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Does Corruption Facilitate Trade for the New EU Members?

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Abstract The paper uses a gravity model to examine the role of corruption in the direction of trade in a data set comprising OECD economies, new EU members and developing nations. Contrary to a number of studies, the findings suggest that membership of the RTAs does not always increase bilateral trade whereas reducing a country's corruption does tend to increase trade flows. The results suggest that EU membership, with the associated improvement in the perceived level of corruption, should have a positive impact on Romania and Bulgaria.

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Keywords Trade; corruption; EU membership

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1. Introduction

In May 2004 eight former centrally planned economies, along with Cyprus and Malta, gained membership of the European Union (EU). The level of economic development of these Central and Eastern European countries (CEECs) was considerably lower than that of the 15 existing EU members, denoted EU(15). At the time of accession Slovenian gross domestic product per capita, the highest amongst CEECs by a significant amount, was only 52 per cent of the average level of the EU(15) and below that of the Portugal, the poorest of the existing members.

There was an expectation that membership to the EU would enable the CEECs to achieve higher growth rates and greater economic development, which would reinforce their transition to a market economy and enable their standard of living to approach that of the old members. Behind such an optimistic outlook for the CEECs was the view that further trade integration with the EU(15), requiring trade liberalisation and institutional reform, would provide a positive stimulus to the various economies. During the transition process of the 1990s, a number of policies were introduced by both the CEECs and by the EU to liberalise trade but the anticipated upsurge of regional trade flows did not always materialise. One explanation could be that while international trade appears to be correlated with the economic development of a country, there is some ambiguity as to the precise direction of the causality between trade and growth. Greater EU integration will only come about when production has reached a specific threshold. An alternative explanation is that trade integration will only lead to growth if the appropriate institutional structure is in existence. As Hall and Jones (1999) and Acemoglu *et al* (2001) argue, institutions are a crucial factor in determining economic performance.

One of the problems investigating the relationship between the institutional framework and trade is that the meaning of institution is vague. Various aspects of the organisational structure of each country have been proposed as key factor affecting international trade, for example the rule of law, the legal and political system and the method of doing business. A nation's institutional structure can affect the incentives of businesses and individuals to enter into contracts with foreign parties, since international transactions take place in different legal and political jurisdictions. Any procedures designed to hinder the function of the legal system, for example a lack of full enforcement of contracts, will discourage traders to engage

in cross-border transactions as it increases the risk associated with international trade involved in trading across borders, which would have an impact on the cost of exporting (Anderson and Marcouiller, 2002). In this respect a poor legal framework of a partner country can be thought of having the same impact as a tariff on an imported good as it increases the price of trading across borders. If the exporter is risk neutral, the impact of a poor judicial framework will be a reduction in the volume of trade.

An opposing view is that if the administrative arrangements in a country are particularly burdensome then corruption might facilitate trade by cutting through the red tape. There is the possibility that entry into the EU might lead to a tightening up of rules and regulations, which might create a barrier to international transactions. As a consequence EU membership might not result in the economic gains forecast by certain economists.

In the first wave of transition economies admitted into the EU in 2004, views were expressed about the institutional structure present in each country. Romania, Bulgaria and Turkey had applied for membership but their entry was postponed due to key considerations having not been met, some economic and some political. One of the concerns about Romania and Bulgaria was the level of economic development and the nature of corruption in the countries. Although the two countries became members in January 2007, it is a commonly held view that the level of corruption had not been eradicated or reduced to that found in old members. A casual observer of EU policy might interpret the entry of Romania and Bulgaria, with the associated increase in intra-EU exports, to signal that corruption does not act as a significant barrier to trade. An alternative interpretation is that membership, in particular the acceptance of the *EU acquis*, will reduce the level of corruption in the two countries, resulting in greater trade integration and economic development of the transition economies.

The focus of this paper is to investigate whether corruption plays an important role in bilateral trade. Following a number of studies, the gravity trade model is employed to examine the volume of trade between two countries. The basic model is modified by the inclusion of the corruption perception index to capture the potential distrust of a trading partner, which can be considered as a barrier to trade. Such an approach enables us to assess the potential impact when the two countries enter the European Union in 2007.

The structure of the paper is as follows. Section 2 provides a brief survey of the role that corruption may play in international trade. The following section considers the model specification and related econometric issues. Section 4 presents the estimated results accompanied by their corresponding economic interpretation. The conclusions and policy implications are discussed in Section 5.

II. Corruption: Does it facilitate international trade?

“Perversion or destruction of integrity in the discharge of public duties by bribery or favour; the use or existence of corrupt practices, esp. in a state, public corporation, etc.” (Oxford English Dictionary).

While corruption can be thought of as being anything that goes against legal system or a set of advanced country business culture, it is rather difficult to define precisely as it depends upon the country’s norms or conventions. The effects of corruption or perceptions of corruption, in a country can be wide reaching and will permeate deep into the organisational arrangements, for example the legal system, and the general business ethical standards of a nation, such as the acceptability of bribes. Hence, one way of identifying the degree of corruption in a country is via the structures and institutions present in a nation. The institutional framework of a country can be thought of as a general term describing the formal and informal ways of undertaking transactions in a jurisdiction. It captures the business practices within the location, the sanctions that can be imposed if the rules are violated and the bodies established to enforce those norms (Cheptea 2007).

There exists a large literature on the influence of the institutional framework on economic activity, ranging from Mauro (1995) and Knack and Keefer (1995) who look at total investment to Wei (2000) on foreign direct investment. The general consensus is that a poor institutional structure, captured by the rule of law and bureaucratic corruption, has a negative impact on economic growth and leads to a lower level of development (Rodrik et al 2004). Empirical studies on the influence of corruption on economic performance display mixed findings. While it is commonly perceived that corruption will adversely affect the standard of living of a country, a number of cross-country studies have found a positive impact has

been found (see *inter alia* Meon & Weill 2008, Aidt *et al.* 2008, Mendez & Sepulveda 2006 and Eggar & Winner 2005).

With the exception of de Jong & Bogmans (2011), little attention has been given to the influence of institutions on trade. While Rodrik (2000) highlighted the relationship between the institutional and governance structure and trade reform, his focus was more on how the removal of protectionist measures encouraged institutional reform, leading to a higher level of economic development. This strand of the literature emphasised causality in one direction, with an improved institutional structure being brought about by trade reforms.

When looking at the impact of enlargement of the EU, the analysis is in the other direction and considers that corruption might act as a barrier on bilateral trade. The pro-trade effect of institutions is still in its infancy (see *inter alia* Anderson and Marcouiller (2002), de Groot *et al.* (2004) and Meon and Sekkat (2007)). Such a direct relationship on exports may work through formal routes but may also include informal mechanisms. The primary impact of institutions on international trade is via the expected rate of return compared to domestic transactions. The existence of foreign establishments of low quality, be them public or private, will act as a tax on international trade. Equally good organisational structures in a nation stop corrupt practices and foster trade.

In countries where government regulations are pervasive, there will be a tendency for protectionist trade policies to exist, requiring import licences for foreign produced goods to enter the country. Such a situation would encourage rent-seeking activities by agents in the form of bribery and corruption (Krueger 1974). The more restrictive the trade policies the greater the incentives to engage in corrupt activities, with larger bribes paid to bureaucrats. As a consequence, there should be a negative relationship between bilateral trade and corruption.

These factors should not be viewed as being independent. An over-zealous bureaucracy will restrict the functioning of the legal system as well as reducing the volume of imports. The combination of regulations in both sectors creates an incentive to increase bribes to officials to facilitate the business transaction. Hence there might be a positive relationship between the degree of corruption and the volume of international transactions.

A nation's business culture could be a deterrent to international trade and it may be that similarities of ethical standards between countries are an important issue. An international transaction will take place if both the buyer and seller believe the side payment to a government official, or a personal kickback, is perfectly acceptable. Alternatively, if either party comes from a country where backhanders are not the norm then there is a cultural barrier stopping the exchange of goods and services. Consequently, it may be the difference between the level of corruption in the two economies that discourages bilateral trade between the countries.

An indirect effect, magnifying the above argument, is the loss of reputation that a firm, based in country with high ethical standards, might face when found trading with a corrupt country. The bad publicity from the exposure might be damaging in other export markets and even domestic consumers might turn away from the company's products. Hence, there will be tendency for like-minded firms to undertake international transactions, even though there might be profitable export possibilities elsewhere.

Two other indirect influences have been cited in the literature. Firstly, the institutional framework is important for investment as corruption will deter new projects being undertaken. This is due partly to an increase in the cost of capital caused by the sweeteners that have to be paid to establish the venture. Equally, the uncertainty emanating from corruption will reduce the level of foreign direct investment and result in lower gross capital formation in a country. There is evidence that investment has been found to be a determinant of exports, Rodrik (1995). Hence, a high level of corruption will impact on investment and reduce trade.

The second indirect influence that the business environment has on trade is via productivity, with low levels of output per workers being associated with low quality institutions (Hall & Jones 1999). Along with the exchange rate and unit labour costs, labour productivity is one of the determinants of competitiveness. Low labour productivity will result in low competitiveness, which leads to a low level of international trade.

The above discussion has highlighted a number of ways how the quality of the institutions in a country might determine the volume of trade. However, it must be acknowledged that the causality between openness and organisational structure of countries might run in the opposite direction, with trade affecting the legal system and democracy, or be bidirectional,

Dollar and Kraay (2003). As a consequence, the empirical work will have to recognise the potential endogeneity issues and care will be needed when interpreting the estimated parameters.

There is not an unambiguous measure of corruption in an economy and a number exist in the literature, for example the International Country Risk Guide, the index for Economic Freedom by the Heritage Foundation and Cost of Doing Business from the World Bank. Each index has advantages and disadvantages associated with it. As the economic structures of the new EU entrants have undergone significant changes over the last 20 years, the index should have a relatively long time dimension and a wide coverage of countries. Consequently, the Corruption Perception Index, compiled by Transparency International, has been adopted in a number of the empirical studies. The range of the index goes from 0, a high perception of corruption, to 10, very low level of corruption.

Table 1: Corruption Perception Index for EU members

<i>Existing members</i>	Average	1998	2007		<i>New entrants</i>	Average	1998	2007
Austria	7.96	7.5	8.1		Bulgaria	3.75	2.9	4.1
Belgium	6.68	5.4	7.1		Cyprus	5.75	6.1	5.3
Denmark	9.60	10	9.4		Czech Republic	4.57	4.8	5.2
Finland	9.58	9.6	9.4		Estonia	6.00	5.7	6.5
France	6.90	6.7	7.3		Hungary	5.06	5.7	6.5
Germany	7.58	7.9	7.8		Latvia	3.92	3.8	4.8
Greece	4.56	4.9	4.6		Lithuania	4.58	3.8	4.8
Ireland	7.63	8.2	7.5		Malta	6.28	5.8	6.8
Italy	4.85	4.6	5.2		Poland	4.32	4.6	4.2
Netherlands	8.86	9	9		Romania	3.10	3	3.7
Portugal	6.46	6.5	6.5		Slovak Republic	4.10	3.9	4.9
Spain	6.54	6.1	6.7		Slovenia	6.04	6	6.6
Sweden	9.27	9.5	9.3					
United Kingdom	8.48	8.7	8.4					

An overview of scores according to the Corruption Perception Index for the existing EU members and the new entrants is provided in Table 2, presenting the means for 1996-2008 along with the values in 1998 and 2007. Out of the old members, the ranking of the Scandinavian countries is high, indicating a low perception of corruption. Although making comparisons over time is fraught with difficulties, the index for Belgium, France, Italy and

Spain shows an improvement over time. The relationship between the corruption perception index and bilateral trade is not obvious from casual observation.

As expected, on average the existing members of the EU are perceived to be less corrupt than the new entrants. However, Italy and Greece are ranked below Cyprus, Estonia, Hungary, Malta and Slovenia. There is a substantial difference between the scores of the latest new entrants, Bulgaria and Romania, and those from the first wave, with only Latvia having an average below 4. With the exception of Poland, all the transition economies have higher perceived levels of corruption in 1998 compared to 2007, which would be consistent with EU membership resulting in an improved institutional framework in these economies.

III. Data Description, Regional Trading Agreements and Model Specification

Given that the majority of empirical studies into trade and the institutional framework use the gravity trade model (GTM), we follow their approach, which enables comparisons to be made with other work in the literature. The basic GTM can be expressed algebraically as follows:

$$X_{ij} = AY_i^{\beta_1} Y_j^{\beta_2} Pop_i^{\beta_3} Pop_j^{\beta_4} Dist_{ij}^{\beta_5} F_{ij}^{\beta_6} \varepsilon_{ij} \quad (1)$$

where X_{ij} is the current value of exports from country i to country j , Pop_i and Pop_j are the populations of i and j , Y_i and Y_j are their respective incomes, $Dist_{ij}$ represents the distance between the two countries' capital cities, F_{ij} counts for any other factor helping or preventing trade between pairs of countries, and ε_{ij} represents the error term.

The economic sizes of exporting and importing countries are captured by GDP. The output can be modified by the ratio of its production for export to total production, referred to as the openness ratio, and it shows a tendency to vary negatively with population. The physical size and therefore self-sufficiency of the economy is captured by the population variable. Country j 's demand for imports depends on its income and the size of the economy for which population is a proxy. For the importer, GDP is a measure of income. Population is included to reflect that larger, more populous countries tend to be more self-sufficient and therefore engage less actively in trade. The model assumes that the price importers face for any given variety of exported good rises with the cost of doing business internationally, and this is broadly measured by distance.

The empirical analysis in this paper uses data on the volume of trade taken from the IMF Direction of Trade Statistics. The countries included in the data set are given in Appendix 1. For estimation purposes we specify an augmented version of equation (1) in log-linear form which is given by:

$$\begin{aligned}
\ln X_{ij} = & \beta_0 + \beta_1 \ln Y_i + \beta_2 \ln Y_j + \beta_3 \ln \left(\frac{Y}{Pop} \right)_i + \beta_4 \ln \left(\frac{Y}{Pop} \right)_j + \beta_5 \ln Dist_{ij} \\
& + \sum_{i=1}^3 \alpha_{1i} Eu_i + \sum_{i=1}^3 \alpha_{2i} Can_i + \sum_{i=1}^3 \alpha_{3i} Bafta_i + \sum_{i=1}^3 \alpha_{4i} Cefat_i \\
& + \sum_{i=1}^3 \alpha_{5i} Cer_i + \sum_{i=1}^3 \alpha_{6i} Mercosur_i + \sum_{i=1}^3 \alpha_{7i} Nafta_i + \sum_{i=1}^3 \alpha_{8i} Gcc_i \\
& + \beta_6 Contig_{ij} + \beta_7 Comlang_{off_{ij}} + \beta_8 Colony_{ij} \\
& + \beta_{13} \ln Corr_i + \beta_{14} \ln Corr_j + \varepsilon_{ij} \quad (2)
\end{aligned}$$

The model is modified by the inclusion of dummy variables that impact on the cost of doing business (see *inter alia* Wang and Winters (1994), Laaser and Schrader (2002) and Anderson and Wincoop (2003)). If country i and nation j have a common border then it is likely that greater trade will take place between these two countries on account of the cross-border trading, $Contig_{ij}$. The use of dummy variables can be criticised as it implicitly assumes that the incentive for neighbouring states to trade is independent of the location and the size of the border.

Language is an important determinant of the volume of trade. In an attempt to capture this effect the dummy variable $Comlang_{off}$ takes a value 1 if country i and nation j have a common official language and zero otherwise. The variable proxies the language cost of doing business.

As export performance will be determined by business contacts and networks, a common history can be a key factor in trade flows. It will tend to reduce the cost of establishing an export infrastructure, for example a distribution network, as personal connections are more likely to exist and there is general understanding of the market requirement. Furthermore, a common history may lead the population to prefer exports from a former colony over exports from other destinations. Whether a country had been a colony is captured by the dummy variable $Colony$, which take the value 1 if it has been a colony of country j and zero otherwise.

The gravity trade model is modified to include the corruption perception index of the importing country and exporting partner, $\ln Corr_i$ and $\ln Corr_j$ respectively. These two variables capture the institutional and governance structure of countries and, given the measurement of the index, the estimated coefficients are expected to be positive.

In the last fifteen years researchers have also been concerned with the use of gravity models in empirical studies looking at the process of economic integration that RTAs have contributed to significantly. There exist a large number of papers that are particularly linked to our investigation. These papers explore main changes in the geographical pattern of trade and analyze the effects of regional trade arrangements (RTA) and free trade agreements (FTA) as well as currency unions on trade flows. Relevant work in this area has been done by, inter alia, Gros and Gonciarz (1996), Baldwin (1997), Brenton and Di Mauro (1999), Frankel and Rose (2000), Nilsson (2000), Laaser and Schrader (2002), Brenton and Manzocchi (2002), Damian and Masten (2002), Head (2003), De Benedictis, De Santis and Vicarelli (2005). Most of these studies find that the RTAs created to prepare transition countries for EU accession, have generated considerable growth in EU-CEECs trade flows. This statement is supported by the coefficients of regional dummies which are positive and significant.

Damian and Masten (2002) use both static and dynamic model specifications in a panel framework to explore the efficiency of free trade agreements. The efficiency is not instantaneously achieved but instead it takes time for the effects of trade liberalization to impact on trade. To illustrate the argument, the rapid expansion of Slovenian imports from other CEECs members of the Central European Free Trade Area (CEFTA) between 1993 and 1998 is used as the example. Furthermore, tariff reductions become effective in the second to third year after enforcement of the FTA. The analysis revealed that CEFTA members had increased export volumes to Slovenia than other non-CEFTA members (approximately 18.8% higher).

Laaser and Schrader (2002) use a gravity model whose estimates suggest the level of regional integration for the Baltic States is higher than normally observed in the case of other countries. Distance is extremely important for the Baltic States in shaping their regional trade pattern, with the coefficient being close to -1 in all cases. However, the process of European

integration runs primarily via Baltic countries' neighbours and that the transport system dominates the trade regime by shaping trade flows in the region.

The effect of regional trading arrangements on trade patterns in the enlarged EU has been investigated by De Benedictis, De Santis and Vicarelli (2005), who focus on whether and how the EU Free Trade Agreements (FTAs) with the CEECs exerted a different impact on centre-periphery and intra-periphery trade relations. Using a data set comprising bilateral trade flows between eight CEECs and EU countries, a gravity equation is estimated using a system GMM dynamic panel data approach. The results support the hypothesis that distance matters. As far as the effect of free trade agreements is concerned, evidence is found that free trade agreements between EU and the CEECs, as well as among the CEECs, have a positive impact on trade flows.

The gravity trade model is equally well suited to consider an *ex-post* assessment of the trade effects of a country becoming a member of a RTA and has been used by a number of researchers for this purpose (see *inter alia* Aitken, 1973; Soloaga and Winters, 2001; Carrere, 2006). Dummy variables are employed to capture the “atypical” trade due to the RTA. Following a Vinerian approach dummies should be introduced for each RTA to capture three different effects. Firstly, pure trade creation is defined as an increase in intra-regional trade flows with imports from the rest of the world remaining constant. Secondly, pure trade diversion is when the increase in intra regional trade is at the expense of the rest of world. Finally, the possibility should be considered that membership of an RTA could lead to an increase in exports from members to non-members.

There was a fundamental change in the foreign trade regimes of the Central and East European countries (CEECs) after 1989. Following the collapse of the CMEA and the Soviet Union, as well as through trade liberalization with the West, the CEECs' trade was reoriented from East to West. The results provided by our gravity model should shed light on these changes. Secondly, there have been a number of new economic integration agreements, which have been established among the countries in the data set since 1992 and it is important to take into account how these new regional integration agreements have influenced trade flows. Thirdly, the CEECs have been changing rapidly in recent years and hence there is a need to estimate the relationship over a number of years to see whether the parameters remain constant over time.

The main regional trading agreements and the list of members are presented in Table 2. The total volume of trade of the countries listed makes up over 70 per cent of world trade. With the Baltic Free Trade Area and the Central European Free Trade Agreements, some of the CEECs had the experience of being in an RTA before joining the European Union in 2004 and 2007 respectively.

Table 2: Regional trading agreements of countries in the dataset

Abbreviation	Title	Members	Year
<i>Eu</i>	European Union	Austria (1995) Belgium Denmark (1973) Finland (1995) France Germany Greece (1981) Ireland (1973) Italy Luxembourg Netherlands Portugal (1986) Spain (1986) Sweden (1995) United Kingdom (1973) 2004 Entrants: Cyprus Czech Republic Estonia Hungary Latvia Lithuania Malta Poland Slovenia Slovak Republic 2007 Entrants: Bulgaria Romania	1957
<i>Can</i>	Andean Community	Bolivia Colombia* Ecuador* Peru Venezuela*	1993
<i>Bafta</i>	Baltic Free-Trade Area	Estonia Latvia Lithuania	
<i>Cefta</i>	Central European Free Trade Agreement	Bulgaria Croatia Romania	
<i>Cer</i>	Closer Trade Relations Trade Agreement	Australia New Zealand	1989
<i>Mercosur</i>	Southern Common Market	Argentina Brazil Paraguay* Uruguay*	1991
<i>Nafta</i>	North American Free Trade Agreement	Canada, Mexico, United States	1994
<i>Gcc</i>	Gulf Cooperation Council	Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, and United Arab Emirates	1981

* Excluded from the data set

Our work builds on the abovementioned studies and uses the gravity model to estimate the effects of corruption on business standards following Bulgaria's and Romania's accession into the EU.

IV. Econometric issues and empirical results

There was some reservation estimating the model using panel techniques as differences with the measurement of the corruption perception index over time could rule out the possibility of estimating the augmented gravity trade model within a panel framework. Initial estimation took place on a year-by-year basis and there appeared to be homogeneity of coefficients. As a consequence, equation 2 was estimated by panel techniques.

A number of econometric issues have been raised in relation to the estimation of the GTM. Certain authors have proposed a correction of the coefficients' standard error as a result of the clustering of observations due to country specific effects (Baier & Bergstrand 2009, de Jong & Bogman 2011). Although this could have been used as a sensitivity test for the results, it was not used when estimating the models below.

Of more concern is the possibility of the simultaneous determination of exports and the perceived corruption. A country with a high propensity to export will have greater contact with the rest of the world, which will affect its perceived level of corruption by the other countries. Equally a population is outward looking and a low level of corruption will tend to be active in world politics and this may lead to a higher level of international trade. Although instrumental variable estimation could be employed to deal with the simultaneity problem, the Hausman-Taylor approach is adopted following Egger (2005). The correlation between the independent variables and the unobserved country specific effects is eliminated by instrumental variables from within the GTM.

Table 3: The augmented Gravity Trade Model, Full sample

	Pooled OLS	Pooled OLS, time dummies	Random effects	Hausman Taylor
	b/se	b/se	b/se	b/se
$\ln Y_i$	1.005***	0.995***	1.040***	1.026***
	0.006	0.006	0.018	0.028
$\ln Y_j$	1.210***	1.200***	1.256***	1.190***
	0.006	0.006	0.018	0.028
$\ln(Y/Pop)_i$	-0.273***	-0.187***	-0.214***	-0.239***
	0.013	0.014	0.028	0.032
$\ln(Y/Pop)_j$	-0.436***	-0.350***	-0.406***	-0.458***
	0.015	0.016	0.031	0.033
$\ln Dist$	-1.164***	-1.151***	-1.233***	-1.173***
	0.009	0.009	0.029	0.052
<i>contig</i>	0.837***	0.822***	0.814***	0.768***
	0.037	0.038	0.107	0.247
<i>comlang_off</i>	0.686***	0.722***	1.100***	1.092***
	0.030	0.030	0.087	0.203
<i>colony</i>	0.406***	0.391***	0.482***	0.544*
	0.042	0.043	0.133	0.285

<i>bafta</i>	3.205***	3.217***	3.426***	3.444***
	0.077	0.083	0.259	1.232
<i>can</i>	1.349***	1.362***	0.824***	0.623
	0.070	0.080	0.129	2.131
<i>cefta</i>	0.533***	0.505***	0.374*	0.306
	0.103	0.112	0.206	1.225
<i>med</i>	-0.015	0.065	-0.184	-0.350
	0.058	0.059	0.148	0.571
<i>gcc</i>	0.315***	0.268**	0.086	0.287
	0.107	0.109	0.251	0.590
<i>mercosur</i>	0.960***	0.881***	0.665***	0.810
	0.102	0.140	0.105	2.995
<i>nafta</i>	-0.317*	-0.354**	-0.308	0.173
	0.170	0.167	0.600	1.232
<i>lnCorr_i</i>	0.603***	0.396***	0.176***	0.114***
	0.036	0.038	0.046	0.038
<i>lnCorr_j</i>	1.152***	0.946***	0.389***	0.183***
	0.041	0.042	0.061	0.039
<i>Dum1996</i>		-0.146***	0.185***	-0.017
		0.043	0.033	0.029
<i>Dum1998</i>		-0.034	0.215***	0.008
		0.040	0.033	0.025
<i>Dum1999</i>		-0.093**	0.186***	-0.028
		0.041	0.034	0.024
<i>Dum2000</i>		0.072*	0.318***	0.105***
		0.040	0.033	0.024
<i>Dum2001</i>		0.077*	0.331***	0.124***
		0.040	0.032	0.025
<i>Dum2002</i>		-0.023	0.280***	0.081***
		0.040	0.030	0.024
<i>Dum2003</i>		-0.211***	0.193***	0.023
		0.040	0.024	0.024
<i>Dum2004</i>		-0.268***	0.138***	-0.005
		0.041	0.021	0.025
<i>Dum2005</i>		-0.317***	0.126***	0.008
		0.040	0.018	0.027
<i>Dum2006</i>		-0.375***	0.071***	-0.025
		0.041	0.015	0.028
<i>Dum2007</i>		-0.435***		-0.071**
		0.042		0.031
<i>Constant</i>	20.300***	19.593***	21.175***	22.291***
	0.146	0.157	0.417	0.568
R-squared	0.738	0.740	0.730	
N	39881	39881	39881	39881

ll	-77322.16	-77173.22		
rmse	1.682	1.761	.737	
aic	154680.3	154404		
bic	154835	154654		

The results from estimating the GTM on the full set of countries are presented in Table 3, with coefficients for pooled OLS, pooled OLS with time dummies, random effects and Hausman-Taylor estimation techniques. The majority of the estimated coefficients are consistent with economic intuition, although their magnitude might differ from expectations. The income elasticity of the importer is close to unity and below that of the exporter, although both are highly significant. The size of the population, via the inclusion of per capita terms, is to capture the physical size and therefore self-sufficiency of the two economies. The coefficients are negative and statistically significant from zero. When the equation is reparameterised to give the logarithm of the income of the two countries and their relative populations, the income elasticities of both importer and exporter are approximately equal to 0.8. The estimated coefficient on distance is slightly -1 in magnitude, indicating that a doubling of distance leads to more than a halving of trade.

The coefficients on the perception of corruption depend upon the estimation technique. The Taylor-Hausman parameter estimates are lower than those that do not consider the potential endogeneity of corruption. However, both are still statistically significant at 1% level. In 3 out of the 4 estimated coefficients the influence of corruption level of the exporter is more important than that of the importer. For instance the bilateral trade from the UK to Romania is higher than the trade from Romania to the UK.

The effects of a common border, a common official language and being a colony on bilateral trade are correctly signed and of a plausible size, although there is some differences in magnitude relating to estimation technique. For the new entrants into the EU, policies could not really be introduced to increase the exports to members, assuming they were not prepared to change the official language.

The coefficients on the various RTA dummies provide some information of their influence on bilateral trade. Membership of the Andean Community, Baltic Free-Trade Area the Central European Free Trade Agreement, the Southern Common Market and Gulf Cooperation

Council had a positive impact on intra-RTA bilateral trade compared to the EU. The same cannot be said about the North Atlantic Free Trade Association, which had a negative effect on exports between members.

Table 4: EU importers

	Pooled OLS	Pooled OLS, time dummies	Random effects	Hausman Taylor
lnY_i	1.152	1.128***	1.101	0.90794
	0.062	0.049	0.015	0.411178
lnY_j	1.271	1.271***	1.276	1.270038
	0.012	0.012	0.012	0.01228
ln(Y/Pop)_i	-0.664	-0.312	0.060	-0.85645
	0.086	0.098	0.046	0.413082
ln(Y/Pop)_j	-0.629	-0.595	-0.601	-0.59377
	0.028	0.029	0.029	0.028504
lnDist	-1.086	-1.081	-1.110	-1.07862
	0.023	0.023	0.023	0.022533
lnCorr_j	1.294	1.224	1.228	1.224379
	0.072	0.074	0.075	0.073724
lnCorr_i	0.677	0.419	-0.255	0.229864
	0.180	0.188	0.105	0.219034
Contig	0.473	0.473	0.433	0.481703
	0.090	0.090	0.091	0.09011
comlang_off	-0.215	-0.214	-0.180	-0.22298
	0.114	0.113	0.112	0.113356
Colony	1.023	1.023	0.920	1.02729
	0.114	0.114	0.113	0.114039
Eu	0.637	0.627	0.607	0.622462
	0.049	0.049	0.048	0.048673
Bafta	3.758	3.772	3.826	3.767183
	0.316	0.315	0.317	0.31479
Cefta	0.475	0.477	0.922	0.449017
	0.379	0.378	0.380	0.377377
dum1997		-0.187	-0.082	-0.19776
		0.132	0.134	0.131958
dum1998		0.008	0.088	-0.01062
		0.120	0.122	0.120317
dum1999		0.219	0.270	0.223626
		0.115	0.116	0.115095
dum2000		0.409	0.481	0.374202
		0.116	0.117	0.115936
dum2001		0.490	0.559	0.475423
		0.116	0.118	0.11644
dum2002		0.376	0.411	0.439467
		0.115	0.117	0.116037
dum2003		0.052	0.032	0.27751

		0.114	0.114	0.120091
<i>dum2004</i>		-0.082	-0.162	0.272458
		0.116	0.114	0.129824
<i>dum2005</i>		-0.053	-0.151	0.367281
		0.118	0.114	0.136268
<i>dum2006</i>		-0.019	-0.141	0.475918
		0.120	0.115	0.144684
<i>dum2007</i>		-0.086	-0.266	0.547674
		0.126	0.117	0.162465
<i>_cons</i>	23.382	20.286	18.369	22.59848
	0.577	0.687	0.371	3.260536

To check the sensitivity of the results to the countries included in the data set, Table 4 present estimated coefficients of the GTM for subsets with the importers being the EU members.

Table 5 presents the GTM parameters where the exporters are the 26 countries in the European Union.

For the basic parameters in the GTM, the results in Table 4 are similar to those for the full sample, with the exception that the coefficients on income per capita. There is little difference in the coefficients from the different panel estimation techniques. The same cannot be said about the influence of corruption, where the impact of the perceived standard of business ethics of the exporter appears constant but that for the importer varies. The influence of institutional norms of the importing country is not statistically significant for some of the estimation techniques, which is consistent with general intuition. There is likely A country considered to suffer from a high level of corruption will have a lower level of exports to the EU countries. The impact of the 3 RTAs affecting the EU countries (denoted by *bafta*, *cefta* and *eu*) are all positive and suggest that joining the EU does not negate the effects of the previous trading blocs.

Table 5: EU exporters

	Pooled OLS	Pooled OLS, time dummies	Random effects	Hausman Taylor
$\ln Y_i$	0.890	0.897	0.904	0.896
	0.013	0.013	0.014	0.013
$\ln Y_j$	1.185	1.188	1.166	-0.081
	0.073	0.047	0.017	0.668
$\ln(Y/Pop)_i$	-0.116	-0.111	-0.129	-0.108
	0.030	0.031	0.032	0.031

ln(Y/Pop)_j	-0.416	-0.368	-0.322	0.596
	0.098	0.100	0.050	0.646
lnDist	-1.249	-1.248	-1.272	-1.245
	0.024	0.024	0.024	0.024
lnCorr_j	1.360	1.412	1.402	1.238
	0.200	0.200	0.115	0.241
lnCorr_i	0.657	0.649	0.675	0.646
	0.079	0.081	0.082	0.080
Contig	0.135	0.149	0.257	0.140
	0.099	0.099	0.100	0.098
comlang_off	0.002	-0.012	-0.252	0.013
	0.125	0.124	0.124	0.124
Colony	0.836	0.823	0.670	0.838
	0.125	0.125	0.125	0.125
Eu	0.047	0.053	0.088	0.048
	0.044	0.044	0.045	0.044
Bafta	3.723	3.692	3.242	3.738
	0.345	0.344	0.348	0.344
Cefta	0.431	0.452	1.111	0.379
	0.413	0.412	0.417	0.412
dum1997		-0.310	-0.351	-0.295
		0.146	0.149	0.146
dum1998		-0.308	-0.342	-0.292
		0.133	0.135	0.133
dum1999		0.100	0.011	0.131
		0.127	0.129	0.127
dum2000		0.356	0.268	0.373
		0.128	0.130	0.128
dum2001		0.416	0.328	0.445
		0.128	0.131	0.129
dum2002		0.278	0.188	0.342
		0.127	0.129	0.129
dum2003		0.151	0.042	0.284
		0.125	0.126	0.134
dum2004		0.074	-0.045	0.263
		0.128	0.126	0.146
dum2005		0.117	-0.002	0.340
		0.129	0.127	0.154
dum2006		0.146	0.024	0.404
		0.131	0.127	0.164
dum2007		0.040	-0.084	0.359
		0.137	0.129	0.185
_cons	19.462	18.711	18.781	14.761
	0.646	0.690	0.408	5.607

The estimated coefficients from a subsample of EU exporters are given in Table 5. While the results are similar to those in the previous table, there are some strange coefficients when the Taylor-Hausman approach is employed, in particular the elasticity of exporter income and the effect of population. The impact of the corruption perception index for both the importer and the exporter, the variables considered endogenous in the GTM, is of a similar size to that previously reported and is not affected by the estimation technique. Having a common official language does not appear to have a significant impact on bilateral trade when only EU countries are considered as the exporting countries. This finding may reflect the tendency to adopt English as the key language to facilitate trade within the majority of countries in the European Union.

Membership of the European Union has an insignificant effect on intra-EU, conditional on the other factors in the GTM. Whereas the influence of the Baltic Free Trade Area is large and exist after the enlargement of the EU, which cannot be said for the Central Free Trade Agreement. This indicates that Bulgaria and Romania had little to gain from membership of the RTAs but they could gain from improving the perceived level of corruption in the two economies.

V. Conclusion and policy implication

The main focus of the current study is investigating the role of corruption in bilateral trade and to see whether it facilitates international transactions or whether it deters cross-border purchases. Using the gravity trade model, the estimated coefficients suggest that ethical standards have a positive impact on international business. In the various dataset and using a number of estimation techniques, the general finding is that higher perceived level of corruption is increases bilateral trade and it is more important for the exporter than for the importer, although both are statistically significant. These results indicate that corruption does not facilitate trade within the European Union, even though the rules and regulations can be considered to be bureaucratic. Adopting business practices that avoid backhanders other trade sweeteners does not end up costing firms lost contracts. The opposite appears to be the case. One possible explanation for the differences in the estimated coefficients could be due to the less corrupt countries having more accurate measures on the importation of goods and services.

Government officials are not prepared to record a lower value of imports and so reduced the size of the tariff imposed on the goods.

There a potential issue of endogeneity of the corruption perception index in the gravity trade model was handled by using the Hausman-Taylor approach. As the estimated coefficients on the corruption variables are reduced in magnitude, there is a possible issue regarding bilateral trade and international business standards being jointly determined. However, from a policy perspective, the EU should

consider policies that make transactions transparent as this act as a stimulus for an increase in intra-EU trade. The entry of Romania and Bulgaria into the EU will not be a panacea to their trade problems but it might improve the business ethics in the two countries and stamp out corruption. If this is the case then EU membership could be viewed as facilitating bilateral trade via an indirect route.

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Appendix 1: Countries in the data set

The data set comprises:-

Albania, Argentina, Australia, Austria, Azerbaijan, Bahrain, Belarus, Belgium, Bolivia, Brazil, Bulgaria, Canada, Chile, China, Croatia, Cyprus, Czech Republic, Denmark, Egypt, Estonia, Finland, France, Georgia, Germany, Greece, Hungary, India, Ireland, Italy, Japan, Jordan, Kazakhstan, Korea, Kuwait, Latvia, Lebanon, Lithuania, Macedonia, Malta, Mexico, Moldova, Morocco, Netherlands, New Zealand, Norway, Oman, Peru, Poland, Portugal, Qatar, Romania, Russian Federation, Saudi Arabia, Serbia and Montenegro, Slovakia, Slovenia, South Africa, Spain, Sweden, Switzerland, Syrian Arab Republic, Tajikistan, Tunisia, Turkey, Turkmenistan, Ukraine, United Arab Emirates, United Kingdom, United States, Uzbekistan, Vietnam.

Appendix 2: Sources and definition of data

Variable	Definition	Source
Y_i	Gross domestic product of the importing country	IMF FS
Y_j	Gross domestic product of the exporting country	IMF FS
Y_i/Pop_i	Per capita gross domestic product of the importing country	IMF FS
Y_j/Pop_j	Per capita gross domestic product of the exporting country	IMF FS
$Dist_{ij}$	Distance between the capital of country i and country j	
Eu	Dummy variable for membership of the European Union	
Can		
$Bafta$		
$Cefta$		
Cer		
$Mercosur$		
$Nafta$		
Gcc		
$Contig$	Country i and j have a common border	
$Comlang_{off}$	Country i and j have a common official language	
$Colony$	Country i is a colony of country j	
$Corr_i$	Corruption Perception index of the importer	
$Corr_j$	Corruption Perception index of the exporter	

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