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Quality of government and regional trade: Evidence from European Union regions

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Abstract: This paper examines – using a novel database of regional trade flows between 267 European regions for 2013 – how government quality affects trade between European Union (EU) regions. The results of a structural gravity cross-sectional analysis of trade show that trade across EU regions is highly influenced by differences in regional government quality. This influence varies by sector of economic activity and by the level of economic development of the region. The results indicate that, if the less developed regions of the EU want to engage in greater interregional trade, improving their institutional quality is a must.

Keywords: Quality of government; institutions; regional policy; gravity model of trade; structural estimation

JEC codes: F15; R10; E02

Introduction and motivation

There are few issues on which economists tend to agree. Trade is one of these few. It is generally acknowledged that trade is good for economic growth (e.g. Krueger, 1998) and that increases in trade are at the base of improvements in innovation (e.g. Grossman and Helpman, 1990) and productivity (e.g. Alcalá and Ciccone, 2004). Hence, most policy recommendations have been that countries should engage in trade.

However, smooth trade requires well-functioning institutions. A good institutional setting facilitates the increase of international exchanges through the reduction of transaction costs (Rodrik, 2011) and the lowering of informal trade barriers (Araujo et al., 2016). Better institutions are, thus, considered to be at the origin of increases in trade and, consequently, of the reduction in income disparities between countries and regions. By contrast, weak institutions can undermine trade flows and lead to places with weaker institutional settings losing out from trade (Levchenko, 2007). Since the works of Levchenko (2007) and Nunn (2007) there has been a growing interest in trying to understand how institutions shape trade flows (Méon and Sekkat, 2008; Helble et al., 2009; Francois and Manchin 2013; Nunn and Trefler, 2014; Álvarez et al., 2018; Beverelli et al., 2018; Martínez-Zarzoso and Márquez-Ramos, 2019). Most of this empirical literature resorts to gravity models of bilateral trade and finds that, indeed, better quality institutions have a positive effect on trade (e.g. Helble, 2009; Álvarez et al., 2018; Martínez-Zarzoso and Márquez-Ramos, 2019). However, the country-level evidence is far from conclusive, with recent contributions claiming that neglecting domestic trade leads to a serious problem of omitted variable bias (Beverelli et al., 2018).

Moreover, most of the research on how institutions affect trade has been conducted at the national level, overlooking the subnational dimension. Yet, more trade happens within national borders, rather than across international ones (e.g. McCallum, 1995; Wei, 1996), especially in large countries. Similarly, institutional differences within countries (e.g. China – Rodríguez-Pose and Zhang, 2019) or broader continental regions, such as the European Union (EU) (Charron et al., 2014, 2015) are pronounced. Hence, how institutions affect substantial trade flows within countries or continental areas remains – mostly because of poor data availability – a significant black box in our understanding of the impact of trade on economic development.

To the best of our knowledge, this is the first paper that analyses the effect of institutions on trade at regional level for the whole EU. By doing so, it covers an important gap in our understanding as to why some places develop faster than others. The research assesses the importance of one of the key institutions behind economic development – quality of government – in explaining trade across regions of the EU, before investigating whether the effect of institutional quality on trade varies by sectors of activity and whether poor government quality – pervasive in the less developed regions of the EU – is more important for explaining trade depending on regional levels of wealth. The analysis conducted benefits from the use of a novel regional trade database. Thissen et al. (2019) provide trade flows for EU regions in 2013 disaggregated by sectors of activity. For the institutional indicators, we rely on Charron et al. (2015)'s measurement of quality of government for European regions. Both datasets are matched to create a database including both regional trade flows and quality of government indicators for 2013.

The results of the analysis show that quality of government is a fundamental determinant of trade between European regions and that institutional quality is more important for international than for intra-national trade. The effect of the local institutional quality differs by sectors, being larger for information and communication technologies (ICT), financial services, and professional services, and lower for manufacturing, industry, and the primary sector. We also find that quality of government explains trade from less developed to more developed regions better than vice-versa.

Theoretical framework and state-of-the-art

Understanding institutions

The interest on the role of institutions for economic development has been rife in social sciences for almost a century and a half (Tönnies, 1881; Weber, 1922). Particularly seminal for economics was the emergence of the New Institutional Economics (Coase, 1937), focusing on contract theory and the transaction costs as the instruments to explain institutions. Yet, the main breakthroughs in understanding how institutions shape economic activities have remained, at least until there recently, somewhat elusive. This is for several reasons. First, agreeing on a definition of institutions has proven difficult. Almost any research working on the topic has his/her own definition of institutions, making comparisons difficult (Rodríguez-Pose, 2013). The most widespread definition of institutions – North's (1991: 97) "institutions are the humanly devised constraints that

structure political, economic, and social interaction" – is far from universally accepted. Second, making the transition from definition to actual measurement of institutions is even more complex. Measurements of institutions are often imperfect and controversial. Third, institutions tend to be context and time-dependent (Rodríguez-Pose, 2013) and any institutional analysis is fraught with problems of endogeneity (Rodrik, 2004). Yet, in spite of all these difficulties, our understanding of how institutions work and more solid and significant attempts at measuring them have grown apace in recent years. Most of the progress has taken place in the measurement of institutions at a national level (e.g. Kaufmann et al., 2009). However, subnational level indices have also flourished, with work by the Quality of Government Institute at the University of Gothenburg (Charron et al., 2011, 2014) being the most popular and successful in this respect.

The interest on institutions has spurred a healthy literature on how institutions affect economic growth at a national level (e.g. Rodrik, 2004; Easterly et al., 2006; Acemoglu and Robinson, 2008). The impact of the quality of institutions on economic growth is also contingent on the role of corruption. On corruption, a debate between two strands of literature has arisen: on the one hand, it is argued that corruption may compensate the costs associated to low government quality. This is known as the "greasing the wheels" hypothesis (e.g. Dreher and Gassebner, 2013). On the other, corruption may expand the costs derived from low quality of government. This is known as the "sanding the wheels" hypothesis (e.g. Méon and Sekkat, 2005).

The number of analysis of the link between subnational institutions and economic growth has been far more limited, with initial attempts focusing on informal institutions, such as family ties and culture (e.g. Duranton et al., 2009; Tabellini, 2010) and, in recent years, using more subnational government quality as a proxy for institutional quality (e.g. Rodríguez-Pose and Garcilazo, 2015; Rodríguez-Pose and Zhang, 2019). Nevertheless, although understanding how institutional quality affects economic growth necessarily implies involving trade in the process (e.g. Dollar and Kraay, 2003) to show how institutional quality variations provoke an effect of trade on growth, this type of research at subnational level has remained mostly overlooked in the literature.

Institutions and trade

The interest on how institutions shape trade patterns is more recent and has become more widespread since the works of Levchenko (2007) and Nunn (2007). Levchenko (2007) derives a theoretical model where incomplete contracts explain the existence of institutional differences. Using data for US imports, he finds how institutional differences impact patterns of trade. Nunn (2007), using data for 146 countries and 222 industries, shows that contract enforcement explains global trade to a greater extent than physical capital and skilled labour.

Since then, research has tended to follow two approaches to the analysis of the impact of institutions on trade. On the one hand, significant progress has been made on measuring institutional quality at country level. The World Governance Indicators (WGI) from the World Bank (Kaufmann et al., 2009, 2011) have become the most widely used indicator for analysing the effects of institutions on trade. On the other, there has been considerable progress on the empirical analysis of the link between institutions and various measures of economic development. Particular attention has been paid to the existence of colonial legacies and to the link between common institutions in the former colony and the colonial power. It is often argued that common institutions – from the existence of a common language to shared cultural factors and habits – contribute to reduce the cost of communications and transactions and shape how economic activity is conducted (Fidrmuc and Fidrmuc, 2016). By far the most influential work in this type of literature is the work conducted by Acemoglu et al. (2001) and Acemoglu and Robinson (2012). They distinguish between two types of institutions based on their quality. Inclusive institutions, that lead to well-functioning formal institutions, such as property rights, the accumulation of human capital within countries, resulting in higher economic growth, versus extractive institutions, related with the extraction of resources, benefiting elites and hampering economic growth. The presence of extractive institutions in a place is also expected to dampen trade flows (Beverelli et al., 2018). Inclusive institutions, by contrast, are deemed to enable and accelerate trade.

Since the work of Acemoglu et al. (2001) the amount of research focusing on the extent to which institutional quality affects trade has multiplied. Different empirical studies have documented the existence of a positive relationship between institutional quality and trade. Earlier attempts were mainly limited to case studies and/or specific country analyses. Rauch and Trindade (2002) found an important effect of an informal institution,

Chinese networks, on bilateral trade patterns. Depken and Sonora (2005) reported how the degree of economic freedom of an importing country affected US bilateral exports, while Helble et al. (2009) showed that the transparency and accountability of institutions reduced trade costs in the Asia-Pacific region. More recently, Martínez-Zarzoso and Márquez-Ramos (2019) found that good governance – proxied using the WGI indicators – had an important impact on trade in the Middle East and North Africa, but that this effect differed depending on the institutional indicator used.

Increasingly, research has tended to spread the geographical breadth of analysis to cover large swaths of the world. Examples of this are Méon and Sekkat (2008), who, using again the WGI indicators, uncovered that national institutional quality was fundamental in determining the flows of manufactured goods. Francois and Manchin (2013) used a weighted indicator of six components measuring institutional quality and reported that a low institutional quality represents a barrier to trade in developing countries. Álvarez et al. (2018) found a greater effect of institutional quality on exports of raw materials and agricultural products. Beverelli et al. (2018) reported a positive connection between institutional quality and trade.

Other research has been less concerned with governance quality and the overall quality of institutions to focus, following Acemoglu et al. (2001) on past colonial legacies. These legacies are the result of common institutions at both former colonies and colonial powers and result in lower transaction costs between them (Rodrik, 2011). There are fewer studies that have focused on this approach in comparison to the wealth of studies dealing with governance quality. Among the main studies in this strand is the work of Head et al. (2010), who identify an erosion of trade following independence from the metropole.

New insights: the importance of regions and sectors

One of the main shortcomings of past research on the link between institutions and trade is that the literature has almost exclusively focused on this relationship at country level (Helble et al., 2009; Head et al., 2010; Álvarez et al., 2018, among others). However, this level is far to aggregate and does not permit capturing the large institutional quality differences that often exist within countries (Ketterer and Rodríguez-Pose, 2018). Moreover, this type of research ignores the importance of space in explaining the distribution of economic activities as brought to the fore by the revolution initiated by the New Economic Geography (Krugman 1991a, 1991b). Firms agglomerate in specific areas

within a country to take advantage of knowledge generating activities and reap knowledge spillovers (Duranton and Puga, 2005), as well as to benefit from the best pools of labour and from the best formal and informal institutional conditions (Storper, 1997). This implies that trade flows are often very unequal within countries and involve certain regions and cities to a far greater extent than others, reproducing existing economic inequalities (Kim, 2009; Rodríguez-Pose, 2012). Trade happens not only between but also within countries. Large volumes of trade take place within national borders. Hence, understanding trade and industrial linkages requires studying intranational trade patterns as well (McCann, 2013).

However, the interest on the subnational dimension of trade – possibly because of data availability problems – has been paltry to date. Among the earlier attempts at looking at the within country dimension of trade, only two cases appear. Márquez-Ramos (2016) is, so far, the only scholar to assess the effect of institutions on trade at a regional level. Her study, however, only concerned exports from Spanish regions during the period 2000–2008, focusing on the institutional dimension of trade agreements, rather than on institutional quality per se.

Yet, how local institutions shape trade may be affected by factors such as the sectoral specialisation of a particular place or its level of development. In order to incorporate sectoral structure into the analysis, we opt for an intra-industry trade framework (Krugman, 1980). Given the existence of productivity differences across sectors, which determine a country's comparative advantage (Levchenko and Zhang, 2012), the sectoral specialisation of a country will affect the impact of its institutional quality on trade. In this respect, we follow Méon and Sekkat (2008), who distinguish a direct and an indirect effect of institutions on trade by sectors that explains the importance of the sectoral disaggregation. The direct effect is related to the existence of manufactured and non-manufactured goods, because, in their view, the degree of corruption may differ between sectors. The OECD (2014) identifies five sectors that concentrate two thirds of the bribes: manufacturing, information and communication, transportation, construction, and extractive. In contrast, the indirect effect has to do with opportunities of exploiting resources within a sector, which defies the traditional determinants of comparative advantage, such as infrastructure or productivity (Méon and Sekkat, 2008). To this extent, different authors have found a greater effect of institutions on trade for differentiated products (Rauch and Trindade, 2002; Méon and Sekkat, 2008) and for agricultural

products (Álvarez et al., 2018). Given this sectoral heterogeneity, it is necessary to study not only the impact of institutions on trade, but how these impacts vary by sector. The level of development of a country and a region may also be strongly correlated with its overall institutional quality (Rodrik, 2004; Rodríguez-Pose, 2013).

Institutional quality is therefore key to assess the strengths and weaknesses of regions and their capacity to become competitive in a highly globalized world (Rodríguez-Pose, 2020). A region with transparent and effective institutions in a poorly governed country will be able to stand out and benefit more from international trade networks, as institutions constitute a source of comparative advantage (Nunn and Trefler, 2014). We expect institutions to play a more important role for the international openness of the regions, as comparative advantages are more important when regions must compete in the world market, rather than when their competitors are located within national borders.

Empirical approach

Econometric specification and estimation strategy

Gravity equations are the main econometric technique used by the literature to analyse how different economic and political factors affect bilateral trade (Helble et al., 2009; Francois and Manchin, 2013; Álvarez et al., 2018, Martínez-Zarzoso and Márquez-Ramos, 2019). The gravity model of trade relates bilateral trade flows to the economic size of the trading partners, commonly measured using the gross domestic product (GDP) and the geographical distance between the two (Tinbergen, 1962).

$$TRADE_{ij} = \frac{GDP_i \times GDP_j}{DIST_{ij}} \qquad (1)$$

Gravity models are commonly augmented to include other variables of interest for both the exporter and the importer. They also tend to extend the concept of distance to a broader group of trade costs. Anderson and Van Wincoop (2003) refer to trade costs as all sets of variables that constitute potential barriers to trade, such as physical distance, the existence of borders, and the like. Our basic gravity equation, in log form, is expressed as follows:

$$\begin{aligned} \ln TRADE_{ij} = {} & \beta_0 + \beta_1 \ln GDP_i + \beta_2 \ln GDP_j + \beta_2 INST_i + \beta_4 INST_j + \beta_5 \ln DIST_{ij} \\ & + \beta_6 LANG_{ij} + \beta_7 REGCONTIG_{ij} + \beta_8 COUNTCONTIG_{ij} \\ & + \beta_9 NATIONAL_{ij} + \beta_{10} INTERNATIONAL_{ij} + \varepsilon_{ij} \qquad (2) \end{aligned}$$

where the i and j subscripts denote the exporting and importing region, respectively. $TRADE_{ij}$ are trade flows between region i and j, including internal trade for $i = j$. GDP_i and GDP_j are the gross domestic product of the exporter and the importer, respectively, and $INST_i$ and $INST_j$ measure the quality of institutions in the exporting and the importing region.

$DIST_{ij}$ refers to different bilateral physical distance between regions i and j. The remaining variables are a raft of controls that previous research has identified as factors affecting bilateral trade. These include: $LANG_{ij}$ representing language, which takes the value of 1 if both regions share a common official language and are located in different countries and 0 otherwise; $REGCONTIG_{ij}$ denoting a common border within a country, which takes the value of 1 if both regions share a common border within the same country, and 0 otherwise. Similarly, $COUNTCONTIG_{ij}$ represents the existence of a common border across national borders. It takes the value of 1 if both regions are contiguous but located in different countries. $NATIONAL_{ij}$, is a national dummy, which takes the value of 1 if both trading regions belong to the same country and 0 otherwise. $INTERNATIONAL_{ij}$ is another dummy to denote cross-country trade. It takes the value of 1 if the exporting and importing regions are in different countries – indicating that trade crosses an international border – and 0 otherwise. As our dataset includes internal flows – e.g. production in Brussels that it is consumed in Brussels – the national and international dummy variables do not add up to one, as we set both $NATIONAL_{ij} = 0$ and $INTERNATIONAL_{ij} = 0$ for internal flows, which constitute the baseline for these two dummy variables. Therefore, we can expect a negative coefficient for $NATIONAL_{ij}$, as trade between regions belonging to the same country is lower than trade within regional boundaries. Similarly, the expectation is of a stronger negative coefficient for $INTERNATIONAL_{ij}$, as trade between regions in different countries is normally lower than trade between regions in the same country. Finally, ε_{ij} is the error term.

These variables are in line with the literature about institutions and trade. Given the prominent role performed by information frictions in trade patterns (Allen, 2014; Steinwender, 2018), institutions are introduced in the model assuming that they can reduce informational frictions (Araujo et al., 2016) and, hence, trade costs.

Distance is considered as per the basic gravity models. These models assume that trade flows are higher between nearby locations. While the most common distance indicator is physical distance between the two trading patterns, we also consider a raft of other distance indicators, such as economic distance and institutional distance, which may also influence the propensity to trade between two regions.

For the remaining control variables related to contiguity and national and international borders, we follow Gallego and Llano (2014) and acknowledge that trade mainly happens within countries, and that international trade is more frequently concentrated in regions close to an international border (McCallum, 1995).

Gravity models have been subject to growing criticism in scholarly literature as they do not capture well the so-called Multilateral Resistance Terms (MRTs) – the barriers to trade that each exporting region faces with all its trading partners – leading to biased estimates. Different solutions have been proposed in the literature. First, Feenstra (2002) advocated setting exporter and importer fixed-effects as the most suitable method. However, the inclusion of said fixed-effects excludes region-specific variables, such as the institutional quality of the exporter and the importer. Hence, only bilateral variables, such as institutional distance, may be included in the model.

Fally (2015) demonstrated that the use of the Poisson pseudo-maximum likelihood (PPML) estimator, proposed by Santos-Silva and Tenreyro (2006), with exporter and importer fixed-effects is the only estimator consistent with the MRTs in cross-sectional data. Other benefits of using a PPML estimator are that it mitigates heteroscedasticity problems derived from the logarithmic transformation of variables and it allows for the inclusion of zero trade flows.

Baier and Bergtrand (2009) suggest the Bonus Vetus (BV) OLS estimator. It consists in applying a Taylor approximation to the bilateral trade costs components (i.e. distance and control variables), leading to identical estimated coefficients, as if origin and destination fixed-effects were used. Trade cost variables are transformed by double-demeaning the variable by origin and by destination.

The inclusion of origin and destination fixed-effects allows capturing characteristics of the exporting and importing regions that are not explicitly included in the equation. These may involve factors such as regional specialization, transport logistics and accessibility, having access to international ports, the degree of integration in global value chains,

whether a region is the capital or the economic centre of a country, and some characteristics of neighbouring regions that may have an influence in shaping trade patterns. As these are region-specific factors, their effect can be captured by the fixed-effects variables.

More recently, Beverelli et al. (2018) have proposed a model to estimate the effect of institutional quality on international trade relative to intra-national trade, by considering origin and destination fixed-effects, and introducing the interaction of the quality of institutions variable of the exporter with the international trade dummy variable. We adapt Beverelli et al. (2018)'s country model to our regional trade framework in the following equation:

$$\begin{aligned}\ln TRADE_{ij} = {} & \beta_0 + \beta_1 INST_i * INTERNATIONAL_{ij} + \beta_2 \ln DIST_{ij} + \beta_3 LANG_{ij} \\ & + \beta_4 REGCONTIG_{ij} + \beta_5 COUNTCONTIG_{ij} + \beta_6 NATIONAL_{ij} \\ & + \beta_7 INTERNATIONAL_{ij} + \mu_i + \mu_j + \varepsilon_{ij} \qquad (3)\end{aligned}$$

where μ_i and μ_j are origin and destination fixed-effects.

Potential endogeneity problems between institutions and trade can arise in the analysis. Trade flows can provoke changes triggering institutional transformations (Acemoglu et al., 2005; Puga and Trefler, 2014). Another problem is the potential existence of omitted variable bias, due to unobservable factors (Levchenko, 2007). The case of economic integration of Central and Eastern European countries in the EU illustrates how trade can also induce improvements in institutional quality: after the fall of the Iron Curtain, these countries were urged to implement structural reforms to facilitate trade and foster economic development. Institutional upgrading through better democratic accountability and improvements in the rule of law and in government efficiency were fundamental reforms behind increases in trade (Fabrizio et al., 2010). With these reforms, the levels of institutional quality in Eastern Europe rose faster relative to western countries, originating a process of convergence in institutional quality that, in turn, facilitated economic convergence (Boltho, 2020). In any case, the quality of institutions in Central and Eastern Europe today remains low in comparison with Western European countries.

To overcome endogeneity in our equation (3), we follow Nizalova and Murtazashvili (2016), who show that the endogeneity bias can be removed when the potentially endogenous variable is interacted with a control, if the variable of interest is uncorrelated

with the treatment variable and the omitted variables. Beverelli et al. (2018) – applying this framework when the variable of interest is the interaction of institutional quality and the treatment variable is the international border control and including both exporter and importer fixed-effects to reduce possible omitted variable bias – find that this specification avoids endogeneity issues. The explanation is that the international border control is independent of any region and is equal to 1 for all international flows and equal to 0 for intra-national ones. Therefore, the international border control is uncorrelated with institutional quality, and the interaction term of quality of institutions with the international border control is a consistent estimate of the effect of institutions on international trade relative to intra-national trade.

Why focus on the EU? The EU represents an ideal context to evaluate how institutions affect trade at the regional level for a number of reasons. First, because it is the area of the world where the most progress has been made in terms of measuring and analysing differences in institutional quality at subnational level (Charron et al., 2014, 2015). Differences in quality of government across countries and regions of the EU are, as elsewhere in the world, rife (Charron, 2016). Differences in institutional quality have also been proven to play a fundamental role in explaining differences in regional development and growth in the EU (Rodríguez-Pose and Garcilazo, 2015; Ketterer and Rodríguez-Pose, 2018). Economic growth and trade are intrinsically related and the regional effect of institutions on economic growth may be the result of a previous effect of institutions on trade. Moreover, institutional quality is connected to other factors that determine economic development and prosperity, such as human capital, innovation, or infrastructure (Rodriguez-Pose, 2013). It is therefore highly plausible that differences in the quality of institutions have an important impact on overall trade costs, meaning that the higher the quality of the institutions in a particular place, the lower the trade costs and the higher the trade flows.

Data

The dataset used in the paper combines two databases: a novel trade database for EU regions disaggregated by sectors of activity (Thissen et al., 2019) with a regional database of indicators of the quality of government for European regions (Charron et al., 2015). In the dataset bilateral trade in intermediate and final demand goods and services are fully disaggregated. The dataset covers 61 countries, with the 28 EU Member States

disaggregated into 267 NUTS 2 (Nomenclature of Territorial Units for Statistics, level 2) regions for year 2013 (Thissen et al., 2019).

As the measure of Quality of Government, we use the European Quality of Government Index (EQI) for 2013 from Charron et al. (2014). This indicator is built by means of a large survey including citizen's perceptions and experience about corruption and quality and impartiality in public sector functions. The index is designed to allow for regional comparisons both within and between countries. The EQI index is the most comprehensive and widely used indicator of quality of government for EU regions.

To measure the distance between regions, we follow Boschma (2005) in considering that geographical distance is not the only distance possible between two places. We, therefore, in addition to physical distance, include economic and institutional distance. Physical distance is computed as the distance between the centroids – the central points – of two individual regions. Geographical data on regional administrative boundaries is extracted from Eurostat GISCO. We assume, following the overwhelming majority of trade and economic growth literature, that regions farther apart trade less. Economic distance is measured using Gross domestic product (GDP) per capita at current market prices in 2013, taken from Eurostat. Similarly, we assume that a big economic gap between two regions represents an obstacle from trade. Finally, institutional distance is measured using the quality of government indicator explained before. The intuition behind the inclusion of institutional distance is the same as in all other distances: big gaps in government quality are bound to discourage trade flows.

Different methods can be used to transform region specific indicators, such as GDP and institutional quality, into bilateral distance measures. Traditional approaches in the literature use the absolute value of the difference in indicator values between the two trading partners. Martínez-Zarzoso and Márquez-Ramos (2019) propose a fuzzy similarity metric to measure the similarities in institutional quality between trading partners. In this paper, we follow their approach and transform similarity metrics into distance metrics. The economic distance, for example, between two regions i and j is computed as:

$$distGDP_{ij} = 1 - fuzzyGDP_{ij} = 1 - \left(\frac{\min\left(GDP_i, GDP_j\right) + 1}{\max\left(GDP_i, GDP_j\right) + 1}\right) \quad (4)$$

The distance indicator ranges from 0, when the two regions have the same level of GDP, and 1. The more dissimilar two regions are in terms of GDP levels, the greater the value of the index. The same approach is followed to compute institutional distance. The descriptive statistics of the variables used in the model are displayed in Table A.2 in the Online Appendix.

Estimation Results

Quality of Government and Regional Trade

The estimation results of model (2) using different estimation are presented in Table 1. Columns (I) and (II) are estimated using the Bonus Vetus OLS (Baier and Bergstrand, 2009) without and with the institutional distance, respectively. Results show that the quality of government of both the exporter and the importer are positive and significant, confirming that better quality of government is associated with greater trade flows across EU regions. Institutional distance is negative and significant, indicating that highest trade volumes happen between regions with high and similar institutional quality. This is in line with recent findings at country level (Álvarez et al., 2018, Martínez-Zarzoso and Márquez-Ramos, 2019). Columns (III) and (IV) estimate the model including origin and destination fixed-effects using OLS and PPML, respectively. The estimated coefficient for institutional distance is around four times larger when zeros and heteroskedasticity in trade flows are taken into account in the PPML estimation. This fact reinforces the inconsistency of the OLS estimator in the presence of zeros and heteroskedasticity in trade flows.

The negative and significant coefficient for physical distance is in line with expectations in gravity equation models. Trade flows decrease as distance grows, as a consequence of higher trade costs. Economic distance, measured as GDP per capita distance is also negative and significant; indicating that regions with similar income per capita trade more with one another, corroborating the Linder hypothesis.

The control variables go with expectations. Regions sharing the same language or a common border within a country trade more. The negative coefficient for the national trade variable reflects that internal trade flows – domestic production that is consumed in the region – is higher than external trade flows. The estimated coefficient for international

trade is negative and significant, revealing the existence of a border effect. It also signals that, although many firms can participate in intra-national trade, not all of them can compete in the international market. However, this border effect is mitigated when the two regions share a common language, as shown by the positive and significant coefficient of the common language variable. As this pattern of coefficients is similar across the additional results, we omit the non-institutional variables for the sake of brevity when discussing the implications in terms of quality of government.

Table 1: Estimations results for total trade flows.

	(I) BV-OLS	(II) BV-OLS	(III) OLS	(IV) PPML
QoG origin	0.203***	0.203***		
	(0.005)	(0.005)		
QoG destination	0.064***	0.064***		
	(0.005)	(0.005)		
Institutional distance		-0.148***	-0.146***	-0.582***
		(0.036)	(0.029)	(0.056)
Log of GDP origin	0.651***	0.651***		
	(0.005)	(0.005)		
Log of GDP destination	0.808***	0.808***		
	(0.004)	(0.004)		
GDP per capita Distance	-0.042*	0.005	-0.002	-0.116**
	(0.025)	(0.027)	(0.021)	(0.046)
Log of Physical Distance	-0.571***	-0.561***	-0.559***	-0.433***
	(0.011)	(0.011)	(0.008)	(0.043)
Common Language	0.251***	0.249***	0.249***	0.397***
	(0.021)	(0.021)	(0.017)	(0.055)
Neighbour Region	0.764***	0.771***	0.773***	0.466***
	(0.037)	(0.039)	(0.038)	(0.054)
Neighbour Country	-0.382***	-0.366***	-0.365***	-0.164
	(0.070)	(0.070)	(0.058)	(0.113)
International Trade	-6.257***	-6.279***	-6.285***	-6.093***
	(0.058)	(0.058)	(0.058)	(0.172)
National Trade	-3.610***	-3.641***	-3.647***	-3.254***
	(0.054)	(0.053)	(0.057)	(0.135)
Constant	-12.640***	-12.640***	12.41***	6.152***
	(0.062)	(0.062)	(0.053)	(0.109)
Observations	71,145	71,145	71,145	71,289
Fixed Effects	No	No	Yes	Yes
R-squared	0.681	0.681	0.833	0.926

Note: Robust standard errors in parentheses. ***, and ** denotes significance at the 0.01 and 0.05 levels respectively. The dependent variable in columns (I) to (III) is the log of trade flows, whereas in column (IV) is trade flows. OLS: ordinary least squares. BV-OLS: Bonus Vetus OLS. PPML: Pseudo Poisson maximum likelihood.

International Trade vs Intra-national Trade

The estimation results of equation (3) are presented in Table 2. Our independent variable of interest is the interaction of quality of government with the international trade control variable. The coefficient for this variable is positive and statistically significant in models (I) to (III), being robust to the use of different estimation methods. This points that better institutions are more important in explaining international trade than intra-national trade. The PPML estimation in columns (II) and (III) leads to lower estimated coefficients for the interaction of the quality of government with the international trade variable.

Table 2: Estimations results for international trade relative to intra-national trade.

	(I) OLS	(II) PPML	(III) PPML	(IV) PPML
QoG origin * International Trade	0.550***	0.114***	0.039*	-0.010
	(0.025)	(0.018)	(0.020)	(0.023)
QoG origin * International Trade Lagging to Rich				0.489***
				(0.063)
QoG origin * International Trade Rich to Lagging				0.143**
				(0.072)
Institutional distance	0.092***		-0.515***	-0.297***
	(0.027)		(0.062)	(0.076)
GDP per capita Distance	-0.010	-0.203***	-0.103**	0.012
	(0.021)	(0.045)	(0.047)	(0.052)
Log of Physical Distance	-0.577***	-0.437***	-0.433***	-0.429***
	(0.008)	(0.043)	(0.043)	(0.042)
Common Language	0.213***	0.416***	0.389***	0.394***
	(0.017)	(0.057)	(0.056)	(0.056)
Neighbour Region	0.699***	0.461***	0.466***	0.473***
	(0.036)	(0.054)	(0.054)	(0.054)
Neighbour Country	-0.370***	-0.147	-0.157	-0.155
	(0.057)	(0.115)	(0.113)	(0.114)
International Trade	-6.273***	-6.215***	-6.120***	-6.161***
	(0.058)	(0.177)	(0.172)	(0.171)
National Trade	-3.503***	-3.239***	-3.253***	-3.270***
	(0.057)	(0.136)	(0.136)	(0.135)
Constant	12.453***	6.164***	6.153***	6.143***
	(0.054)	(0.110)	(0.110)	(0.109)
Observations	71,145	71,289	71,289	71,289
R-squared	0.836	0.927	0.927	0.927

Note: Robust standard errors in parentheses. ***, **, and * denotes significance at the 0.01, 0.05 and 0.01 levels respectively. The dependent variable in column (I) is the log of trade flows, whereas in columns (II) to (IV) is trade flows. OLS: ordinary least squares. PPML: Pseudo Poisson maximum likelihood. All regressions include origin and destination fixed effects.

Quality of government distance is positive and significant in the OLS estimations and negative and statistically significant in the PPML estimations. This reinforces the usage of the PPML estimation. When institutional distance is included, the estimated coefficient for quality of government at origin is smaller, but still positive and significant. This shows

that both the quality of institutions and the different institutional environment between the exporting and importing regions matters for trade.

Finally, column (IV) shows the effect of institutional quality on international trade distinguishing by level of economic development of the region. The analysis includes i) exports from rich to lagging regions and ii) exports from lagging to rich regions.[1] For this analysis, the econometric model is enlarged with the inclusion of an interaction term, involving quality of government and the variables capturing both international trade from lagging regions to rich regions and vice versa. The estimated coefficient of the interaction of quality of government with international trade from lagging to rich regions is around 3.4 times larger than from rich to lagging regions. This is opposite to what Beverelli et al. (2018) obtain when analysing poor and rich countries, revealing the importance of studying regional trade patterns, as their behaviour may differ from what is known for countries.

Quality of Government and Sectoral Trade

Once the existence of a positive effect of government quality on aggregate trade and its more important effect in international trade relative to intra-national trade has been documented, we turn to explaining if this latter effect may be heterogeneous by sector. Table 3 displays the estimation results of equation (3) distinguishing among 10 sectors of economic activity and by level of regional development.

The scenarios for different sectors yield two major implications. First, the greatest positive coefficient is found for international exports from rich to lagging regions in the case of financial services. This fact is not surprising, since the major financial centres in the EU, such as Frankfurt, Paris, Madrid, or, formerly, London are in rich regions. On the other hand, however, the overall effects are greater for the case of exports from lagging to rich regions, where the coefficients of institutional quality are close to 1 for three specific sectors: ICT, professional services and public services. In addition to that, the number of sectors where the coefficients of institutional quality are negative or non-significant are greater for international exports from rich to lagging regions.

[1] See Table A.3 in the Online Appendix for the list of lagging regions, according to the low-growth and low-income criteria.

Table 3: Estimations results for international trade relative to intra-national trade by sectors of economic activity and level of regional development.

Sector	(I) Primary	(II) Other Industry	(III) Manufacturing	(IV) Construction	(V) Wholesales & Accommodation	(VI) ICT	(VII) Financial Services	(VIII) Professional Services	(IX) Public Services	(X) Other Services
QoG origin * International Trade	0.114**	0.072	-0.024	-1.166***	0.110**	0.255***	0.635***	0.264***	0.070	-0.010
	(0.053)	(0.050)	(0.022)	(0.075)	(0.051)	(0.039)	(0.120)	(0.047)	(0.127)	(0.050)
QoG origin * International Trade Lagging to Rich	0.430***	0.402***	0.577***	-0.549***	0.072	0.963***	0.496***	0.947***	1.025***	0.620***
	(0.112)	(0.103)	(0.053)	(0.137)	(0.114)	(0.087)	(0.132)	(0.077)	(0.173)	(0.098)
QoG origin * International Trade Rich to Lagging	0.310*	0.278**	0.053	-0.385**	0.694***	0.177	1.300***	0.251***	-0.081	-0.171*
	(0.172)	(0.114)	(0.062)	(0.190)	(0.108)	(0.125)	(0.201)	(0.095)	(0.589)	(0.102)
Institutional Distance	-0.749***	-0.039	-0.418***	-3.000***	-0.321**	-0.231	0.713**	0.071	1.444***	0.554***
	(0.182)	(0.144)	(0.078)	(0.396)	(0.156)	(0.159)	(0.349)	(0.156)	(0.431)	(0.212)
GDP per capita Distance	-0.430***	0.577***	-0.135**	2.758***	-0.008	-0.142	0.904	-0.117	-0.210	-0.867***
	(0.121)	(0.108)	(0.055)	(0.465)	(0.169)	(0.115)	(0.690)	(0.123)	(0.282)	(0.144)
Log of Physical Distance	-0.368***	-0.283***	-0.537***	-0.328***	-0.418***	-0.414***	-0.259***	-0.442***	-0.483***	-0.326***
	(0.044)	(0.052)	(0.035)	(0.034)	(0.043)	(0.034)	(0.094)	(0.036)	(0.051)	(0.052)
Common Language	-0.668***	1.357***	0.028	1.737***	1.377***	0.486***	1.601***	0.438***	-0.401**	-0.048
	(0.111)	(0.075)	(0.039)	(0.218)	(0.105)	(0.085)	(0.235)	(0.080)	(0.168)	(0.172)
Neighbour Region	1.287***	0.336***	0.647***	0.224***	0.484***	0.021	0.218**	0.070	0.365***	0.384***
	(0.076)	(0.069)	(0.056)	(0.057)	(0.074)	(0.047)	(0.097)	(0.052)	(0.069)	(0.060)
Neighbour Country	-0.916***	-0.014	-0.508***	0.867**	-0.189	0.415***	0.028	0.421***	0.900***	0.763***
	(0.205)	(0.184)	(0.115)	(0.404)	(0.134)	(0.142)	(0.337)	(0.133)	(0.309)	(0.197)
International Trade	-6.170***	-7.689***	-4.441***	-12.516***	-7.538***	-6.860***	-9.215***	-7.236***	-12.294***	-9.103***
	(0.181)	(0.220)	(0.142)	(0.242)	(0.186)	(0.148)	(0.400)	(0.162)	(0.244)	(0.220)
National Trade	-3.663***	-3.540***	-2.449***	-4.094***	-3.605***	-3.379***	-3.872***	-3.465***	-3.855***	-4.288***
	(0.150)	(0.154)	(0.115)	(0.113)	(0.138)	(0.112)	(0.275)	(0.120)	(0.165)	(0.164)
Constant	9.048***	9.887***	11.875***	10.318***	11.500***	10.356***	10.574***	11.126***	11.312***	9.450***
	(0.120)	(0.135)	(0.094)	(0.087)	(0.108)	(0.086)	(0.229)	(0.090)	(0.130)	(0.135)
Observations	71,289	71,289	71,289	71,289	71,289	71,289	71,289	71,289	71,289	71,289
R-squared	0.943	0.973	0.958	0.991	0.987	0.981	0.979	0.988	0.991	0.988

Note: Robust standard errors in parentheses. ***, **, and * denotes significance at the 0.01, 0.05, and 0.01 levels respectively. The dependent on each model is trade flows on that sector. All models include origin and destination fixed effects.

The results by sector differ both in magnitude and by level of economic development. The significant positive effects range from 0.402 in other industry and 0.430 in agriculture to 0.947 in professional services, 0.963 in ICT, and 1.025 in public services, for trade from lagging to rich regions. In contrast, positive and significant estimated coefficients for trade from rich to lagging regions range from 0.251 in professional services and 0.278 in other industry, to 0.694 for wholesale and 1.300 for financial services. The negative and significant effect for the construction sector indicates that, for this sector, institutions are more important in explaining intra-national than international trade. This is expected as construction is a sector that is less exposed to international trade and more prone to intra-national trade.

The estimated coefficients are higher for financial services, professional services, and information and communication technologies (ICT), and lower for manufacturing and industry, and the primary sector. This is relevant in the current context of deregulation and liberalisation of services in the EU, and relative to the aim of creating a digital single market where consumers and business can access online goods and services regardless of where they live.

Overall, these results confirm that regions with a lower government quality (generally, lagging behind regions) can benefit to a greater extent from improvements in institutional quality. As lagging regions have a greater room for manoeuvre to improve their quality of government, gains from trade will be higher. Rich regions with better government quality will, by contrast, benefit less from higher trade flows, as they are closer to the point of saturation in terms of institutional quality in comparison to lagging regions. The same pattern is obtained by Rodríguez-Pose and Ketterer (2020) when analysing regional growth trends.

Conclusions

This is the first study that has assessed, from a comparative cross-country perspective, how variations in subnational quality of government affect trade flows. Using a novel dataset of regional trade for EU regions, we have demonstrated that better governments represent a boon for trade between EU regions, that institutions affect more the capacity of regions to participate in international trade than in intra-national trade, and that this

positive effect differs by sector and level of development. Institutions constitute a source of comparative advantage (Nunn and Trefler, 2014) and by improving its quality, regions can become players in the international trade network. EU regions with greater specialisation in ICT, financial services and professional services stand to gain more from improvements in government quality, than those more specialised in manufacturing, industry, and the primary sector. Regions more dependent on construction are unlikely to gain in terms of international trade because of improvements in government quality. Furthermore, lagging regions will benefit considerably more from improving their government quality.

Important policy implications can be derived from these results. First, institutional quality at a regional level is a factor that needs to be taken seriously into consideration when considering changes to trade policies, as the returns of opening to trade are highly dependent on local variations in government quality. Second, given the regional heterogeneity of the effects of institutional quality on trade, the implementation of place-based territorial policies becomes relevant to maximize gains from trade. The targeted improvement of local government quality, particularly in less developed regions depending on their sectoral specialisation, is therefore fundamental to maximise trade flows and a positive integration of many EU regions into the European economy. In particular, regions whose economic structure is more dependent on sectors that are weakly integrated in international markets and that suffer from low quality institutions have much more to gain from improving their quality of government and shifting their economic production structure to market services sectors. Lagging regions, usually with a lower quality of institutions, will also benefit considerably more from improvements in government quality (Rodríguez-Pose and Ketterer, 2020). In these areas, improvements in government quality will lead to increases in trade flows that, in turn, will result in higher economic growth and less overall inequality for lagging regions. This will also contribute to enhance the returns of public investment policies, such as the European Cohesion Policy.

While this research has pushed the boundaries of what we know about the relationship between institutions and trade at a subnational level, it is not without limitations. Perhaps the most important limitation is that trade data are only available for the year 2013. Improvements in the timeframe of data on regional trade within the EU will allow future studies to deal with the regional link between institutional quality and trade from a

dynamic perspective, also taking into consideration how changes in the quality of institutions affect the evolution of trade patterns over time, as improvements in government quality have been proven to drive regional development (Rodríguez-Pose and Ketterer, 2020). The sectoral analysis presented is a first attempt to gain new insights into the role played by institutions in international exports by sectors. Future research could deep dive into different sectors. In doing so, the analysis may be extended to differentiate trade in intermediate goods and final goods in order to capture the position of European regions in global production networks, as well as the existence of spatial dynamics and trade interdependencies.

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References

Acemoglu, D., & Robinson, J. (2008). *The role of institutions in growth and development*. World Bank, Washington DC.

Acemoglu, D., Johnson, S., & Robinson, J.A. (2001). The colonial origins of comparative development: An empirical investigation. *American Economic Review, 91*(5), 1369–1401.

Acemoglu, D., Johnson, S., & Robinson, J. (2005). The rise of Europe: Atlantic trade, institutional change, and economic growth. *American Economic Review, 95*(3), 546–579.

Acemoglu, R., & Robinson, J. (2012). *Why nations fail*. New York: Crown Publishing Group.

Alcalá, F., & Ciccone, A. (2004). Trade and productivity. *Quarterly Journal of Economics*, *119*(2), 613–646.

Allen, T. (2014). Information frictions in trade. *Econometrica*, 82(6), 2041–2083.

Álvarez, I.C., Barbero, J., Rodríguez-Pose, A., & Zofío, J.L. (2018). Does institutional quality matter for trade? Institutional conditions in a sectoral trade framework. *World Development, 103*, 72–87.

Anderson, J. E., & Van Wincoop, E. (2003). Gravity with gravitas: A solution to the border puzzle. *American Economic Review*, *93*(1), 170–192.

Araujo, L., Mion, G., & Ornelas, E. (2016). Institutions and export dynamics. *Journal of International Economics, 98*, 2–20.

Baier, S. L., & Bergstrand, J. H. (2009). Bonus vetus OLS: A simple method for approximating international trade-cost effects using the gravity equation. *Journal of International Economics, 77*, 77–85.

Beverelli, C., Keck, A., Larch, M., & Yotov, Y. (2018). *Institutions, trade and development: A quantitative analysis (No. 2018-3).* LeBow College of Business, Drexel University.

Boltho, A. (2020). Southern and Eastern Europe in the Eurozone: convergence or divergence? *Baltic Journal of Economics, 20*(1), 74–93.

Boschma, R. (2005). Proximity and innovation: a critical assessment. *Regional Studies*, *39*(1), 61–74.

Charron, N. (2016). Explaining the allocation of regional Structural Funds: The conditional effect of governance and self-rule. *European Union Politics*, *17*(4), 638–659.

Charron, N., Dijkstra, L., & Lapuente, V. (2014). Regional governance matters: quality of government within European Union member states. *Regional Studies, 48*(1), 68–90.

Charron, N., Dijkstra, L., & Lapuente, V. (2015). Mapping the regional divide in Europe: A measure for assessing quality of government in 206 European regions. *Social Indicators Research, 122*(2), 315–346.

Charron, N., Lapuente, V., & Rothstein, B. (2011) *Measuring Quality of Government and Sub-national Variation,* Report for the EU Commission of Regional Development European Commission Directorate-General Regional Policy Directorate Policy Development.

Coase, R.H. (1937). The nature of the firm. *Economica, 4*(16), 386–405.

Depken, C.A., II, & Sonora, R.J. (2005). Asymmetric effects of economic freedom on international trade flows. *International Journal of Business and Economics, 4*(2), 141–155.

Dollar, D., & Kraay, A. (2003). Institutions, trade, and growth. *Journal of Monetary Economics, 50*(1), 133–162.

Dreher, A., & Gassebner, M. (2013). Greasing the wheels? The impact of regulations and corruption on firm entry. *Public Choice*, *155*(3-4), 413–432.

Duranton, G., & Puga, D. (2005). From sectoral to functional urban specialisation. *Journal of urban Economics*, *57*(2), 343–370.

Duranton, G., Rodríguez-Pose, A., & Sandall, R. (2009). Family types and the persistence of regional disparities in Europe. *Economic Geography*, *85*(1), 23–47.

Easterly, W., Ritzen, J., & Woolcock, M. (2006). Social cohesion, institutions, and growth. *Economics & Politics, 18*(2), 103–120.

Feenstra, R. C. (2002). Border effects and the gravity equation: Consistent methods for estimation. *Scottish Journal of Political Economy*, *49*(5), 491–506.

Fidrmuc, J., & Fidrmuc, J. (2016). Foreign languages and trade: evidence from a natural experiment. *Empirical Economics, 50*(1), 31–49.

Fabrizio, S., Leigh, D., & Mody, A. (2010). The second transition: Eastern Europe in perspective. In *Five years of an enlarged EU* (pp. 191–220). Springer, Berlin, Heidelberg.

Fally, T. (2015). Structural gravity and fixed effects. *Journal of International Economics, 97*(1), 76–85.

Francois, J., & Manchin, M. (2013). Institutions, infrastructure, and trade. *World Development, 46*, 165–175.

Gallego, N., & Llano, C. (2014). The border effect and the nonlinear relationship between trade and distance. *Review of International Economics, 22*(5), 1016–1048.

Grossman, G.M., & Helpman, E. (1990). Trade, Innovation, and Growth. *American Economic Review*, *80*(2), 86–91.

Head, K., Mayer, T., & Ries, J. (2010). The erosion of colonial trade linkages after independence. *Journal of International Economics, 81*(1), 1–14.

Helble, M., Shepherd, B., & Wilson, J. S. (2009). Transparency and regional integration in the Asia Pacific. *World Economy*, *32*(3), 479–508.

Kaufmann, D., Kraay, A., & Mastruzzi, M. (2009), *Governance matters VIII: Aggregate and individual governance indicators 1996-2008*. Washington, D.C: The World Bank.

Kaufmann, D., Kraay, A., & Mastruzzi, M. (2011). The worldwide governance indicators: methodology and analytical issues. *Hague Journal on the Rule of Law*, *3*(2), 220–246.

Ketterer, T.D., & Rodríguez-Pose, A. (2018). Institutions vs. 'first-nature' geography: What drives economic growth in Europe's regions? *Papers in Regional Science*, *97*, S25–S62.

Kim, S. (2009). Institutions and US regional development: A study of Massachusetts and Virginia. *Journal of Institutional Economics, 5*(2), 181–205.

Krueger, A. (1998). Why trade liberalisation is good for growth. *Economic Journal*, *108*(450), 1513–1522.

Krugman, P. (1980). Scale economies, product differentiation, and the pattern of trade. *The American Economic Review*, *70*(5), 950–959.

Krugman, P. (1991a). Increasing returns and economic geography. *Journal of Political Economy*, *99*(3), 483–499.

Krugman, P. (1991b). *Geography and trade*. Cambridge, Mass: MIT Press.

Levchenko, A. A. (2007). Institutional quality and international trade. *Review of Economic Studies, 74*(3), 791–819.

Levchenko, A. A., & Zhang, J. (2012). Comparative advantage and the welfare impact of European integration. *Economic Policy*, *27*(72), 567–602.

Márquez-Ramos, L. (2016). The role of institutional environment in international trade: The case of Spanish regions. *REGION-Journal of The European Regional Science Association*, *3*(2), 125–140.

Martínez-Zarzoso I, Márquez-Ramos L. (2019) Exports and governance: Is the Middle East and North Africa region different? *World Economy, 42*(1), 143–174.

McCallum, J. (1995). National borders matter: Canada-US regional trade patterns. The *American Economic Review, 85*(3), 615–623.

McCann, P. (2013). *Modern urban and regional economics*. Oxford: Oxford University Press.

Méon, P. G., & Sekkat, K. (2005). Does corruption grease or sand the wheels of growth? *Public choice*, *122*(1-2), 69–97.

Méon, P.G., & Sekkat, K. (2008). Institutional quality and trade: which institutions? Which trade? *Economic Inquiry, 46*(2), 227–240.

Nizalova, O.Y., & Murtazashvili, I. (2016). Exogenous treatment and endogenous factors: Vanishing of omitted variable bias on the interaction term. *Journal of Econometric Methods, 5*(1), 71–77.

North, D.C. (1991). Institutions. *Journal of Economic Perspectives*, *5*(1), 97–112.

Nunn, N. (2007). Relationship-specificity, incomplete contracts, and the pattern of trade. *Quarterly Journal of Economics, 122*(2), 569–600.

Nunn, N., & Trefler, D. (2014). Domestic institutions as a source of comparative advantage. In G. Gopinath, E. Helpman, & K, Rogoff (eds.), *Handbook of International Economics* (Vol. 4, pp. 263–315). Amsterdam: Elsevier.

OECD (2014). *OECD foreign bribery report: Analysis of the crime of Bribery of foreign public officials*. Paris: OECD Publishing.

Puga, D., & Trefler, D. (2014). International trade and institutional change: Medieval Venice's response to globalization. *Quarterly Journal of Economics, 129*(2), 753–821.

Rauch, J. E., & Trindade, V. (2002). Ethnic Chinese networks in international trade. *Review of Economics and Statistics*, *84*(1), 116–130.

Rodríguez-Pose, A. (2012). Trade and regional inequality. *Economic Geography*, *88*(2), 109 –136.

Rodríguez-Pose, A. (2013). Do institutions matter for regional development? *Regional Studies*, *47*(7), 1034–1047.

Rodríguez-Pose, A. (2020). Institutions and the fortunes of territories. *Regional Science Policy & Practice*, *12*(3), 371–386.

Rodríguez-Pose, A., & Garcilazo, E. (2015). Quality of government and the returns of investment: Examining the impact of cohesion expenditure in European regions. *Regional Studies*, *49*(8), 1274–1290.

Rodríguez-Pose, A., & Ketterer, T. (2020). Institutional change and the development of lagging regions in Europe. *Regional Studies, 54*(7), 974–986.

Rodríguez-Pose, A., & Zhang, M. (2019). Government institutions and the dynamics of urban growth in China. *Journal of Regional Science*, *59*(4), 633–668.

Rodrik, D. (2004). Getting institutions right. *CESifo DICE Report*, 2: 1–13.

Santos-Silva, J.S., & Tenreyro, S. (2006). The log of gravity. *Review of Economics and Statistics,* 88(4), 641–658.

Steinwender, C. (2018). Real effects of information frictions: When the states and the kingdom became united. *American Economic Review, 108*(3), 657–696.

Storper, M. (1997) *The regional world: Territorial development in a global economy*. London: Guildford Press.

Tabellini, G. (2010). Culture and institutions: economic development in the regions of Europe. *Journal of the European Economic Association*, *8*(4), 677–716.

Thissen, M., Ivanova, O., Mandras, G., & Husby, T. (2019). *European NUTS 2 regions: construction of interregional trade-linked Supply and Use tables with consistent transport flows*. JRC Working Papers on Territorial Modelling and Analysis No. 01/2019, JRC115439. Seville: European Commission.

Tinbergen, J. (1962). *Shaping the world economy; suggestions for an international economic policy.* New York: Twentieth Century Fund.

Tönnies, F. (1881). *Gemeinschaft Und Gesellschaft: Grundbegriffe Der Reinen Soziologie* (8th ed.). Darmstadt, Germany: Wissenschaftliche Buchgesellschaft.

Weber, M. (1921). *Wirtschaft und Gesellschaft. Grundriß der verstehenden Soziologie* Tübingen: Mohr.

Wei, S.J. (1996). *Intra-national versus international trade: how stubborn are nations in global integration?* NBER Working Papers 5531. Cambridge; National Bureau of Economic Research.

Appendix: Additional Tables

Table A.1: Sectors of economic activity.

Sector	NACE 2 Codes	Description
Primary	A	Agriculture, Forestry and Fishing.
Other Industry	B, D, E	Mining and quarrying. Electricity, Gas, Steam and Air Conditioning Supply. Water Supply Sewerage, Waste Management and Remediation Activities.
Manufacturing	C	Manufacturing.
Construction	F	Construction
Wholesales & Accommodation	G, H, I	Wholesale and Retail Trade; Repair of Motor Vehicles and Motorcycles. Transportation and Storage. Accommodation and Food Service Activities.
ICT	J	Information and Communication.
Financial Services	K, L	Financial and Insurance Activities. Real Estate Activities.
Professional Services	M, N	Professional, Scientific and Technical Activities. Administrative and Support Service Activities.
Public Services	O, P, Q	Public Administration and Defence; Compulsory Social Security. Education. Human Health and Social Work Activities.
Other Services	R, S, T, U	Arts, Entertainment and Recreation. Other Service Activities. Activities of Households as Employers; Undifferentiated Goods and Services Producing Activities of Households for Own Use. Activities of Extraterritorial Organisations and Bodies.

Table A.2: Descriptive statistics.

	Mean	Standard Deviation	Minimum	Maximum
Total Trade	468.30	9,245.72	0.00	1,290,160.00
Trade: Primary	9.60	167.95	0.00	14,143.29
Trade: Other Industry	23.96	523.19	0.00	66,908.18
Trade: Manufacturing	132.01	2,145.23	0.00	274,120.90
Trade: Construction	31.23	721.15	0.00	98,811.19
Trade: Wholesales & Accommodation	80.59	1,854.00	0.00	250,323.80
Trade: ICT	22.65	548.15	0.00	77,571.28
Trade: Financial Services	47.44	1,196.47	0.00	145,521.90
Trade: Professional Services	43.24	1,214.81	0.00	222,123.00
Trade: Public Services	63.46	1,369.95	0.00	149,202.80
Trade: Other Services	14.25	323.00	0.00	41,202.88
Quality of Government	53.87	17.03	0.00	100.00
Physical Distance	1,223.89	723.17	0.39	5,322.00
GDP per capita Distance	0.39	0.26	0.00	0.96
Institutional Distance	0.29	0.23	0.00	0.99
Common Language	0.04	0.20	0.00	1.00
Neighbour Region	0.01	0.11	0.00	1.00
Neighbour Country	0.00	0.06	0.00	1.00
International Trade	0.93	0.26	0.00	1.00
National Trade	0.07	0.26	0.00	1.00

Table A.3: List of lagging regions

Country	Region Code	Region Name	Category
Bulgaria	BG31	Severozapaden	Low income
	BG32	Severen tsentralen	Low income
	BG33	Severoiztochen	Low income
	BG34	Yugoiztochen	Low income
	BG42	Yuzhen tsentralen	Low income
Greece	EL51	Anatoliki Makedonia, Thraki	Low growth
	EL52	Kentriki Makedonia	Low growth
	EL53	Dytiki Makedonia	Low growth
	EL54	Ipeiros	Low growth
	EL61	Thessalia	Low growth
	EL62	Ionia Nisia	Low growth
	EL63	Dytiki Ellada	Low growth
	EL64	Sterea Ellada	Low growth
	EL65	Peloponnisos	Low growth
	EL41	Voreio Aigaio	Low growth
	EL43	Kriti	Low growth
Spain	ES42	Castilla-la Mancha	Low growth
	ES61	Andalucía	Low growth
	ES62	Región de Murcia	Low growth
	ES64	Ciudad Autónoma de Melilla	Low growth
	ES70	Canarias	Low growth
Hungary	HU23	Dél-Dunántúl	Low income
	HU31	Észak-Magyarország	Low income
	HU32	Észak-Alföld	Low income
	HU33	Dél-Alföld	Low income
Italy	ITF1	Abruzzo	Low growth
	ITF2	Molise	Low growth
	ITF3	Campania	Low growth
	ITF4	Puglia	Low growth
	ITF5	Basilicata	Low growth
	ITF6	Calabria	Low growth
	ITG1	Sicilia	Low growth
	ITG2	Sardegna	Low growth
Poland	PL31	Lubelskie	Low income
	PL32	Podkarpackie	Low income
	PL33	Swietokrzyskie	Low income
	PL34	Podlaskie	Low income
	PL62	Warminsko-Mazurskie	Low income
Portugal	PT11	Norte	Low growth
	PT15	Algarve	Low growth
	PT16	Centro	Low growth
	PT18	Alentejo	Low growth
Romania	RO11	Nord-Vest	Low income
	RO21	Nord-Est	Low income
	RO22	Sud-Est	Low income
	RO31	Sud – Muntenia	Low income
	RO41	Sud-Vest Oltenia	Low income

Source: European Commission (2017).

European Commission (2017) *Competitiveness in low-income and low-growth regions: The lagging regions report*. Commission Staff Working Document. Number SWD(2017) 132. Brussels: European Commission.