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Cross The Border and Close The Gap?
How Do Migrants Enhance Trade

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Abstract

Recent theoretical works suggest that migrants carry their social networks when moving across borders and that they bridge the information gap between partner countries. We derive a theoretical model where migrants reduce informational trade barriers and thus enhance exports. The model is estimated using international trade data at a German State-level. We provide evidence that migrants have a positive and statistically significant impact on bilateral exports of German States.

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1 Introduction

International trade is costly despite today's world economic integration. These costs go well beyond transportation costs as described by Anderson and van Wincoop (2004). One reason for these costs is the lack of information that producers and customers have with respect to conditions on international markets. Most of the goods traded have no organized market where prices reflect continuously up-to-date information on the product between buyers and sellers. Furthermore, recent studies using firm-level data have shown that only a small fraction of firms exports. The evidence also suggests substantial barriers to exporting (Bernard *et al.* (2003), Eaton *et al.* (2004), Tybout (2003)). Exporters tend to be more productive and larger. This advantage allows them to overcome trade costs, which comprise also the costs of searching and finding foreign partners.

Recent theoretical literatures propose a departure from the assumption of perfect information that characterizes classical trade models and model information costs as a search and matching process (Rauch and Trindade, 2004; Casella and Rauch, 2003). Rauch and Trindade assume that social networks between countries reduce information barriers. In particular, they show that the information transferred through networks has a positive impact on the matching process between buyers and sellers located in different countries.

In this paper, we develop a monopolistic competition model that includes informational trade barriers. We regard migrants as foreign intermediaries that reduce these information barriers. Migrants convey non-price information between two distant locations and thus facilitate trade by bridging information gaps between their home and their host country. Migrants fill the information gap between two distant places by establishing a privileged link between two

local networks. They carry information on trade opportunities and share their knowledge on country's commercial, legal and political institutions. This is documented by several empirical studies that include the stock of immigrants to traditional gravity equations (Gould, 1994; Head and Ries, 1998; Girma and Sourafel, 2002; Wagner *et al.*, 2002; Combes *et al.*, 2005).

Most of these papers assume that information costs are function of the absolute number of immigrants in a specific region. As in Combes *et al.* (2005), we assume that domestic producers obtain information on business opportunities abroad through immigrants. However, we depart from Combes *et al.* (2005) by assuming that this impact is larger, the higher is the probability to meet a migrant coming from the partner country. Our information costs variable is constructed as the stock of immigrant from a partner country relative to the local population. We believe that this variable is closer to the idea that migrant close the gap between buyers and sellers located in distant countries. Yet, it seems unlikely that the impact of immigrants on trade is limited solely to the information channel. Another potential effect described by Gould (1994) and Head and Ries (1998) is that migrants have a penchant for the goods from their country of origin. They increase thus import flows from their home country in order to satisfy their preferences. Gould shows however that the effect remains negligible compared to the information channel on which we focus in this paper.

The methodology we employ is as follow. We first construct a simple trade and geography model, which is taken from Redding and Venables (2004). We specify explicitly a trade costs function, which incorporates physical transportation costs, information barriers and contracting costs. In order to estimate the model, we apply fixed-effects panel estimation techniques on data on bilateral export for each of the 16 German States with 45 foreign partners from 1991

to 2002. This allows to control for any unobservable component of transport costs or trade policy that is common across all partners and exporting States (Anderson and van Wincoop, 2004; Redding and Venables, 2004).

We find that German States' exports to an individual country increase with the probability of finding migrants from this country. This results is robust to the inclusion of the fixed-effects and through a wide range of robustness tests. We provide thus evidence that economic geography matters for bilateral German State exports.

The paper is structured as follow. In the following section we set out a stylized model of trade, which incorporate trade costs. In section 3, we discuss the estimation strategy. In particular, we introduce the specification of our trade costs function. In section 4, we present the estimation results and undertakes also a number of robustness tests. We conclude in section 5.

2   A Stylized Model of Trade

The model derived in this section is a stylized version of the Redding and Venables (2004) trade and geography model. We describe below the theoretical underpinnings of the augmented gravity equation, which takes into account networks effects.

2.1   A Standard New Trade Theory Model

We assume that the world consists of $i = 1, ..., R$ countries. There is a manufacturing sector in each country, where firms operate under increasing returns to scale and produce differentiated products. Production requires intermediate goods [1]. Firms engage in monopolistic competition à la Dixit-Stiglitz. Firms

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export a part of their output because, in each country, a distinct set of differentiated goods is produced. Export is subject to transport frictions in trade.

On the demand side, we assume that each firm produces a differentiated product, which is used both in consumption and as an intermediate good. The model starts with the assumption of homothetic preferences, approximated by a CES utility function as defined by equation (1):

$$U_j = \left(\sum_i^R n_i \, x_{ij}^{\frac{(\sigma-1)}{\sigma}} \right)^{\frac{\sigma}{\sigma-1}}, \; \sigma > 1 \tag{1}$$

where n_i are the varieties produced in country i and x_{ij} is the consumption by region j consumers of goods from region i. σ is the constant elasticity of substitution between all goods. In equilibrium, all varieties produced in i are demanded by country j in the same quantity.

The price index for manufactures in each country, G_j, defined over the prices of each varieties produced in i and sold in j, p_{ij} is given as in (2).

$$G_j = \left(\sum_i^R n_i \, p_{ij}^{(1-\sigma)} \right)^{\frac{1}{1-\sigma}}, \; \sigma > 1 \tag{2}$$

Let E_j denotes total expenditures on manufacture by country j. By Shephard's Lemma on the price index, we derive country j's demand for each product.

$$x_{ij} = p_{ij}^{-\sigma} E_j G_j^{\sigma-1} \tag{3}$$

where p_{ij} is the price paid by consumers in j for varieties from i. This price is the product of the mill price p_i and the iceberg trade cost, T_{ij}, paid by consumers [2]. The own price elasticity of demand is σ and the term $E_j G_j^{\sigma-1}$, gives the demand curve faced by each firm in market j. It is the market capacity

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[1] This model follows Fujita *et al.* (1999) but only focuses on the manufacturing sector.
[2] $p_{ij} = p_i T_{ij}$. If $T_{ij}=1$ then trade is costless, while T_{ij}-1 measures the proportion of output lost in shipping from i to j.

of country j. It depends on the total expenditure in j, E_j, and the weighted price index, $G_j^{\sigma-1}$.

Equation (3) gives the volume of sales per firm to each location, and expressing it in aggregate value, gives exports from i to j

$$n_i p_i x_{ij} = n_i p_i^{1-\sigma}(T_{ij}^{1-\sigma})E_j G_j^{\sigma-1} \tag{4}$$

The right-hand side of this trade equation contains both demand and supply characteristics. $E_j G_j^{\sigma-1}$ is country j market capacity. $n_i p_i^{1-\sigma}$ is the supply capacity of the exporting country. It is defined as the product of the number of firms and their price competitiveness. Our variable of interest is $T_{ij}^{1-\sigma}$, which is bilateral trade costs between countries. We can thus rewrite the trade equation

This allows the trade equation to be rewritten as (5):

$$n_i p_i x_{ij} = \phi_i (T_{ij})^{1-\sigma} \psi_j \tag{5}$$

where ψ_j and ϕ_i represents respectively the market capacity of the importing country j and the supply capacity of the exporting country i defined as:

$$\psi_j \equiv E_j G_j^{\sigma-1}, \tag{6}$$
$$\phi_i \equiv n_i p_i^{1-\sigma}$$

The main purpose of this paper is to specify an iceberg trade costs function between each partner countries. We assume trade costs, T_{ij}, to be a function of physical transportation costs, τ_{ij}, information costs, I_{ij}, and contracting costs C_j.

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3 Estimation Strategy

3.1 The Empirical Specification

The theoretical model is estimated using export data between German States and partner countries. The bilateral export flows depends on German State characteristics (ϕ_i), the partner country characteristics (ψ_j), and the iceberg trade costs (T_{ij}). We follow the same methodology as Redding and Venables and apply a set of State and country dummy variables to control unobserved economic variables. In the following section, we specify the market and supply capacity of i and j using their respective Gross Domestic Product. We show that the introduction of these economic variables does not change the qualitative results.

The transportation costs, τ_{ij}, are determined by the bilateral physical distance, d_{ij} and the existence of a state-border, b_{ij}, between an individual German states and the partner country j. While distance should have a negative impact on trade, the state-border parameter should be positive.

Information costs, I_{ij}, are more difficult to specify. We assume as in Combes *et al.* (2005) that producers in State i obtain some information on country j market thanks to people living in state i but that were born in country j. However, we depart from Combes *et al.* (2005) by assuming that this impact is larger, the higher is the probability to meet a migrant coming from country j [3]. We are thus closer to the idea that information externalities transferred through migrants have a positive impact on the matching process between buyers and sellers located in distant countries. We use the number of foreign born population from country j, Mig_{ij}, relative the total population in state i,

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[3] Combe *et al.* assume that the network effect is a function of the absolute number of migrants in a specific region

Pop_i, to proxy information costs between i and j. Therefore, the positive effect of the percentage of migrants on trade should be spatially concentrated at the State-level. The percentage of migrant from country j relative to the state population is expected to have a negative impact on trade costs. Moreover, by using the inward stock of migrants, instead of the immigration flows, we assume that building a network is costly in terms of time. Migrants have to learn cultural, social and economic norms and values. This is only possible by repeated and close interaction with the local population.

To assess the robustness of the results derived using the share of foreign born from the country of export, we also use the total number of migrants that are not coming from country j, relative to the State population to approximate information stocks. Foreigners originated from other countries might provide information on local business opportunities but do not close the information gap between each state-country pair.

According to Anderson and van Wincoop (2004), networks substitute weak international enforcement of formal contract and explain a large part of the networks effect on trade found by Rauch and Tindade (2002). In order to filter out this impact from our information costs variable, we include a proxy for contracting costs. We use an index, which is associated to contract viability and payment delays in the partner country. The contracting costs variable is denoted by C_j and should increase trade costs. Since low scores correspond to high contracting costs, the index enters negatively the trade costs function.

Finally we can rewrite the trade costs function as in equation (7):

$$T_{ij} = d_{ij}^{\gamma} \, e^{\theta b_{ij}} \, I_{ij}^{-\delta} \, C_j^{-\mu} \tag{7}$$

Plugging equation (7) into the trade equation (5) leads

$$n_i p_i x_{ij} = \phi_i (d_{ij}^{\gamma} \, e^{\theta b_{ij}} \, I_{ij}^{-\delta} \, C_j^{-\mu})^{1-\sigma} \psi_j \tag{8}$$

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We estimate a log-linearized version of equation (8). Log-linearizing gives:

$$\ln X_{ij} = \phi_i + \psi_j + \zeta \ln d_{ij} + \kappa b_{ij} + \lambda \ln I_{ij} + \chi \ln C_j + \nu_{ijt}, \tag{9}$$

Where X_{ij} is the value of bilateral exports flows from state i to partner j. As described above, ϕ_i and ψ_j are respectively the German State and country specific effects which controls for any unobservable component of transport costs or trade policy that is common across all partners for a particular exporting State (Anderson and van Wincoop, 2004; Redding and Venables, 2004). The distance costs parameter $[\zeta = (1 - \sigma)\gamma]$ is expected to be negative. The State-border parameter $[\kappa = (1 - \sigma)\theta]$ is expected to be positive. The information costs parameter, $[\lambda = (1 - \sigma)\delta]$, which enters negatively the trade costs function, is expected to be positive. Finally, we expect the parameter of contracting costs, $[\chi = (1 - \sigma)\mu]$, to be positive. ν_{ijt} is the stochastic error term.

The data imply a specific panel model with two cross-section dimensions, i.e., the sixteen German State i, $i = 1, ..., 16$, and the 58 partner country j, $j = 1, ..., 58$, and one time dimension t with $t = 1, , 10$, from 1992 to 2001. Due to the heterogeneity of the country specific effects, the F-test rejects the ordinary least squares estimation (test statistic 526.35, p-value 0.000). Turning to the choice between fixed and random effects, the fixed effects model is preferred because we want to control for structural determinants other than the ones associated with the explanatory variables. Generally, our economic variables vary along the time dimension. The exceptions are the distance and the State-border variables. Despite the fact that both are time-invariant, we still find significant effects using the country specific effects panel because of the unbalanced nature of our panel. Therefore, the distance and the State-border variables can *"change over time"* for a given country.

While heteroscedasticity in ν_{ijt} is always a potential problem, serial correlation is likely to be more important, because it affects the standard errors in fixed-effects models. The residuals of the static trade model exhibit autocorrelation. This indicates the presence of a sluggish adjustment process. The Baltagi (2001) LM5 test for autocorrelation rejects the null of no autocorrelation (test statistic 19.07, p-value 0.000). The effect is larger the longer the time horizon. We used cluster sample methods as describe in Wooldridge (2003). Essentially, this is a generalization of the Huber-White sandwich variance estimator. Instead of dealing with individual observations, we now treat each cluster or group as if it were a single observation. This robust variance matrix estimator is valid in the presence of heteroscedasticity and serial correlation. The robust standard errors are obtained as the square roots of the diagonal elements of the covariance matrix.

3.2 The Data

A correlation matrix, some summary statistics and more information about the data sources are presented in Tables (A.1) to (B.1) of the Appendix. The data on bilateral export flows are available from the German Statistical Office [4]. The database entails information on bilateral export of each German state with 58 partner countries from 1992 to 2001. The data are converted in constant 1995 US dollars using the IFS end of period exchange rate between German/EURO Mark and US dollars.

We combine the bilateral trade data with information on trade costs. The distance costs variable is defined as the geodesic distance calculated using the great circle formula between the capital city of each German state and its partner country. The State-border variable is a dummy variable that takes the

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[4] Descriptions of the data can be found in Kuhn (1994)

value of 1 when the German State shares a common border with the partner country, and 0 otherwise.

Data on the stock of migrants per country of origin is provided by the German statistical office, which updates this information by micro-census every year. Contrary to Gould (1994) and Head and Ries (1998), we do not estimate the migrants stock. According to German law, people moving across borders are counted as immigrants if they register with the local registration office (Einwohnermeldeamt) and if they state that their last country of residency has been abroad. People are counted as emigrants if they are deleted from the register because they move to a foreign country. Registration is compulsory. The data do not include temporary migrants, i.e. people commuting across borders or staying abroad for only a short period of time.

The contracting costs are approximated by the investment profile index of the International Country Risk Guide (ICRG). The risk rating assigned is the sum of three subcomponents, contract viability/expropriation, profits repatriation and payment delays, each with a maximum score of four points and a minimum score of 0 points. A score of 12 points equates to very low risk while a score of 1 points to very high risk.

Data on real GDP of German States and the host countries have been respectively taken from the German Statistical Office and the World Bank's World Development Indicators (2003).

4 Results

4.1 The Structural Estimation

The results are presented in Table (1). The coefficients are all in accordance to our predicted signs. As seen by the overall R^2, the explanatory variables explain 50% of the variation of German States' bilateral exports. In the first specification (S1), we use the share of foreigners from country j relative the total population in state i to proxy the information costs while in the second specification, (S2), these costs are approximated by the share of other foreigners in each German State i.

As expected, the coefficient, λ, of the information costs variable in specification (S1) is highly significant and positive. It is not statistically significant in specification (S2). Therefore, we conclude that migrants from the same country of export help bridging the information gap between an individual German state and its partner. Contrary to the migrants that are coming from other countries of export, they do not only know the local market where they live, but also have information on the country where they come from. In specification (S1), a percentage point increase of the share of immigrants from country j relative to the total State population increases on average the value of export to this country by about 0.10%. Thus, the economic importance of this variable is relatively small. To show this, we compute so-called beta-factors, which measure the contribution of the variance of a given variable to the overall variance of the dependent variable. In specification (S1), contracting costs are the most important determinant of export (beta coefficient of about 16%), followed by the distance (8%), and the State-border (3%). The information costs are relatively unimportant economically, with beta coefficients of about 2%. Controlling for contracting costs, the low estimated coefficient

Table 1

Export Equation: Dependent Variable $ln(X_{ijt})$, Country-Fixed Effects Panel, 1992-2001.

Variables	Label	(S1)†	(S2)‡
		Share of migrant from j	Share of "other migrant"
Distance Costs	d_{ij}	-0.68***	-0.69***
		(-3.85)	(-3.88)
State-border	b_{ij}	0.41**	0.42**
		(2.65)	(2.82)
Information Costs	I_{ijt}	0.10***	0.02
		(2.71)	(1.27)
Contracting Costs	C_{jt}	0.15***	0.15***
		(9.04)	(8.90)
State Dummy Variables	ϕ_i	yes	yes
Country Dummy Variables	ψ_j	yes	yes
Observations		8090	8090
Number of Groups		58	58
R^2-within		0.77	0.77
R^2-between		0.25	0.24
R^2-overall		0.50	0.49

* denotes statistical significance at 10% level.

** denotes statistical significance at 5% level.

*** denotes statistical significance at 1% level.

Robust t-ratio into bracket. Standard errors have been adjusted for clustering around the country's identity

†: Share of migrants from country j as proxy for I_{ijt}

‡: Share of "other migrants" as proxy for I_{ijt}

on the information costs variable is in line with the expectation of Anderson and van Wincoop (2004). In fact, the migration variable might capture some information on enforcement and contracting costs.

The coefficient for the contracting costs, χ, is positive and highly significant. This positive effect is in accordance with the theoretical model since a high index reflects low contracting costs. The elasticity of the exports value with

respect to contracting costs is relatively robust across specification and equal to 0.15 in both specifications.

Turning to the coefficient of the distance costs variable, ζ, it is significant and shows the negative impact of distance on the value of export. The elasticity of the export value with respect to distance is relatively (0.68) in specification (S1). High distance costs reduce the value of export abroad.

The coefficient of the State-border variable, κ, is significant and has a positive impact on the value of export in both specification. In specification (S1), having a State-border with a German States raises export by almost 49%[5]. However, we should be careful by interpreting the results on the distance and State-border parameters since they are mainly driven by the unbalanced nature of our panel. The main results are however robust to dropping the distance and State-border variable from the regression.

4.2 Robustness Tests

So far, we find evidence that information cost and contracting costs are strong determinants of bilateral exports of German States. In the following, we test the robustness of these results. We first supplement the market and supply capacity of our trading partners by using information on their Gross Domestic Product (GDP). Thus, the supply (market) capacity of a German States (host country) is not only defined by its GDP but also by a dummy variable that controls for all unobserved economic determinants. We also split the full sample into West- and East-German States. We also split our destination country into EU- and Non-EU partners. Finally, we drop individual States one-by-one.

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[5] This is computed using the Kennedy (1981) estimates as:

$$\hat{p}_{State-border} = 100 \times (\exp\{\hat{\kappa} - 0.5\hat{V}(\hat{\kappa})\} - 1) = 100 \times (\exp\{0.41 - 0.5(0.024)\} - 1)$$

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The parameters on the supply capacity of German States and on the market capacity of the host countries have a positive and statistically significant impact on German State bilateral exports. Moreover, we find that the main results of the paper are qualitatively not affected by the use of economic variables. We notice however a drop in the parameter of the contracting costs variables. This parameter is divided by two compared to the one in specification (S1) of Table (1). This is certainly due to the correlation between the contracting costs and the market capacity variable.

Are the results driven by West-Germany? Until 1990, East-Germany has been isolated from international markets up until the start of our sample period (Buch *et al.*, 2003). The share of foreign population in East-Germany was about 3% in 1991 which makes East-Germany the most homogenous country in continental Europe (Fearon, 2003). In contrast, West-Germany has the highest number of foreigners in Europe (Salt, 2001). Therefore, it is reasonable to expect different effects of information costs on exports from West- and East-Germany.

The results in Table (2) show indeed quite significant differences between East- and West-Germany. In particular, most findings reported earlier are driven by West German States. The quality of the regression is slightly higher for West-German States, the overall R^2 being higher. The distance costs are above-average for the East-German States and below-average for the West-German States. State-border is not statistically significant for East-Germany meaning that the sharing a common border does not matter for East German States exports.

Turning to the parameter of the information costs variable is positive but not significant for East-Germany. One possible interpretation concerns the export pattern and the type of migrants living in East-German States. In fact, firms

Table 2
Robustness Tests: Dependent Variable $ln(X_{ijt})$, Country-Fixed Effects Panel, 1992-2001. (1)

Variables	Label	Baseline	West-Germany	East-Germany	European Union	Non-European
Market Capacity	GDP_{it}	1.85***	1.33***	2.85***	2.01***	1.83***
		(8.40)	(5.75)	(8.20)	(4.04)	(7.70)
Supply Capacity	GDP_{jt}	1.69***	1.84***	1.23***	1.67***	1.71***
		(11.53)	(18.37)	(6.83)	(9.02)	(9.44)
Distance Costs	d_{ij}	-0.67***	-0.30**	-1.26***	-0.53***	-0.71***
		(-3.86)	(-2.45)	(-4.89)	(-3.10)	(-2.59)
State-border	b_{ij}	0.41***	0.46***	0.17	0.27***	0.60***
		(2.68)	(5.18)	(0.58)	(4.19)	(2.68)
Information Costs	I_{ijt}	0.09**	0.09*	0.04	0.17**	0.08***
		(2.56)	(1.67)	(0.76)	(2.10)	(2.62)
Contracting Costs	C_{jt}	0.08***	0.07***	0.08***	0.10***	0.06***
		(4.34)	(4.22)	(3.43)	(3.33)	(2.79)
State Dummy Variables	ϕ_i	yes	yes	yes	yes	yes
Country Dummy Variables	ψ_j	yes	yes	yes	yes	yes
Observations		8090	5057	3033	1823	6267
Number of Groups		58	58	58	13	48
R^2-within		0.80	0.80	0.50	0.89	0.78
R^2-between		0.86	0.86	0.78	0.84	0.81
R^2-overall		0.75	0.82	0.64	0.77	0.69

* denotes statistical significance at 10% level.

** denotes statistical significance at 5% level.

*** denotes statistical significance at 1% level.

Robust t-ratio into bracket. Standard errors have been adjusted for clustering around the country's identity

in East Germany tend to export to countries independently of the the stock of migrants. As mentioned earlier, networks are costly to form and East-Germany was isolated from international factor markets. This may explain why we do not find any significant information costs parameter for East-Germany.

In addition to difference between East- and West-Germany, we might also

expect structural differences between large German State and smaller States like Hamburg and Bremen. To assess the robustness of our results, we drop observation from each individual States successively [6]. We essentially obtain the same qualitative results as earlier.

Finally, we split our full sample into European and non-European member countries. The qualitative results are roughly the same for both groups. The distance costs are above-average for the non-European members and below-average for the European members. Turning to the information costs parameter, they are statistically significant for both the European and the non-European members. However, the impact of the information costs variables is largely above the average for the European members.

5 Conclusion

We develop a structural gravity equation model, for which we specify a trade costs function. We assume trade costs to be determined by the physical transportation costs, informational trade barriers and contracting costs. We focus on informational trade barriers between two countries, i and j, which are assumed to be reduced by local networks. The latter is proxied as the percentage of migrants over total population in country i coming from country j.

Estimates based on bilateral export flows of German States show that geography matters. In particular, we find that German State's bilateral exports to country j are larger, the higher is the probability to meet a migrant coming from this country. This result has quite important implications for Germany since the location of migrants shape the exports of its States. The impact is statistically significant and positive but remains economically negligible with respect to the contracting costs and the physical transportation costs.

[6] The results are available upon request.

We present a variety of robustness tests, which provide additional evidence that migrants coming from the same country as the country of export bridge information between distant locations. Results are find to be robust to the split of our full sample into European and non-European union members. However the results are mainly driven by West-German States.

Two interesting extension come two mind. First, as in Combes *et al.*, the model could be extended to include business networks using information on the number of German affiliates of foreign multinational firms located in each German State. Second, the estimated parameters of distance costs and State-border, rely on the unbalanced nature of our panel. A Hausman-Taylor approach could be appropriate to estimate consistently the time-invariant parameters.

Appendix

A Correlations and Summary Statistics

Table A.1
Correlations of variables

	$ln(X_{ijt})$	$ln(\psi_j)$†	$ln(\phi_i)$‡	$ln(d_{ij})$	b_{ij}	I_{ij}	C_{jt}
$ln(X_{ijt})$	1.0000						
$ln(GDP_{jt})$	0.6328	1.0000					
$ln(GDP_{it})$	0.5463	0.0016	1.0000				
$ln(d_{ij})$	-0.3452	0.0186	0.0011	1.0000			
b_{ij}	0.1794	0.0846	0.0412	-0.2308	1.0000		
I_{ij}	0.1944	0.1179	0.0791	-0.0776	0.0485	1.0000	
C_{jt}	0.2507	0.1896	-0.0031	-0.1465	0.0516	-0.0058	1.0000

Table A.2
Summary Statistics

Variable		Mean	Std. Dev.	Min	Max	Observations
$ln(X_{ijt})$	Overall	10.826	2.287	1.435	17.359	N = 10254
	Between		1.728	7.428	14.251	n = 67
	Within		1.562	3.857	15.198	$\bar{T}$=9.565
$ln(d_{ij})$	Overall	7.751	1.076	4.248	11.265	N = 10720
	Between		1.068	5.838	9.818	n = 67
	Within		0.181	6.161	9.936	T = 10
b_{ij}	Overall	0.014	0.118	0.000	1.000	N = 11360
	Between		0.041	0.000	0.188	n = 71
	Within		0.111	-0.173	0.952	T = 10
I_{ij}	Overall	0.106	0.365	0.000	9.239	N = 10683
	Between		0.268	0.002	2.048	n = 68
	Within		0.248	-1.932	7.296	$\bar{T}$= 9.819
C_{jt}	Overall	6.941	2.077	1.000	12.000	N = 9760
	Between		1.359	2.333	10.000	n = 66
	Within		1.637	2.283	10.983	$\bar{T}$ = 9.242

B   Data Sources

Table B.1
Variables description and data sources

	Description	Source
$ln(X_{ijt})$	Log of real export of German State i to country j at time t	German Statistical Office, Several Edition
$ln(\psi_j)$	Log of real GDP of Country j	World Development Indicators
$ln(\phi_i)$	Log of real GDP of State i	German Statistical Office, Several Edition
$ln(d_{ij})$	Geodesic Distance between the main city of State i and the capital of country j	Own Computation†
b_{ij}	Dummy variable that takes the value of 1 if the German state shares a common border with its exports partner, and 0 otherwise	Own Computation
I_{ij}	Number of foreigners in Germany by country of origin and German States	Bevölkerung Statistik Fachserie 1 Reihe 2
C_{jt}	The risk rating assigned is the sum of three sub-components, contract viability/expropriation, profits repatriation, payment delays, each with a maximum score of four points and a minimum score of 0 points. A score of 12 points equates to very low risk and a score of 1 points to very high risk.	International Country Risk Guide

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