Trade, Trust and Institutions

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Abstract

To investigate the relation between trust and formal institutions, we analyze bilateral trade patterns in a sample of 16 European countries between 1996-2009. Trust in trading partners has a significant positive effect on bilateral trade. However, our results suggest that trust and formal institutions are substitutes, as the positive effect of trust on trade is conditional on the quality of formal institutions. When the institutional quality of the importing country increases, the effect of trust on trade decreases, and eventually becomes insignificant. The decline in the effect of trust on trade is less when the exporting country's institutional quality improves.

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1. Introduction

Several authors have pointed to the importance of institutions, often making a distinction between formal and informal institutions (North 1990; Hall and Jones 1999; Acemoglu, Johnson and Robinson 2001; 2002; Kerekes and Williamson 2008). North (1994) and Williamson (2000) classify trust as an informal institution and the judicial system as a formal institution. Historical evidence suggests that both trust and formal institutions are important for the process of economic development (Greif 1994; 2006; Boettke, Coyne and Leeson 2008). Trust, which is based on deeply rooted cultural traditions (Fukuyama 1995; Putnam, Leonardi and Nanetti 1993; Tabellini 2008a), is defined as the willingness to permit others' actions to influence one's welfare (Sobel 2002). More precisely, an agent is willing to take a risk on the actions of others based on the belief that potential trustees will "do what is right" (Hoffman 2002).

Since contracts are usually incomplete, a trader has an incentive to expropriate the rights of another trader. To prevent opportunistic behaviour, such as hold-up, traders have to divert resources to monitoring and contract enforcement activities. Costs induced by these activities will shy away potential traders (Anderson 1999). Trust may mitigate these transaction costs and thereby affect economic outcomes. Studies have linked trust to economic growth (Knack and Keefer 1997; Zak and Knack 2001; Beugelsdijk, de Groot and van Schaik 2004, Francois and Zabojnik 2005), the amount of trade (Guiso, Sapienza and Zingales 2009), government regulation and functioning (Aghion, Algan, Cahuc and Shleifer 2010; Fine, 2001; Putnam, Leonardi and Nanetti 1993) and size of the welfare state (Bjornskov and Bergh 2011).[1]

One recurring discussion concerns the nature of the relation between trust and formal institutions (Tabellini 2008a; 2008b). Trust and formal institutions are considered to be two different transaction cost reducing channels and as such serve as substitutes. Anderson and Young (2006) argue that country differences in contract enforcement, i.e. formal institutions, create uncertainty concerning the expected payoff from a trade transaction. Although institutions like the International Court of Arbitration are supposed to alleviate this type of disputes, the ultimate enforcement power resides with national courts. Since traders cannot foresee when and where economic disputes will happen, they face uncertainty as to which national court will enforce the contract. When heterogeneity in judicial quality creates uncertainty, informal channels, such as trust, may then have a significant effect on trade. Alternatively, when formal

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[1] See Beugelsdijk and Maseland (2011) for an overview.

institutions function properly, the trust channel is arguably less important. It is against this background that we explore the nature of the relationship between trust and formal institutions. We do so in the context of bilateral trade, because that allows us to relate trust that one group has in another group to the intensity of market transactions between both groups while controlling for the quality of institutions in both groups.

In relating formal institutions and trust to trade, existing studies have either focused on formal institutions or on trust, but the interplay between trust and formal institutions has not been explicitly considered so far. Most studies have focused on the role of formal institutions. De Groot, Linders, Rietveld and Subramanian (2004) and Berkowitz, Moenius and Pistor (2006) show that countries with a higher quality of formal institutions trade more. Anderson and Marcouiller (2002) report that inadequate formal institutions constrain trade as much as tariffs do. By classifying traded goods into differentiated and non-differentiated goods, Ranjan and Lee (2004) verify the effect of contract enforcement on the volume of trade in both types of goods showing that the impact is larger for differentiated goods. Recent literature examines whether institutional quality determines a country's comparative advantage. In particular, Levchenko (2007) demonstrates that countries with better institutions specialize in goods that are institutionally dependent. Nunn (2007) reports that countries with good contract enforcement specialize in the production of goods for which relationship-specific investments are most important. Studies investigating how trust affects trade are less common. Guiso, Sapienza and Zingales (2009) show that pairs of European countries with high mutual trust trade more than country pairs with low mutual trust. Others test the relationship between trust and trade indirectly, such as Rauch (2001) and Rauch and Trinade (2002), who find that co-ethnic business networks (characterized by high trust levels) reduce the information costs needed for trading more differentiated goods.

To investigate the relation between trust and formal institutions, we analyze bilateral trade patterns in a sample of 16 European countries over the period 1996-2009. Following Guiso, Sapienza and Zingales (2009), we use a historically determined measure of trust based on a series of Eurobarometer surveys between 1970 and 1996. The quality of formal institutions is proxied using indicators provided by the World Bank. In an otherwise standard gravity equation, we show that trust in the trading partners has a significant positive effect on bilateral trade, a finding in line with Guiso, Sapienza and Zingales (2009). Moreover, and that is new, our results

suggest that this positive trust effect is conditional on the quality of formal institutions. When the institutional quality of the importing country increases, leading to a smaller difference in formal institutions between the trading countries, the positive effect of trust on trade decreases, and eventually becomes insignificant. Simply put, country A will import more from country B when the people living in A trust the people living in B more (and vice versa), but the role of trust becomes smaller when controlling for institutional quality of country A and B. This effect is however asymmetric for importing and exporting countries' institutional quality, because the decline in the effect of trust on trade is less when the exporting country's institutional quality improves. In other words, when country A imports from exporting country B, the trust reducing effect in case of formal institutional improvements is larger for the trust that the exporting country B has in country A than for the trust that country A has in country B.

Our most fundamental contribution is that we show that trust and formal institutions interact in such a way that they can be considered substitutes, and that this substitution effect is asymmetric for the trading partners. Our results imply that by improving the quality of institutions countries can offset the negative lack-of-trust effect on trade. Trust matters, but well-functioning institutions matter even more. This suggests that there is room for policy, and trade policy in specific. Whereas recent literature on the role of culture in economics, including the literature on trust, seems to suggest that countries are locked in to long run positions related to their (un)favourable cultural endowments, our study shows this is not necessarily true in the context of trade.

The remainder of our paper is structured as follows. Section 2 describes our data and empirical strategy. The results of our main analysis and of our robustness analyses are presented in Sections 3 and 4, respectively. Finally, Section 5 concludes and provides a discussion of the theoretical and empirical implications of our findings.

2. Data and Sample

To test whether the effect of culture-rooted bilateral trust on trade is conditional on institutional quality, our empirical strategy consists of two steps. First, we deduct the time dimension of a series of social surveys conducted discontinuously between 1970 and 1996. This approach results in a proxy for trust that captures its time-invariant part. Then, this proxy will be used to

examine the effect of bilateral trust on trade after 1995. Since the proxy for trust is generated before the sample period used to estimate a gravity model, we make sure the causality runs from trust to trade and the trust proxy does not capture institutional well-functioning. The use of this time invariant trust variable in the second stage is validated by the fact that trust is largely determined by historical factors, which means its time-invariant part will not alter after the survey period.

2.1 Time invariant trust

Trust does not change easily (Guiso, Sapeinza and Zingales, 2008). The measure of bilateral trust used in this study is obtained from a subsample of surveys conducted by Eurobarometer in various years and countries. The first survey was conducted in 1970 in only five countries while the last survey in 1996 included 17 countries. A detailed description of the selected subsample is reported in Table 1. In view of data availability and the degree of homogeneity in trading rules and income levels, we restrict the analysis to 16 European countries.[2] The weighted average of Great Britain and Northern Ireland is used as score for the UK.

Insert Table 1 about here

In each country, about 1,000 representative individuals were asked the following: "I would like to ask you a question about how much trust you have in people from various countries. For each, please tell me whether you have a lot of trust, some trust, not very much trust, or no trust at all." According to Guiso, Sapienza and Zingales (2004), this type of question measures generalized trust, which shows how much trust people have towards a random member of an identifiable group. Guiso, Sapienza and Zingales (2009) show that the Eurobarometer survey question indeed reports the subjective probability that a random person is trustworthy. It differs from personalized trust that people develop through repeated interactions (Greif, 1993; Beugelsdijk and Maseland, 2011). Since this study focuses on international trade, it is more suitable to use generalized trust.

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[2] France, Belgium, The Netherlands, Germany, Italy, Denmark, Ireland, Great Britain, Northern Ireland, Greece, Spain, Portugal, Norway, Sweden, Finland, and Austria.

Answers to the above trust question are recoded to 1 (no trust at all), 2 (not very much trust), 3 (some trust) and 4 (a lot of trust). Then, they are matched by pairs of countries for each year. Since countries differ in their years of participation and the survey methods varied over time, there are potential measurement errors that can lead to biased results. Thus, we follow Guiso, Sapienza and Zingales (2009) and collapse the dataset by averaging the residuals of the regression of $Trust_{ijt}$ on calendar-year dummies t. Then, the generated averaged residuals, $Trust_{ij}$, will be used to show the trust a representative individual from country i has towards a randomly selected individual from country j. Cases are dropped when i is equal to j. The value of $Trust_{ij}$ is reported in Table 2.

Insert Table 2 about here

As the data in Table 2 show, systematic differences exist regarding the extent to which inhabitants from a country trust inhabitants from other countries, and the extent to which inhabitants of a country are trusted. People from Scandinavian countries and the Netherlands have more trust in people from other countries. This may suggest that people excessively apply the level of trustworthiness of their own countrymen to people from other countries, which is consistent with the experimental evidence provided by Sapienza, Toldra and Zingales (2007). Meanwhile, on average, people in southern Europe are less trusted by inhabitants from other European countries. Swedes receive most time-invariant trust from people in other countries in the sample, while Portuguese receive the least trust from people in other countries.

In order to test whether our trust variable is time-invariant, we relate trust to an array of historical variables. The Appendix shows the results. Our findings are in line with the conclusion of Guiso, Sapienza and Zingales (2009), i.e. our bilateral trust variable is largely determined by fixed historical factors. Following Guiso, Sapienza and Zingales (2009), we use this generated proxy for trust in our analysis of trade flows.

2.2 Trade data and the gravity model

The data on commodity trade are obtained from UN Comtrade for the period from 1996 to 2009.[3] The advantage of this dataset is that it provides bilateral trade statistics among the 16 countries included in this study. Primacy was given to the commodity trade flows reported by the importing country, as that these are more accurate than those from exporting countries (Feenstra, Lipsey, Deng, Ma and Mo 2005). Since the focus of this study is on the aggregate trade flow between countries, we chose the total trade volume between countries in thousands of US dollars.

Since we are interested in the transaction cost reducing effect of formal institutions, we measure institutional quality by the effectiveness of property rights protection and contract enforcement. As our primary measure of institutional quality, we use the "rule of law" indicator from Kaufmann, Kraay and Mastruzzi (2009), which captures perceptions of individuals on the effectiveness and predictability of the judiciary and the enforcement of contracts. One advantage of this measure is that it reflects the effectiveness of judicial system (*de facto judicial quality*), which differs from *de jure* judicial quality. Another advantage is that both "rule of law" and bilateral trust measure perception of agents. Kaufmann, Kraay and Mastruzzi (2009) provide data for 1996, 1998, 2000 and sequential years afterwards. In order to test the sensitivity of the results to the use of alternative measures of judicial quality, we also use the "legal structure and security of property rights" from Gwartney and Lawson (2009) in Section 5 as a robustness check.

The gravity model used here is developed from Anderson and van Wincoop (2003). It is consumption-based and assumes that trade is driven by love of variety instead of resource endowments. We use the following regression model:

$$LnExport_{jit} = \alpha_0 + \alpha_1 GDP_{it} + \alpha_2 GDP_{jt} + \alpha_3 Dis\tan ce_{ij} + \beta_1 Trust_{ij} + \beta_2 IQ_{ijt-1} + \beta_3 Trust_{ij} * IQ_{ijt-1} + \beta_4 X_{ij} + k_i * Year_t + \lambda_j * Year_t + \varepsilon_{ijt} \quad (1)$$

Where *LnExport* $_{jit}$ is the aggregated export of goods (in logarithm) from country *j*, the exporter, to country *i,* the importer, in year *t*. The exporter represents the demand side in the trade context

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[3] Guiso, Sapienza and Zingales (2009) use data from Feenstra, Lipsey, Deng, Ma and Mo (2005), which is no longer available after 2000. Thus, we use UN Comtrade, which is the original source for Feenstra, Lipsey, Deng, Ma and Mo (2005).

while the importer represents the supply side. We include the usual determinants in a gravity model: $GDP_{i(j)t}$, the logarithm of real GDP per capita in country i (j) in Year t, and $Distance_{ij}$ which measures the geographic distance between the importing country i and the exporting country j.

To test our hypotheses, we add $Trust_{ij,}$ which is measured as explained above. Institutional quality is measured as the difference between the institutional quality of country i and country j in year t-1, IQ_{ijt-1}. We also include the interaction between trust and institutional quality, $Trust_{ij}* IQ_{ijt-1}$. Since international trade can influence the development of legal systems (Acemoglu, Johnson and Robinson 2005) as well, we use IQ_{ijt-1} instead of IQ_{ijt} to avoid a potential simultaneity problem.

Finally we control for importing-country fixed effects, k_i, exporting-country fixed effects, λ_j, and year fixed effects, $Year_t$. X_{ij} is a vector of three common determinants in international trade: 1) *Common border*, a dummy for whether country i and country j share borders; 2) *Common language*, a dummy for whether country i and country j share the same official language; and 3) *Common legal origin*, a dummy for whether country i and country j share the same legal origin. The summary statistics of the variables listed above are reported in Table 3.

Insert Table 3 about here

3. Empirical Results

We first estimate a standard gravity model. All model specifications include exporter-by year ($\lambda_j *Year_t$) and importer-by-year ($k_i* Year_t$) fixed effects. The results are shown in Table 4. In model 1, export from country j to country i are regressed upon the levels of their GDP and the geographic distance between them. The results are in line with other studies finding that GDP significantly affects trade while distance has a negative impact on trade.

Insert Table 4 about here

In model 2, we add the proxy for trust ($Trust_{ij}$) from the importer towards the exporter to the gravity model. We find a positive and significant effect of trust on trade, a result in line with Guiso, Sapienza and Zingales (2009). The result implies that assuming other variables the same, an increase of trust by one standard deviation (0.302, i.e. the trust from Swedes to Italians increases to the trust Swedes have in Germans) leads to an increase in trade (i.e. the export from Italy to Sweden) by 26 percent. We tried another proxy for bilateral trust, which is simply the mean of $Trust_{ijt}$ among all the survey years country i participated. The result is robust.

We use IQ_{ijt-1} in model 3 to test whether two trading countries' judicial quality has an impact on trade volumes. Since the gravity model used is consumption-based and is driven by the demand side, IQ_{ijt-1} is the difference between IQ_{it-1} and IQ_{jt-1}. When IQ_{ijt-1} is positive, the importer is superior to the exporter in terms of effectively protecting property rights and enforcing contracts. If it is negative, the exporter has a more effective legal system. As IQ_{ijt-1} gets more positive, the judicial quality of the importer improves in comparison to the exporter. The coefficient for IQ_{ijt-1} is positive and significant at the level of 1 percent. It implies that an improvement in institutional quality has a positive impact on international trade, a result in line with studies showing that formal institutions affect trade. In model 4 we include $Trust_{ij}$ and IQ_{ijt-1} simultaneously. The coefficients for both variables are positive and significant at the 1% level. In model 5 we test the interaction between trust and formal institutions by adding the interactive term $Trust_{ij} *IQ_{ijt-1}$. The coefficients for $Trust_{ij}$ and IQ_{ijt-1} have the same sign and significant level as in the previous models, while the coefficient for $Trust_{ij} *IQ_{ijt-1}$ is negative and significant at the level of 1%.

To get a better understanding of the nature of the relationship between trust and institutional quality, we calculate the marginal effect of trust on trade. The marginal effect of $Trust_{ij}$ on $LnExport_{jit}$ is calculated as follows:

$$\frac{\partial LnExport_{jit}}{\partial Trust_{ij}} = \beta_1 + \beta_3 * IQ_{ijt-1} \tag{2}$$

With the corresponding estimated standard error:

$$\hat{\sigma} = \sqrt{\text{var}(\beta_1) + IQ_{ijt-1}^2 \, \text{var}(\beta_3) + 2*\text{cov}(\beta_1, \beta_3)*IQ_{ijt-1}} \tag{3}$$

We plot the marginal effect in Figure1 with the associated 95% confidence interval.
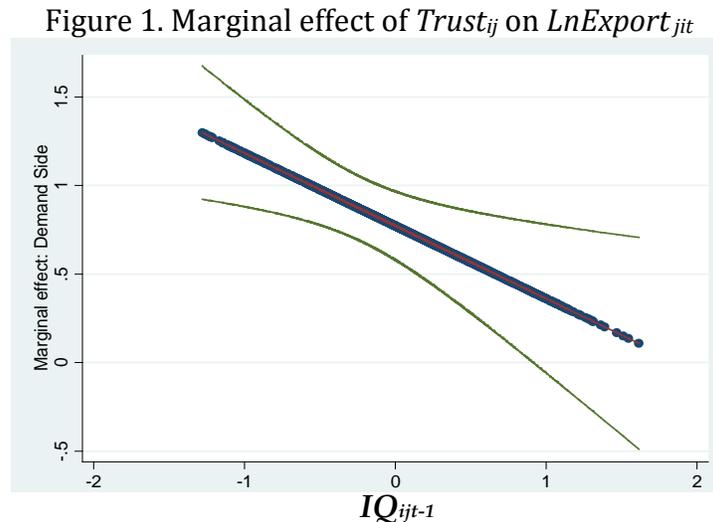
Figure 1. Marginal effect of $Trust_{ij}$ on $LnExport_{jit}$

Note: the figure shows the marginal effect of $Trust_{ij}$ on commodity trade flows for various values of IQ_{ijt-1}. Furthermore, (in green) the 95% confidence interval for the marginal effect is plotted.

The marginal effect has a downward slope, meaning that when IQ_{ijt-1} increases, the effect of trust on trade becomes smaller. More precisely, when the importing country improves the quality of its formal institutions, the extent to which bilateral trust promotes trade is reduced. As the importer improves its judicial system, the positive effect of $Trust_{ij}$ on $LnExport_{jit}$ diminishes. Figure 1 also shows that the marginal effect of trust on trade eventually becomes insignificant when the importer's institutional quality is even better than the exporter's. It means that when the importer has a sufficiently good legal system, bilateral trust no longer matters for trade. With an effective formal institution in place, the impact of informal institution disappears.

So far, we just focus on the trust from the demand side (i.e. from country i to country j). However, the judicial quality of country i, the importer, may matter more for the country j, the exporter. When two countries trade, if the importer has a bad judicial system, the exporter would fear the default of his payment. The uncertainty will shy away potential exporters. Thus, we turn our attention to the trust from the supply side ($Trust_{ji}$, i.e., the trust from country j to country i). The results testing the effect of $Trust_{ji}$ on trade are shown in models 6-8.

We add $Trust_{ji}$ to the gravity model in model 6. The coefficient for $Trust_{ji}$ is positive and significant at the level of 1%. It is smaller than the standardized beta for $Trust_{ij}$. It implies that the trust from the demand side has a stronger impact on trade and is in line with the assumption that trade is demand-driven. Model 7 includes both $Trust_{ji}$ and IQ_{ijt-1}. Similar to model 4, the coefficient for $Trust_{ji}$ and IQ_{ijt-1} are both positive and significant at the level of 1%. In model 8, we add the interactive term $Trust_{ji}*IQ_{ijt-1}$. The coefficients for $Trust_{ji}$ and IQ_{ijt-1} are still positive and significant at the level of 1%, while the coefficient for $Trust_{ji}*IQ_{ijt-1}$ is negative and significant at the level of 1%. Moreover, the standardized beta for $Trust_{ji}*IQ_{ijt-1}$ is lower than the beta for $Trust_{ij}*IQ_{ijt-1}$.

Figure 2 plots the marginal effect of $Trust_{ji}$ on trade, together with the 95% confidence interval. Figure 2 closely resembles Figure 1. Again, the marginal effect has a downward slope, meaning that as the institutional quality of the importer improves, the effect of trust on trade gets smaller.

Figure 2. Marginal effect of $Trust_{ji}$ on $LnExport_{jit}$
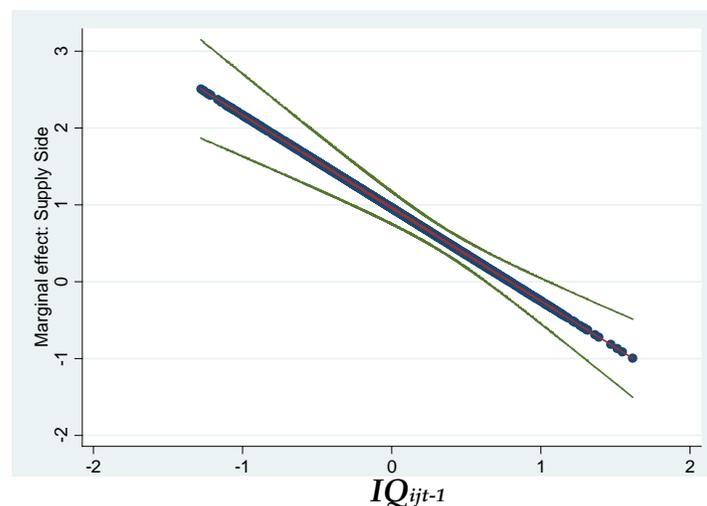
Note: the figure shows the marginal effect of $Trust_{ij}$ on commodity trade flows for various values of Q_{ijt-1}. Furthermore, (in green) the 95% confidence interval for the marginal effect is plotted.

By plotting the two slopes of Figure 1 and Figure 2 together in Figure 3, we can clearly see that the slope of the marginal effect of $Trust_{ji}$ on $LnExport_{jit}$ is much steeper than the slope of the marginal effect of $Trust_{ij}$ on $LnExport_{jit}$. As the importer improves its judicial system, the positive effect of (supply side) $Trust_{ji}$ on $LnExport_{jit}$ diminishes faster than the effect of (demand

side) $Trust_{ji}$ on $LnExport_{jit}$. The intuition is clear: if the importer has a bad judicial system, the exporter would fear the default of his payment, and an improvement in the institutional quality of the importer will reduce the required trust of the exporter in the importer more than vice versa. In both cases, the confidence interval drops below zero at some point suggesting that the effect of trust on trade turns insignificant for high levels of institutional quality.

Figure 3. Marginal effect of $Trust_{ji}$ (Blue)/ $Trust_{ij}$ (Red) on $LnExport_{jit}$

IQ_{ijt-1}
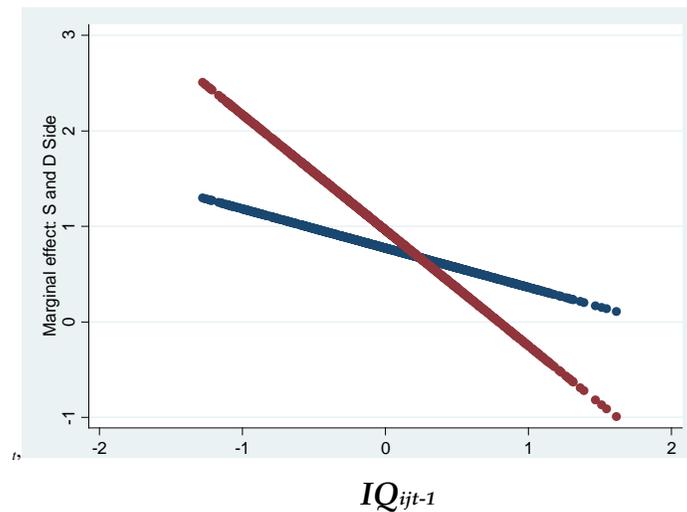
Note: The blue line is the marginal effect of $Trust_{ij}$ on $LnExport_{jit}$, and the red line is the marginal effect of $Trust_{ij}$ on $LnExport_{ji}$

4. Robustness checks

We test the robustness of our main results along several dimensions. First, we include a set of additional control variables (i.e. *Common border, Common Language, Common legal origin)*. Second, instead of using the lagged institutional quality measure, we use current values. Third, we split our sample into two time periods, one before the launch of the Euro, and one after. Finally we use an alternative measure of institutional quality. The estimation results are summarized in Table 5. The main results (i.e. model 5 and 8 in Table 4) are included as well to facilitate comparison.

Insert Table 5 about here

In each panel, we start with the model specification of model 5 in Table 4 (column 1), and then the model specification of model 8 in Table 4 (column 2). Additional controls are added to the lower row of each panel. For brevity, only the coefficients and standard errors for $Trust_{ij}$ ($Trust_{ji}$), IQ_{ijt-1} and their interactive terms are reported.

Main models with additional controls

The first row of Panel A reports the main results of model 5 and 8 in Table 4 in column 1 and 2. In the second row, three additional controls (i.e. *Common border, Common Language, Common legal origin)* are added to the models in the first row. Since these variables are also determinants for $Trust_{ij}$ (Guiso, Sapienza and Zingales 2009), adding these controls rules out that the effect of trust on trade is merely due to its connection with these three variables. The coefficients for the three controls are both positive and significant at the level of 1 percent. It shows support for the existing literature suggesting that similar institutions and familiarity promote trade (De Groot, Linders, Rietveld and Subramanian 2004).

Moreover, the coefficients for $Trust_{ij}$ and IQ_{ijt-1} have the same sign and significant level as in model 5. The coefficient for $Trust_{ij}*IQ_{ijt-1}$ is still negative and significant at the level of 10 percent. When concerning the demand side, the coefficients for $Trust_{ji}$, IQ_{ijt-1} and their interactive term, $Trust_{ji}*IQ_{ijt-1}$, have the same signs and significance level as in model 8. Thus, our main findings are not driven by the fact that some trading partners share common language, common border or common legal origin.

Current values of institutional quality

In the main results, we used the lagged value of IQ_{ijt} instead of its current value to test how the difference in institutional quality influences the marginal effect of trust on trade. In Panel B, for the whole sample period, we investigate whether our main results are sensitive to the use of IQ_{ijt} instead of IQ_{ijt-1}. Comparing Panel B with Panel A suggests that the results are quite robust. The coefficients for $Trust_{ij}$ and $Trust_{ji}$ are significantly positive, with and without additional controls. One of our key findings that the standardized beta for $Trust_{ji}*IQ_{ijt-1}$ is significantly below zero is also supported. Although $Trust_{ij}*IQ_{ijt-1}$ still has a negative coefficient, it is not significant from

zero. The reason may be that trade and institutional quality interact with each other. The endogeneity problem leads to a biased estimate.

Results for the period 1996-2000

In Table 4, we assumed the launch of the Euro currency does not influence how trust and institutional quality affect trade. However, this might not be true. Thus, we separate the whole sample into two periods: the period before 2001 (1996-2000) and the period afterwards (2001-2009). Then, we redo the regressions separately for each period.

Estimating models in the first period with IQ_{ijt-1} from Kaufmann, Kraay and Mastruzzi (2009) leaves us with observations for 1997 and 1999 only. Still, the coefficients for $Trust_{ij}$ and $Trust_{ji}$ are still significant and positive with and without additional controls. However, while $Trust_{ji}*IQ_{ijt-1}$ still has a strongly negative and significant coefficient, the coefficient for $Trust_{ij}*IQ_{ijt-1}$ is negative but insignificant. Although data is only available for two years before the launch of the Euro, the results from Panel C suggest that our main results as reported in Table 4 are robust.

Results for the period 2001-2009

The results for the period from 2001 to 2009 show that the coefficients for $Trust_{ij}$, IQ_{ijt-1} and $Trust_{ji}$ are significant both with and without additional controls. Meanwhile, the coefficients for the interactive terms ($Trust_{ji}*IQ_{ijt-1}$ and $Trust_{ii}*IQ_{ijt-1}$) are both negative and significant. More importantly, the coefficient of $Trust_{ji}*IQ_{ijt-1}$ is much lower than that of $Trust_{ji}*IQ_{ijt-1}$. The results confirm the main results as reported in Table 4.

Alternative indicator of institutional quality

The alternative measure of judicial quality, "legal structure and security of property rights", is developed by Gwartney and Lawson (2009). It is constructed by using multiple other studies, including Global Competitiveness Reports, International Country Risk Guide, and World Bank's Doing Business surveys. It covers several dimensions, such as judicial independence, impartial court and legal enforcement of contracts. It is available every 5 years for the period from 1970 to 1995. From 2000 onwards, the proxy is reported for each sequential year. Thus, we can only use

it for the second period, 2001-2009. For this period, the two proxies for judicial quality, Kaufmann, Kraay and Mastruzzi (2009) and Gwartney and Lawson (2009), have a correlation of 90.81 percent. The estimation results in Panel E are largely in line with the results in Panel D. Again, both $Trust_{ji}$ and $Trust_{ji}$ have a positive coefficient that is significant at 1 percent level, with or without additional controls. While the interactive term, $Trust_{ji}*IQ_{ijt-1}$, has a negative coefficient that is significant at the level of 1 percent, the coefficient for $Trust_{ij}*Q_{ijt-1}$ is not significantly different from zero. In general, our main findings do not change if we use this alternative proxy for institutional quality.

5. Conclusions

How does institutional quality influence the effect of trust on trade? This study does not only find that both institutions and trust matter for trade, but also suggests that the effect of trust on trade depends on whether the importing country's judicial quality is sufficiently good for the exporting country. When the importing country does not have good legal institutions, there is uncertainty concerning potential expropriation and defaults. This kind of uncertainty makes traders rely on informal institutions, such as trust (Williamson 2000), to assess future payoffs. Trust will make people believe that traders from another country will take beneficial actions (Child 2001). When the importing country improves its formal institutions, traders rely less on trust. Moreover, our results suggest that exporters shift their reliance on trust to the judicial system faster than importers. The reason is not hard to understand. When the importing country has a malfunctioning judicial system, the exporter is the expropriation target.

Our results are robust to the use of different proxies and different sample periods. Thus, our finding generally suggests that formal institutions and informal institutions are substitutes in the setting of international trade. Under the absence of formal institutions, traders base their decisions on informal institutions. When well-functioning institutions are in place, the effect of informal institutions disappears. Our findings complement those of Ahlerup, Olsson and Yanagizawa (2009), who show that the effect of trust on economic growth is conditional in the quality of institutions.

Our study also has important policy implication. Whereas recent literature on the role of culture in economics, including the literature on trust, seems to suggest that countries are locked in to long run positions related to their cultural endowments, our study shows this is not

necessarily true in the context of trade. While Guiso, Sapienza and Zingales (2009) show the disadvantage in trade for countries that receive little trust, our findings imply that countries can eliminate this disadvantage by improving the quality of their formal institutions.

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Table 1. List of Surveys from Eurobarometer

No.	Country Sampled	Number of years present in Survey	Years Present
1	Austria	1	1996
2	Belgium	8	1970, 1976, 1980, 1986, 1990, 1993, 1994, 1996
3	Denmark	7	1976, 1980, 1986, 1990, 1993, 1994, 1996
4	Finland	2	1993, 1996
5	France	8	1970, 1976, 1980, 1986, 1990, 1993, 1994, 1996
6	Greece	6	1980, 1986, 1990, 1993, 1994, 1996
7	Ireland	7	1976, 1980, 1986, 1990, 1993, 1994, 1996
8	Italy	8	1970, 1976, 1980, 1986, 1990, 1993, 1994, 1996
9	Netherlands	8	1970, 1976, 1980, 1986, 1990, 1993, 1994, 1996
10	Norway	1	1993
11	Portugal	5	1986, 1990, 1993, 1994, 1996
12	Spain	5	1986, 1990, 1993, 1994, 1996
13	Sweden	1	1996
14	Great Britain	7	1976, 1980, 1986, 1990, 1993, 1994, 1996
15	Northern Ireland	7	1976, 1980, 1986, 1990, 1993, 1994, 1996
16	(West)Germany	8	1970, 1976, 1980, 1986, 1990, 1993, 1994, 1996

Source: http://www.gesis.org/dienstleistungen/daten/umfragedaten/eurobarometer-data-service/

Table 2. Matrix for time invariant trust

Country i	Aus	Bel	Den	Fin	Fra	Gre	Ire	Ita	Net	Nor	Por	Spa	Swe	UK	Ger	Average
Austria		0.145	0.147	0.138	-0.178	-0.282	-0.25	-0.37	0.149	0.201	-0.305	-0.218	0.249	-0.212	0.29	-0.035
Belgium	0.033		0.219	0.116	0.165	-0.343	-0.041	-0.352	0.13	0.112	-0.26	-0.203	0.191	0.087	-0.005	-0.011
Denmark	0.416	0.397		0.399	0.074	-0.179	0.232	-0.254	0.54	0.702	-0.115	-0.13	0.607	0.43	0.309	0.245
Finland	0.49	0.273	0.498		0.114	-0.124	0.124	-0.293	0.341	0.682	-0.128	-0.196	0.548	0.38	0.09	0.2
France	-0.097	0.284	0.177	0.111		-0.257	-0.067	-0.325	0.156	0.171	-0.195	-0.111	0.192	-0.214	-0.009	-0.013
Greece	-0.478	-0.186	-0.225	-0.381	-0.012		-0.243	-0.453	-0.235	-0.4	-0.189	-0.074	-0.291	-0.449	-0.495	-0.294
Ireland	0.128	0.142	0.202	0.115	0.02	-0.287		-0.137	0.214	0.127	-0.136	-0.147	0.119	0.017	-0.034	0.025
Italy	-0.137	-0.149	-0.085	-0.016	-0.094	-0.388	-0.415		-0.018	-0.021	-0.463	-0.15	0.085	-0.243	-0.151	-0.16
Netherlands	0.101	0.396	0.506	0.449	-0.031	-0.202	0.009	-0.401		0.502	-0.051	-0.146	0.538	0.24	0.081	0.142
Norway		0.36	0.714		0.117	-0.293	0.19	-0.17	0.448		-0.22	-0.253		0.452	0.178	0.139
Portugal	-0.672	-0.136	-0.139	-0.621	0.106	-0.388	-0.29	-0.249	-0.1	-0.581		-0.21	-0.558	-0.133	-0.265	-0.303
Spain	-0.149	-0.071	-0.068	-0.092	-0.427	-0.334	-0.231	-0.195	0.047	-0.006	-0.291		0.035	-0.504	-0.142	-0.173
Sweden	0.727	0.434	0.768	0.691	0.239	0.075	0.46	0.01	0.534	0.85	0.166	0.056		0.632	0.329	0.426
UK	0.08	0.108	0.312	0.147	-0.427	-0.261	-0.118	-0.288	0.339	0.228	-0.073	-0.323	0.198		-0.222	-0.022
Germany	0.184	0.049	0.188	0.046	0.091	-0.276	-0.196	-0.393	0.128	0.123	-0.31	-0.132	0.194	-0.069		-0.027
Average	0.048	0.146	0.23	0.085	-0.017	-0.253	-0.06	-0.276	0.191	0.192	-0.184	-0.16	0.162	0.029	-0.003	0.007

Table 3. Summary statistics

Variable	Description	Obs	Mean	S. D.	Min	Max	Source
$LnExport_{jit}$	Log of export (in thousands of USD) from country j to country i in year t	2828	14.839	1.608	10.015	18.552	UN comtrade
$Distance_{ij}$	Log of distance in kilometers between the major cities (mainly, capital cities) of the respective countries.	2828	7.081	0.642	5.153	8.121	Jon Haveman's website: http://www.macalester.edu/research/economics/
$GDP_{i(j)t}$	The natural logarithm of GDP per capita of country i(j) in year t	2520	10.164	0.237	9.528	10.896	PWT 6.3
$Trust_{ij}$	The averaged residuals of regressing the mean of answers to the trust question from country j to country i in survey year t on calendar-year dummies t	2787	0.010	0.302	-0.672	0.850	Eurobarometer
IQ_{ijt} [1]	The difference between the institutional quality of country i and country j in year t (IQ_{it}-IQ_{jt}), where $IQ_{i(j)t}$ is the *de facto* judicial quality of $i(j)$ in year t	2100	0	0.593	-1.659	1.659	Kaufmann, Kraay and Mastruzzi (2009)
IQ_{ijt} [2]	The difference between the institutional quality of country i and country j in year t (IQ_{it}-IQ_{jt}), where $IQ_{i(j)t}$ is the *de facto* judicial quality of $i(j)$ in year t	1680	0	1.532	-3.900	3.901	Gwartney and Lawson (2009)
Common language	A dummy for whether country i and country j share the same official language	2828	0.028	0.165	0	1	Jon Haveman's website
Common border	A dummy for whether country i and country j share borders	2828	0.148	0.355	0	1	Jon Haveman's website
Common legal origin	A dummy for whether country i and country j share the same legal origin	2828	0.275	0.447	0	1	Djankov, McLiesh and Shleifer (2007)

Table 4. Main Results

$LnExport_{jit}$	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
$Distance_{ij}$	-0.960***	-0.843***	-0.942***	-0.833***	-0.837***	-0.879***	-0.861***	-0.838***
	0.0231	0.0234	0.0366	0.0357	0.0356	0.0250	0.0387	0.0397
GDP_{it}	-115.1***	-104.3***	-0.706**	-1.296***	-3.005***	-93.00***	-1.583***	-1.804**
	31.17	29.10	0.356	0.438	0.333	29.87	0.470	0.716
GDP_{jt}	38.47***	104.3***	1.333***	1.513***	3.057***	24.84***	2.006***	2.050***
	10.22	29.10	0.287	0.480	0.420	7.804	0.450	0.550
$Trust_{ij}$		0.859***		0.876***	0.772***			
		0.0653		0.0904	0.0987			
IQ_{ijt-1}			1.256***	1.521***	1.690***		1.516***	1.477***
			0.144	0.161	0.174		0.153	0.296
$Trust_{ij*}IQ_{ijt-1}$					-0.411***			
					0.158			
$Trust_{ji}$						0.640***	0.701***	0.961***
						0.0663	0.0975	0.107
$Trust_{ji*}IQ_{ijt-1}$								-1.210***
								0.194
Exporting-country fixed effects*Years	YES	YES	YES	YES	YES	YES	YES	YES
Importing-country fixed effects*Years	YES	YES	YES	YES	YES	YES	YES	YES
Observations	2520	2484	1260	1251	1251	2484	1241	1241
R-squared	0.931	0.937	0.930	0.937	0.937	0.937	0.936	0.939

Robust standard errors in the second row while p < 0.1* p < 0.05** p < 0.01***. All regressions include Exporting-country fixed effects*Years (dummies) and Importing-country fixed effects*Years (dummies),since the F-tests for those fixed effects suggest they are jointly significant at 1 percent.

Table 5. Robustness Checks

	Column (1)			Column (2)		
	IQ_{ijt-1}	$Trust_{ij}$	$Trust_{ij*}IQ_{ijt-1}$	IQ_{ijt-1}	$Trust_{ji}$	$Trust_{ji*}IQ_{ijt-1}$
Panel A: Main Model						
Without Control Variables	1.69 (0.17)***	0.77 (0.10)***	-0.41 (0.16)***	1.48 (0.30)***	0.96 (0.11)***	-1.21 (0.19)***
With Control Variables	0.29 (0.08)***	1.39 (0.14)***	-0.25 (0.13)*	1.43 (0.30)***	0.42 (0.09)***	-1.12 (0.17)***
Panel B: Q_{iit}(Kaufmann et al., 2009)						
Without Control Variables	36.44 (10.10)***	0.84 (0.08)***	-0.10 (0.12)	30.30 (10.33)***	0.81 (0.08)***	-0.70 (0.13)***
With Control Variables	46.09 (10.16)***	0.45 (0.06)***	-0.01 (0.10)	2.94 (1.09)***	0.39 (0.07)***	-0.84 (0.11)***
Panel C: Q_{iit-1} (Kaufmann et al., 2009), 96-00						
Without Control Variables	-0.13 (0.17)	0.86 (0.17)***	-0.20 (0.28)	-1.49 (0.18)***	0.78 (0.18)***	-1.02 (0.30)***
With Control Variables	-0.39 (0.18)**	0.47 (0.14)***	-0.10 (0.25)	-1.69 (0.18)***	0.34 (0.15)**	-1.17 (0.26)***
Panel D: Q_{iit-1}(Kaufmann et al., 2009), 01-09						
Without Control Variables	-0.83 (0.18)***	0.72 (0.12)***	-0.52 (0.19)***	1.47 (0.29)***	1.06 (0.13)***	-1.32 (0.25)***
With Control Variables	1.49 (0.29)***	0.19 (0.09)**	-0.33 (0.15)**	1.42 (0.31)***	0.45 (0.12)***	-1.08 (0.22)***
Panel E: Q_{iit-1} (G & L, 2009), 01-09						
Without Control Variables	-0.31 (0.28)	0.84 (0.09)***	-0.19 (0.47)	-0.18 (0.28)	0.81 (0.09)***	-0.26 (0.05)***
With Control Variables	-0.26 (0.26)	0.44 (0.07)***	0.02 (0.04)	-0.20 (0.25)	0.37 (0.07)***	-0.30 (0.04)***

Robust standard errors in the second row while $p < 0.1$* $p < 0.05$** $p < 0.01$***. All regressions include Exporting-country fixed effects*Years (dummies) and Importing-country fixed effects*Years (dummies),since the F-tests for those fixed effects suggest they are jointly significant at 1 percent.

Appendix. Determinants of Trust

To prove that trust is largely cultural-rooted and time invariant, we follow Guiso, Sapienza and Zingales (2009) and explain bilateral trust with match-specific variables. These match-specific variables are historical and do not vary over time. Additionally, both country-of-origin fixed effects and country-of destination fixed effects are included. Country-of-origin fixed effects are used to control for the fact that people apply the level of trustworthiness of their own countrymen towards people from other countries (Glaeser, Laibson, Scheinkman and Soutter 2000; Sapienza, Toldra and Zingales 2007). The regression model for bilateral trust takes the following form:

$$Trust_{ij} = k_i + \lambda_j + \beta X_{ij} + \varepsilon_{ij}$$
(A1)

Where k_i is the country-of-origin (where trust originated) fixed effect, λ_j is the country-of destination (where trust is received) fixed effect, and X_{ij} is the match-specific variables that are rooted in culture and can explain bilateral trust. The values for X_{ij} depend on country pairs.

According to Guiso, Sapienza and Zingales (2009), countries differ in their trust toward the same population for several possible reasons. One is the difference in the information sets countries possess: better information leads to a more accurate estimate. An alternative is that some sort of cultural-rooted bias can be passed over several generations and form the perception of trustworthiness today. To capture the two possible reasons, we select both proxies for information and proxies for cultural similarity. Table A1 offers a description of all the match-specific variables used.

The proxies for information include the geographic distance (*Distance_{ij}*) between the two countries, a dummy variable indicating whether two countries share the same official language (*Common language*), the commonality between two languages, and a dummy variable indicating whether two countries share a common border (*Common border*). To capture the commonality between two languages, we use a measure (*Linguistic common roots*) created by Fearon and Laitin (2003). It is based on a count of the number of common branches two languages share in the language trees reported by Ethnologue.com. As two languages share more common branches, fewer efforts are needed for citizens from one country to understand the language used in another country.

The proxies for culture can be further categorized into three groups: 1) religious similarity (*Religious distance*); 2) ethnic distance (*Somatic distance, Genetic distance*) and 3) interactions in past history (*War*). To calculate religious distance, we obtain the percentage of people belonging to each religious denomination in one country from Alesina, Devleeschauwer, Easterly, Kurlat and Wacziarg (2003). To take into account the level of fragmentation, the measure for religious distance has the following form:

$$\frac{\sum_w (\rho_{iw} - \rho_{jw})^2}{2(1 - \sum_w \rho_{iw} * \rho_{jw})} \tag{A2}$$

where $\rho_{i(j)w}$ represents the fraction of individuals in country i (j) who have religion w.

Two measures are used to capture ethnic distance. The first is *Genetic distance* between indigenous populations developed by Cavalli-Sforza, Menozzi and Piazza (1996). It measures differences in the genetic composition between two populations by summing the differences in frequencies of these polymorphisms.[3] Secondly, *Somatic distance* developed by Guiso, Sapienza and Zingales (2009) is used to account for the fact that people trust people who look like them more than those who do not (DeBruine 2002). Furthermore, we adopt the classification of Djankov, McLiesh and Shleifer (2007) classification and construct a dummy variable (*Common legal origin*) equal to one if the countries share the same legal origin. The last measure (*War*) for historical interactions captures the conflicts between countries. Presumably, countries with a long history of wars and conflict will mistrust each other. We compute the number of years a country pair has been in a war between 1816 and 1970 by using the COW (Correlates of War) dataset. Although including wars before 1816 will provide us with more incidences, it is hard to believe that those wars are relevant. European countries began to have their current shape after 1800. Another advantage of this dataset is that it provides detailed information on where the battles took place and which states were involved. By using this information, we took the border change into consideration.

Table A2 includes all the regressions. Both country-of-origin and country-of-destination fixed effects are included. In column (1), we use all the match-specific variables. To improve the model, we take a general-to-specific model selection procedure. Starting with the model specification in column (1), the least significant variable from the regression is dropped one at a

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[3] The calculation for for this measure is similar to eq. (A2), which measures religious distance.

time. The procedure ends when only significant variables remain. The result is reported in column (2).

In column (2), only three variables remain significant. Countries with a long history of conflicts and wars will have a tendency to mistrust each other. Moreover, it supports the argument of Guiso Sapienza and Zingales (2009) and DeBruine (2002) that people trust people who look like them more than those who do not. When two populations lack common somatic traits, they tend not to trust each other. The effect of somatic distance on bilateral trust is constantly significant at the level of 1 percent. Although the dummy variable indicating whether two countries have the same legal origin is only significant at the level of 10 percent, it has the expected positive sign. It suggests that the similarity in formal institutions facilitates the formation of trust between two populations.

In columns (3) to (11), we regress one of the match-specific variables upon $Trust_{ij}$ at a time. Most of them are significant at the level of one percent, except the dummy variable indicating whether two countries share the same official language and genetic distance. One reason is that not many European country pairs have the same official language. The effect of linguistic similarity on trust can be verified by the coefficient for linguistic common roots. This variable is not only statistically significant at the level of one percent but also economically significant. Moving from having none common branches in the language tree to sharing one common branched would improve one population's trust upon another by 0.262.

By using the model specification in column (2), $Trust_{ij}$ can be largely explained. Moreover, when one match-specific variable is regressed upon $Trust_{ij}$ at a time, most of them tend to be significant and have the expected sign. Since country-of-origin and country-of-destination fixed effects are time-invariant as well, we conclude that $Trust_{ij}$ does not vary much over time and it is appropriate to use it as explanatory variable in our model for trade flows.

Table A1. Descriptive statistics of data used in the appendix

Variable	Obs	Mean	Std. Dev.	Min	Max	Source:
$Trust_{ij}$	207	0.00738	0.301656	-0.67224	0.849558	Eurobarometer
Common language (Official)	207	0.028986	0.168173	0	1	Jon Haveman's website
$Distance_{ij}$ (Geography)	207	7.086713	0.643405	5.153484	8.120583	Jon Haveman's website
Common border	207	0.140097	0.347929	0	1	Jon Haveman's website
War	207	1.024115	2.139889	0	10.58356	COW version 3.0
Religious distance	206	0.459115	0.277538	0.011283	0.851569	Alesina Devleeschauwer, Easterly, Kurlat and Wacziarg (2003)
Somatic distance	207	9.47343	5.117837	0	20	Guiso, Sapienza and Zingales (2009)
Genetic distance (fst*1000)	206	55.49029	43.19188	4	204	Cavalli-Sforza, Menozzi and Piazza (1996)
Common legal origin	207	0.270531	0.445311	0	1	Djankov, McLiesh and Shleifer (2007)
Linguistic common roots	207	0.555161	0.25162	0	0.9	Ethnologue.com

Table A2. Determinants of trust

$Trust_{ij}$	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
War	-0.012**	-0.011**	-0.012*								
	0.006	0.005	0.006								
Somatic distance	-0.016***	-0.017***		-0.019***							
	0.003	0.002		0.002							
Common legal origin	0.041	0.047*			0.172***						
	1.254	0.027			0.027						
Common language	0.073					0.097					
	-0.600					0.064					
$Distance_{ij}$	0.006						-0.104***				
	0.033						0.021				
Common border	0.029							0.119***			
	0.041							0.026			
Religious distance	-0.022								-0.197***		
	0.056								0.043		
Genetic distance (fst*1000)	0.0002									0.0000	
	0.0003									0.0003	
Linguistic common roots	0.075										0.524***
	0.120										0.103
Observations	205	207	207	207	207	207	207	207	206	206	207
R-squared	0.846	0.847	0.755	0.841	0.798	0.754	0.775	0.768	0.768	0.751	0.790

Robust standard errors in the second row while $p < 0.1$* $p < 0.05$** $p < 0.01$***. All regressions include country-of-origin and country-of-destination fixed effects, since the F-tests for those fixed effects suggest they are jointly significant at 1 percent.