of corruptions' effects on trade when accounting for the change in level of trade protection in a country. Lastly, the results of my estimations are used to account for the monetary gains the region could experience as a consequence of lowered corruption levels.

My empirical analysis has thus aspired to answer the following questions:

1. *What effects has the prevalence of corruption in the Western Balkans had on these countries' trade levels?*

2. *Do the negative effects of corruption amplify when we account for bilateral Free Trade Agreements, i.e. for lower tariffs?*

3. *How much would trade value in the region increase if the countries lowered their levels of corruption?*

In order to answer these questions, I designed a corruption augmented version of the gravity model which has been estimated through a two-step procedure thus separating for the multi-faceted effects of corruption. As economic literature mainly focuses on the overall effects of corruption and fails to present a systematic result on the two-face effects of corruption, the contribution of this thesis has been to provide further insight into these two-fold mechanisms. In particular, I test Dutt and Traca's hypothesis that level of tariffs determines corruption's effects on trade by accounting for corruption's effects once countries (almost) completely abolish trade tariffs.

The thesis proceeds as follows: first, a background section on corruption is presented where corruption is explained and where the effects of corruption on trade are clarified. In the section after, an overview of the previous research is provided, followed by a presentation of my methodological approach and the use of data. Lastly, I give an account of the empirical findings and follow up my thesis by analyzing and discussing my results.

2 Background on Corruption and Free Trade Agreements

2.1 Defining and Measuring Corruption

Corruption enjoys great attention in the public domain, characterized as one of the major obstacles towards economic development (World Bank, 2016a). While there is no doubt that corruption is undesirable, no unanimous definition of corruption has emerged. However, as Tanzi explains: *"… like an elephant, while it may be difficult to describe, corruption is generally not difficult to recognize when observed."* (Tanzi, 1998,564). The most popular definition, used by the majority of researchers as well as international agencies including the World Bank, International Monetary Fund and UN, defines corruption as "*the abuse of entrusted power for private gain"* (UNDP, 2008, 12).

Even though most researchers agree upon this simple definition, measuring this phenomenon proves more difficult. Some methods of measurement are non-financial while some include accounting for the money loss and the sector in which corruption takes place. At its extreme, corruption represents acts committed at the highest level of government which directly distort central functioning of the state, in which political leaders allow themselves to benefit financially from public goods (Transparency International, 2016a). In a trade related context, corruption often takes form of bribery at the border which has direct influences on trade levels. Exactly through which mechanisms corruption affects trade levels will be presented further down in the text.

Due to the fact that corruption has many determinants which tend to interrelate in a complicated manner, and that most aspects of corruption are illegal and thus hidden, it becomes impossible to measure the levels of corruption with complete accuracy (Treisman, 2000, 437-438). Therefore, we rely on indirect measures about corruption's prevalence based on the perceived levels of corruption, indicators of governance outcomes, and expert assessments of governance and anti-corruption performance (Tanzi, 1998, 577; Transparency International, 2016a). These measures of corruption are compiled in various indexes amongst which the Corruption Perception Index (CPI); the World Bank Institute´s World Governance Indicators, in particular the Control of Corruption indicator (CC); and the International Country Risk Guide (ICRG) are the most widely used in economic literature. This comes as no surprise due to the fact that these indexes conduct annual assessments and have extensive global coverage (UNDP,

2008, 37). These indexes further show high correlation values, CPI and control of corruption have a correlation coefficient of 0.95, which implies that there is a high consensus in the literature as to what corruption entails (Tanzi, 1998, 578).

Notwithstanding, one should be careful when using these indicators as they capture different aspects of corruption and vary in their methodologic approaches. The CPI and CC indicators are based solely on public perceptions, measures which are accused of being unreliable and inconsistent. Another argument against such subjective measures is that perceptions tend to change at a slower pace than anti-corruption actions takes place, resulting in an over-estimation of the prevalence of corruption (UNDP, 2008, 37). However, as Kaufmann, Kraay and Mastruzzi - the architects behind the CC index - claim, as corruption leaves no physical trails, perceptions might be the best, or only, alternative. Further, their claim is that people often base their actions on perceptions why such indicators might be desirable when measuring the degree of corruption (Kaufmann et.al, 2010, 10-20).

Due to availability of data, I have in my study chosen the CC indicator as the main measure of corruption. Drawing its data from 31 sources, the CC index covers 200 countries since 1996[2] and measures the public perceptions[3] on corruption based on "*the extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as "capture" of the state by elites and private interests*." (Kaufmann, Kraay, Mastruzzi, 2010, 6). The scores of corruption are then ranked from -2.5 to 2.5, in which -2.5 responds to highest levels of corruption, i.e. lowest control of corruption, and vice versa (Kaufmann, Kraay, Mastruzzi, 2012, 10-21). Although this index is not directly connected to trade-related corruption, by including measurements such as illegal payments in export and import; level of corruption between administrations and foreign companies; risk that individuals face bribery to carry out businesses; degree of border/tax officials' involvement in corruption (and more), the CC indicators capture the extent to which corruption prevails in the trade sector[4] (Worldwide Governance Indicators, 2016).

2.2 Corruption and Free Trade in Western Balkans

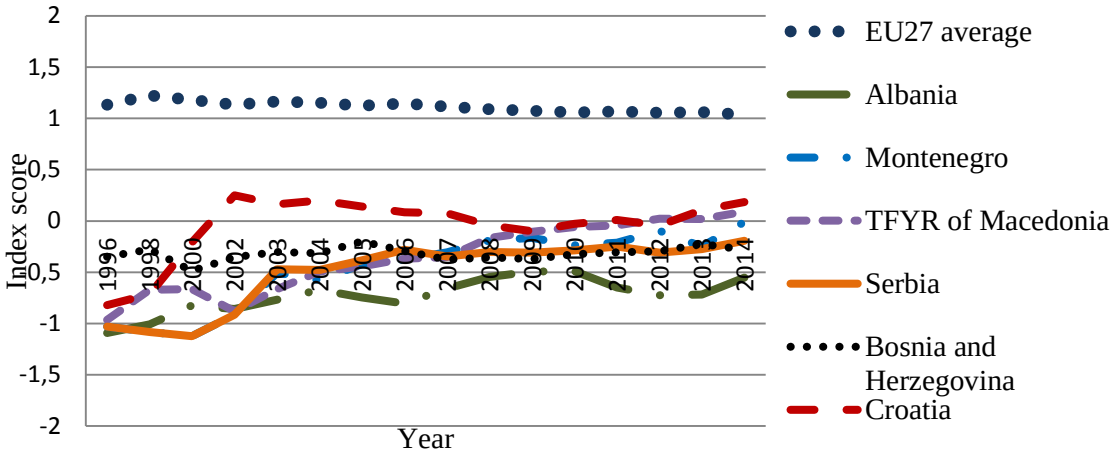
Western Balkans is a region with a turbulent history and a present characterized by strive for sustainable economic development. At the end of the 80's during which the region started its' transformation towards a market-based economy, the SFR Yugoslavia[5] had

[2] The index covers the periods of 1996, 1998, 2000 and is presented on a yearly basis from 2002 onwards.
[3] Including: survey respondents, non-governmental organizations, commercial business information providers, and public sector organizations worldwide.
[4] For further information on the control of corruption methodology, see Kaufmann et.al. (2010).
[5] SFR Yugoslavia stands for "Social Federal Republic of Yugoslavia" and included countries of Slovenia, Croatia, Bosnia and Herzegovina, Serbia and Montenegro until year 1991.

more favorable starting conditions than many other transition countries. However, these advantages got destroyed by the armed conflicts and the split of SFR Yugoslavia resulting in the breakdown of the common markets (Grupe and Kusic, 2005, 8). Besides leading to market failures throughout the region, the conflicts forced great trade suppressions which had greater impact than merely the countries' shift from trading internally with each other to being forced to commit to external trade (IMF, 42; World Bank, 2008, 46).

As a further consequence, the failure of the markets brought about high levels of corruption in the region. Around the end of the 90´s, corruption was seemingly most widespread in the countries of Serbia and Montenegro who reached all-time low levels in year 2000. At that time, Serbia and Montenegro were ranked the second most corrupt countries in the world based on the Corruptions Perceptions Index (Transparency International, 2016b). The remaining countries scored slightly better, and eventually the region managed to converge towards a positive trend in battling corruption.

Graph 1. Control of Corruption Index
ranges from -2,5 (most corrupt) to 2,5 (least corrupt)



Notes: Author's summary based on the values from the CC Index.

However, we see clearly that the Western Balkan region lags far behind the EU27 countries in control of corruption, a fact valid also for measurements on rule of law and political stability. The issues of corruption are recognized for imposing severe obstacles on economic activity in the region, and governance reforms have been very slow to implement (IMF, 2015, 15, 23). Many findings suggest that with stronger institutions these countries will be more likely to attract investment and participate in trade (EBRD, 2013, 45-51). Indeed, efforts are made for improvement in the quality of the institutions and in particular the protection of property rights; fighting corruption and government inefficiency; plus improving the corporate sector performance are put on priority within these countries (IMF, 2015, 30).

2.2.1 Free Trade Implementations in the region

Within the region the importance of increased economic openness is often underlined, as openness is associated with better economic institutions (EBRD, 2013, 45-51). Looking at trade liberalization, one of the biggest and most extensive efforts in economic terms is the signing of the Stabilization and Association Agreement (SAA) between the EU and the Western Balkan countries in late year 2000. These agreements set the stage for policy-induced economic integration both through liberalizing trade with EU and also through liberalizing intra-regional trade (World Bank, 2003, 60; Grupe and Krusic, 2005, 4). This process commits the six countries of the Western Balkans to gradually eliminate tariffs on their trade with EU, thus increasing competitiveness of domestic products in international markets. It also pushes for the countries to harmonize domestic policies to European standards, thus allowing the domestic companies to take advantage of trade openings (World Bank, 2003, 263).

Considering the fact that EU is the largest trading partner of the region accounting for 73% of the imports and 80% of exports, allowing nearly all exports to EU without customs duties or quantity limits brings forth extensive trade opportunities. Already now, the preferential agreements have contributed to an increase in exports to the EU, but whether these rising opportunities will be fully exploited depend largely on the countries' economic policies (European Commission, 2016a; World Bank, 2003, 60).

2.3 Corruption and trade

Most often, corruption is thought of as a negative factor when speaking in terms of economy. However, early work from Leff (1964) and Huntington (1968) suggest that corruption might in fact promote growth and have further positive impacts on economic activities. In countries where governments impose high restrictions corruption allows for a cut-through around the restrictions and "*greases the wheels*" of economic activity (Tanzi, 1998, 578-581).

2.3.1 Theoretical implications of corruption's influence on an economy

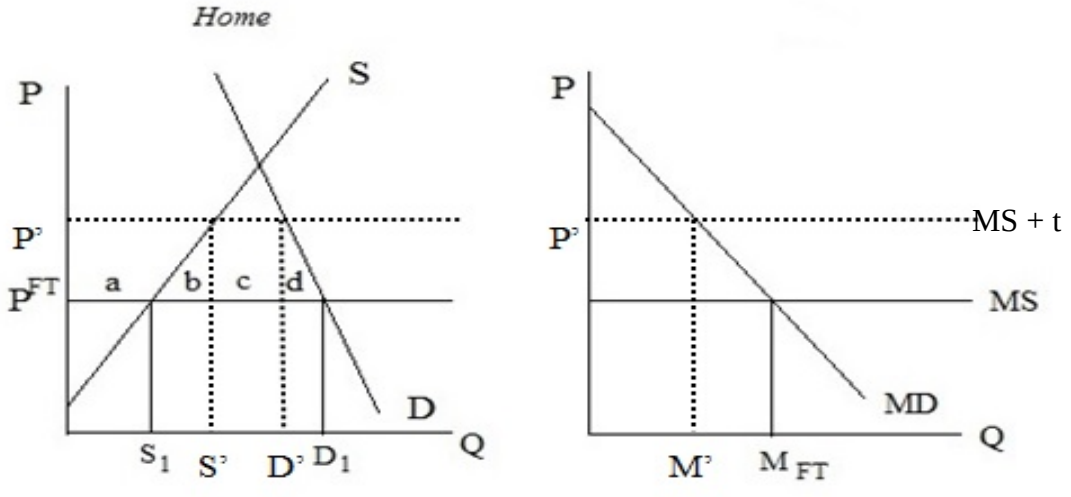
Literature suggests that volumes of international trade are much less than predicted by theory due to various frictions in the economy. Corruption is part of these frictions, and strong correlation is found between high perceptions of corruption and low levels of international trade (see Anderson and Marcouiller (2012), Sandholtz and Gray (2003) Shirazi, (2011), De Jong and Bogmans (2009)).

In 1974, Krueger wrote an article which has come to influence much of the research field of trade-related corruption. In her article, she analyses corruption in the light of quantitative restrictions on imports and finds that where high restrictions are present, incentives are created for competitive rent-seeking activities. These activities often take form of corruption at the border, in which officials can extort bribes in order to allow the goods to go through customs (Krueger, 1974, 301).

Anderson and Marcouiller (2012) add on to these theoretical implications and claim that corruption and bribe extortion impose hidden transaction costs which raise insecurities in international exchange. More concrete, they claim that "*…corrupt officials generate a price mark-up equivalent to a hidden tax or tariff*" (ibid. 351). This price mark-up depends largely on the degree of insecurity in the importing and exporting countries, implying that trade among countries with stronger institutions will be relatively unaffected by corruption, while trade among countries with poor institutions is doubly disadvantaged. The conclusion is thus that insecurity, which is connected to corruption levels, constrains trade by raising the price of the traded goods (Anderson and Marcouiller, 2012, 347). In fact, corruption is recognized to be one of the main obstacles to undertaking businesses in the world market and ranks second right after tax regulations (Thede and Gustafsson, 2012, 651; Anderson and Marcouiller, 2012, 342).

These theoretical implications can be analyzed through the simplified graph below which accounts for both effects in trade quantity and the welfare effects of tariffs and corruption. We assume here that home and foreign goods are perfect substitutes, and due to the small size of the analyzed economies, that the MS line is horizontal.

Graph 2. Tariffs' and corruption's effects on trade



Notes: Baldwin and Wyplosz, 2012, 130. Dotted line added by the author.

MS and MD here represent import demand and supply and M^{FT} the equilibrium of the trade market when free trade prevails. In the home market D_1 - S_1 represent the quantity

of imports when free trade prevails. When tariffs are imposed on the market, they shift the MS curve to MS + t, thus raising the prices to P'. This, as suggested, affects the quantity levels negatively forcing imports to fall to M' (or the distance between D' and S'). The welfare effects of the tariff are that: 1) Consumer surplus falls by a + b + c + d; 2) Producer surplus rises by a; 3) Government gains revenue equal to c. The tariff thus leaves a negative net welfare effect on the economy of – (b + d). We can see here that for large tariffs, the negative welfare effects amplify as the area of b and d now become relatively larger to that of the c area.

Assuming instead that corruption acts in a similar manner by imposing a hidden tax/tariff on trade, it would affect the trade quantity negatively by raising the price to P'. The consumers would still lose a + b + c + d in welfare, while producers would gain a. However, government would now lose their revenue as the revenues would now fall in the hands of corrupt officials. Thus, the net welfare effects of corruption are – (b + c + d), implying that corruption's effects on trade quantities are similar to those of a tariff, but result in larger welfare losses.

Krueger further suggests that due to the high level of rents which can be extracted in restricted trade markets, people will reallocate from other working sectors to those in which rents can be extracted. Thus, rent-seeking is associated not only with a welfare loss which emerges through the tariffs alone, but rent seeking activities add on to this welfare loss by misallocating labor (ibid., 299).

In the context of trade corruption is most easily observed in the relationship between the exporter and the customs official where frequency of payments to customs, the number of days to import, and an indicator of the quality of the customs all show significant effects on trade levels (De Jong and Bogmans, 2011, 389). In the interplay between the exporter and the customs, bribe-payments occur either to speed up procedures, or to change the type of registration of goods. As the custom official has a job to ensure that the goods comply with regulatory barriers, the official can here choose to allow for a wrongful classification and let the goods enter the country through lower tariff rates. The custom official can also choose to smuggle the goods into the country, thus completely avoiding tariff regulations (Dutt and Traca, 2010, 844) .These behaviors are risky for the customs officials and are more likely to occur when levels of tariffs in a country are high, due to the increase in the possible bribe extortion monetary value (ibid., 845). One should be careful to consider these mechanisms, as they contribute to misreporting of trade levels. If there is a high circumvention around registration of trade goods, then presented trade levels are lower than actual trade levels and the negative effects of corruption tend to become overestimated (De Jong and Bogmans, 2011, 387).

Although most often corruption's relation to trade is analyzed in the interaction with the customs, international transactions are far more complex than that and require many additional activities. These activities include partner search, contracting and goods transports that all have significant impacts on trade as well. When there is a high prevalence of corruption in a partner country there are increased search costs for an

honest business partner and raised expected bureaucratic transaction costs. Through this mechanism, trade costs are increased and trade levels are affected negatively (Thede and Gustafson, 2012, 653). Also, corrupt agents tend to do business with corruptible agents, which both sustain corrupt behavior and works as a disadvantage towards new trading partners (ibid. 655).

So far, we can conclude that there seems to be a two-fold effect of corruption on international trade levels. Either corruption imposes extra cost on trade and lowers actual trade levels, or it allows traded goods to avoid regulations and enter through lower costs which thus raise the trade levels (Dutt and Traca, 2010, 843). Although it seems that the negative effects of corruption dominate, it is also shown that when level of tariffs is high, corruption indeed provides a trade enhancing effect (Dutt and Traca, 2010, 857; Gylfason et.al. 2015, 1224). Also, in countries where less frequent bribes are payed to customs, trade levels are lower suggesting that bribe paying functions as a sort of lubricant for trade (De Jong and Bogmans, 2011, 389). It may thus come as no surprise that countries with high protectionist trade policies also seem to project higher levels of corruption (Dutt, 2009, 155).

2.3.2 Effects of corruption once a Free Trade Agreement is in place

Considering the above explained mechanisms, it is reasonable to assume that once protectionist countries lower their level of trade tariffs, i.e. as a consequence of signing Free Trade Agreements, corruption's positive effects will diminish.

Returning to the previous analysis, corruption can in cases of high tariff levels increase the quantity level of trade by lowering the actual price that exporters face. In the graph presented above, this would mean that the actual price exporters face would lie below P', why imports would increase. However, when Free Trade prevails at the market, the prices would be at $P^{FT}$and the trade levels would increase to M_{FT}. Corruption would in this case not allow for lower prices, but instead only impose an additional cost on trade. This mechanism implies that prevalence of corruption would instead impose a double-fold negative effect on trade.

3 Previous Research

Empirical results imply that inadequate institutions, including high levels of corruption, can constrain trade as much as tariffs and when transaction costs are reduced there emerges a significant increase in trade levels. Recent studies within this field are conducted by Anderson and Marcouiller (2002); Dutt and Traca (2010); De Jong and Bogmans (2011); Thede and Gustafson (2012) and Gylfason et.al. (2015).

Anderson and Marcouiller (2002) analyze the reduction in trade as a consequence of poor institutions and corruption through a structural model of import demand in which insecurity works as a hidden tax on trade. In line with Krueger's assumptions, they find that corrupt officials impose a price mark-up on trade which is equivalent to a tariff, suggesting that a 10% rise in transparency would lead to a 5% increase in import volumes. The authors also implicate that excluding the corruption aspect from gravity models; would cause the models to suffer from omitted-variable bias. Another implication of their study is that trade between countries with high-quality institutions tend to be high due to low insecurity costs, while transaction costs could impose a double disadvantage on trade among low-income and low-security countries.

Dutt and Traca (2010) examine more closely the trade enhancing and trade hampering effects of corruption on bilateral trade by deriving a corruption-augmented version of the gravity model. The authors include an interaction variable which measures the impacts of corruption in relation to level of tariffs. This approach is similar to mine, but differs as I instead account for the effects of corruption when trade tariffs are (almost) completely abolished. Dutt and Traca find support that corruption has a trade hindering effect because as bribes increase, incentives for the countries to engage in trade reduce. However, they also find a trade enhancing effect in corrupt environments in which custom officials allow for tariff evasion. Looking at a time-frame from 1982-2000, and a total of 128 exporters and 126 importers, they find that the effect of corruption is mediated by levels of tariff protection and that in 5%-14% of their observations corruption shows a positive impact on trade.

De Jong and Bogmans (2011) use measures of specific forms of corruption at the border and quality of customs and study their effects on bilateral trade. Through the gravity model, they estimate their model based on data for 80 countries using 2 different measures of corruption. They find that in general, corruption hampers international trade, results most robust for the exporting country. They also find that frequent payment to customs enhances imports while bad institutions (days of wait at the border) hamper imports. The positive effect of corruption on imports is most significant in countries with

bad quality of customs, leading to the conclusion that bribing compensates for damaging effects of bad institutions in the importing country.

Thede and Gustafsson (2012) derive a gravity model where they look at five different corruption characteristics, including level, prevalence, customs location, function and predictability of corruption, and examine corruptions multifaceted effects on international trade. In their cross-country study they examine a range of countries[6] in the year 1999 and find that the different characteristics impose individual effects on trade. They find that total effect on trade is negative, yielding larger impacts on trade levels than other economic distance variables of the gravity model.

The study which lies the closest to mine is that of Gylfason et.al. (2015). In their paper, the authors first study the effect of Free Trade Agreements on bilateral trade, and second, they account for the role of corruption in fostering trade. They base their model on trade agreements between the EU and Moldova, Georgia and Ukraine; respectively trade agreements between Russia and Moldova, Georgia and Ukraine. Based on data for 60 exporters and 150 importers in the period of 1995 to 2012, their estimation suggest that trade agreements with EU are beneficial while trade with Russia is only slightly beneficial or at times negative, and explained partly by the lack of good institutional quality in Russia. After accounting for the impact of FTAs on trade, the authors isolate the variation in trade which can be explained by corruption levels. The authors here find a weak negative relationship between corruption and exports, but fail to disentangle the relationship between the enhancive and hindering effects of corruption on trade.

In summary, the belief that corruption has negative effects on international trade levels is by large supported by economic literature. The extent of these negative effects has been shown to vary in significance and extents based on what corruption measures and estimation techniques are employed in the study. Research also suggests that in protectionist[7] countries, corruption can have a trade enhancing effect but there is less clear evidence as to when negative and positive effects of corruption are interchanging why systematic conclusions should be avoided.

[6] Their country sample includes countries that vary in geographical disposition, per capita incomes and corruption scores. For further discussion see Thede and Gustafsson (2012, 652).

[7] Level of protection on trade often varies across different sectors, why one can assume that the effects of corruption will tend to show sector-specific outcomes. The division between different sectors falls outside of the scope of my study and these results will not be included here.

4 Data and Methodology

4.1 Empirical Model

Guided by the previous studies on the topic of corruption and trade, my empirical research will be based on the gravity model. The model is referred to as the workhorse of applied international economics and with its ability to explain variations in observed volumes of bilateral trade, it represents the most common used model when studying the empirical relationship between international trade and other trade-related variables (Anderson and van Wincoop, 2003; Shepherd, 2013).

Starting from the thoughts of Newton's gravity equation, the model was first introduced by Tinbergen in 1962 where the levels of bilateral trade where believed to be proportional to the size of the respective economies and the distance between these (Bacchetta et.al., 2012, 103). The model was first specified in a multiplicative form (1), where the value of trade flows from country *i* to country *j* in year *t*, T_{ijt}, was proportional to the product of the two countries' GDP, Y_{it} and Y_{jt} respectively, and inversely proportional to their distance, D_{ij}. Also included is the variable A which represents an unknown constant, and β-variables which represent unknown parameters. Further, as a log-linearization of the model allows for a simple estimation through OLS-methods, the model is most often expressed in a logarithmic form (2) where the error term ε_{ijt} is added (Shepherd, 2013).

$$T_{ijt} = AY_{it}^{\beta 1} Y_{jt}^{\beta 2} D_{ij}^{\beta 3} \quad (1)$$

$$lnT_{ijt} = \beta_0 lnA + \beta_1 lnY_{it} + \beta_2 lnY_{jt} + \beta_3 lnD_{ij} + \varepsilon_{ijt} \quad (2)$$

The log-linearized version of the model makes it easy to interpret the coefficients as they now represent the elasticities of the variation in trade. However, this does not hold true for dummy variables which are to be included in the equation later on[8] (Bacchetta et.al. 2012, 127).

Although this simple model has proven to be empirically successful, it has been criticized for being naïve due to the lack of theoretical foundations (Head and Mayer, 2013, 12). In order to solve for these inadequacies, Anderson and van Wincoop (2003) extended the

[8] Using the following equation: *value* $=e^b-1$, we can account for the percentage change in trade levels when the dummy goes from zero to one.

basic gravity model to include bilateral trade costs and to include multilateral resistance variables. Their log-linearized model (3) in its simple version looks as following:

$$\ln T_{ijt} = \ln Y_{it} + lnY_{jt} - \ln Y_t^W + (1 - \sigma) \ln t_{ijt} - (1 - \sigma) \ln P_{it} - (1 - \sigma) \ln P_{jt} \qquad (3)$$

Besides including the respective countries' GDP as explanatory variables (Y_{it} and Y_{jt}) they also include the world GDP (Y_t^W); the bilateral trade costs (t_{ijt}); and the country-specific multilateral resistance variables (P_{it} and P_{jt})[9]. These variables by definition represent the trade barriers that countries are subject to in trading with all its trade partners, independent of the bilateral trade costs already present. Anderson and van Wincoop further claim that bilateral trade is affected by global interactions, why the multilateral resistance variables can be either time-variant or time-invariant. Omitting these variables can result in biased estimates, which can leave profound consequences on the estimation results (Anderson and van Wincoop, 2003. 178-180; Baier & Bergstrand, 2009, 84).

Estimating this more theoretically sound model requires that we include a trade cost function of bilateral trade barriers, among which the most commonly included are variables such as ethnic ties, common border, language and customs unions (Anderson and van Wincoop, 2003, 170). Accounting for multilateral resistance terms proves more troublesome as it requires the inclusion of time-varying or time-constant country-specific dummies (ibid. 180-182). For reasons which will be set clear for further down this paper, I will in this study adapt an easier estimation technique of the multilateral resistance terms as suggested by Baier and Bergstrand (2009). Their method implicates the inclusion of exogenous multilateral resistance terms, which are measured through the remoteness variable based on the following equation:

$$Remoteness_{jt} = \Sigma_j \frac{Dist_{ij}}{GDP_{jt}/GDP_{wt}} \qquad (4)$$

Here, $Remoteness_{jt}$ measures a country's average weighted distance ($Dist_{ij}$) from its trading partners, where weights are the partner countries' share of the world GDP (GDP_{jt}/GDP_w) (Bacchetta et.al. 2012, 110-111). Although this approach is criticized for relying only on geographical measures, it provides us with estimates which are less biased than the original gravity model and adds to the theoretical validity of the model (Baier and Bergstrand, 2009, 84).

[9] σ is here the elasticity of substitution for all goods. For further discussion on the basic assumptions in gravity models, see Anderson and van Wincoop (2003).

4.1.1 Specification of the corruption augmented gravity model

In order to test my two hypotheses, further explanatory variables have been introduced into the basic model. The gravity model is then tested using two log-linearized equations in which the first one (5) is used to estimate corruption's overall effects on trade levels; and the second one (6) is used to measure corruption's effects after countries sign Free Trade Agreements:

$$\ln Imports_{ijt} = \beta_1 + \beta_2 \ln GDP_{it} + \beta_3 \ln GDP_{jt} + \beta_4 \ln POP_{it} + \beta_5 \ln POP_{jt} + \beta_6 \ln Distance_{ij} + \beta_7 Border_{ij} + \beta_8 Language_{ij} + \beta_9 lnCorruption_{jt} + \beta_{10} FTA_{ijt} + ln\ Remoteness_{jt} + \lambda_t + \gamma_i + \varepsilon_{ijt} \quad (5)$$

$$\ln Imports_{ijt} = \beta_1 + \beta_2 \ln GDP_{it} + \beta_3 \ln GDP_{jt} + \beta_4 \ln POP_{it} + \beta_5 \ln POP_{jt} + \beta_6 \ln Distance_{ij} + \beta_7 Border_{ij} + \beta_8 Language_{ij} + \beta_9 lnCorruption_{jt} + \beta_{10} FTA_{ijt} + \beta_{11} FTA_{ijt} * \ln Corruption_{jt} + ln\ Remoteness_{jt} + \lambda_t + \gamma_i + \varepsilon_{ijt} \quad (6)$$

In equation (5) and (6), the dependent variable $Imports_{ijt}$ represents value of imports from each of the 17 exporting countries[10]; to each of the importing EU27 countries, during a time period between 2002 and 2012.

The classical variables of exporting and importing countries' GDP is included, GDP_{it} and GDP_{jt}. The GDP is often used as a proxy for the trading partners' supply and demand for various goods, where a larger GDP represents a larger demand for imports, and a larger supply of exports respectively, why the variables are believed to have a positive impact on imports.

Variables on exporting and importing countries population are included, POP_{it} and POP_{jt},. The estimates of the population variable are ambiguous and depend on whether a big country exports/imports more than a small country or whether the country exports/imports less when it is big. Thus, it is uncertain whether these variables leave positive or negative impacts on imports.

Further, the $Distance_{ij}$ variable, which measures the distance between the trading countries largest cities, is included. The $Distance_{ij}$variable is believed to have a negative impact implying that countries which are further away from one another tend to trade less. The values of this variable normally lie between -0.7 and -1.5 (Shepherd, 2012, 36).

[10] A full list of exporting and importing countries can be found in *Appendix 1*.

$Border_{ij}$ and $Language_{ij}$ are dummies for whether the countries share the same border or language. Both variables are believed to have a positive impact on trade flows, as both of them are believed to decrease actual trade costs.

The main independent variable is $Corruption_{jt}$ which measures the level of corruption in the exporting country and is believed to capture the direct effects of corruption on bilateral trade. In line with my hypotheses and previous research, this variable is believed to have a negative effect on exports.

A dummy FTA_{ijt} is included which takes value 1 if trading countries have signed a FTA between each other and takes value 0 otherwise. As FTAs eliminate the tariffs imposed on trade, this variable is believed to have a positive impact on imports by lowering actual trade costs.

In equation (6), an interaction variable $FTA_{ijt} * Corruption_{jt}$ is added. This variable captures the effects of corruption on trade once the trading countries sign a FTA. Theory suggests that corruption can be trade enhancive in presence of high tariffs; however, when countries lower their tariffs, the positive effects of corruption will tend to diminish. Thus, when countries change from high tariffs to low tariffs (or eliminate the tariffs completely), corruption's positive effects not only go away, but corruption now instead becomes directly trade hampering. Thus, the expected impact of the variable is believed to be negative.

The $Remoteness_{jt}$ variable is included which strengthens the theoretical base of the model, as it accounts for multilateral resistance terms and also deals with unobserved heterogeneity among exporters.

Lastly, in gravity models a standard procedure is to include time specific effects. In my model, this is done through the inclusion of λ_t which is a set of dummy variables for a specific year, one per year (total of 11 dummies for my sample). Including λ_t makes it possible to account for global economic events which affect all countries in the study at a given year. The model also includes importer fixed effects, γ_i, which account for unobserved heterogeneity for a specific importer across all exporters.[11]

4.2 Sample and data

4.2.1 Sample

As shown, my model is based on panel data in which I observe a sample of 27 importers, the EU27 member countries, and 17 exporters, countries from the regions of Western Balkans[12], Caucasus and Central Asia, over a period between 2002 and 2012.

[11] I chose in my model not to include exporter fixed effects, for discussion see 4.3.1.
[12] Due to lack of trade data for Kosovo, the country is not included in the study.

Including more countries into the model than those of primary interest in the study, is done due to the reason that the gravity model is best estimated when it involves as many countries as possible (Bacchetta et.al. 2012, 180). Determining the sample of the exporting countries is difficult as there are no clear criteria for which countries to choose. In my study, the regions of Caucasus and Central Asia are included, mainly because they are believed to be affected by corruption in a similar manner but help in creating variation in the data thus providing better estimates of the model.

A further motivation behind choosing these countries is their geographic location, a methodology also applied in Gylfason et.al. (2015). This method of choice is adapted due to the fact that European neighboring countries are likely to engage in trade with EU more so than the countries which are relatively more distant.

The chosen period of study, 2002 to 2012, is mainly decided by the availability of data. The corruption data is only available on a yearly basis from 2002 why this was chosen as a starting year. Also, due to the historical conflicts and split of the SFR Yugoslavia, it becomes difficult to provide exact estimates for specific countries in an earlier period. As Serbia and Montenegro were one country until year 2006, the trade data for these countries was modified by taking the total average value of exports and dividing the trade values accordingly. However, in my sample which spans across 11 years, variation in corruption, free trade and trade levels can be observed why estimations of this sample should yield significant results.

4.2.2 Data

When collecting data I have by large been guided by previous research, which not only confirmed the validity of my data sources, but also makes the study easily comparable to other studies in the field[13].

Import statistics are generally preferred to before export statistics, why my dependent variable represents the import value in nominal USD from 17 exporting countries to the EU27 countries (Bacchetta et.al. 2012, 119). The data on the imports has been downloaded from the UN Comtrade (2016) database, covering a period of 2002 to 2012.

The independent variables GDP_{it} and GDP_{jt}, measure the countries' GDP measured in nominal USD and were collected from the World Bank (2016c) World Development Indicators Database. The variables POP_{it} and POP_{jt} are too collected from the World Bank (2016c) and represent the total population in a country at a given year. The variables on $Dist_{ij}, Border_{ij}$, and $Language_{ij}$, have all been retrieved from the CEPII[14] (2016) database[15].

[13] A short summary of my data sources is to be found in Appendix 2.
[14] Centre d´Etudes Prospectives et d´Informations Internationales.
[15] The data for the countries of Serbia and Montenegro needed to be modified as the countries were the same country at the date the data was issued. This was solved by coding the variable on $Language_{ij}$ the same for the countries, and by

The main independent variable, $Corruption_{jt}$, is retrieved from the World Bank (2016d) Worldwide Governance Indicators database. In order to simplify the interpretation of the coefficient, the values have been rescaled from -2.5 to +2.5, to 0 to 5. The values have also been reversed and a higher value represents a higher level of corruption. In my robustness test, another measure of corruption will be used based on CPI measures (Transparency International 2016c). Also these values have been transformed so that 0 represents lowest corruption and 5 highest corruption levels.

The FTA_{ijt} variable has been constructed manually using the information from the World Trade Organization (2016), the European Commission (2016b) and CEFTA (2016)[16]. As several of the countries were engaged in regional trade agreements before they signed FTAs with the EU as a whole, the variable had to be carefully adjusted to account for historical trade agreements as well.

Lastly, $Remoteness_{jt}$ is computed by equation (4) presented earlier in the text, and has been calculated using data from World Bank (2016a) and CEPII (2016) databases.

4.3 Estimation technique and issues

As mentioned, the majority of studies focused on bilateral trade apply the gravity model in their study. However, there are many methods for estimating the model, each with its own just justifications. When estimating the model, some of the most common problems deal with heterogeneity, endogeneity, heteroscedasticity and zero trade flows (see Baier and Bergstrand, 2009; Head and Mayer, 2013; Baltagi et.al. 2014). Although the model was originally estimated through the OLS technique, Silva and Tenreyro (2003) suggest that a Poisson pseudo-maximum-likelihood (PPML) method is better suited for the purpose. Below, I will present the main issues which arise in connection to the estimation of the model, as well as my choice of the baseline model and the robustness tests.

4.3.1 Unobserved heterogeneity

When estimating the gravity model, unobserved heterogeneity is an issue which often arises due to the presence of unobserved differences between the objects of study, in my case differences between the exporters and importers over time. The presence of such effects results in inefficient coefficient estimates and invalid standard errors (Shepherd, 2013, 33-34). As my study is built on panel data, it allows for a fruitful way of

adjusting the variable of $Border_{ij}$ to correspond to the borders as they are today. The variable $Dist_{ij}$ was coded the same for both countries which slightly biases the results as the distance between the two countries' capitals is approximately 420km.

[16] A table on the signing of the Free Trade Agreements is listed in the Appendix.

overcoming the problems of unobserved heterogeneity through the inclusion of fixed effects[17] in the model (e.g. fixed effect OLS or fixed effect PPML) (Dougherty, 2011, 514-515). By including time fixed effects, I account for unexpected variation or special global events which affect all countries. By including importer fixed effects, I account for heterogeneity that is constant for a given importer across all exporters. Including these effects are in line with theory, and provide better estimations of the model (Shepherd, 2012, 33-34).

However, including fixed effects comes at a cost. An inclusion of fixed effects causes variables that vary in the same dimension as the fixed effects to be dropped as these would be perfectly collinear with the fixed effects (Shepherd, 2012, 34). This fact hinders me from including exporter fixed effects as this effect would not allow me to account for exporters' corruption score which is constant across all importers for a given exporter and thus becomes subsumed into the fixed effects. The inclusion of the exporter specific remoteness variable helps instead in dealing with exporter specific unobserved heterogeneity. I will also as a robustness test include country-pair fixed effects which account for time invariant country-pair heterogeneity. However, including country-pair fixed effects only allows for estimation of bilateral variables that vary over time and thus causes several variables to drop (Shepherd, 2012, 34; Dougherty, 2011, 518-519).

The issues connected to fixed effect estimations hinder me from adapting the Anderson and van Wincoop (2003) approach when accounting for multilateral resistance terms (MRT). As their proposal is to include a set of fixed effects, including importer, exporter, time and country-pair fixed effects, it would cause some important variables to be dropped from the estimation (Bacchetta et al 2012, 108-112). For these reasons, my main approach for dealing with unobserved heterogeneity will be through the inclusion of the remoteness variable as suggested by Baier and Bergstrand (2009). By accounting for the multilateral terms exogenously, their methodology provides almost identical estimates without the use of fixed effects which is better suited for the purpose of my study (Shepherd, 2013, 39-40).

4.3.2 Endogeneity

Endogeneity can arise through multiple ways such as measurement errors, simultaneity and omitted variables (Dougherty, 2011, 333). In my model, two main variables are likely to be suffering from endogeneity. The first one is the FTA variable as it is likely that countries who sign trade agreements are those which already have high trade levels before the signing of the agreement. Thus, we might well believe that the variable is correlated to the error term as it is some unobserved characteristics which explain the high trade levels between the countries and which also explain why it is more likely for the two countries to form a FTA agreement (Bacchetta et.al., 2012, 118; Head and Mayer, 2013, 36). Endogeneity issues might also arise when policy-related variables such as corruption are included in the model. Because corruption levels are believed to be

[17] Another approach is the random effect approach; however, as this method works under restrictive assumptions and is not used frequently in the literature, it will not be discussed here but for further discussion, see Shepherd, 2013.

influenced by a country's integration in the world market, we are led to believe that the corruption variable suffers from simultaneity issues.

The arguably best approach to deal with these issues is to find instrument variables (IV) which would be correlated to the variables but exogenous to the error term and the dependent variable. However, these are often difficult to find as often those variables belong in the trade equation by themselves (Shepherd, 2012, 41). The previous research conducted in the field also fails to present adequate solutions to endogeneity issues or to present suitable IVs, and due to the difficulties of finding proper instruments, Head and Mayer suggest that including country-pair fixed effects might be the best possible solution which will force identification to come from within the dimension of the data (Head and Mayer, 2013, 36).

Endogeneity present due to omitted variables, such as the multilateral resistance terms, will be solved for through the inclusion of the remoteness variable as well as the inclusion of fixed effects.

4.3.3 Heteroscedasticity

The issue of heteroscedasticity is common when observing trade, and implies that the variance of the error term is not constant for all observations. Although heteroscedasticity does not alter parameter estimates per se, it provides us with incorrect measures of the standard errors of the regression coefficients. As a consequence, the t-tests and f-tests will be invalid and overestimated, leading us to wrong perceptions of the precision of our coefficient estimates (Dougherty, 2011, 282-283). A simple way of accounting for the heteroscedasticity is including the robust option in the estimation which will account for arbitrary patterns of heteroscedasticity in the data (Shepherd, 2013, 28).

However, the simple solution of heteroscedasticity proves insufficient when OLS is chosen as a method of estimate due to the fact that this method involves log-linearizing the error term and thus completely changes its' properties. OLS is thus no longer the best option as it proves to be inefficient, suggesting that other estimates could be found which have smaller variances in the error term and are still unbiased (Dougherty, 2011, 282-283). Silva and Tenreyro (2003) suggest using a Pseudo Maximum Likelihood estimation, which proves to be more efficient than both OLS and NLS (Non-Linear Least Squares) estimates in regard to heteroscedasticity (2003, 652).

4.3.4 Zero trade flows

A further problem which arises when the model is estimated in its log-linear form is the presence of zero trade flows. By estimating this model through OLS, all observations with zero trade flows will be dropped as the log of 0 is undefined. While majority of research chooses to still proceed with the OLS estimation, others chose to replace the 0

values with 1 which makes it possible to keep the OLS as estimator without dropping observations. However, Silva and Tenreyo claim that these procedures lead to inconsistent parameter estimators and the extent of the faultiness depends on the characteristics of the sample (2003, 643-644).

A PPML estimator provides a natural way of dealing with zeroes in the trade data as it does not require a log-linearization of the model (Silva and Tenreyro, 2003, 649-653).

4.3.5 Method of estimation

My main method of estimating the gravity model (5) and (6) will be the OLS estimation technique, a technique used by majority of researchers. The widespread use of OLS as an estimation model makes my study trustworthy, while also more easily comparable to other studies within this field of research. However, in compliance with methodology literature, other estimation techniques will be included as robustness tests.

My baseline estimation deals with unobserved heterogeneity through the inclusion of time and importer fixed effects. Accounting for heteroscedasticity will be done through the inclusion of robust standard error across all estimation models, a method which is commonly applied throughout research.

Bearing in mind that zero trade flows account for less than 4% of my total observations, the issue of zero trade flows ought to be small. Nevertheless, a robustness test for zero trade flows is included by adding a very small constant in cases where trade equals zero. Although imperfect, this methodology represents an optional way of dealing with zero trade flows.

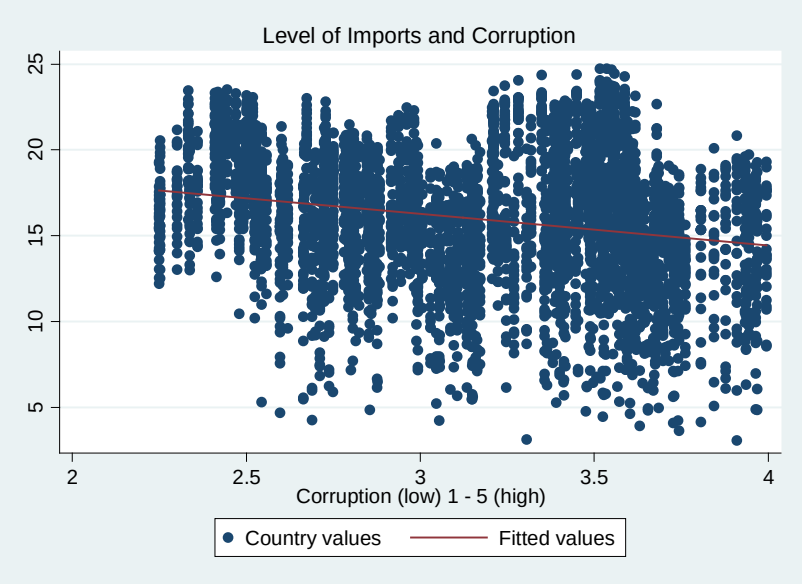
As a robustness test, country-pair fixed effects are included in the estimations, accounting for time-invariant country-pair heteroscedasticity. A further robustness test is performed by using another measure of corruption computed from the CPI scores.

It would have been desirable to include the Poisson Pseudo Maximum Likelihood estimation due to the model's capabilities of providing consistent estimates in the presence of heteroscedasticity, while simultaneously accounting for zero trade flows (Shepherd, 2013, 52). However, when trying to estimate my model using PPML estimator, my model fails to converge and does not present estimation results.

5 Empirical results and analysis

I began my empirical analysis by plotting the relationship between the logged value of imports and corruption. Doing so, the graphic scatter diagram suggests that there exists a clear negative relationship between levels of corruption and imports; thus implying that higher corruption is associated with lower levels of trade. One should be careful when interpreting this result however, as correlation does not necessarily mean causation. But, as I mentioned earlier, corruption has an ability to influence trade through multiple channels which might well be reason to believe that corruption indeed hampers international trade.

Graph 3. Level of Imports and International Trade



Notes: Calculated from own dataset using STATA.

5.1 Model estimations

As the aim of this thesis has been to test two different hypotheses, the estimations in the study have been split up into two different parts. First part is designated to estimate equation (5), thus testing the hypothesis that corruption has a negative effect on international trade levels. The results of the baseline regressions for this equation can be found in Table 1 below. The second part is designated to test the hypothesis that corruption has an amplified negative effect when FTAs are signed, i.e. tariffs are abolished, and estimates equation (6). The results of these regressions can be found in Table 2.

The baseline model here has been the OLS model including the importer and year fixed effects whose results can be seen under column (c). These results are used as baseline estimations as they represent the most robust model in the study. It is also these estimations which will be used when simulating the effects of lowered corruption levels in the Western Balkans. However, due to mechanisms explained in 4.3.5, the coefficient estimates should be interpreted with care, why more emphasize is put on the sign of the coefficients rather than their exact values.

5.1.1 OLS estimations without interaction variable

The baseline results of equation (5) which can be found in *Table 1* in column (c), implies that corruption has a negative effect on bilateral trade significant on the 1% level with a value of -2.57. As the estimation of continuous variables can be interpreted as elasticities, this means that a 10% increase of corruption levels in a country would result in a 25.7% decrease in bilateral trade flows.

Looking at the estimation of the FTA dummy, we can see that it has a positive effect on trade levels, a result significant on the 1% level FTA across 3 out of 4 estimations. After calculating the value of the impact of an FTA according to the estimation presented in the methodology chapter, we get the result that once countries sign an FTA, they increase their trade by 36.9% ($e^{0.314}$*-1).* Although values could be biased, the result goes in line with Gylfason et.al. (2015) results where they imply that FTAs with the EU significantly increase trade levels.

The remaining standard coefficients of gravity models, except for GDP exporters, are significant in the pooled OLS estimation (a). Estimates on importer GDP are significant on the 1% level and show a positive value after including importer fixed effects, but falls out of significance once time fixed effects are added. It is reasonable to assume that OLS estimates were inflated without year specific effects, why this result is not surprising. The estimates on the exporter GDP are not significant in any regression.

The estimations on exporter population is positive and significant at the 1% level in 3 of 4 regressions, instead yielding a large negative value once bilateral fixed effects are included. The estimates on the importing country's population are significant at the 1% only in the pooled OLS estimations but fall out of significance in the remaining regressions. However, theory implies the effects of population can be ambiguous why not much emphasize is put on these results.

Further, estimates on the distance variable are significant at the 1% and have a value ranging from -1.77 to -1.13. These results go in line with economic theory which predicts the distance variable to gain values between -0.7 and -.1.5. The common border variable is also in line with my predictions and shows a positive value on imports and is significant on a 5% level in 2 out of 3 estimations. The common language variable on the other hand goes against the theoretical predictions and shows a negative value significant

in all three estimations. Due to the fact that only Turkey and Cyprus share an official common language out of all possible country pairs, this negative effect is best explained by the conflict which prevails between the countries.

Table 1. OLS estimations without interaction variable

IMPORTS	(a)	(b)	(c)	(d)
Corruption	-2.886***	-2.985***	-2.831***	-0.688
	(0.457)	(0.457)	(0.464)	(0.473)
Free Trade Agreement	0.255**	0.248**	0.314***	-0.144
	(0.102)	(0.102)	(0.101)	(0.114)
GDP exporters	-0.0909	-0.102	0.514	0.268
	(0.195)	(0.255)	(0.405)	(0.235)
GDP importers	0.557***	0.664***	0.477	0.531
	(0.126)	(0.225)	(0.409)	(0.391)
Population exporters	0.914***	0.893***	0.797***	-9.559***
	(0.206)	(0.202)	(0.203)	(1.424)
Population importers	0.793***	-1.124	-1.079	-1.497
	(0.145)	(1.679)	(1.880)	(1.750)
Distance	-1.770***	-1.625***	-1.139***	
	(0.175)	(0.216)	(0.319)	
Common Border	0.728**	0.633	0.977**	
	(0.350)	(0.407)	(0.438)	
Common Language	-2.670***	-2.022***	-1.754**	
	(0.253)	(0.683)	(0.690)	
Remoteness	0.582**	0.605*	0.0743	
	(0.296)	(0.317)	(0.452)	
Adjusted R^2				0.118
Observations	4 867	4 867	4 867	4 867
Remoteness	Yes	Yes	Yes	No
Time FE	No	No	Yes	Yes
Importer FE	No	Yes	Yes	No
Bilateral FE	No	No	No	Yes

Notes: Robust standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1. All continuous variables are transformed into their log-values.

In summary, we see that OLS estimations of the corruption variable are significant in 3 out of 4 estimations, falling out of significance once bilateral fixed effects are included[18]. The baseline regression (c) shows strong support for my first hypothesis, why the

[18] For discussion, see 5.1.5

conclusion drawn from here is that corruption has an overall negative effect on trade, a result robust even when controlling for importer and year fixed effects.

5.1.2 OLS estimations when interaction variable is included

Having added the interaction variable between corruption and FTAs, the variable estimations of corruption and FTA slightly change. The remaining estimates and significance levels of variables and dummies of the model are almost identical to those presented earlier, why a presentation here is not required.

In the new model we can see that corruption variable now gains a slightly smaller value in all observations except when bilateral fixed effects are included. The FTA variable instead gains a much larger value once the interaction variable is included, results significant across all estimations.

The interaction variable, FTA * Corruption, is supposed to capture the additional effects on corruption once trading countries commit to a free trade agreement. As explained in 2.3.2, due to elimination of tariffs, corruption's positive effects diminish why the interaction variable is expected to have a negative effect on imports. The interaction variable measures the extent of these effects, and its' results should be interpreted as an estimation of the additional costs of corruption when free trade prevails. The estimations of the variable show a negative value significant on the 5% level for all estimations, with a value of -1.69. The results obtained strongly support my hypothesis, and we can see that the negative effects of corruption amplify once we take the FTAs into consideration.

Although I am more interested in the sign of the effects rather than the scope, the results suggest that the overall effect of corruption is negative with an elasticity value of 4,15 (based on the regression with importer and year fixed effects), implying that a 10% increase in corruption levels would yield a 41,5% decrease in trade levels. However, as the inclusion of the interaction variable changes the FTA dummy (which has a positive effect on trade) by large, we can suspect that this effect is smaller than calculated.

In conclusion, the results suggest that corruption does represent an additional cost to trade once free trade prevails, and the results are robust even after controlling for bilateral fixed effects.

Table 2. OLS estimations with interaction variable

IMPORTS	(e)	(f)	(g)	(h)
Corruption	-2.608***	-2.684***	-2.470***	-0.330
	(0.469)	(0.468)	(0.480)	(0.508)
Free Trade	1.736**	1.817**	2.118***	1.829**
Agreement	(0.739)	(0.732)	(0.745)	(0.782)
FTA *	-1.389**	-1.470**	-1.687**	-1.848**
Corruption	(0.699)	(0.691)	(0.700)	(0.739)
GDP	-0.135	-0.143	0.540	0.379
exporters	(0.197)	(0.257)	(0.403)	(0.246)
GDP	0.579***	0.689***	0.526	0.586
importers	(0.125)	(0.226)	(0.408)	(0.390)
Population	0.914***	0.901***	0.802***	-9.855***
exporters	(0.205)	(0.201)	(0.203)	(1.437)
Population	0.772***	-1.248	-1.164	-1.591
importers	(0.145)	(1.676)	(1.877)	(1.753)
Distance	-1.799***	-1.658***	-1.120***	
	(0.175)	(0.217)	(0.319)	
Common	0.729**	0.627	1.012**	
Border	(0.356)	(0.415)	(0.446)	
Commmon	-2.685***	-2.034***	-1.736**	
Language	(0.255)	(0.689)	(0.696)	
Remoteness	0.643**	0.658**	0.0662	
	(0.296)	(0.318)	(0.449)	
R-squared				0.120
Observations	4 867	4 867	4 867	4 867
Remoteness	Yes	Yes	Yes	No
Time FE	No	No	Yes	Yes
Importer FE	No	Yes	Yes	No
Bilateral FE	No	No	No	Yes

Notes: Robust standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1. All continuous variables are transformed into their log-values.

5.1.3 Robustness test 1: Accounting for zero trade flows

In order to account for the observations with zero trade flows which are normally dropped when OLS is used as an estimation method, I have conducted a robustness test in which the zero trade values have been replaced by 1, thus making it possible to include these observations in the study. The results of these estimations can be found in Table 3, where (1), (2) and (3) are estimations without the interaction variable and (4), (5) and (6) are estimations with the interaction variable[19]. As this method does not provide the ultimate solution to dealing with zero trade flows, I only look at the sign of the variables rather than their values.

Looking at the corruption coefficient, we see that the results of the test reinforce my first hypothesis as the corruption variable now becomes significant on the 1% level even after accounting for bilateral fixed effects, suggesting that zero trade flows do matter.

The FTA estimations and the interaction variable go in line with my earlier presented results, showing significant values across all regressions (except for FTA in regression (3)). Albeit the values now become large, the sign of the coefficients point in the expected directions. One major observation is that the values of the FTA estimations increase by large once the interaction variable is included and remain significant at the 1% level in all observations. The interaction variable shows large negative values in the estimations and is significant at the 1% level in 3 out of 3 observations, thus providing additional support for my second hypothesis. The remaining coefficients go in hand with the baseline estimations.

To conclude, it seems as zero trade flows influence the results and should be included as robustness tests. The results of this test reinforce my results as corruption now becomes significant after controlling for bilateral FE, and the significance levels increase for the FTA and the interaction variables.

5.1.4 Robustness test 2: Using the CPI as the corruption index

Another robustness test was performed using the Corruption Perception index when estimating the effects corruption has on international trade. The values obtained for the CPI range from year 2002-2009, why a smaller number of observations is included in the estimations.

Nevertheless, the results support the first hypothesis showing that corruption has a significant negative impact on trade. These results are significant on a 1% level when year and importer fixed effects are included but fall out of significance once the bilateral fixed effects are included.

[19] The pooled OLS estimations are not included in the table.

My second hypothesis is less supported as now both FTA and the interaction coefficients fall out of significance when using the time and importer fixed effects. However, the estimations on the interaction variable now become significant at the 10% level once bilateral fixed effects are included, why a support for the hypothesis is found. As for the remaining variables, they once again act in accordance to the baseline estimation (c), and are not analyzed in detail here.

Table 3. Robustness test 1: Adjusting for zero trade flows.

IMPORTS	(1)	(2)	(3)	(4)	(5)	(6)
Corruption	-4.851***	-4.798***	-2.084***	-3.889***	-3.718***	-1.093
	(0.662)	(0.677)	(0.769)	(0.650)	(0.671)	(0.837)
Free Trade Agreement	0.500***	0.547***	-0.0464	5.153***	5.547***	5.433***
	(0.165)	(0.162)	(0.196)	(1.353)	(1.367)	(1.499)
FTA * Corruption				-4.343***	-4.658***	-5.122***
				(1.287)	(1.298)	(1.427)
GDP exporters	-0.443	0.308	0.243	-0.511	0.395	0.546
	(0.342)	(0.513)	(0.350)	(0.347)	(0.511)	(0.363)
GDP importers	1.142***	1.380**	1.483**	1.220***	1.519**	1.639***
	(0.366)	(0.629)	(0.604)	(0.366)	(0.617)	(0.593)
Population exporters	0.764***	0.687***	-11.98***	0.860***	0.777***	-12.64***
	(0.246)	(0.250)	(2.199)	(0.249)	(0.252)	(2.178)
Population importers	-0.996	-0.158	-0.337	-1.361	-0.388	-0.596
	(2.574)	(2.784)	(2.656)	(2.514)	(2.741)	(2.624)
Distance	-1.645***	-1.040***		-1.716***	-0.993**	
	(0.276)	(0.388)		(0.282)	(0.390)	
Common Border	0.619	1.067**		0.611	1.148**	
	(0.469)	(0.497)		(0.494)	(0.520)	
Common language	-1.239	-0.914		-1.258	-0.862	
	(1.014)	(1.013)		(1.027)	(1.024)	
R-squared			0.088			0.094
Observations	5 049	5 049	5 049	5 049	5 049	5 049
Remoteness	Yes	Yes	No	Yes	Yes	No
Time FE	No	Yes	Yes	No	Yes	Yes
Importer FE	Yes	Yes	No	Yes	Yes	No
Bilateral FE	No	No	Yes	No	No	Yes

Notes: Robust standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1. All continuous variables are transformed into their log-values.

Table 4. Robustness test 2: OLS using CPI as proxy for corruption

IMPORTS	(7)	(8)	(9)	(10)	(11)	(12)
Corruption (CPI)	-1.893***	-2.207***	-0.692	-1.907***	-2.123***	-0.443
	(0.437)	(0.459)	(0.523)	(0.471)	(0.491)	(0.550)
Free Trade Agreement	0.0141	0.104	-0.230*	-0.0559	0.589	1.384
	(0.109)	(0.109)	(0.123)	(0.770)	(0.768)	(0.921)
FTA * Corruption				0.0582	-0.393	-1.317*
				(0.633)	(0.634)	(0.770)
GDP exporters	-0.121	0.552	0.699**	-0.117	0.554	0.781**
	(0.355)	(0.395)	(0.293)	(0.354)	(0.395)	(0.307)
GDP importers	0.521*	0.647	0.709*	0.516*	0.655	0.737*
	(0.268)	(0.417)	(0.416)	(0.267)	(0.418)	(0.416)
Population exporters	0.458**	0.256	-8.634***	0.455**	0.253	-8.879***
	(0.213)	(0.213)	(1.722)	(0.213)	(0.212)	(1.741)
Population importers	-2.497	-1.006	-1.267	-2.505	-1.023	-1.329
	(2.169)	(2.414)	(2.327)	(2.169)	(2.412)	(2.331)
Distance	-1.708***	-1.098***		-1.704***	-1.095***	
	(0.285)	(0.325)		(0.284)	(0.326)	
Common border	0.412	0.861**		0.413	0.868**	
	(0.420)	(0.438)		(0.420)	(0.440)	
Common language	-2.188***	-1.913***		-2.189***	-1.907***	
	(0.673)	(0.657)		(0.673)	(0.658)	
R-squared			0.117			0.118
Observations	3 277	3 277	3 277	3 277	3 277	3 277
Remoteness	Yes	Yes	No	Yes	Yes	No
Time FE	No	Yes	Yes	No	Yes	Yes
Importer FE	Yes	Yes	No	Yes	Yes	No
Bilateral FE	No	No	Yes	No	No	Yes

Notes: Robust standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1. All continuous variables are transformed into their log-values.

5.1.5 Summary of the estimation results

All estimations, except those including the bilateral fixed effects, show strong support for my first hypothesis that corruption has a negative influence on international trade levels. These results are not only significant at the 1% level in all estimations, but also hold true after accounting for zero trade flows and using a different index of corruption. Although the scope of corruption's influence on trade could be debated, my baseline estimates suggest an elasticity of -2,831, implying that battling corruption can have widespread effects on trade levels.

The support for my second hypothesis is a bit more ambiguous, and the estimates are not significant at all when using the CPI as measure of corruption (except at 10% level when bilateral fixed effects are included). However, in my baseline regression for this model, regression (g), I find significant support for the hypothesis. Reading these results implies that after FTAs are signed, corruption's effects on trade amplify; i.e. the benefits of corruption fade away. Considering the fact that the inclusion of the interaction variable changes the FTA variable by a great amount and that my model fails to converge when using the PPML method rather than OLS, a different specialization of the model would likely yield better estimates.

The results also imply that there is a presence of unobserved pair specific heterogeneity, why some important variables fall out of significance (including corruption) when bilateral FE are included.

5.2 Simulations

Having found empirical support for corruption's significant negative effects on trade in my study, I now seek to answer the question on how much trade would increase if these countries would to lower their level of corruption.

These simulations have been calculated using the estimations in the baseline regressions (c) and (g), accounting for the two-fold negative effects of corruption. The simulations are aimed at providing an approximation of the potentials in lowering corruption in regard to trade levels. However, the results obtained here are not to be interpreted as firm predictions of the future and it should be stressed that the results do not represent general-equilibrium but only partial effects.

The short summary of corruption levels below shows that the countries of Western Balkans project higher corruption levels than the EU-average, and also that there are significant internal difference within the region.

Table 5. Corruption levels

Control of Corruption Indicator	Average	Standard deviation	Minimum Value	Maximum Value
Corruption EU27 *2010-2014*	1.493	0.824	0.0474	2.794
Corruption in the EU27 *2014*	1.513	0.822	0.239	2.784
Corruption WB *2010-2014*	2.714	0.237	2.315	3.224
Corruption WB *2014*	2.627	0.272	2.315	3.053

Notes: Recoded from the CC indicator, 1 corresponds to lowest corruption level and 5 highest. The scores for the last 5 years are included as to show the recent development in corruption.

Calculating the effects of lowered corruption levels could have been adapted to account for the change in the regional exports of the Western Balkans as a whole. However, I chose in my study to use the best scoring country, Croatia, and the worst scoring country, Albania, as proxies for the regional gains in exports as a result of battling corruption. This was done due to the regional differences in corruption levels, and the belief that the countries with lower corruption scores will tend to reach EU-average levels faster than the countries which are subject to higher corruption. With this in mind, I chose to include the following scenarios in my simulation:

- Croatia improves to EU27-average
- Croatia improves to levels of the least corrupt country in EU27
- Croatia falls to levels of WB-average
- Albania improves to WB-average
- Albania improves to levels of Croatia
- Albania improves to EU27-average.

Through including a variation of scenarios, my aim was to give a good sense on how the countries could be affected by battling corruption.

As shown, Croatia's score is 2,315 and Albania's score is 3,053 when measured by CC indicator. Croatia's total exports to EU amount to 7 356 451 000 USD and Albania's exports to EU amount to 1 751 865 000 USD. It is these values which are used in my simulation results.

Table 6. Simulating corruption's effects on trade levels in Croatia and Albania

	Croatia to EU average	Croatia to best practice	Croatia to WB average	Albania to WB average	Albania to WB best scorer	Albania to EU average
Required CC score *(% change required*)	1,513 (16,44%)	0,239 (41,52%)	2,627 (-14,76%)	2,627 (8,52%)	2,315 (14,76%)	1,513 (56,28%)
Increase in exports* (*million USD and % change*)	3 420 (46,5%)	8 646 (117,54%)	-3 074 (-41,8%)	421 (24,1%)	732 (41,8%)	2 789 (159,3%)
Increase in exports including interaction variable** (*million USD and % change*)	5 024 (68,3%)	12 696 (172,6%)	-4 516 (-61,4%)	619 (35,4%)	1 075 (61,4%)	4 097 (234%)

Notes: Author's own calculations. *Based on regression (c). **Based on regression (g).

As can be seen from the table, Croatia and Albania, and the region as a whole, has much to gain from combatting corruption. For example, we can see that Croatia would increase its' exports by 12 696 million USD if it improved its' corruption scores to the level of the best performing country, Denmark. On the other hand it would decrease its' exports by 4 516 million USD if the corruption levels fell to the Western Balkan average score. A scenario which is likely to occur in the future in which the country lowers their score to EU average, would yield a 5 024 million USD increase in exports. Albania on the other hand, would raise their export level by 619 million USD if they increased their score to WB average. Improving to EU average would increase trade levels by 234%, increasing trade by 4 097 million USD.

These results include the double-fold effects of corruption. Estimating only the results on the effects of corruption based on (c), yields smaller but still highly significant results. Once again, it is worth mentioning that these results serve as proxies rather than exact quantitative trade measures of the consequences of lower corruption. It is also worth mentioning that the results including the interaction variable should be interpreted with care as the results of these findings are less robust. Nevertheless, the results imply that the region has much to gain from combatting corruption.

6 Summary and conclusions

This paper has tested the hypotheses that corruption has an overall negative effect on trade, and that corruption's negative effects are more profound when corruption takes place in economies that switch from being highly protective to more open towards international trade. This analysis was adopted on countries of Western Balkans who are undergoing a transformation towards more liberal trade policies, and the effects of corruption have been used to account for the monetary changes which these countries could expect in case they lowered their corruption levels.

The hypotheses have been empirically tested through an importer and year fixed effects OLS estimator, based on data for 17 exporters and 27 importers, with the Control of Corruption Index being the main proxy for levels of corruption in a country.

The empirical results obtained in my study show strong support for corruption's negative effects on trade levels. The answer to my first question, "*What effects has the prevalence of corruption in the Western Balkans had on these countries' trade levels?"* is thus that corruption has had a significantly large and negative impact on these countries' trade levels, implying that a 10% increase in corruption levels would lead to a 28,31% reduction in trade levels.

The answer to the second question, "*Do the negative effects of corruption amplify when we account for bilateral Free Trade Agreements, i.e. for lower tariffs?"*, is that negative effects indeed seem to amplify when we account for lower tariffs between the trading countries. In the baseline estimation, this effect yields an elasticity of -1.687, implying that a 10% increase in corruption would lower trade by another 16.87% in addition to the original negative effects of corruption. However, these results are less robust and seem to be insignificant when CPI is used as a proxy for corruption. Also, this model fails to converge when PPML method is used as an estimator, why different approaches towards measuring these effects could be better suited.

When answering the last question: "*How much would the trade value in the region increase if the countries lowered their levels of corruption?"*, I chose to use the Croatia and Albania, the best and the worst scoring country in terms of corruption, as proxies for the regional gains. The results imply that if Croatia improved to the levels of corruption equal to the European average, they would increase their trade levels by 5 024 million USD, a percentage change of 68,3%. Albania on the other hand, would

increase their trade by 619 million USD if they improved their score to Western Balkan average, yielding a 35.4% increase in trade levels. As these results include the double negative effects of corruption which are not always significant; we can expect the numbers to be skewed upwards. Nevertheless, disregarding the additional negative effects of corruption, my results imply that the countries of Western Balkans could gain much by lowering their levels of corruption.

In summary, this paper finds support for my two hypotheses, although the results for my second hypothesis are less robust. Due to the limitations of my method of estimation, such as the issues of heteroscedasticity and endogeneity, my results should further be interpreted with care. My study differs from others as it accounts for the effects of corruption once countries switch from being protectionist towards eliminating trade tariffs, while earlier studies measure corruption's impacts in presence of tariffs. Although the results should be tested further, my paper supports Dutt and Traca's hypothesis that corruption's influence on trade is determined by levels of tariffs, and thus it helps shed further light on the two-fold effects of corruption on trade.

The paper also suggests that the region could gain much by battling corruption. The countries are experiencing trade liberalization towards its neighbors and the EU, but whether they will fully exploit these opportunities depends largely on their economic policies (World Bank, 2003, 60). Being aware of the hindering effects of corruption, the countries have now placed reforms related to the quality of institutions on the top of their priority lists (IMF, 2015, 30). It remains to be seen whether these efforts will result in lower corruption levels, and what exact effects this will have on these countries trade levels.

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Appendix

Appendix 1. List of importers and exporters

Importers	**Exporters**
Austria	Albania
Belgium	Armenia
Bulgaria	Azerbaijan
Cyprus	Bosnia Herzegovina
Czech Rep.	Croatia
Denmark	Georgia
Estonia	Iran
Finland	Kazakhstan
France	Kyrgyzstan
Germany	Montenegro
Greece	Russian Federation
Hungary	Serbia
Ireland	Tajikistan
Italy	TFYR of Macedonia
Lithuania	Turkey
Luxembourg	Turkmenistan
Latvia	Uzbekistan
Malta	
Netherlands	
Poland	
Portugal	
Romania	
Slovakia	
Slovenia	
Spain	
Sweden	
United Kingdom	

Appendix 2. Data and Sources

Variables	**Sources and Definitions**
Corruption	***Source***: Control of Corruption Index, downloaded from World Bank; and Corruption Perception Index (CPI), downloaded from Transparency International. ***Definition***: Both indexes measure perceived level of corruption in a country, albeit computed through different methodological approaches.
Free Trade Agreements	***Source***: WTO, European Commission and CEFTA. ***Definition***: A dummy variable which takes the value 1 when countries share a bilateral Free Trade Agreement. (0 otherwise)
GDP Exporters	***Source***: World Bank. ***Definition***: GDP of exporting countries in nominal USD.
GDP Importers	***Source***: World Bank. ***Definition***: GDP of importing countries in nominal USD.
Population Exporters	***Source***: World Bank. ***Definition***: Total population of exporting countries.
Population Importers	***Source***: World Bank. ***Definition***: Total population of importing countries.
Distance	***Source***: CEPII database. ***Definition***: Distance between the trading countries most populated cities.
Common Border	***Source***: CEPII database. ***Definition***: Dummy variable for whether the trading countries share a common border.
Common Language	***Source***: CEPII database. ***Definition***: Dummy variable for whether the trading countries share a common official language.
Remoteness	***Source***: World Bank and CEPII. ***Definition***: Calculated using equation (4), measures a country's remoteness from the world market.

Apendix 3. Free Trade Agreements

European Union Accessions

Label	**Date**
EC 15	01/1995
EC 25	05/2004
EC 27	01/2007
EC 28	07/2013

Free Trade Agreements between EU as whole and exporting countries *(Agreement directly extends to New Member Countries)*

Exporter	**Importers**	**Date**
Albania	EC25	12/2006
Bosnia and Herzegovina	EC27	07/2008
Croatia	EC25	02/2005
Georgia	EC28	06/2014
Montenegro	EC27	01/2008
Russian Federation	EC15	12/1997
Serbia	EC27	02/2010
TFYR of Macedonia	EC15	06/2001
Turkey	EC15	03/1996

Bilateral Free Trade Agreements

Exporter	**Importers**	**Date**
Bosnia and Herzegovina	Slovenia	01/2005
Croatia	Bulgaria	03/2003
	Czech Republic	03/2003
	Hungary	03/2003
	Romania	03/2003
	Slovakia	03/2003
	Slovenia	01/1999

Notes: Retrieved from WTO, European Commission and CEFTA.