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Institutions, trade, and integration: what can be expected within the enlarged EU?

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in Economics*



**Institutions, trade, and integration:
What can be expected within the enlarged EU?**

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Dresden Discussion Paper in Economics No. 16/08

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Institutions, trade, and integration: What can be expected within the enlarged EU?

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Abstract:

This paper investigates the potential for a further increase in trade between the fifteen old EU members and the twelve new countries having joined in 2004 and 2007 that results from a convergence of the new members' institutions towards the level of the EU-15 in accordance with the *Acquis Communautaire*. To this aim we estimate a gravity model applying both static and dynamic panel data techniques and incorporate detailed variables measuring institutional quality. We conclude that there is further potential for trade resulting from the successive convergence of the new members' institutional framework towards EU standards.

JEL-Classification: C23, F10, F15, O17, P30

Keywords: European integration, institutions, gravity model, trade potential

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1 Introduction

The Eastern enlargement of the European Union (EU) by ten new members on May 1st, 2004 and lately by Bulgaria and Romania on Jan 1st, 2007 constitutes an outstanding event in European history and brings with it multiple implications for the old and new members' economic affairs. In the field of bilateral trade relations the Europe Agreements concluded between the EU and the 12 accession countries (AC-12) lead to a continuous reduction of barriers to trade and to an integration process that culminated in these countries entering the European Single Market simultaneously with EU membership. By the beginning of the twenty-first century, EU tariffs on imports from the Central and Eastern European countries were almost completely eliminated. In the beginning of this process, large unexploited potentials in the trade volume between the EU and the Central and Eastern European countries were estimated (Hamilton and Winters (1992), Winters and Wang (1994), Baldwin (1994), and Faini and Portes (1995)). As a matter of fact, trade between the fifteen old and the twelve new members of the EU roughly tripled between 1995 and 2004, whereas overall trade between the EU-15 and the rest of the world experienced a growth of merely about 80% (see Figure 1). In light of this rapid growth, more recent studies from Breuss and Egger (1999) and Piazzolo (2001) argue that the trade potential might already be exploited by now. Yet there remain informal barriers to trade, resulting from still existing differences in the old and the new members' institutional environments. Entering the EU especially brings with it the adoption of the *Acquis Communautaire*, which should result in a further reduction of any informal and more indirect barriers to trade by slowly changing the institutional framework.

The role of institutions for economic growth and development has been widely acknowledged (Hall and Jones (1999), Acemoglu, Johnson, and Robinson (2001), Knack and Keefer (1995), and Rodrik, Subramanian, and Trebbi (2004)). Only lately, however, has the link between institutions and trade become more prominent in the empirical literature. Since institutions are bound to create order and reduce uncertainty in exchange (North (1991)),

they should be of particular relevance for international trade because of the higher insecurity and risk compared to exchange on the national level. The positive influence of high-quality institutions on bilateral trade flows is confirmed by Anderson and Marcouiller (2002), Babetskaia-Kukharchuk and Maurel (2004), and de Groot, Linder, Rietveld, and Subramanian (2004). Focusing on the Central and Eastern European countries, Cheptea (2007) finds a significant impact on trade with the EU through improving institutions in the former countries.

Our study combines and extends the empirical literature on institutions, trade and European integration by asking if the adjustment of the AC-12's institutional framework to that of the EU-15 might give rise to a further potential in trade between the old and the new member countries. To this end we follow the methodology of the seminal studies on European trade undertaken in the nineties and resort to the gravity model. We first estimate a benchmark gravity regression taking into account the commonly used explanatory variables income, population, distance, and membership in regional trade bloc regimes in order to quantify these basic determinants of foreign trade flows. In a second step we include indicators on the quality of a country's institutions. They are part of the Index of Economic Freedom (IEF) and contain ten single factors of economic freedom covering a wide array of institutional aspects. We use a large country data set in order to identify in this general setting which institutions exactly exert an influence on bilateral trade flows. This result forms the basis upon which the further potential for trade between the EU-15 and the AC-12, resulting from a convergence of the AC-12's institutional framework towards that of the EU-15, can be calculated.

One additional feature of our study consists in the usage of econometric specifications. Although the role of history for bilateral trade flows has been repeatedly emphasized (see, for example, Eichengreen and Irwin (1997) and Bun and Klaassen (2002)), dynamic panel data models have rarely been applied to gravity models. Hence, in all our regressions we not only resort to the commonly used cross-sectional estimation methods, but also apply dynamic panel estimation techniques in order to explicitly incorporate changes

over time.

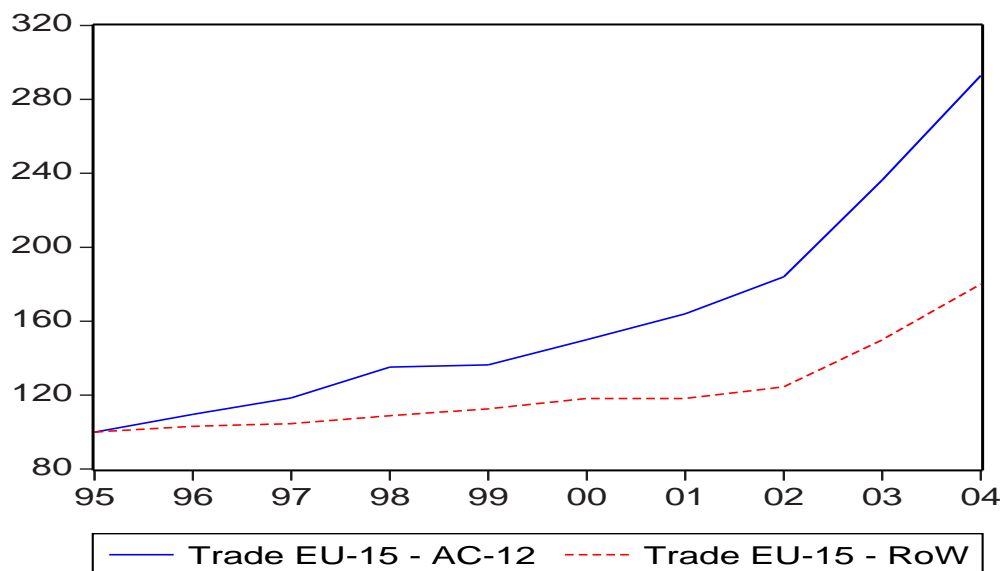
We find a strong influence of institutions on trade, albeit on a rather general level in the form of government activity. Highlighting the positive role a government can play in the minimization of risks that emanate from trade openness, exports from the EU-15 to the AC-12 could be particularly stimulated by a growing government sector in the new member states. Imports into the EU-15 could gain most from the fight against corruption in the AC-12. Here the differences between the old and the new EU members are still most pronounced. On the whole, we can conclude that exports from the old to the new countries of the EU could experience an additional impulse of 5.7% and imports of 17.9% if the institutional framework in the AC-12 was adjusted to the average of the old member states of the EU. The dynamic panel regressions provide evidence that history plays a role in explaining current trade flows, which also alludes to the influence of the institutional quality obtained in the past.

The paper is structured as followed. Section 2 provides an overview of the link between institutions and trade and illustrates the relevance of institutions for the European integration process. Section 3 discusses the gravity model and its empirical applications as well as econometric issues. In section 4, the data are presented. The role of institutions for trade and our results on the EU-15's trade potential with the twelve new members are reported in section 5. We conclude with a summary of our results.

2 Institutions, trade and EU integration

Institutions, both of informal (traditions, codes of conduct) as well as of formal nature (constitutions, laws, property rights), are essential for economic transactions, since, as North (1991) stresses, they create order and reduce uncertainty in exchange. Basically, institutions influence economic transactions in three ways (World Bank (2002), 8): (1) They channel information about market conditions, goods, and participants and thus help reduce information asymmetries. (2) They define and enforce property rights and

Figure 1: Trade between the EU-15, the AC-12 and the rest of the world (RoW) (1995=100)



contracts, determining who gets what and when. Knowing one's rights to assets and income and being able to protect those rights are essential for market development. (3) They regulate competition in markets, which directly interacts with innovation and economic growth. Through these three functions, well developed institutions help to decrease the transaction costs for market participants, affect the distribution of assets, incomes and costs as well as increase the efficiency of markets. The quality of institutions is generally assessed according to the degree they can guarantee these functions.

The role and importance of institutions with regard to growth and development issues has been subject to a large body of empirical research. Poor governance is maintained to bring about negative externalities for private transactions, which raises transaction costs and ultimately generates negative effects on growth and development. In contrast, the protection of private property rights, a reliable rule of law, and a stable government are found to stimulate investment and thus enhance growth.¹

¹Empirical studies on the effect of institutions on aggregate income include Hall and

Only lately has the link between institutions and trade become more prominent in the empirical literature, acknowledging that there are more barriers to trade than tariffs, quotas and distance. As a matter of fact, transaction costs between economic agents are often higher when doing business with foreign countries than domestically due to higher insecurity and consequently higher risk in exchange. Some studies explicitly analyze the influence of institutions on trade in a gravity model context. Carrying out a case study on the overseas Chinese network, Rauch and Trindade (2002) examine the impact of informal transnational networks on bilateral trade and find a strong positive network effect. Anderson and Marcouiller (2002) show how insecurity of international exchange acts as a hidden tax on trade and conclude that weak institutions, favoring corruption and imperfect contract enforcement, significantly constrain trade. The positive influence of high-quality institutions on bilateral trade flows is also confirmed by Babetskaia-Kukharchuk and Maurel (2004) and Jansen and Nordås (2004). Furthermore, de Groot, Linder, Rietveld, and Subramanian (2004) and Cheptea (2007) stress that an institutional framework that is similar between countries promotes bilateral trade.

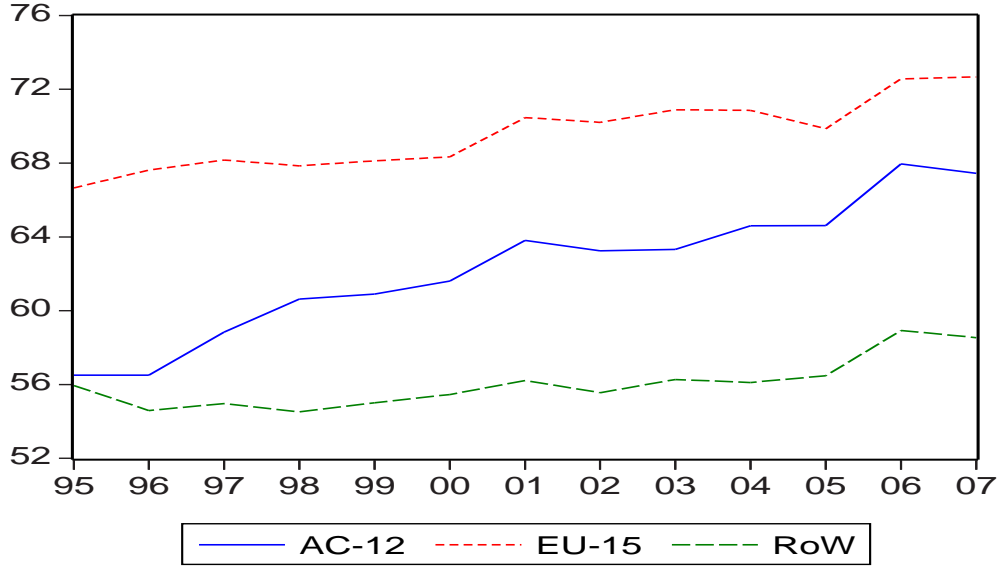
In addressing the question whether trade between the old and the new EU member countries will be fostered by a convergence in the institutional framework, we first have to ascertain that membership in the EU indeed positively influences the quality of institutions in the member countries. Figure 2 makes clear that the AC-12 have seen a large increase in institutional freedom and that the Index of Economic Freedom (IEF) slowly converges towards the average of the EU-15.²

Can it rightfully be asserted that this convergence between the AC-12 and the EU-15 will be significantly enhanced by the accession to the EU, or are there rather other forces at work in raising the institutional quality

Jones (1999), Acemoglu, Johnson, and Robinson (2001), Knack and Keefer (1995), and Rodrik, Subramanian, and Trebbi (2004). de Haan and Sturm (2001), using the Index of Economic Freedom, find a positive relationship between economic freedom and economic growth.

²See section 4 for details on the data.

Figure 2: Index of Economic Freedom (IEF) for the EU-15 and the AC-12



in the AC-12? In order to find out to what extent institutions explain the magnitude and direction of bilateral trade flows between the old and the new EU members, we estimate the following stylized pooled OLS regression for all countries included in our data base:

$$X_{ij} = \alpha + \beta EU_{ij} + \gamma INST_{ij} + \epsilon_t \quad (1)$$

Exports and imports between countries i and j (X_{ij}) simply depend on membership in the EU and the institutional variables from the IEF. The EU dummy turns out to be highly significant and reaches a value of 0.202 for exports and 0.189 for imports (see Table 2). Omitting $INST_{ij}$ from the equation, the parameter of the EU dummy would measure not only the *ceteris paribus* effect of EU membership on trade, but also the effect of EU membership on trade including the effect of institutions. If EU membership has indeed a positive effect on institutional quality as measured by INST, the coefficient of EU should become larger if INST was removed from the equation. The estimation results without institutions suggest that this is indeed the case. Hence, we can conclude that institutional adjustments triggered

Table 1: Institutions and EU integration

	N	with institutions	without institutions
exports	109,365	0.202 (0.003)	0.359 (0.003)
imports	113,434	0.189 (0.003)	0.361 (0.003)

Notes: This table reports the value of the EU dummy (β) from equation (1). p -values are in parentheses.

by the accession should have an effect on foreign trade that goes beyond the mere trade impact of the accession itself. The primacy of institutions is also stressed by Rodrik, Subramanian, and Trebbi (2004) who find that when it comes to economic development, institutions exert a much larger influence than integration on the world economy or geographical characteristics.

3 Methodology and econometric issues

3.1 The gravity model

Over the last decades, the gravity model, based on Isaac Newton's law of gravitation, has become a popular instrument in empirical international trade analysis. Tinbergen (1962), Pöyhönen (1963), and Linnemann (1966) were among the first to explain the volume of bilateral trade flows with gravity-type models. In its basic form, the gravity equation relates bilateral trade flows to three fundamental determinants: (i) export supply, measured as income of the exporting country,³ (ii) import demand, measured as income of the importing country, and (iii) transaction costs, proxied by the geographical distance between the two countries. The such specified relationship has provided very robust results in its empirical application.⁴

The basic gravity model can be refined by taking into account various influences on transaction costs that go beyond the mere geographical distance.

³Apart from the national income, Bergstrand (1989) also employs GDP per capita to capture the exporting country's capital-labor endowment ratio.

⁴In providing the theoretical foundations, Anderson (1979), Bergstrand (1985), Feenstra, Markusen, and Rose (2001), and Evenett and Keller (2002) reconciled the gravity model with several trade theories.

Factors generally found to promote bilateral trade are the membership in regional trading blocs, a common border or ethnic and linguistic ties. Trade-hampering factors, on the other hand, comprise direct policy instruments like tariffs and quotas. More indirect obstacles to trade can further arise out of a weak institutional framework, resulting in an imperfect enforcement of laws and property rights, or the existence of corruption. As Anderson and van Wincoop (2004) stress, policies influencing institutions are more important than direct policy instruments in the determination of trade costs.

With the help of the gravity model the trade potential between countries or regions can be analyzed. This line of research has become prominent in the early nineties in dealing with the integration of the former Council for Mutual Economic Assistance (CMEA) member countries into the international division of labor. Empirical studies with emphasis on the future trade prospects between the EU and selected former CMEA countries include Hamilton and Winters (1992), Winters and Wang (1994), Baldwin (1994), Faini and Portes (1995), and Christin (1996). The main results are that there exists a large unexploited trade potential originating from the transition process from planned towards market economies. Assuming that the Central and Eastern European transition countries already behave more like market economies and that the EU has by now established itself as their dominant trade partner, a recent study by Papazoglou, Pentecost, and Marques (2006) estimates the potential gains from trade from the Eastern expansion of the EU single market. They conclude with an average rise in exports from the ten accession countries to the EU-15 of 12.4 percent, whereas the accession economies' imports from the EU-15 are expected to grow by 50.2 percent. Taking a more critical standpoint, Gros and Gonciarz (1996), Breuss and Egger (1999) and Piazzolo (2001) argue that most of the trade potential might have already been exploited. First of all, the trade liberalisation process between the EU and the Central and Eastern European countries in line with the Europe Agreements stimulated the rapid intensification of the trade relations. Secondly, from an econometric viewpoint Breuss and Egger (1999) cast doubts on the reliability of results based on cross-section gravity empirics and conclude that they do not permit any definite judgment as to whether actual

East-West trade has already reached its potential level.

In order to calculate the trade potential, it is generally assumed that foreign trade between the Eastern and Western European countries will in the medium term be subject to the same factors governing the trade relations between countries already well integrated into the world trade system. By means of the gravity model this benchmark trade intensity can be estimated. The resulting parameters are then used to project the trade pattern between the Eastern and Western European countries that would result if the benchmark coefficients also held for the former Socialist countries. The excess of the such calculated potential trade over actual trade can be interpreted as an un-exhausted trade potential.

Our study builds upon this line of research with the focus on trade between the EU-15 and the AC-12. Hereby we assume that due to the trade liberalization already accomplished all major trade obstacles have been removed by now and that a future potential for trade can rather be realized by adjustments in the new members' institutional environment towards the EU-15 average. Furthermore, we explicitly distinguish between exports and imports in order to analyze separately the forces behind the respective supply and demand conditions.

3.2 Econometric issues

The question of the proper specification of the gravity model has been increasingly discussed in the literature. In building a gravity model, specification errors can arise from various sides. On the one side, misspecification can be a result of country heterogeneity and dynamics. On the other side, it can be due to the exclusion or inclusion of specific covariates. In aiming at a proper specification, we closely follow Rose (2004) and estimate the following

equation:

$$\begin{aligned} \ln(X_{ijt}) = & \beta_0 + \beta_1 \ln(GDPpc_{it}) + \beta_2 \ln(GDPpc_{jt}) + \beta_3 \ln(Dist_{ij}) \quad (2) \\ & + \beta_4 EU_{ij} + \beta_5 EMU_{ij} + \beta_6 Border_{ij} + \sum_{i=1}^{23} \alpha_i Dummy \\ & + \sum_{l=1}^{10} \gamma_l INST_{lt} + \sum_{k=1}^{10} \delta_k INST_{kt} + \tau_t + c_i + c_j + c_{ij} + \epsilon_{ijt}, \end{aligned}$$

where i and j denote trading partners, t is time, and X_{ijt} are exports respectively imports between country i and j at time t . $GDPpc$ is GDP per capita, $Dist$ is the distance between i and j in km, EU and EMU are binary variables that are unity if both trading partners are members of the EU or the European Monetary Union (EMU), respectively. $Border$ is a binary variable that is unity if both trading partners share a common border. $Dummy$ represents further dummy variables as used in Rose (2004) to control for as many other causes of trade as possible. $INST$ comprises the institutional variables. The parameters τ_t , c_i , c_j , c_{ij} denote time effects and country effects, respectively, and ϵ_{ijt} represents the omitted other influences on bilateral trade.

Taking care of history has been increasingly discussed also with respect to gravity models. While many studies used to be carried out with cross-sectional estimation methods, Matyas (1997), Breuss and Egger (1999) and Egger and Pfaffenmayr (2003) pointed out that the panel approach is a more appropriate procedure. In general, both approaches are static and refer to long-run relationships. The importance of dynamic gravity models was first stressed by Eichengreen and Irwin (1997). Likewise, Bun and Klaassen (2002) argue that trade history plays an important role in estimating gravity models and that static models are misspecified. Enterprises in countries that have long been involved in international trade have set up distributions and service networks in the partner countries, which has led to low entrance and exit barriers due to sunk costs. In addition, consumers have grown accustomed to the partner countries' products. It is therefore very likely that current bilateral trade between such countries is high because it has already

been high in the past. Dynamic models in the gravity context have been applied by De Grauwe and Skudelny (2000), Bun and Klaassen (2002), and De Benedictis and Vicarelli (2005), who use their results to calculate trade potentials.

Modeling dynamics in a panel data model with fixed effects is not straightforward. Consider the simple panel data model

$$X_{ijt} = \beta_0 X_{ij,t-1} + \beta_i(Y_{ijt}) + \epsilon_{ijt}, \quad (3)$$

where Y_{ijt} includes the explanatory variables from (2). The dynamic panel data model cannot be consistently estimated with an OLS or a fixed-effects (FE) estimator (or Least Squares Dummy Variables (LSDV) estimator) due to the fact that the lagged dependent variable is correlated with the error term assuming a finite time horizon and an infinite number of cross-section observations.⁵ To avoid the inconsistency of the LSDV estimator, numerous alternatives have been proposed, with the most popular class of the generalized methods of moments (GMM) estimator. Arellano and Bond (1991), Arellano and Bover (1995) and Blundell and Bond (1995) have shown that equation (3) can be consistently and efficiently estimated by using first differences and a system GMM estimation approach. The Arellano-Bond (AB) estimator uses the lagged levels of the dependent variables as instruments. The Blundell-Bond (BB) estimator utilizes the lagged levels as well as the lagged differences of the explanatory variables, hereby allowing to use an additional observation in time compared to the AB-estimator. Therefore, the BB-method is more efficient and less plagued by biases, also with respect to small samples. The validity of instruments requires the absence of second-order serial correlation in the residuals. Overall validity can also be

⁵In the fixed-effect case the bias disappears when the number of time periods and observations is very large (see for instance Baltagi (2005)). De Grauwe and Skudelny (2000) ($T = 32$, $N = 156$) and Bun and Klaassen (2002) ($T = 48$, $N = 156$) rely on this argument in their gravity model estimations. Furthermore there is an ongoing discussion about how large "very large" is (see, for example, Judson and Owen (1999)). Bun and Klaassen (2002) show in a simulation study that LSDV is a serious alternative for the estimation of dynamic gravity models when T increases. However, as our time period from 1995 to 2004 is rather short we can not resort to this alternative.

tested using a Sargan test (for the AB-estimator) or a Hansen test (for the BB-estimator).

In our analysis we proceed in three steps. In order to compare our results with those of earlier studies, we start with a simple pooled OLS regression with robust standard errors. In a second step we run FE-panel regressions to control for country-specific effects. The FE model that is in most regression specifications preferable to the random-effects (RE) model (Egger (2002)) delivers the within-effects estimator and makes use of the time-varying component of changes in the explanatory variables. The estimates of the FE-model can therefore be interpreted as short-run effects of changes in exports and are the relevant estimators for our data given the relative short time-period utilized in the sample (see Mundlak (1978)).⁶ In addition to the static analysis of our data, in a third step we estimate the influence of institutions on trade with the help of dynamic panel data models and use both the AB- as well as the BB-estimator.

4 The data

The quality of national institutions can be quantified with the help of various measures. They all provide a systematic, empirical measurement of either the competitiveness of countries or the main factors of economic growth and prosperity and allow for a ranking of countries according to the quality of their institutions.⁷ In line with Babetskaia-Kukharchuk and Maurel (2004) and Cheptea (2007) we resort to the Index of Economic Freedom (IEF). It was first published in 1995 by the Heritage Foundation and the Wall Street Journal and offers on a yearly basis an examination of the factors that contribute most directly to economic freedom and prosperity (Heritage Founda-

⁶The FE-estimator eliminates all time-invariant variables by the data transformation. To overcome this problem, Hausman and Taylor (1981) propose an instrumental variable estimator for panel data regression. This estimator was used by Babetskaia-Kukharchuk and Maurel (2004) and Rault, Sova, and Sova (2008) in the gravity context. As we want to focus on the (time varying) institutional variables, however, we leave out this estimator.

⁷Ochel and Röhn (2006) provide an overview of various indices as well as a discussion of the respective approaches and methodologies.

tion (2008)). The index is computed as a simple average over ten individual factors of economic freedom (see Table 2) for meanwhile 162 countries with scores ranging from 0 to 100 and is available for each year from 1995 to 2008.⁸ The higher the score on a factor is, the higher the level of economic freedom and hence the lower the level of government interference in the economy. Since, as a rule, good market conditions and economic freedom are guaranteed by strong and independent institutions, the IEF can be viewed as a measure of the quality of national institutions. Descriptive statistics on the single factors of economic freedom for the EU-15 and the AC-12 are provided in Table 3.

The database for our gravity model consists of a comprehensive sample of 146 countries, which results in an average of twelve thousand observations per year, excluding unobserved trade flows between pairs of countries. This large database enables us to get a clear picture on the general importance of institutions for the direction and magnitude of foreign trade flows.⁹ Our analysis covers the years from 1995 to 2004. At the beginning of the 1990s the trade pattern of the Central and Eastern European countries underwent dramatic changes due to the economic breakdown after the fall of the Iron Curtain, which strongly shows in the data before 1995. Furthermore, the IEF starts in that year. Foreign trade data is obtained from the IMF's World Trade Statistics and is deflated by the American consumer price index for all urban consumers in analogy to Rose (2004). Constant GDP (in 2000 US dollars), GDP per capita, and population data are from the World Bank's World Development Indicators. For the calculation of the distance between the countries we refer to the distance in km between their capitals.¹⁰

⁸We do not consider Labor Freedom because of inconsistencies in the time series. In the course of restructuring the IEF, the 2007 index adopted an independent labor freedom factor that is designed to measure countries' labor market regulations more adequately than the variable previously used. Since the old and the new factor differ somewhat in the calculation, we refrain from combining the old and the new factor.

⁹In this respect, we also follow the advice of Frankel (1997) to use as broad a set of data as possible in order to ascertain how European links differ from what is considered normal. As a result, the present study is more comprehensive than most of the other empirical studies working with gravity models. See Table 4 for an overview of the relevant studies and the number of observations considered.

¹⁰www.indo.com/distance.

Embedded in the framework of the gravity model, we use the IEF to analyze the link between institutions and trade. To this end we do not select only those factors that we a priori expect to have an impact on trade, but include all nine institutional factors and let the econometric models decide which of them are relevant for the explanation of bilateral trade flows.

5 Results

5.1 Benchmark regressions

The general suitability of the gravity model for explaining the magnitude and direction of foreign trade flows is illustrated in Table 5 that contains the benchmark estimation results for both exports and imports. For reasons of clarity, we report only the coefficients on the basic determinants of trade, which are GDP per capita and distance. Furthermore, the estimated values of the EU and EMU dummies are included in order to show the stimulus in trade that membership in these regimes advances. The border dummy stands for more general trade-enhancing factors arising out of proximity between two countries.¹¹

In a first step we estimate a simple pooled OLS model (column 1), assuming that all explanatory variables are exogenous. However, as it is implausible that there are no unobserved individual effects and to explicitly take into account time effects in a second step we estimate a panel model with random and fixed effects. Since the Hausman test points towards a systematic difference in the coefficients of the two methods the fixed-effects (FE) model is given preference. Results are depicted in column 2. The regression results yield the expected results for exports and for imports and are generally in line with those of other studies. Countries with a higher per capita income trade more, while trade decreases with the distance between them. In addition, being member in the EU or the EMU as well as sharing a common border further stimulates foreign trade.¹²

¹¹The detailed results can be obtained from the authors upon request.

¹²The coefficients on EU and EMU are rather small when compared to other literature

Results on the two dynamic panel specifications are reported in column 3 for the Arellano-Bond (AB) estimator and in column 4 for the Blundell-Bond (BB) estimator. The highly significant lagged values in both dynamic panel estimations suggest a strong dynamic setup. This implies that the previous time path of the explanatory variables, i.e. history, provides a good explanation for the current value of foreign trade between countries (see also Bun and Klaassen (2007), De Benedictis and Vicarelli (2005) and Moser, Nestmann, and Wedow (2008)). However, the Hansen and Sargan tests are significant at the 5 per cent level implying that the instruments are not valid.¹³ Furthermore there is still second-order autocorrelation, suggesting that a valid dynamic specification is not feasible for our data set. Apparently, the combination of the relatively short time horizon with the large data sample does not yield consistent results. This highlights the general problems of modeling dynamic panel estimations in the gravity context.

5.2 The role of institutions

In this section we extend the benchmark analysis and focus on the influence of institutions on bilateral trade. Tables 6 and 7 provide results of the gravity model estimations with the inclusion of the factors of economic freedom. As with the benchmark estimations, we run static and dynamic panel regressions for exports and imports separately. Again, the lagged dependent values hint towards a significant dynamic behavior, but the dynamic models are not appropriate in terms of the validity of instruments. Hence, in the following discussion, we again concentrate on the FE-estimation results. The basic coefficients are similar compared to the benchmark regressions, implying that the fundamental relationships are stable when the institutional variables are included.

Our results clearly confirm the importance of institutions for interna-

in this context (see Table 4 and Bun and Klaassen (2007)). This can largely be explained with the large number of countries included in our dataset and the consideration of various other regional free trade agreements so that the influence of EU or EMU membership might be attenuated in this global perspective.

¹³In the export regressions of Egger (2000) the Sargan test is only marginally satisfied.

tional trade, but not all of the considered institutional factors are significant. What is more, not all coefficients show the expected positive signs, suggesting that in some economic areas, a higher level of government interference in the economy along with less economic freedom might even be beneficial in promoting foreign trade. Three of the nine institutional factors exert a particularly large influence on trade, which we will discuss in more detail.

According to our results, the most important institutional factor for trade is the role of the government within a country. The level of government expenditures as a percentage of GDP captured by Government Size (*Gov*) is highly significant and negative both for exports and imports, supporting the view that high government spending fosters trade. This finding might at first sight be surprising, given that it does not adhere to concrete aspects of institutional quality. Rather more elementary, the role of government in the economy can be interpreted as the way countries deal with risk emanating from turbulence in the world markets. Rodrik (1998) brings forward this argument in presenting a robust positive association between an economy's exposure to foreign trade and the size of its government. More open economies have a greater exposure to external risk emerging from insecurity in international relations. Larger government spending in such economies can be regarded as providing social insurance insofar as the government is a "safe" sector in terms of employment and purchases from the rest of the economy compared to the sector producing tradeable goods. Hence, in open economies the government can reduce risk going along with trading with other countries by taking command of a larger share of the economy's resources. Likewise, Bates, Brock, and Tiefenthaler (1991) emphasize that governments can respond to the risks engendered by international exposure either with protectionism or with domestic forms of insurance, i.e. welfare and transfer payments. Hence, government expenditures can not only be seen as distorting market outcomes, but also under the aspect of providing insurance against external risk. This explanation is corroborated by the IEF data. The large open economies of the world tend to have smaller values for *Gov*, implying that government expenditures are relatively high in comparison to

GDP.¹⁴

Second, the degree of banking security and independence from government control (*Fin*) also significantly influences trade relations between countries. However, the signs differ for the exporting and the importing countries. Since a company involved in imports from a foreign country has to be able to meet the accounts and to have access to sound credits and foreign currency, free access to credit and finance is likely to be of greater importance for the importing country j than for the exporting country i . This might explain the positive coefficients for the importing country j . The negative values for the exporting country i can be interpreted in the sense that a prudential state supervision of banks and other financial services also guarantees reliable financing options for companies. Moser, Nestmann, and Wedow (2008), for example, find evidence for the case of Germany that official credit guarantees against export risks are indeed able to foster exports. Like for *Gov*, this explanation addresses the active role government can play in regulating economic transactions and in providing an insurance mechanism against external risk.

The third institutional factor that exerts a significant impact on trade is the level of corruption (*Cor*). A low level of corruption fosters exports, which is in line with results of Anderson and Marcouiller (2002) and Babetskaia-Kukharchuk and Maurel (2004). In contrast, a high level of corruption goes hand in hand with increasing import demand. This apparently paradox finding can be explained twofold. The first argument concerns the relationship between trade intensity, respectively country size, and corruption. Many studies conclude that higher trade intensity and/or small populations are associated with lower corruption levels. Knack and Azfar (2003) demonstrate that these relationships are largely an artefact of sample selection bias, because often small nations that are not so well governed are not included in the analyses. Since these nations are also included in our database, this can serve as one explanation for our findings.¹⁵ Further reinforcing the sample selec-

¹⁴Closely connected with *Gov* is the concept of fiscal freedom (*Fiscal*), which measures the activity of governments in generating revenue for themselves by raising taxes. However, this institutional factor is less significant and does not show consistent signs.

¹⁵The coefficients on corruption become positive and significant when only the OECD

tion bias, trade with corrupt countries can also be stimulated if it is expected to generate profits that compensate the accompanying risks. For example, this can be the case for trade with natural resources. A second argument deals with the connection between rapid political and trade liberalizations and corruption. Tavares (2007) investigates the relationship between corruption and reforms, distinguishing between political and economic reforms. She finds that undertaking both kinds of reforms in rapid succession leads to a decrease in corruption, whereas countries that liberalized more than 5 years after democratizing experienced an increase in corruption. Hence, an increase in the overall institutional framework can well go along with increasing corruption.

Compared to these three institutional factors, we find a considerably lower influence of the other factors of economic freedom. The effects of free trade agreements on trade flows are mainly captured by the dummies included in the regression. Hence, the extent of tariff and non-tariff barriers to trade (*Trade*) becomes significant only for import flows, suggesting that only those factors unaccounted for by the dummies appear. As can be expected, low barriers in country i are conducive to imports. Likewise, the variable on restrictions on foreign and internal investment (*Inv*) is significant only for import flows. High restrictions on investment in the importing country foster imports, which can be interpreted as substituting for the lacking possibility to carry out foreign direct investment. Monetary institutions managing to hold inflation low and preventing price controls (*Mon*) also act positively upon exports. Business freedom (*Bus*) and property rights (*PR*), finally, are of minor relevance for bilateral trade.

5.3 The potential for trade between the EU-15 and the AC-12

The regression results discussed above present clear evidence on the role of institutions for bilateral trade relations. We can now apply these findings

countries are included in the regression. As to be expected, then, a low level of corruption is conducive to the volume of international trade.

on our initial question of how trade between the old and the new EU members will be affected by a change in the AC-12's institutions in the process of EU enlargement. As section 2 has shown, the twelve accession countries on average still lag considerably behind the old EU members in spite of the convergence process that has already taken place. Further improving the institutional quality in the AC-12 in accordance with the *Acquis Communautaire* implies an additional potential for increasing trade between the old and the new EU member states. To assess this trade potential, we assume that the accession to the EU will result in a convergence of the AC-12's institutional scores towards the level of the old EU member states. This implies, for example, that the value for freedom from corruption (*Cor*) in the AC-12 will rise from 42.9 towards the EU 15-level of 75.5 (see Table 3). On the other hand, it can be expected that the new EU member countries will experience an increase in the size of their governments, which would result in a decrease of their average value for *Gov* of 46.3 to the EU-15 average of 27.8.¹⁶ Since, according to our estimation results, lower values of *Gov* give rise to trade expansion, this decrease should result in a higher trade volume between the two blocks of countries that we measure in logarithms as $\Delta \ln X_{ij}$. The algebraic calculation of the trade potential is straightforward

$$\Delta \ln X_{ij} = \hat{\alpha}_j(INST_i - INST_j), \quad (4)$$

where $\hat{\alpha}_j$ represents the coefficient of the respective institutional factor of Economic Freedom estimated with the FE-model for exports and for imports. $INST_i$ stands for the score in the year 2004 for the EU-15 and $INST_j$ for the ten countries having joined the EU in 2004, whereas for Bulgaria and Romania we choose the scores in 2006.

Table 8 illustrates the potential for trade for each institutional factor. Exports from the old to the new members as well as the old members' imports from the new ones are considered separately. The largest impulse for exports from the EU-15 to the new member states comes from diminishing

¹⁶The development of public expenditures in the countries entering the EU in prior enlargement rounds is quite instructive in this respect. See Maravall (1993) for an account on Spain.

differences in government size. It is driven by the high relevance of this institutional factor that has become visible in the regression results combined with the still notably lower share of government expenditures in the AC-12. On the other hand, imports from the AC-12, i.e. exports from the new to the old EU members, could be most effectively fostered by the fight against corruption in the AC-12. Here the differences between the old and the new EU countries are still largest. Accordingly, successfully reducing corruption might *ceteris paribus* give way to higher trade. Furthermore, the high relevance of Financial Freedom for bilateral trade flows entails a large additional gain from trade, although the differences between the old and the new EU member countries are not very large in this respect.¹⁷

Table 9 presents the calculations on the trade potential for each pair of countries individually over all significant institutional factors.¹⁸ As the last column shows, exports from the old EU countries could increase between 2.6% in the case of Spain and 11.3% in the case of Denmark. Exports from the AC-12 to the EU-15 are estimated to increase between 0.6% from Malta and 2.6% from Bulgaria. Overall, exports from the old to the new EU member states could additionally increase by 5.7% and imports by 17.9% because of a convergence in the AC-12's institutions towards the average of the EU-15.

6 Summary

This paper presents evidence on additional gains from trade between the 15 old EU countries and the 12 new members having joined the EU in 2004 and 2007 that result from the convergence of the AC-12's institutional environment towards the standard of the EU-15. We resort to the gravity model for the calculation of potential export and import flows and focus on the

¹⁷Also based on the IEF, Cheptea (2007) confirms the importance of fighting corruption in the AC-12. Her conclusions regarding the other components of the IEF, however, depart from our results, what might be due to differences in the country samples and methodologies applied.

¹⁸In calculating the potential rise in trade flows, we look at each pair of countries separately and assume that the value of the new member's institutional factor will reach that of the old EU member country.

role institutions play for international trade. Our estimates are based on a large panel data set of 142 countries and ten years. Augmenting the gravity model by detailed institutional variables from the Index of Economic Freedom clearly shows that institutions do matter for foreign trade. Above all, our results highlight the positive role government can play in minimizing risk that goes along with trade openness. Large government spending can in this sense be regarded as providing social insurance against external risk by means of comparably safe employment or transfer payments. In addition, a prudential state supervision of banks and other financial services can guarantee reliable financing mechanisms for enterprises that are involved in international trade. Exports are further fostered by the fight against corruption. Besides, the dynamic panel regressions provide evidence that history plays a role in explaining current trade flows, which also alludes to the influence of the institutional quality that was obtained in the past.

Having determined the relevance and the influence institutions exert on trade, we can calculate the potential for trade expansion that results from the further convergence of the institutional framework between the old and the new EU member countries in accordance with the *Acquis Communautaire*. Exports from the EU-15 to the AC-12 would be particularly stimulated by a growing government sector in the new members, while imports into the EU-15 would gain most from the fight against corruption in the AC-12. Here the differences between the old and the new EU members are most pronounced. On the whole, we can conclude that exports from the old to the new EU countries could experience an additional impulse of 5.7% and imports of 17.9% if the institutional framework in the AC-12 was adjusted to the average of the old member states of the EU.

Lastly, two restrictions on our findings are in order. The gravity model does not provide information on how much time it will take until the trade potential can be realized. Since the AC-12's institutional environment is not expected to converge immediately towards the EU level, it would be plausible to say that the calculated trade potential could be gained in the medium to long run. Another more general aspect concerns the formulation of policy recommendations on the basis of qualitative indices measuring the quality of

institutions. We have provided evidence on the role of specific institutions for trade and the impact on trade between the old and the new EU members if the AC-12 induced a change in their institutional environment. We cannot, however, furnish information on the precise measures that should be taken in order to induce a change in the corresponding index values. This question is left to further research.

References

- ACEMOGLU, D., S. JOHNSON, AND J. ROBINSON (2001): “The Colonial Origins of Economic Development: An Empirical Investigation,” *American Economic Review*, 91(5), 1369–1401.
- ANDERSON, J. (1979): “A Theoretical Foundation for the Gravity Equation,” *American Economic Review*, 69(1), 106–116.
- ANDERSON, J., AND D. MARCOUILLER (2002): “Insecurity and the Pattern of Trade: An Empirical Investigation,” *Review of Economics and Statistics*, 84(2), 342–352.
- ANDERSON, J., AND E. VAN WINCOOP (2004): “Trade Costs,” *Journal of Economic Literature*, 42(3), 691–751.
- ARELLANO, M., AND S. BOND (1991): “Some test of specification for panel data: Monte Carlo evidence and an application to employment equations,” *Review of Economic Studies*, 58(2), 127–134.
- ARELLANO, M., AND O. BOVER (1995): “Another look at the instrumental variables estimation of error-components models,” *Journal of Econometrics*, 68, 29–51.
- BABETSKAIA-KUKHARCHUK, O., AND M. MAUREL (2004): “Russia’s accession to the WTO: the potential for trade increase,” *Journal of Comparative Economics*, 32(4), 680–699.
- BADINGER, H., AND F. BREUSS (2004): “What has determined the rapid post-war growth of intra-EU trade?,” *Review of World Economics*, 140(1), 31–51.
- BALDWIN, R. (1994): *Towards an integrated Europe*. Centre for Economic Policy Research, London.
- BALTAGI, B. H. (2005): *Econometric analysis of panel data*. Wiley, Chichester.

- BATES, R., P. BROCK, AND J. TIEFENTHALER (1991): "Risk and trade regimes: another exploration," *International Organization*, 45(1), 1–18.
- BERGSTRAND, J. (1985): "The gravity equation in international trade - some microeconomic foundations and empirical evidence," *Review of Economics and Statistics*, 67(3), 474–481.
- (1989): "The generalized gravity equation, monopolistic competition and the factor-proportions theory in international trade," *Review of Economics and Statistics*, 71(1), 143–153.
- BLUNDELL, R., AND S. BOND (1995): "Initial conditions and moment restrictions in dynamic panel data models," *Journal of Econometrics*, 87(1), 115–143.
- BREUSS, F., AND P. EGGER (1999): "How reliable are estimations of East-West trade potentials based on cross-section gravity analysis," *Empirica*, 26(2), 81–94.
- BUN, M., AND F. KLAASSEN (2002): "The importance of dynamics in panel gravity models of trade," Discussion Paper 108/2, Tinbergen Institute.
- BUN, M., AND F. KLAASSEN (2007): "The Euro effect on trade is not as large as commonly thought," *Oxford Bulletin of Economics and Statistics*, 69(4), 473–496.
- CHEPTEA, A. (2007): "Trade liberalization and institutional reforms," *Economics of Transition*, 15(2), 211–255.
- CHRISTIN, D. (1996): "The long-term volume of East Europe's foreign trade: An estimate," *Economics of Planning*, 29(1), 1–24.
- DE BENEDICTIS, L., AND C. VICARELLI (2005): "Trade potentials in gravity panel data models," *Topics in Economic Analysis and Policy*, 5(1), 1–31.
- DE GRAUWE, P., AND F. SKUDELNY (2000): "The impact of EMU on trade flows," *Review of World Economics*, 136(3), 381–402.

- DE GROOT, H., G. LINDER, P. RIETVELD, AND U. SUBRAMANIAN (2004): “The institutional determinants of bilateral trade patterns,” *Kyklos*, 57(1), 103–124.
- DE HAAN, J., AND J. STURM (2001): “How robust is the relationship between economic freedom and economic growth?,” *Applied Economics*, 33(7), 839–844.
- EGGER, P. (2002): “An econometric view on the estimation of gravity models and the calculation of trade potentials,” *The World Economy*, 25(2), 297–312.
- EGGER, P., AND M. PFAFFENMAYR (2003): “The proper panel econometric specification of the gravity equation: A three way model with bilateral interaction effects,” *Empirical Economics*, 28(3), 571–580.
- EICHENGREEN, B., AND D. IRWIN (1997): “The role of history in bilateral trade flows,” in *Issues in Regionalism*, ed. by J. Frankel, pp. 33–57, Chicago. Chicago: University of Chicago Press.
- EVENETT, S., AND W. KELLER (2002): “On theories explaining the success of the gravity equation,” *Journal of Political Economy*, 110(2), 281–316.
- FAINI, R., AND R. PORTES (1995): *European Union trade with Eastern Europe: Adjustment and opportunities*. CEPR, London.
- FEENSTRA, R., J. MARKUSEN, AND A. ROSE (2001): “Using the gravity equation to differentiate among alternative theories of trade,” *Canadian Journal of Economics*, 30(2), 430–447.
- FRANKEL, J. (1997): *Regional trading blocs in the world trading system*. Institute for International Economics, Washington D.C.
- GROS, D., AND A. GONCIARZ (1996): “A note on the trade potential of Central and Eastern Europe,” *European Journal of Political Economy*, 12(4), 709–721.

- HALL, R., AND C. JONES (1999): “Why do some countries produce so much more output per worker than others?,” *Quarterly Journal of Economics*, 114(1), 83–116.
- HAMILTON, C., AND A. WINTERS (1992): “Opening up international trade with Eastern Europe,” *Economic Policy*, 14, 77–116.
- HAUSMAN, J., AND W. TAYLOR (1981): “Panel data and unobservable individual effects,” *Econometrica*, 49(6), 1277–1298.
- HERITAGE FOUNDATION (2008): *The 2008 Index of Economic Freedom*. Washington, D.C.
- JANSEN, M., AND H. NORDÅS (2004): “Institutions, infrastructure, trade policy and trade flows,” Discussion paper, CEPR Discussion Paper.
- JUDSON, R., AND A. OWEN (1999): “Estimating dynamic panel data models: a guide for macroeconomists,” *Economics Letters*, 65(1), 9–15.
- KNACK, S., AND O. AZFAR (2003): “Trade intensity, country size and corruption,” *Economics of Governance*, 4(1), 1–18.
- KNACK, S., AND P. KEEFER (1995): “Institutions and economic performance: Cross-country tests using alternative measures,” *Economics and Politics*, 7(3), 207–227.
- LINNEMANN, H. (1966): *An econometric study of international trade flows*. North-Holland, Amsterdam.
- MARAVALL, J. M. (1993): “Economic reforms in new democracies,” New York. Cambridge University Press.
- MATYAS, L. (1997): “Proper econometric specification of the gravity model,” *The World Economy*, 20(3), 363–368.
- MOSER, C., T. NESTMANN, AND M. WEDOW (2008): “Political risk and export promotion: Evidence from Germany,” *World Economy*, 31(6), 781–803.

- MUNDLAK, Y. (1978): “On the pooling of time series and cross section data,” *Econometrica*, 46(1), 69–85.
- NORTH, D. (1991): “Institutions,” *Journal of Economic Perspectives*, 5(1), 97–112.
- OCHEL, W., AND O. RÖHN (2006): “Ranking of countries—the WEF, IMD, Fraser and Heritage indices,” *CESifo DICE Report*, 2, 48–60.
- PAPAZOGLU, C., E. PENTECOST, AND H. MARQUES (2006): “A gravity model forecast of the potential trade effects of EU enlargement: Lessons from 2004 and path-dependency in integration,” *The World Economy*, 29(8), 1077–1089.
- PIAZOLO, D. (2001): *The integration process between Eastern and Western Europe*. Springer, Berlin, Heidelberg.
- PÖYHÖNEN, P. (1963): “A tentative model for the volume of trade between countries,” *Weltwirtschaftliches Archiv*, 90(1), 93–100.
- RAUCH, J., AND V. TRINDADE (2002): “Ethnic Chinese networks in international trade,” *Review of Economics and Statistics*, 84(1), 116–130.
- RAULT, C., A. SOVA, AND R. SOVA (2008): “Modeling international trade flows between CEEC and OECD countries,” *Applied Economics Letters*, forthcoming.
- RODRIK, D. (1998): “Why do more open economies have bigger governments?,” *Journal of Political Economy*, 106(5), 997–1032.
- RODRIK, D., A. SUBRAMANIAN, AND F. TREBBI (2004): “Institutions rule: The primacy of institutions over geography and integration in economic development,” *Journal of Economic Growth*, 9(2), 131–165.
- ROSE, A. (2004): “Do we really know that the WTO increases trade?,” *American Economic Review*, 94(1), 98–114.

- TAVARES, S. (2007): “Do rapid political and trade liberalizations increase corruption?,” *European Journal of Political Economy*, 23(4), 1053–1076.
- TINBERGEN, J. (1962): *Shaping the world economy. Suggestions for an international economic policy*. The Twentieth Century Fund, New York.
- WINTERS, A., AND Z. WANG (1994): *Eastern Europe’s international trade*. Manchester University Press, Manchester, New York.
- WORLD BANK (2002): “Building institutions for markets,” *World Development Report*.

Table 2: The factors of economic freedom

Factor of economic freedom	Description
Business Freedom (<i>Bus</i>)	Quick and easy creation, operation and closing of an enterprise
Trade Freedom (<i>Trade</i>)	Tariff and non-tariff barriers
Fiscal Freedom (<i>Fiscal</i>)	Tax burden, tax revenue
Government Size (<i>Gov</i>)	Government expenditures
Monetary Freedom (<i>Mon</i>)	Price stability and price controls
Investment Freedom (<i>Inv</i>)	Free flow of (foreign) capital
Financial Freedom (<i>Fin</i>)	Banking security and independence from government control
Property Rights (<i>PR</i>)	Ability of individuals to accumulate private property
Freedom from Corruption (<i>Cor</i>)	Perception of corruption in the business environment
Labor Freedom	Ability of workers and businesses to interact without restriction by the state

Source: Heritage Foundation (2008).

Table 3: Institutional Factors: Descriptive Statistics (average values over the years 1995 to 2004)

	Highest	Average EU-15	Average AC-12	Lowest
Overall Score	77.2 (GB)	67.7	61.0	49.6 (RO)
Business Freedom	88.3 (DK)	75.4	72.4	55.0 (BG)
Trade Freedom	81.6 (EST)	78.5	71.7	60.3 (BG)
Fiscal Freedom	77.8 (LV)	47.0	64.4	31.5 (DK)
Gov't Size	65.8 (LT)	27.8	46.3	0.8 (S)
Monetary Freedom	90.0 (DK)	84.2	64.5	36.4 (RO)
Investment Freedom	90.0 (EST)	71.4	65.6	52.0 (F)
Financial Freedom	90.0 (NL)*	67.6	62.8	38.0 (GR)
Property Rights	90.0 (A)**	82.1	58.8	30.0 (RO)
Freedom from Corruption	96.0 (DK)	75.5	42.9	28.0 (M)

Notes: *: also GB, CZ. **: also B, DK, FIN, D, IRL, L, NL, GB.

Source: Heritage Foundation, authors' own calculations.

Table 4: Literature review: Sample size and EU estimates

	Time period	N	EU
Hamilton and Winters (1992)	1984-1986	4,320	0.70
Baldwin (1994)	1979-1984	3,390	-
Breuss and Egger (1999)	1990-1994	506	0.42
Bun and Klaassen (2002)	1950-1997	10,608	-
Badinger and Breuss (2004)	1960-2000	1,456	-
Rose (2004)	1948-1999	234,597	1.2 ^a
Babetskaia-Kukharchuk and Maurel (2004)	1994-2001	13,712	0.17
de Groot, Linder, Rietveld, and Subramanian (2004)	1998	9,006	0.87 ^a
De Benedictis and Vicarelli (2005)	1991-2000	3,347	0.240 ^a
Papazoglou, Pentecost, and Marques (2006)	1992-2003	4,157	0.287
Cheptea (2007)	1993-2000	1,356	-

Notes: ^a: Regional Free Trade Agreements.

Table 5: Benchmark results - exports and imports

	Exports			
	OLS	FE	AB	BB
X_{ijt-1}			0.220 ^{***}	0.244 ^{***}
GDP _{pc_i}	0.541 ^{***}	0.369 [*]	0.227 [*]	0.513 ^{***}
GDP _{pc_j}	0.408 ^{***}	0.581 [*]	0.458 ^{***}	0.407 ^{***}
distance	-0.092 ^{***}		0.000	-0.120 ^{***}
EU	0.017 ^{***}		-0.002 ^{***}	-0.042 ^{***}
EMU	0.014 ^{***}	-0.002	0.001	0.031 ^{***}
Border	0.066 ^{***}		0.000	-0.074 ^{***}
Sargan			0.000	
Hansen				0.000
Autocorrelation			0.008	0.000
N	109,365	109,365	75,379	90,676
	Imports			
	OLS	FE	AB	BB
X_{ijt-1}			0.201 ^{***}	0.261 ^{***}
GDP _{pc_i}	0.410 ^{***}	0.678 ^{***}	0.515 ^{***}	0.394 ^{***}
GDP _{pc_j}	0.572 ^{***}	0.412 ^{***}	-0.112	0.501 ^{***}
distance	-0.092 ^{***}		-0.001 ^{***}	-0.109 ^{***}
EU	0.007 ^{***}		-0.003 ^{***}	-0.041 ^{***}
EMU	0.013 ^{***}	0.000	0.001 [*]	0.027 ^{***}
Border	0.062 ^{***}		-0.002 [*]	-0.061 ^{***}
Sargan			0.000	
Hansen				0.000
Autocorrelation			0.004	0.000
N	113,434	113,434	78,706	94,589

Notes: Regressand: log exports and log imports, respectively. Intercept, further dummies from equation (1) and time dummies included but not reported. ***, **, and *, indicate significance at 1%, 5%, and 10%, respectively. OLS = pooled OLS, FE = fixed effects, AB = Arellano Bond, BB = Blundell Bond.

Table 6: Estimation results with institutional variables - exports

	OLS	FE	AA	BB
$X_{ij,t-1}$			0.226***	0.317***
GDP_{pc_i}	0.502***	0.366***	0.122***	0.324***
GDP_{pc_j}	0.398***	0.568***	1.597***	0.265***
distance	-0.097***		-0.001***	-0.062***
EU	0.020***		-0.002***	0.016***
EMU	0.002	0.000	0.000**	0.002
Border	0.062		0.000	0.038***
Bus_i	0.000	-0.094*	0.092	-0.120*
Bus_j	0.179***	-0.015	0.059	-0.055
$Trade_i$	0.476***	-0.027	0.034	0.183***
$Trade_j$	0.548***	0.042	0.014	0.239***
$Fiscal_i$	-0.476***	-0.005	-0.344***	-0.077
$Fiscal_j$	0.343***	0.134*	0.149	0.259***
Gov_i	0.975***	-0.296***	0.028	0.398***
Gov_j	0.629***	-0.126***	-0.049	0.321***
Mon_i	-0.931***	0.108***	-0.106**	-0.431***
Mon_j	-0.188***	-0.037	-0.111**	-0.086*
Inv_i	0.535***	0.006	0.035	0.371***
Inv_j	0.213***	0.000	0.084	0.208***
Fin_i	-0.300***	-0.097***	0.004	-0.293***
Fin_j	0.051	0.249***	0.088	0.034
PR_i	0.376***	0.114**	-0.027	0.350***
PR_j	-0.003	0.056	0.083	0.073
Cor_i	0.740***	0.186**	0.046	0.315***
Cor_j	0.196***	-0.135**	-0.049	0.075
Sargan			0.000	
Hansen				0.000
Autocorr.			0.001	0.000
N	109,365	109,365	75,379	90,676

Notes: Regressand: log exports. Intercept, further dummies from equation (1) and time dummies included but not reported. ***, **, and *, indicate significance at 1%, 5%, and 10%, respectively. OLS = pooled OLS, FE = fixed effects, AB = Arellano Bond, BB = Blundell Bond. Institutional coefficients are multiplied by 1000.

Table 7: Estimation results with institutional variables - imports

	OLS	FE	AA	BB
$X_{ij,t-1}$			0.238***	0.335***
GDP_{pc_i}	0.392***	0.657***	1.757***	0.256***
GDP_{pc_j}	0.553***	0.446***	-0.665***	0.342***
distance	-0.096***		-0.001**	-0.061***
EU	0.013***		-0.003***	0.012***
EMU	0.000	0.001	0.000***	0.002
Border	0.058***		-0.001	0.032***
Bus_i	0.341***	0.079	0.108	0.117
Bus_j	-0.093	-0.202***	-0.182**	-0.115
$Trade_i$	0.736***	0.118***	0.109**	0.255***
$Trade_j$	0.414***	-0.179***	-0.156***	0.163***
$Fiscal_i$	0.367***	0.175**	0.236**	0.294***
$Fiscal_j$	-0.414***	-0.140*	-0.415***	-0.124
Gov_i	0.316***	-0.130***	-0.216***	0.153***
Gov_j	1.345***	-0.143***	0.071	0.610***
Mon_i	-0.349***	-0.029	-0.119**	-0.229***
Mon_j	-0.806***	0.120***	-0.135**	-0.365***
Inv_i	-0.009	-0.088*	-0.095	0.072
Inv_j	0.904***	0.108**	0.091	0.484***
Fin_i	-0.116***	0.253***	-0.016	-0.102***
Fin_j	-0.190***	-0.277***	-0.053	-0.203***
PR_i	0.257***	0.038	0.135	0.208***
PR_j	-0.031	0.074	-0.038	0.180**
Cor_i	0.003	-0.195***	-0.087*	-0.005
Cor_j	0.854***	0.148***	0.017	0.355***
Sargan			0.000	
Hansen				0.000
Autocorr.			0.000	0.000
N	113,434	113,434	78,706	94,589

Notes: Regressand: log imports. Intercept, further dummies from equation (1) and time dummies included but not reported. ***, **, and *, indicate significance at 1%, 5%, and 10%, respectively. OLS = pooled OLS, FE = fixed effects, AB = Arellano Bond, BB = Blundell Bond. Institutional coefficients are multiplied by 1000.

Table 8: Trade potential between the EU-15 and the AC-12 by institutional factor

	Business Freedom	Trade Freedom	Fiscal Freedom	Government Size	Monetary Freedom	Investment Freedom	Financial Freedom	Property Rights	Freedom from Corruption	Sum
Exports	0.003	-	0.003	0.348	0.005	-	0.299	0.245	0.018	0.920
Imports	0.036	-	0.402	0.394	0.112	0.250	0.499	-	0.815	2.508

Table 1: The trade potential between the EU-15 and the AC-12 by country pairs

	Exports												Sum
	Bulgaria	Cyprus	Czech Republic	Estonia	Hungary	Latvia	Lithuania	Malta	Poland	Romania	Slovakia	Slovenia	
Austria	0.006	0.003	0.002	0.004	0.002	0.005	0.006	0.001	0.004	0.013	0.005	0.009	0.060
Belgium	0.005	0.002	0.002	0.004	0.001	0.005	0.006	0.001	0.004	0.012	0.005	0.009	0.057
Denmark	0.012	0.009	0.004	0.006	0.008	0.011	0.007	0.007	0.010	0.019	0.006	0.015	0.113
Finland	0.006	0.003	0.002	0.004	0.002	0.005	0.006	0.001	0.004	0.013	0.005	0.009	0.060
France	0.006	0.003	0.002	0.004	0.001	0.005	0.006	0.002	0.004	0.008	0.005	0.004	0.051
Germany	0.005	0.002	0.002	0.004	0.001	0.004	0.005	0.000	0.003	0.007	0.004	0.003	0.040
Greece	0.004	0.005	0.002	0.006	0.001	0.003	0.005	0.005	0.002	0.006	0.003	0.005	0.048
Ireland	0.008	0.005	0.001	0.001	0.006	0.007	0.002	0.006	0.007	0.014	0.002	0.013	0.074
Italy	0.003	0.003	0.001	0.004	0.000	0.002	0.004	0.003	0.001	0.005	0.002	0.003	0.031
Luxembourg	0.009	0.006	0.001	0.003	0.006	0.009	0.005	0.005	0.007	0.016	0.004	0.013	0.084
Netherlands, The	0.009	0.007	0.002	0.004	0.006	0.010	0.006	0.006	0.008	0.017	0.004	0.014	0.093
Portugal	0.004	0.002	0.001	0.003	0.000	0.003	0.005	0.001	0.002	0.006	0.003	0.003	0.032
Spain	0.003	0.000	0.000	0.001	0.000	0.001	0.003	0.000	0.001	0.009	0.001	0.006	0.026
Sweden	0.007	0.003	0.003	0.005	0.002	0.006	0.007	0.002	0.005	0.014	0.006	0.010	0.071
United Kingdom	0.008	0.006	0.001	0.003	0.006	0.008	0.005	0.005	0.007	0.016	0.003	0.012	0.080
EU	0.007	0.009	0.001	0.003	0.001	0.004	0.005	0.001	0.003	0.012	0.004	0.008	0.057

	Imports												Sum
	Bulgaria	Cyprus	Czech Republic	Estonia	Hungary	Latvia	Lithuania	Malta	Poland	Romania	Slovakia	Slovenia	
Austria	0.013	0.010	0.015	0.017	0.009	0.016	0.020	0.007	0.014	0.021	0.020	0.008	0.170
Belgium	0.014	0.011	0.016	0.015	0.009	0.014	0.020	0.008	0.014	0.022	0.020	0.008	0.173
Denmark	0.018	0.015	0.014	0.015	0.013	0.018	0.018	0.012	0.018	0.026	0.019	0.012	0.198
Finland	0.015	0.012	0.016	0.018	0.010	0.015	0.020	0.008	0.015	0.022	0.021	0.009	0.182
France	0.018	0.015	0.020	0.021	0.014	0.019	0.024	0.010	0.017	0.018	0.025	0.007	0.209
Germany	0.019	0.016	0.021	0.020	0.015	0.019	0.024	0.013	0.019	0.021	0.025	0.008	0.220
Greece	0.011	0.011	0.014	0.019	0.008	0.015	0.021	0.007	0.010	0.012	0.018	0.003	0.148
Ireland	0.009	0.006	0.007	0.003	0.007	0.009	0.007	0.005	0.011	0.015	0.010	0.005	0.095
Italy	0.012	0.011	0.014	0.019	0.008	0.016	0.021	0.009	0.013	0.015	0.019	0.003	0.160
Luxembourg	0.013	0.010	0.009	0.008	0.009	0.013	0.013	0.007	0.013	0.020	0.014	0.007	0.134
Netherlands, The	0.018	0.015	0.012	0.011	0.011	0.016	0.016	0.009	0.016	0.023	0.017	0.010	0.174
Portugal	0.009	0.006	0.015	0.018	0.009	0.017	0.022	0.008	0.014	0.016	0.020	0.002	0.157
Spain	0.011	0.008	0.011	0.012	0.006	0.010	0.015	0.008	0.009	0.015	0.014	0.003	0.118
Sweden	0.019	0.016	0.022	0.021	0.015	0.020	0.025	0.014	0.020	0.028	0.026	0.014	0.240
United Kingdom	0.011	0.008	0.009	0.007	0.010	0.012	0.012	0.007	0.013	0.020	0.013	0.007	0.130
EU	0.026	0.025	0.014	0.014	0.008	0.013	0.018	0.006	0.012	0.020	0.018	0.006	0.179

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