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Trade Patterns and Endogenous Institutions: Global Evidence

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Abstract

We propose a novel way to measure the rule of law intensity of exports at the goods level based on nearly 100 million disaggregated bilateral trade flows around the globe. We categorise goods into three groups: fragmented, primary and other. The theoretical literature on hold-up problems connected to incomplete or incompletely enforceable contracts or property rights predicts that goods resulting from fragmented production processes should be the most rule of law intensive. However, we find that the rule of law intensity of other goods is, on average, only slightly lower than that of fragmented goods. We examine how exogenous variation in countries' trade patterns influences the quality of institutions. Our regressions show that trade flows generated by fragmented and other processes of production improve rule of law, while trade flows generated by primary production do not.

JEL-Classification: C83, D91, E21
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1 Introduction

A voluminous body of research has documented that good institutions are key to long-term economic development (for an authoritative survey, see Acemoglu et al. (2005a)) and that the quality of institutions differs sharply across countries (Acemoglu et al., 2005b; North, 1990). A large body of literature has also examined the drivers of these differences in institutional quality and suggested various channels, such as legal origin, ethnic heterogeneity, factor endowments or climate factors (Acemoglu et al., 2001; Sokoloff and Engerman, 2000). However, the international trade channel of cross-national differences in institutional quality has received considerably less attention (Rodrik, 2002; Levchenko, 2007). In this paper, we empirically examine whether trade patterns can explain heterogeneity in the quality of institutions across countries and whether some trade patterns improve the quality of institutions, while others do not. To the best of our knowledge, the latter question has not yet been examined in the literature.

Trade flows and patterns react to the design of specific and economically relevant institutions, such as the legal system, which may strengthen or weaken technology- or endowment-related comparative advantages. As a result, the relevant literature now considers institutions a source of comparative advantage (Levchenko, 2007; Nunn, 2007; Costinot, 2009; Chor, 2010). As institutions also generate rents, there is a theoretically justifiable presumption of reverse causality, i.e., from trade to institutions, because institutional choices might be aimed at seeking rents from trade. Therefore, any empirical strategy to evaluate the effects of trade on institutions must account for endogeneity.

In this paper, we focus on an economically significant formal institution, the rule of law, operationalised as the degree of enforceability of contractual rights. Levchenko (2013) is the only contribution to theoretically and empirically establish that trade patterns matter for the quality of institutions. Specifically, Levchenko (2013) shows that countries exporting goods that are more rule of law intensive exhibit better rule of law. Rule of law–intensive goods result from production processes that feature high demand for enforceability of contractual rights and are typically described by some measure of product(ion) complexity. To extend Levchenko (2013), we examine traditional trade classifications and investigate whether different goods categories have systematically different effects on countries' rule of law. Different types of goods might have varying sensitivity to the enforceability of contractual claims and property rights and, hence, to the design of legal institutions. For example, trade flows that are generated by the fragmentation of complex production processes might be particularly sensitive, while primary products might not be sensitive at all.

Mostly due to data limitations, the previous literature has used US input-output tables to proxy for the institutional intensity of sectors worldwide. We contribute to this literature by offering a novel exogenous, trade-based and good-specific measure of the rule of law intensity of exports. Our measure uses bilateral trade flow data covering all tradable (merchandise) goods on the basis of a highly disaggregated global dataset and country-specific information. Our measure enables us to distinguish among trade flows generated by different production activities. This

allows us to first generalise the results presented in Levchenko (2013) to our highly disaggregated and extensive measure of goods' rule of law intensity, and second, to examine whether separate trade flows generated by primary (fragmented or other) production exert significantly different influences on rule of law quality.

Our detailed goods-level information on the rule of law intensity allows us to build trade-weighted aggregate measures of the rule of law intensity for three broad groups. We find that, on average, intermediate and final goods generated in fragmented processes of capital goods and transport equipment production are more institutionally intensive than primary goods. Somewhat surprisingly, however, the institutional intensity of all other goods is, on average, only slightly lower than that of fragmented goods.

Our regression results confirm that exports that are more rule of law intensive contribute to better rule of law in the country of origin. However, when we extend the regressions in Levchenko (2013) and examine our broad good categories in detail, we find that both fragmented and other goods exert a positive effect on rule of law. To the contrary, if countries are predisposed to export primary goods, their rule of law is unlikely to improve. As a consequence, our results suggest which countries are likely to benefit from international trade in terms of improved rule of law. In addition, we find that legal origin, political institutions, trade liberalisation and economic development are important determinants of countries' rule of law.

Importantly, we find that the size of the effect of fragmented goods on rule of law is approximately the same as that of other goods. Therefore, our results motivate reservations about incomplete or incompletely enforceable contracts or property rights foundation of trade theory explanations for why we observe cross-national differences in institutional quality. According to that theory, only more complex production processes benefit from higher degrees of enforceability of contractual claims. Our results suggest that the enforceability of contractual claims is critical to a larger basket of goods than previously thought.

The rest of the paper is structured as follows. In section 2, we discuss the literature on the interdependence between institutions and trade patterns to motivate our hypotheses. In section 3, we introduce our new trade-based, good-specific, and country-specific measures of rule of law intensity of exports. Section 4 outlines our estimation strategies and regression specifications. In section 5, we present our results. Finally, section 6 concludes and provides directions for further research. An Appendix with additional data descriptions and regression results follows.

2 Institutions and Openness

In this section, first, we present selected studies of the effects of rule of law on international trade, with an emphasis on the theoretical underpinnings of these studies. Second, we discuss the scarce literature examining the effects of trade patterns on rule of law, including theoretical and empirical aspects, and present our hypotheses.

2.1 Rule of Law as a Determinant of Trade

A recent body of literature examines whether trade flows and trade patterns react to the design of legal institutions that can strengthen or weaken comparative advantage (Anderson and Marcouiller (2002), Levchenko (2007), Nunn (2007), Cheptea (2007), Costinot (2009), and Chor (2010)). The theoretical basis of this influence draws on a combination of the hold-up problem (Caballero, 2007), the incomplete contracts (Williamson, 1985) and the property rights (Grossman and Hart, 1986; Hart and Moore, 1990) literatures, according to which more complex production organisation benefits from a higher degree of contract enforceability.

When investing in a joint production activity involving several parties or factors of production, parts of the investment are specific to particular relationships. The value of that investment is higher within than outside the relationship. With irreversible investments, this difference constitutes an appropriable quasi-rent, the core of the hold-up problem on which the investor might have to (re-)negotiate *ex post* investment with the owners of other factors of production. This creates opportunities for non-investors to earn rents over and above marginal productivity. Accordingly, the willingness to invest decreases below the efficient level.

Investment inefficiency could in principle be alleviated *ex ante* by writing enforceable, complete contracts to describe the claims of all parties for all possible states of the world or by assigning enforceable property rights to allocate all residual rights of control. However, real-world contracts and property rights are incomplete or incompletely enforceable and cannot deliver investment efficiency. Thus, the degree of enforceability of contracts and property rights, which here describes the rule of law quality, is of obvious importance. An environment with low enforceability of contractual claims results in great underinvestment inefficiency from hold-up problems. That is, the worse the rule of law, the more imperfect the contractual arrangement and the greater the resulting under-investment and rents in a sector that is characterised by investment specificity.

The relevance of hold-up problems is good specific, varying with the complexity of the production process, which features more or less demand for contract and property rights enforceability. That means goods vary in their rule of law intensity. Country-specific rule of law therefore affects the productivity of a rule of law–intensive good. In the international context, this means that countries with better rule of law may have a comparative advantage in rule of law intensive sectors—beyond sources of relative technology or factor endowment.

Empirical strategies to identify the effects of rule of law on trade patterns typically rely on an approach that interacts country- and sector-specific influences to test Heckscher-Ohlin theories

(Romalis, 2004). These studies usually rely on sector-specific measures of rule of law intensity, which are combined with country-specific rule of law measurements. In particular, several studies have shown that countries with better rule of law export more in sectors that feature more intensive demands on the enforceability of contractual claims. Sector-specific demand on enforceability, in turn, is described by the complexity of production processes, proxied by various measures, such as Herfindahl indices of input concentration (Levchenko, 2007), the proportion of user-specified inputs according to (Rauch, 1999)'s classification (Nunn, 2007), work complexity (Costinot, 2009), or all of these together (Chor, 2010).

2.2 Trade Patterns as Determinants of Rule of Law: The Role of Rents

The influence of international openness on institutional change has been postulated for a long time. Perhaps the most important historical example reported in the literature is the opening of Atlantic trade in the 16th century, which gave rise to a merchant class that lobbied for institutional change (Acemoglu et al., 2005b). In fact, previous empirical studies, such as Rigobon and Rodrik (2005) and Rodrik et al. (2004), find a positive association between openness and quality of institutions in a cross-section of countries. Giavazzi and Tabellini (2005) show that liberalisation episodes improve the quality of political institutions over time.

To the best of our knowledge, Levchenko (2013) provides the only formulation of and test for the effects of trade *patterns* on institutional quality while explicitly addressing endogeneity. His approach is based on a three-sector/two-factor Heckscher-Ohlin-Ricardo model of trade with equilibrium properties *à la* Davis (1995). The model incorporates holdup-problem features such that first, poor rule of law generates rents for non-investors in the sector that provides intensive demands on the enforceability of contractual claims, and second, good rule of law generates a comparative advantage in rule of law–intensive goods. For similar technologies, rule of law is the only source of comparative advantage. Lobbying for rents then allows for the endogenisation of institutional quality.

In particular, exogenous external liberalisation leads to competition for better rule of law between countries that have similar technology: non-investors fear losing the rents generated by bad rule of law should the production of their sector move abroad. The only way to prevent this shift is improving rule of law under partial loss of rents. Over the long run, non-cooperative rent seeking behaviour among non-investors across countries implies a race to the top. Ultimately, all open countries with similar technologies have the same—highest—level of rule of law.[1] The theoretical approach in Levchenko (2013) provides two testable hypotheses. First, for small technological differences between countries, exogenous external liberalisation leads to improvements in rule of law. Second, for small cross-national technological differences, countries that enjoy a comparative advantage in rule of law intensive sectors are more likely to

[1] Institutional differences have no impact on comparative advantage when sectoral technological differences between countries are sufficiently large. Then, external liberalisation provides no incentive to improve rule of law in order to keep a portion of rents in the country. For an alternative theoretical approach rooted in a Melitz-type model of firm heterogeneity and trade, see Do and Levchenko (2009).

have better rule of law. This comparative advantage in rule of law–intensive sectors is assumed to be independent of existing country-specific institutions.

Levchenko (2013) tests the second hypothesis for a cross-section of countries. The problem of endogenous institutions and trade patterns is addressed by a two-step approach. In the first step, a country-specific variable of institutionally intensive exports, IIX, is constructed as a weighted openness measure for the entire economy by interacting geographically pre-determined, sector-specific Frankel and Romer (1999) openness measures with sector-specific rule of law intensities, which are subsequently aggregated across all sectors. In the second step, a regression analysis of rule of law quality is conducted, with IIX as the key explanatory variable. The path dependence of rule of law is taken into account by considering different legal traditions. In robustness exercises, the approach is embedded in the hierarchy of institutions hypothesis (Acemoglu et al., 2005a) according to which political institutions shape economic institutions. The results show that countries with higher IIX values, i.e., countries whose geographical characteristics pre-determine stronger exports in rule of law–intensive goods, indeed exhibit significantly better rule of law.

The empirical results in Levchenko (2013) are theoretically underpinned by the effects of rent seeking on institutional design. However, there are sources of rents other than hold-up problems in complex production processes that are characterised by investment specificity and irreversibly combined with incomplete or incompletely enforceable contracts or property rights. Hoff and Stiglitz (2004) identify factors that reduce the political demand for rule of law, including corrupt privatisation, abundant natural resources, and hyperinflation. These factors potentially compete for influence on rule of law quality. A number of contributions argue that dependence on natural resources is responsible for low institutional quality (Beck and Laeven, 2006; Bhattacharyya and Hodler, 2010; Gylfason, 2001; Matsuyama, 1992; Sachs and Warner, 1995a), although this view is not unanimous. Indeed, Alexeev and Conrad (2009) find that natural resource dependence is not related to institutional quality.

Returning to seeking appropriable quasi-rents, specificity, appropriable quasi-rents and hold-up problems characterise a variety of transactions that are prevalent throughout the economy. The prime example concerns capital-labor relationships (Caballero, 2007). Analogously to the complex production process argument, investment specificity and irreversibility create hold-up problems between capital and labor, enable labor to earn rents above marginal productivity and decrease willingness to invest at the efficient level.[2] The relevance of hold-up problems in a capital-labor relationship "may be increased by such institutional features as dismissal regulations (which devalue the firm's option of using its investment outside the relationship) or unionization (which narrows the firm's outside option to a sector outside the scope of the union)" (Caballero, 2007, p. 60).

Consequently, capital-labor hold-up problems can be alleviated by labor market deregulation. Importantly, Caballero et al. (2013) emphasise the key distinction between effective and official labor market regulation, measuring effective labor regulation by interacting official measures

[2] In fact, the Heckscher-Ohlin-Ricardo trade model in Levchenko (2013) is perfectly compatible with an interpretation of incorporated hold-up problems describing capital-labor relations.

of job security provision with measures of rule of law and government efficiency. The authors find that job security regulation hampers the creative destruction process, especially in countries where regulations are likely to be enforced, i.e., places with strong rule of law.

We thus conjecture that, in terms of endogenising effective labor market institutions in open economies, actors – when seeking appropriable quasi-rents accruing from hold-up problems in capital-labor relationships that are characterised by investment specificity – choose between lobbying for lower degrees of official labor market regulation and lobbying for higher quality rule of law. In fact, the evidence points towards the existence of this choice: while Potrafke (2013) fails to find globalisation-induced labor market deregulation, Davies and Vadlamannati (2013) find that labor standards interdependence among countries is more evident in labor practices (i.e., enforcement) than in official labor laws.

All this previous work suggests specialisation-specific channels through which open economy rent seeking affects institutional design: an economy-wide channel of seeking appropriable quasi-rents accruing from hold-up problems in capital-labor relationships, a channel of seeking appropriable quasi-rents accruing from hold-up problems in complex production processes with incomplete contracts, and a channel of rents seeking from primary production.

In this paper, complex production processes result from fragmentation due to changes in technology and increasing division of production. In sector terms, fragmentation is commonly observed in the production of capital goods and transport equipment, that is, in generating the parts, components, and respective final products in this sector.[3] Due to their complexity, fragmented production processes are particularly vulnerable to hold-up problems and may therefore especially benefit from improved rule of law. The interdependence between trade patterns and rule of law can then be examined in light of different categories of goods, with special attention to trade flows generated by the fragmentation of complex production processes.

Accordingly, relative to all other goods, we expect specialisation in fragmented processes of production (i.e., in generating parts, components and final products of capital goods and transport equipment) to be particularly prone to hold-up problems connected to incomplete contracts and property rights and, thus, to *cet. par.* positively affect rule of law. On the contrary, resource rent seeking may negatively impact the quality of legal institutions. Overall, we can expect that some trade patterns are more conducive to rule of law than others.

[3] Fragmentation makes additional specialisation possible, potentially promoting a shift of fragmented production processes abroad. In geographic terms, fragmentation and subsequent dislocation is especially important in East Asia and within Europe, causing systematically increasing trade in parts, components, and final capital goods across these regions (Kimura et al., 2007, 2008; Frensch et al., 2015).

3 Measuring the Rule of Law Intensity of Exports

3.1 Measuring the Rule of Law Intensity of Exports at the Good and Country Levels: RoLIX$_k$ and RoLIX$_i$

For the purpose of providing an exogenous, trade-based, and product-specific measure of the rule of law intensity of goods, we use country-specific institutional indicators, worldwide data on bilateral trade flows, and country pair–specific information, such as proxies for bilateral trade barriers.

Annual rule of law data are typically available since 1996 as one of six governance indicators from the World Bank (see Teorell et al., 2013). Therein, rule of law "captures perceptions of the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence". We normalise the rule of law indicator to range between 0 and 1 instead of from –2.5 to +2.5.

We use the CEPII BACI trade dataset, which is based on UN Comtrade data.[4] It contains bilateral trade flows measured in thousands of US$ at the Harmonized System (HS) Code 92 6-digit level (HS6: 5,017 goods) for the years from 1995 to 2010 for almost 200 countries; nearly 100 million of these are non-zero trade flows. The Broad Economic Categories (BEC) classification of the United Nations Statistics Division allows the grouping of goods into 19 different categories, which in turn can be divided into primary, other and fragmented goods categories. Details on the datasets, variables, list of countries included and classifications of goods are provided in the Appendix.

To identify the influence of trade patterns on institutions, endogeneity has to be addressed; Levchenko (2013) does so by constructing a country-specific variable to measure the rule of law intensity of exports. His measure combines geographically pre-determined information on trade flows with industry-specific information in order to indicate the complexity of production as was also done in Nunn (2007). Nunn (2007) constructs the contract intensity of industries "...as the fraction of each industry's inputs not sold on organized exchanges or reference priced" on the basis of the Rauch (1999) trade-based product classification and US input-output tables. However, this method suffers from some limitations: First, by using only US input-output tables, Nunn (2007) implicitly assumes that the institutional intensity of goods is uniform across countries. Second, disaggregation is constrained to the 2-digit ISIC level. However, trade data are usually not reported using the ISIC, i.e., classifications must be converted from HS or SITC to ISIC. These conversions are far from perfect. Third, some industries are not captured by this measure, specifically in primary production.

Therefore, our approach differs in two major aspects from Nunn (2007) and Levchenko (2013). First, we substitute the ISIC-specific complexity measure with one that indicates the rule of law intensity at a more disaggregated level (for more than 5,000 goods at the HS 6-digit

[4] For further information, refer to `http://www.cepii.fr/anglaisgraph/bdd/baci.htm` of Gaulier and Zignago (2010). The acronym BACI stands for Base pour l'Analyse du Commerce International.

level) in the spirit of Hausmann et al. (2007). Consequently, we are not limited to 28 industries: we also cover primary goods. Second, we do not rely on data from one country (the US input-output tables) but use information from all countries and all bilateral trade relationships to calculate the rule of law intensity of goods.

We construct the country-specific rule of law intensity of exports measure by interacting country-specific (i) with goods-specific (k) information as follows:

$$\mathsf{RoLIX}_i = \sum_{k=1}^{K} \widehat{\omega}_{ik} \cdot \mathsf{RoLIX}_k, \tag{1}$$

with RoLIX_k as our goods-specific measure of rule of law intensity, $\widehat{\omega}_{ik}$ as either the predicted share of total exports x of country i in good k: $\widehat{\omega}_{ik} = \frac{\widehat{x}^k_{i\bullet}}{\sum_{k=1}^{K} \widehat{x}^k_{i\bullet}} = \frac{\widehat{x}^k_{i\bullet}}{\widehat{x}^\bullet_{i\bullet}}$ (called weight 1) or as the predicted total exports of country i in good k: $\widehat{\omega}_{ik} = \widehat{x}^k_{i\bullet}$ (called weight 2). Note that we denote the sum over a certain category using a bullet '$\bullet$', for example, $x^k_{i\bullet} = \sum_j x^k_{ij}$. We present the ranking of countries according to RoLIX_i in the Appendix.

3.1.1 Calculating RoLIX_k

To measure the RoLIX of good *k*, we apply a method by Hausmann et al. (2007), which implies the rule of law requirements a country must meet in order to export good k, using information from all exporting countries:

$$\mathsf{RoLIX}_k = \sum_i \underbrace{\left(\frac{x^k_{i\bullet}/x^\bullet_{i\bullet}}{\sum_i (x^k_{i\bullet}/x^\bullet_{i\bullet})} \right)}_{\text{weight: } \varphi_{ik}} RoL_i, \tag{2}$$

where RoL_i is a country-specific indicator for rule of law, $x^k_{i\bullet}$ denotes the country export volume of product k, and $x^\bullet_{i\bullet} = \sum_k x^k_{i\bullet}$ denotes the total exports of country i. The value of exports is measured in current US dollars. The weights φ_{ik} are variants of Balassa's Revealed Comparative Advantage (RCA) Index and add up to one. The weights ensure that the ordering of the products is not biased by country size.[5] To calculate the indicator we use the user-written Stata program *prody*.[6]

3.1.2 Instrumenting the Export Volume

As trade and institutions are simultaneously determined, we need to instrument trade. To do so, we follow Frankel and Romer (1999) in estimating a gravity-like equation that contains only

[5] Assume, for example, that both country A and country B export bananas. Suppose that country A is larger and has better rule of law than country B. Because A is larger than B, its export volume of bananas is likely to be larger than that of B. However, bananas certainly represent a larger share of B's exports than of A's exports. Not controlling for country size when measuring the RCA in exporting bananas might thus lead to a higher institutional intensity level for bananas simply because they are exported by a country with high institutional quality. In this case, A.

[6] Both the ado-file and the description can be downloaded here: `http://www.uni-regensburg.de/wirtschaftswissenschaften/vwl-moeller/medien/prody/prody.zip`.

the exogenous, time invariant, geographical explanatory variables provided by CEPII:

$$\begin{aligned}\ln T_{ij}^k =& \alpha_0 + \alpha_1 \ln(D_{ij}) + \alpha_2 \ln(N_i) + \alpha_3 \ln(N_j) + \alpha_4 B_{ij} \\ &+ \alpha_5 \ln(A_i) + \alpha_6 \ln(A_j) + \alpha_7 \ln(L_i + L_j) \\ &+ \alpha_8 [B_{ij} \cdot \ln(D_{ij})] + \alpha_9 [B_{ij} \cdot \ln(N_i)] + \alpha_{10} [B_{ij} \cdot \ln(N_j)] \\ &+ \alpha_{11} [B_{ij} \cdot \ln(A_i)] + \alpha_{12} [B_{ij} \cdot \ln(A_j)] + \alpha_{13} [B_{ij} \cdot (L_i + L_j)] + \epsilon_{ijk}, \end{aligned} \tag{3}$$

where T_{ij}^k denotes the log of bilateral exports of good k from country i to country j as a share of GDP, $\left(x_{ij}^k / Y_i\right)$, and T_{ij}^k represents an instrument for $x_{i\bullet}^k$. Both exports and GDP are averaged over the years from 1995 to 2010. Here, D_{ij} is the distance between countries; N_i and N_j is population of country i and j, respectively; A is the size of a country in square meters; B is a dummy for a common border between two countries; L is a dummy for landlocked countries; and ϵ_{ij} is the error term. To generate the GDP-weighted predicted country i exports of good k, we finally aggregate:

$$\widehat{T_{i\bullet}^k} = \sum_{\substack{j=1 \\ j \neq i}} \exp^{\ln(\widehat{T_{ij}^k})}. \tag{4}$$

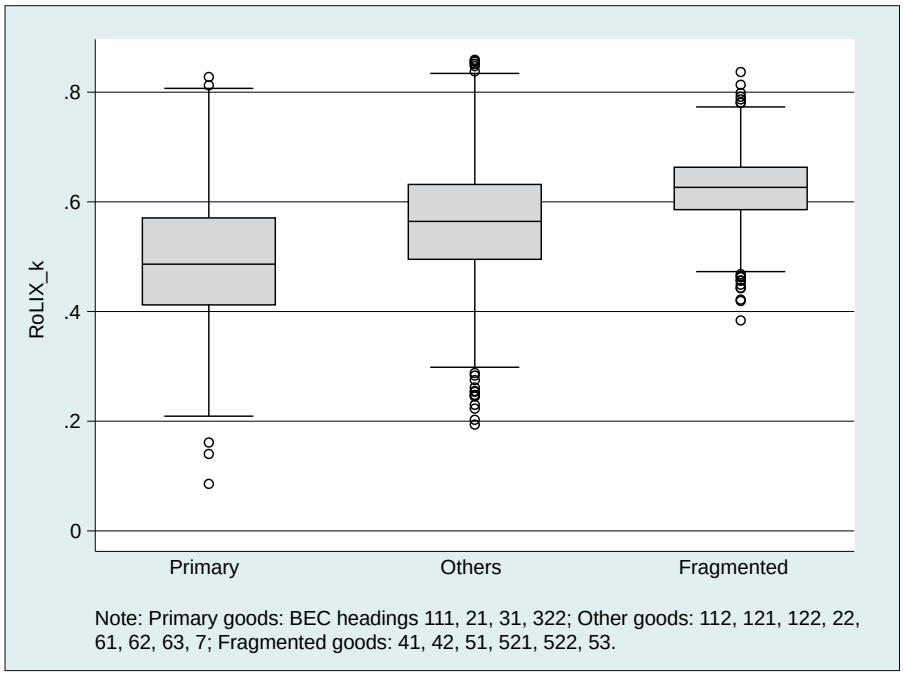
Note that $\widehat{\omega}_{ik}^c = \frac{\widehat{T}_{i\bullet k}^c}{\sum_{k=1}^K \widehat{T}_{i\bullet k}}$.

3.2 Measurement Results

We present our estimates of the rule of law intensity of exports for various goods categories. Figure 1 presents box plots of export rule of law intensities at the goods level by three groups of goods: primary, fragmented and others (see Appendix A.1 for the goods classification). We present the weight 1 estimates, as described by Eq.(1). The estimates using weight 2 are largely similar and are available upon request. As expected, fragmented goods, on average, exhibit the highest rule of law intensity, followed by other goods. Primary goods are the least institutionally intensive. Nevertheless, we observe sizeable within-category heterogeneity supporting the estimation of the rule of law intensity of exports at the goods level.

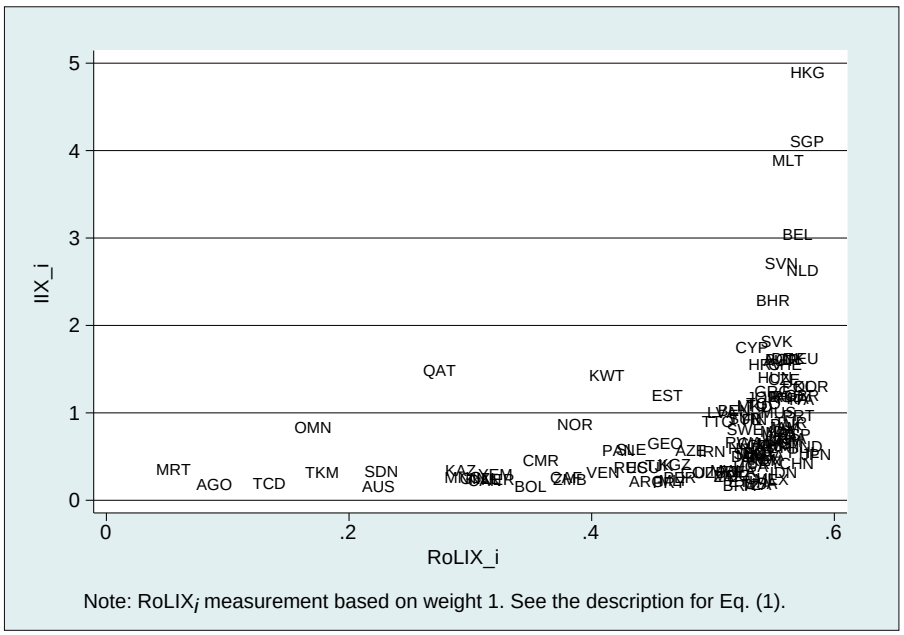
Figure A2 in the Appendix examines the rule of law intensities of exports in greater detail, i.e., for the 19 different BEC categories. Capital goods are the most institutionally intensive, followed by transport equipment. On the other hand, the 'food and beverages mainly for industry' and 'Fuels and lubricants: primary' categories represent the least institutionally intensive goods for export. These results broadly correspond to Levchenko (2013), who finds transport equipment to be the most institutionally intensive and petroleum refineries to be the least.

Figure 2 compares our country-specific RoLIX_i with IIX, the country-specific measure of rule of law intensity of exports used in Levchenko (2013). The correlation between these two measures is positive but far from unity. This is not surprising given the number of differences between RoLIX_k and RoLIX_i and between product-specific and country-specific measures of the rule of law intensity of exports used in Levchenko (2013), as discussed above.



Note: Primary goods: BEC headings 111, 21, 31, 322; Other goods: 112, 121, 122, 22, 61, 62, 63, 7; Fragmented goods: 41, 42, 51, 521, 522, 53.

Figure 1: Rule of Law Intensity of Exports at the Goods Level: Primary, Fragmented and Other Goods



Note: RoLIX$_i$ measurement based on weight 1. See the description for Eq. (1).

Figure 2: The Relationship between Levchenko (2007)'s IIX$_i$ and our RoLIX$_i$

4 Estimation Strategies and Regression Specifications

4.1 Estimation Strategies

We explain country-specific rule of law using exogenous, country-specific measures of the rule of law intensity of exports and a vector of control variables. We employ three estimation strategies. The first one (estimation strategy A) is designed to re-examine the results in Levchenko (2013). The other two (estimation strategies B1 and B2) take us one step further and are designed to pinpoint whether some goods categories are more important for rule of law quality than others.

4.1.1 Estimation Strategy A

We re-examine the results of Levchenko (2013) by substituting the complexity measures from Nunn (2007), which are measured at the industry level (ISIC), with a trade-based rule of law intensity measure, which has a number of advantages. The trade classification is more disaggregated at the goods level (HS-92) and covers a broader range of goods. In particular, we are able to include goods from the primary sector, which are excluded in Nunn (2007). Formally, we estimate the following cross-country regression:

$$\mathsf{RoL}_i = \alpha + \beta \mathsf{RoLIX}_i + \gamma \mathbf{Z}_i + \epsilon_i, \tag{5}$$

where $\mathbf{Z}_i$ is a vector of control variables. Note that our RoLIX_i measurement is exogenous to RoL_i because of the instrumentation explained in section 3.1.2. The vector of control variables is also exogenous, as detailed in section 4.2.

4.1.2 Estimation Strategy B1

We now construct three separate country-specific measures of the rule of law intensity of exports for mutually exclusive and exhaustive primary, fragmented and other goods categories, as our measure enables us to decompose RoLIX_i, as defined in Eq.(1) into:

$$\mathsf{RoLIX}_i = \underbrace{\sum_{p \in \substack{\text{primary}\\ \text{goods}}} \widehat{\omega}_{ip} \mathsf{RoLIX}_p}_{RoLIX_i^p} + \underbrace{\sum_{f \in \substack{\text{fragmented}\\ \text{goods}}} \widehat{\omega}_{if} \mathsf{RoLIX}_f}_{RoLIX_i^f} + \underbrace{\sum_{o \in \substack{\text{other}\\ \text{goods}}} \widehat{\omega}_{io} \mathsf{RoLIX}_o}_{RoLIX_i^o} \tag{6}$$

with $\widehat{\omega}_{ik}^c = \frac{\widehat{T}_{i\bullet k}^c}{\sum_{k=1}^K \widehat{T}_{i\bullet k}}$, where $\widehat{T}$ instruments bilateral exports as defined above. Then, we estimate:

$$\mathsf{RoL}_i = \alpha + \beta^c \mathsf{RoLIX}_i^c + \mathbf{Z}_i \gamma + \epsilon_i, \tag{7}$$

where c denotes the primary (p), fragmented (f), or other (o) goods categories.

We expect that fragmented goods are more likely to be rule of law enhancing than are the other types of goods. Specifically, as motivated in section 2.3, we expect that for Eq. (6):

$$\hat{\beta}^{\text{fragmented goods}} > \hat{\beta}^{\text{other goods}} > \hat{\beta}^{\text{primary goods.}}$$

4.1.3 Estimation Strategy B2

As for the Levchenko (2013) country-specific measure of rule of law intensity of exports, IIX, our RoLIX_i is an interacted variable of two terms. Therefore, its overall variation may reflect variation in the geographically pre-determined total openness of countries or variation in the rule of law intensities of various production processes. In a final estimation approach, we therefore use geographically pre-determined measures of openness that aim to address only the first variation. We define measures of openness for different categories of goods, which we know vary systematically in rule of law intensity by construction, and account for rule of law variation using only countries' geographically pre-determined export shares in goods category c (primary, fragmented, or other goods) and a vector of controls ($\mathbf{Z}_i$), estimating:

$$\mathsf{RoL}_i = \alpha + \beta^c \mathsf{ES}_i^c + \mathbf{Z}_i\gamma + \epsilon_i. \tag{8}$$

Country-specific, pre-determined export shares, ES_i^c, are calculated on the basis of $\widehat{T_{i\bullet}^k}$, as estimated in our Frankel and Romer (1999) regressions (see section 3.2):

$$\mathsf{ES}_i^c = \frac{\sum_{k=1,k\in c}^{K} \widehat{T_{i\bullet}^k}}{\sum_{k=1}^{K} \widehat{T_{i\bullet}^k}}. \tag{9}$$

As ES_i^c sums to one, we can include only two of the three categories in the regression analysis jointly, which changes the interpretation of the estimated coefficients. The size of the coefficients included in the regression are interpreted relative to the ES_i^c that is not included in the regression (we exclude ES_i^o, other goods).

4.2 Regression Specifications

Our set of control variables largely follows Levchenko (2013). First, we include dummy variables on legal origin because according to López de Silanes et al. (1998), the path dependence of rule of law is likely to be characterised by different legal traditions. In addition, we use initial GDP per capita (1995) and population data from the Penn World Table 8.0 (Feenstra et al., 2014).[7] The initial GDP per capita level proxies for differences in technological development. Controlling for technological differences is important in order to comply with the theoretical

[7] We exclude the following outlier countries from our dataset because the information from the PWT is not reliable. (See `http://www.rug.nl/research/ggdc/data/pwt/v80/outliers_in_pwt80.pdf`): Bermuda, Brunei, Burundi, Congo, El Salvador, Equatorial Guinea, Gambia, Guinea Bissau, Israel, Mozambique, Saudi Arabia, Vietnam, and Zimbabwe. We also exclude some extreme outliers, Gabon (GAB) and Bahamas (BHS), as their trade data are very incomplete.

model of Levchenko (2013), as argued in section 2.2 above. Next, we control for initial openness by including the log of trade to GDP ratio for 1995.

We embed our approach in the hierarchy of institutions hypothesis, which argues that political institutions determine economic institutions rather than *vice versa* (Acemoglu et al., 2005a). For this reason, we use the characteristics of political regimes within the scope of the Polity4 project, as measured by the *Polity2* variable that provides an aggregate assessment of country-specific political institutions that range between autocracy and democracy ratings (Marshall et al., 2016).

Institutions are typically persistent, and institutional change occurs in episodes (Acemoglu and Robinson, 2008) and often as a consequence of a liberalisation episode. Therefore, we control for trade liberalisation using the trade liberalisation dummy from Wacziarg and Welch (2008). We argue that for the purposes of this study, external liberalisation is a structural measure, i.e., it is exogenous in a statistical sense. We justify this position because foreign trade liberalisation is typically part of the conditionality in IMF programs; see Estevadeordal and Taylor (2013). As in Levchenko (2013), we control for area and size of population.

5 Regression Results

First, we present our baseline results examining the extent to which the institutional intensity of exports across goods categories influences countries' rule of law. Next, we provide robustness checks, i.e., we examine the stability of our results using different samples of countries and different sets of control variables.

We present our regression results for whether trade patterns affect rule of law in Table 1 (estimation strategy A). Note that this exercise is conceptually the same as that in Levchenko (2013), but it differs in that we improve the measurement of institutional intensity of exports (using our RoLIX_i) and control for the effects of trade liberalisation.

Table 1: Baseline Results: The Effect of RoLIX_i on Rule of Law

VARIABLES	(1) RoL_i	(2) RoL_i	(3) RoL_i	(4) RoL_i	(5) RoL_i	(6) RoL_i	(7) RoL_i
$\ln(\text{trade/GDP})_{t=1995}$	0.004	0.003	–0.005	0.001	–0.017	0.004	–0.017
	(0.018)	(0.020)	(0.020)	(0.021)	(0.018)	(0.018)	(0.018)
French legal origin	–0.077***	–0.080***	–0.095***	–0.092***	–0.071***	–0.076***	–0.070***
	(0.022)	(0.025)	(0.026)	(0.027)	(0.022)	(0.022)	(0.022)
German legal origin	0.058*	0.045	0.028	0.031	0.058**	0.059*	0.059**
	(0.033)	(0.035)	(0.034)	(0.037)	(0.027)	(0.033)	(0.027)
Scandinavian legal origin	0.092***	0.098***	0.060	0.084**	0.041	0.095***	0.044
	(0.034)	(0.031)	(0.040)	(0.035)	(0.041)	(0.034)	(0.041)
Socialist legal origin	–0.128***	–0.125***	–0.154***	–0.144***	–0.127***	–0.127***	–0.126***
	(0.024)	(0.026)	(0.028)	(0.029)	(0.022)	(0.024)	(0.022)
$\ln(\text{income})_{t=1995}$	0.108***	0.101***	0.102***	0.095***	0.083***	0.109***	0.083***
	(0.008)	(0.008)	(0.010)	(0.011)	(0.009)	(0.008)	(0.009)
ln(area)	0.014	0.010	0.008	0.008	0.003	0.013	0.003
	(0.009)	(0.012)	(0.010)	(0.012)	(0.007)	(0.009)	(0.007)
ln(population)	–0.029***	–0.025*	–0.030**	–0.027*	–0.003	–0.027***	–0.002
	(0.010)	(0.014)	(0.013)	(0.015)	(0.008)	(0.010)	(0.008)
RoLIXi	0.381***	0.267**	0.388***	0.336**			
	(0.109)	(0.134)	(0.134)	(0.142)			
Polity2		0.005***		0.004*			
		(0.002)		(0.002)			
Liberalization			0.044**	0.033			
			(0.021)	(0.022)			
RoLIX_i – weight 2					0.005***		
					(0.001)		
RoLIX_i – version 2/weight 1						0.381***	
						(0.113)	
RoLIX_i – version 2/weight 2							0.005***
							(0.001)
Constant	–0.669***	–0.528**	–0.503**	–0.465**	–0.171	–0.659***	–0.174
	(0.174)	(0.204)	(0.209)	(0.222)	(0.141)	(0.176)	(0.141)
Observations	144	128	119	115	144	144	144
Adjusted R-squared	0.732	0.734	0.749	0.740	0.756	0.730	0.755

Robust standard errors in parantheses
*** p<0.01, ** p<0.05, * p<0.1

Note: Columns (4) to (6) contain di erent weights, as explained in the text, as well as an alternative way to measure RoLIX_k. Instead of calculating RoLIX_k for all years separately and taking the mean over all years as in 'version 1', we calculate the average trade ows and rule of law data over time to then calculate the RoLIX_k using these averaged data in 'version 2'.

Our measure of geographically pre-determined institutional intensity of exports at the country level, RoLIX_i, is indeed positively associated with the origin country's rule of law. This result suggests that international trade matters for the quality of institutions. This result holds even

when we control for the degree of openness. The insignificance of openness indicates that it is trade patterns, rather than the overall degree of openness, that matters for rule of law. Therefore, our results largely confirm Levchenko (2013) but do not confirm previous evidence that openness affects rule of law (Rigobon and Rodrik, 2005).

Legal origin also affect rule of law, where the influence of different legal traditions is to be understood relative to that of the Anglo-Saxon tradition. Accordingly, German and Scandinavian legal traditions positively impact rule of law compared to common law traditions; French and specifically socialist legal traditions have a negative impact. We also find that the level of economic development, a proxy for the state of technology, is positively related to rule of law.

Democracy, as measured by the Polity2 variable, and trade liberalisation both positively affect rule of law. The effect of RoLIX_i on rule of law remains significant even when we control for trade liberalisation. This is an important result because the theoretical model in Levchenko (2013) emphasises the role of trade liberalisation even though he does not control for trade liberalisation in his empirical exercise. We find that the size of population displays a negative effect. Our results are also robust to different weighting schemes of RoLIX_i (see columns 5–7 in Table 1).

We examine whether different goods categories have heterogeneous effects on rule of law. To do so, we present scatter plots relating the rule of law intensity of exports for different goods categories to the origin country's rule of law in Figure 3 based on weighting version 1. The results based on weighting version 2 are similar and are available upon request. The results are in line with our expectations: fragmented goods exert a positive influence on rule of law. Interestingly, other goods are as strongly associated with rule of law as fragmented goods. On the other hand, the effect of primary goods on rule of law is negative.

Next, using estimations strategies B1 and B2, we extend the seminal contribution by Levchenko (2013) and examine whether trade flows generated by the fragmentation of complex production processes exert a particularly strong influence on rule of law, as complex production processes are especially sensitive to the enforceability of contractual claims. We provide the regression results in Table 2.

In two of three specifications of our estimation strategy B1, we find that the geographically pre-determined rule of law intensities of fragmented (RoLIX_i^f) and other goods (RoLIX_i^o) exports significantly and positively affect rule of law. At the same time, none of the B2 specifications produce significant effects of the fragmented goods export share, ES_i^f, on rule of law over and above those of other goods. Of our six B1 and B2 specifications, one reveals a significant negative effect of primary goods exports on rule of law. From this pattern, we conclude that fragmented and other goods are typically conducive to rule of law, while primary products are not. These results suggest that the type of goods a country exports affects institutional quality. However, this result conflicts with the prior literature emphasising that fragmented goods play a special role. Our results show that the roles of fragmented and other goods in rule of law quality are approximately the same. The theoretical foundation of our empirical work is based on the effects of rent seeking on institutional design. Specifically, the prior of a special effect of

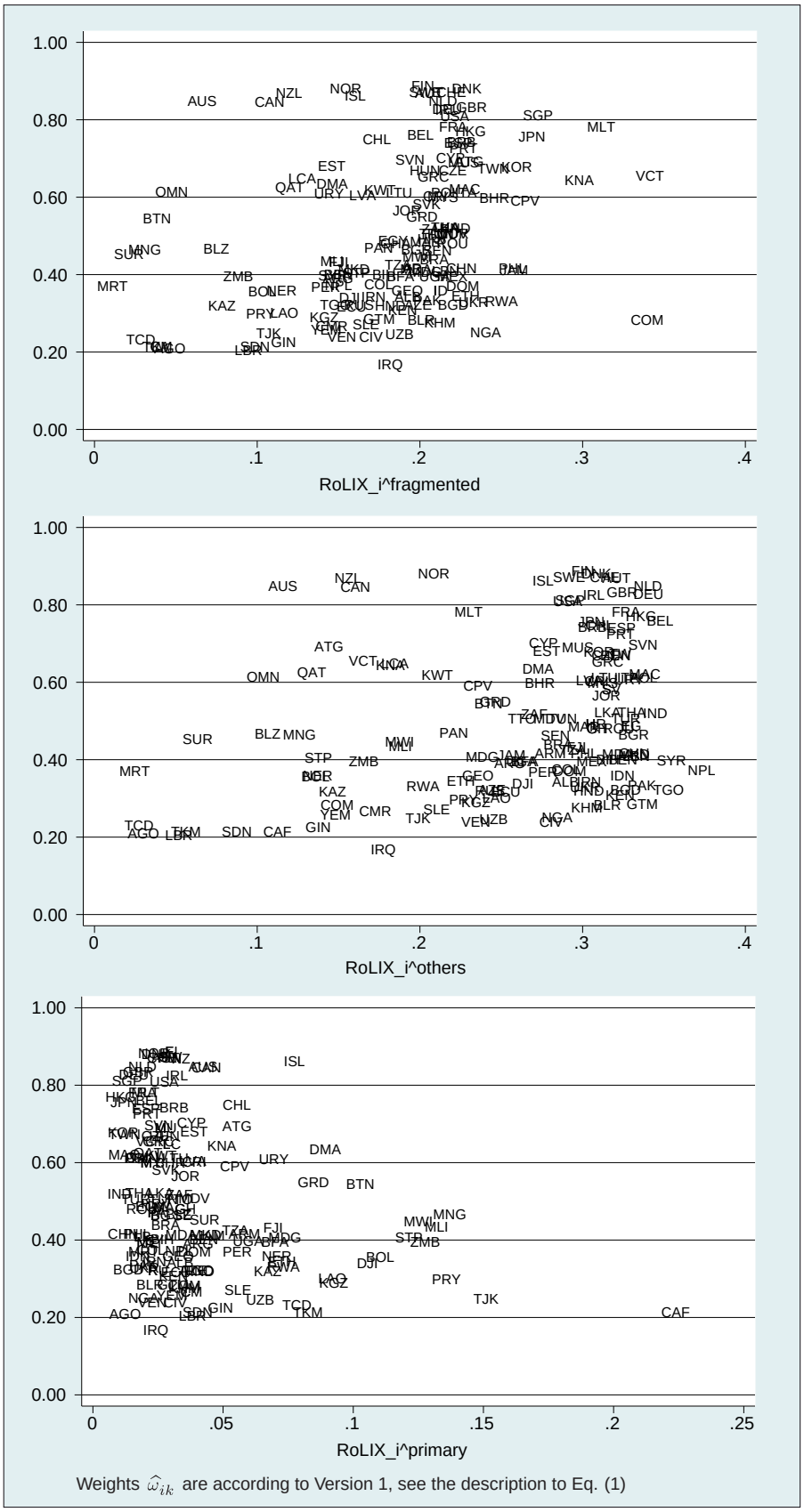


Figure 3: The Relationship of Rule of Law and RoLIX$_i^c$

specialisation and trade in fragmented goods on rule of law quality is guided by Levchenko (2013). Levchenko (2013) endogenise rule of law as actors seeking appropriable quasi-rents accruing from hold-up problems in complex production processes. These processes are characterised by investment specificity and irreversibility combined with incomplete or incompletely enforceable contracts or property rights.

On the basis of the discussion in section 2.2, our results suggest that the economy-wide channel of seeking appropriable quasi-rents accruing from hold-up problems in capital-labor relationships is the dominant force on rule of law endogeneity; the additional channel of seeking appropriable quasi-rents accruing from hold-up problems in complex production processes with incomplete contracts appears too weak to be empirically identifiable separately. In terms of measurement, this is already evident in the rather small differences in the rule of law intensities of fragmented versus other goods, as illustrated in Figure 1.

Table 2: Baseline Results: Effects of $\mathbf{RoLIX}_i^c$ and $\mathbf{ES}_i^c$ on Rule of Law

VARIABLES	(1) RoL_i	(2) RoL_i	(3) RoL_i	(4) RoL_i	(5) RoL_i	(6) RoL_i
$\ln(\text{trade/GDP})_{t=1995}$	0.006	0.005	0.003	0.003	−0.001	−0.002
	(0.018)	(0.018)	(0.020)	(0.020)	(0.019)	(0.020)
French legal origin	−0.077***	−0.076***	−0.080***	−0.079***	−0.096***	−0.096***
	(0.022)	(0.022)	(0.025)	(0.025)	(0.026)	(0.026)
German legal origin	0.059*	0.064*	0.047	0.048	0.029	0.032
	(0.034)	(0.034)	(0.036)	(0.036)	(0.035)	(0.035)
Scandinavian legal origin	0.088**	0.096***	0.098***	0.102***	0.050	0.052
	(0.034)	(0.033)	(0.033)	(0.033)	(0.041)	(0.041)
Socialist legal origin	−0.128***	−0.125***	−0.126***	−0.123***	−0.155***	−0.153***
	(0.025)	(0.025)	(0.027)	(0.027)	(0.029)	(0.029)
$\ln(\text{income})_{t=1995}$	0.107***	0.106***	0.099***	0.099***	0.100***	0.099***
	(0.009)	(0.009)	(0.009)	(0.008)	(0.010)	(0.010)
ln(area)	0.018*	0.016*	0.011	0.008	0.016	0.016
	(0.009)	(0.009)	(0.015)	(0.015)	(0.012)	(0.012)
ln(population)	−0.033***	−0.032***	−0.027	−0.024	−0.039**	−0.040**
	(0.012)	(0.011)	(0.019)	(0.018)	(0.016)	(0.015)
RoLIX_i^p	0.278		0.149		0.205	
	(0.322)		(0.351)		(0.342)	
RoLIX_i^f	0.489**		0.212		0.714**	
	(0.208)		(0.324)		(0.351)	
RoLIX_i^o	0.346**		0.306*		0.277	
	(0.147)		(0.174)		(0.181)	
ES_i^f		0.071		−0.055		0.299
		(0.145)		(0.222)		(0.246)
ES_i^p		−0.180**		−0.148		−0.135
		(0.083)		(0.097)		(0.096)
Polity2			0.005***	0.006***		
			(0.002)	(0.002)		
Liberalization					0.044**	0.045**
					(0.022)	(0.022)
Constant	−0.706***	−0.470***	−0.515**	−0.315	−0.604***	−0.442**
	(0.175)	(0.159)	(0.224)	(0.214)	(0.219)	(0.213)
Observations	144	144	128	128	119	119
Adjusted R-squared	0.728	0.725	0.729	0.729	0.747	0.747

Robust standard errors in parantheses
*** p<0.01, ** p<0.05, * p<0.1

We conduct several robustness checks to examine the stability of our results. First, we change the composition of our three goods categories (primary, fragmented, and other). The definition of these categories based on UN Statistics' Broad Economic Categories is by no means straightforward. Specifically, the composition of goods so far subsumed under fragmented goods omits, due to lack of information in the BEC classification, fragmented consumer goods production processes. We may, however, assume that a number of those goods are included in BEC category 61 (durable consumer goods) and adjust our definitions of fragmented versus other goods accordingly. These results are available in Table A7 in the Appendix and largely confirm the baseline findings presented in Table 2.

Second, we exclude countries with GDP per capita below $2000 from the sample, as the data quality of the least developed countries may be an issue. These results also remain largely unchanged; see Table A6 in the Appendix.

Third, Alexeev and Conrad (2009) argue that the statistically significant, negative coefficients of point resource wealth in institutional quality regressions may be consequences of a positive connection between GDP and point resources rather than some substantive, genuine negative influence of resource endowments on institutions. To control for this problem, they geographically predetermine an initial GDP per capita variable, which they subsequently use as a control when regressing institutional quality on resource endowments. While we also use geographically predetermined trade variables, we doubt the quality of purely geographical instruments for GDP per capita. As an alternative to Alexeev and Conrad (2009), we would prefer to instrument GDP per capita by the quality of political institutions, as measured by the Polity2 variable. However, the hierarchy of institutions hypothesis holds that political institutions directly impact rule of law, which would invalidate the exclusion restriction. Therefore, as an alternative to Alexeev and Conrad (2009), we omit initial GDP per capita in some specifications, leaving the Polity2 variable free to impact rule of law both directly, in the sense of the hierarchy of institutions hypothesis, and indirectly via its effect through the level of development. While the baseline results in Table 2 do not contradict Alexeev and Conrad (2009), after omitting initial GDP from our GDP per capita and openness measures, the results in Table A5 suggest a negative, statistically significant relationship between specialisation in primary goods and rule of law.

Finally, we bootstrap all standard errors instead of computing robust standard errors. The results remain unchanged and are available upon request.

6 Concluding Remarks

Theoretical models in which institutions both create rents and shape comparative advantage yield testable hypotheses of the influence of trade patterns on institutions. In this paper, we test these hypotheses against the background of institutional variation across countries by operationalising trade patterns as different goods categories by use.

First, our results confirm Levchenko (2013) in that countries that export more rule of law–intensive goods exhibit higher quality rule of law.

Second, based on differentiating traded goods by use, we extend previous results by identifying the economic sectors responsible for the impact of specialisation on rule of law. To examine the effects of trade patterns on rule of law in greater detail, we employ a highly disaggregated bilateral trade dataset, which distinguishes more than 5000 goods and contains nearly 100 million observations. In particular, we investigate whether fragmented goods exert a stronger effect on rule of law than other goods and primary products. Our results suggest that trade flows generated by fragmented and other goods production positively influence rule of law, while this is not true for primary goods. We also find that legal origin, level of economic development, political institutions and trade liberalisation affect rule of law.

These results suggest the importance of identifying specialisation-specific channels when analysing how open economy rent seeking impacts institutional design. Our results do not confirm the prior of special effects of specialisation and trade in fragmented goods on rule of law quality. Consequently, our results suggest that the incomplete contracts foundation of trade theory is unlikely to fully explain the effects of trade patterns on legal institutional quality. We find that both fragmented and other goods are critical for good rule of law, suggesting that the enforceability of contractual claims is decisive for a larger basket of goods than previously thought.

In terms of future research, these results leave open a number of potentially rewarding questions. Most importantly, the logic used here suggests that similar testable hypotheses of the influences of trade patterns on other institutions, especially labor market institutions, may be derived and tested.

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Appendix

A.1 Commodity classifications

We use CEPII bilateral BACI trade data, as reported in HS Code 92 at the 6-digit level (5,017 goods) for 1995–2010 for nearly 200 countries (providing nearly 100 million bilateral trade flows). The United Nations Statistics Division's BEC (Broad Economic Categories classification; available online at: http://unstats.un.org/unsd/trade/BEC%20Classification.htm) allows for HS headings to be grouped into 19 activities covering primary and processed foods and beverages, industrial supplies, fuels and lubricants, capital goods and transport equipment, and consumer goods according to their durability. The BEC also provides for the rearrangement of these 19 activities (on the basis of HS categories' main end-use) to approximate basic System of National Accounts (SNA) activities, namely, primary goods, intermediate goods, capital goods, and consumer goods. Specifically, the BEC classification permits the identification of a subset of intermediate capital goods and transport equipment which, together with their respective final goods, we call fragmented goods.

A.2 Tables and charts

Table A1: Description of Variables

Variable	Source — Definition
ln(trade/GDP)	**Heston et al. (2012)** — Openness in current prices, variable openc from PWT 7.1
pop, income	**Feenstra et al. (2014)** — Population in thousands (averaged over time), Income per capita, PPP adjusted (initial value as of 1995).
Polity2	**Marshall et al. (2016)** — Average annual polity scores measuring democratic and autocratic qualities of polities, ranging from +10, indicating full democracy, to −10, indicating full autocracy.
Liberalisation	**Wacziarg and Welch (2008)** — A dummy variable that measures trade liberalisation based on criteria from Sachs and Warner (1995b) for the years from 1990 to 1999. We use a version based on 5 adjusted criteria: (1) average tariff rates of 40 percent or more (TAR); (2) non-tariff barriers covering 20 percent or more of trade (NTB); (3) black market exchange rate at least 10 percent lower than the offcial exchange rate (BMP); (4) state monopoly on major exports (XMB); (5) socialist economic system (as defined by Kornai (1992)) (SOC).
Trade	**Gaulier and Zignago (2010)** — values of exports at the HS 6-digit product disaggregation level for more than 200 countries since 1995.
Rule of law	**Kaufmann et al. (2005)**[8] – the extent to which agents have confidence in and abide by the rules of society, particularly the quality of contract enforcement, police, and courts, as well as the likelihood of crime and violence. The original values ranging between 2.5 and +2.5 are rescaled to vary between zero and one.
Legal origin	**López de Silanes et al. (1998)** — Categorisation of the legal system into different legal traditions: Anglo-Saxon, German, Scandinavian, French or Socialist.
A area, B common border, L landlocked	**Mayer and Zignago (2011)**[9] — Area measures country size in square meters, B is a dummy that indicates a common border, and L is a dummy that indicates the access to the open sea.

[8] See Worldwide Governance Indicators online: http://info.worldbank.org/governance/wgi/sc_country.asp
[9] See also, http://www.cepii.fr/anglaisgraph/bdd/distances.htm

Table A2: Descriptions of Variants of Calculations

Version 1 of RoLIX_k	In this version, we average the time-varying RoLIX_{tk} over the years 1995–2010 using the program prody with option mean2. This version was also used in Hausmann et al. (2007).
Version 2 of RoLIX_k	In this version, we average rule of law and trade over time to calculate RoLIX_k.
Weight 1 of RoLIX_i	$\widehat{\omega}_{ik} = \frac{\widehat{x}^k_{i\bullet}}{\sum_{k=1}^{K} \widehat{x^k_{i\bullet}}} = \frac{\widehat{x}^k_{i\bullet}}{\widehat{x}^{\bullet}_{i\bullet}}$
Weight 2 of RoLIX_i	$\widehat{\omega}_{ik} = \widehat{x}^k_{i\bullet}$
Goods classification	primary goods (BEC 111, 21, 31, 322); other goods (BEC 112, 121, 122, 22, 61, 62, 63, 7); fragmented goods (BEC 41, 42, 51, 521, 522, 53)
Alternative goods classification	primary goods (BEC 111, 21, 31, 322); other goods (BEC 112, 121, 122, 22, 62, 63, and 7); fragmented goods (BEC 41, 42, 51, 521, 522, 53, 61).
Poor countries	BEN, BFA, BGD, CAF, CIV, CMR, COM, ETH, GHA, GIN, KEN, KHM, LAO, LBR, MDG, MLI, MRT, MWI, NER, NGA, NPL, RWA, SDN, SEN, SLE, STP, TCD, TGO, TZA, UGA, YEM, ZMB.

1 Food and beverages
- 11 Primary
  - 111 Mainly for industry
  - 112 Mainly for household consumption
- 12 Processed
  - 121 Mainly for industry
  - 122 Mainly for household consumption

2 Industrial supplies not elsewhere specified
- 21 Primary
- 22 Processed

3 Fuels and lubricants
- 31 Primary
- 32 Processed
  - 321 Motor spirit
  - 322 Other

4 Capital goods (except transport equipment) and parts and accessories thereof
- 41 Capital goods (except transport equipment)
- 42 Parts and accessories

5 Transport equipment and parts and accessories thereof
- 51 Passenger motor cars
- 52 Other
  - 521 Industrial
  - 522 Non-industrial
- 53 Parts and accessories

6 Consumer goods not elsewhere specified
- 61 Durable
- 62 Semi-durable
- 63 Non-durable

7 Goods not elsewhere specified

Figure A1: Broad Economic Categories

Table A3: List of Countries Included

ISO	Name	ISO	Name	ISO	Name	ISO	Name
AGO	Angola	DMA	Dominica	KNA	St. Kitts&Nevis	PRT	Portugal
ALB	Albania	DNK	Denmark	KOR	Korea (Republic)	PRY	Paraguay
ARG	Argentina	DOM	Dominican Republic	KWT	Kuwait	QAT	Qatar
ARM	Armenia	ECU	Ecuador	LAO	Laos	ROU	Romania
ATG	Antigua and Barbuda	EGY	Egypt	LBN	Lebanon	RUS	Russia
AUS	Australia	ESP	Spain	LBR	Liberia	RWA	Rwanda
AUT	Austria	EST	Estonia	LCA	St. Lucia	SDN	Sudan
AZE	Azerbaijan	ETH	Ethiopia	LKA	Sri Lanka	SEN	Senegal
BEL	Belgium	FIN	Finland	LTU	Lithuania	SGP	Singapore
BEN	Benin	FJI	Fiji	LVA	Latvia	SLE	Sierra Leone
BFA	Burkina Faso	FRA	France	MAC	Macao	STP	Sao Tome and Principe
BGD	Bangladesh	GBR	United Kingdom	MAR	Morocco	SUR	Suriname
BGR	Bulgaria	GEO	Georgia	MDA	Moldova	SVK	Slovak Republic
BHR	Bahrain	GHA	Ghana	MDG	Madagascar	SVN	Slovenia
BIH	Bosnia and Herzegovina	GIN	Guinea	MDV	Maldives	SWE	Sweden
BLR	Belarus	GRC	Greece	MEX	Mexico	SYR	Syria
BLZ	Belize	GRD	Grenada	MKD	Macedonia	TCD	Chad
BOL	Bolivia	GTM	Guatemala	MLI	Mali	TGO	Togo
BRA	Brazil	HKG	Hong Kong	MLT	Malta	THA	Thailand
BRB	Barbados	HND	Honduras	MNG	Mongolia	TJK	Tajikistan
BTN	Bhutan	HRV	Croatia	MRT	Mauritania	TKM	Turkmenistan
CAF	Central African Republic	HUN	Hungary	MUS	Mauritius	TTO	Trinidad&Tobago
CAN	Canada	IDN	Indonesia	MWI	Malawi	TUN	Tunisia
CHE	Switzerland	IND	India	MYS	Malaysia	TUR	Turkey
CHL	Chile	IRL	Ireland	NER	Niger	TWN	Taiwan
CHN	China	IRN	Iran	NGA	Nigeria	TZA	Tanzania
CIV	Cote d'Ivoire	IRQ	Iraq	NLD	Netherlands	UGA	Uganda
CMR	Cameroon	ISL	Iceland	NOR	Norway	UKR	Ukraine
COL	Colombia	ITA	Italy	NPL	Nepal	URY	Uruguay
COM	Comoros	JAM	Jamaica	NZL	New Zealand	USA	United States
CPV	Cape Verde	JOR	Jordan	OMN	Oman	UZB	Uzbekistan
CRI	Costa Rica	JPN	Japan	PAK	Pakistan	VCT	St.Vincent&Grenadines
CYP	Cyprus	KAZ	Kazakhstan	PAN	Panama	VEN	Venezuela
CZE	Czech Republic	KEN	Kenya	PER	Peru	YEM	Yemen
DEU	Germany	KGZ	Kyrgyzstan	PHL	Philippines	ZAF	South Africa
DJI	Djibouti	KHM	Cambodia	POL	Poland	ZMB	Zambia

Table A4: The $RoLIX_i$ for all Countries

country	RoLIX_i	country	RoLIX_i	country	RoLIX_i	country	RoLIX_i
TWN	.5845763	NPL	.5558012	SEN	.5300258	TJK	.4544269
JPN	.583527	IRL	.5553235	KNA	.5297396	ARG	.445187
KOR	.5809635	AUT	.554925	VCT	.5283046	ECU	.4420998
IND	.579591	MDA	.554205	HND	.5275806	SLE	.4321976
HKG	.5781359	CPV	.5539881	TUN	.5271715	RUS	.4319666
MAC	.5781093	UKR	.5539632	SWE	.5263563	ATG	.4301975
SGP	.5769061	MUS	.5538251	ETH	.526036	PAN	.4219923
PHL	.5746442	SVK	.5525067	RWA	.5256365	STP	.4189864
NLD	.5743721	HUN	.5516491	SYR	.525488	KWT	.4127159
GBR	.5734003	KHM	.5505972	COM	.5241827	VEN	.4095077
ITA	.5733229	MYS	.5500081	DJI	.5238642	NOR	.3863675
DEU	.5733061	BHR	.5496059	BFA	.5224774	BTN	.383828
LBN	.5704628	MEX	.5484129	BRA	.5218661	IRQ	.3833825
PRT	.5699389	GRC	.548344	BIH	.5208655	ZMB	.3830562
POL	.5698263	NGA	.5446991	BEN	.5175394	CAF	.378798
BEL	.569601	KEN	.5432249	MDG	.5162908	CMR	.3580067
CHN	.5692999	HRV	.5432176	ALB	.5160615	BOL	.3499001
ESP	.566565	GTM	.5426585	ZAF	.5134213	LCA	.3444448
FRA	.5655962	TGO	.5415942	ISL	.5132915	NER	.3225357
THA	.5642564	URY	.5414202	FJI	.5130119	YEM	.3202303
TUR	.5639641	JOR	.5396354	MWI	.5119369	NZL	.3120741
BRB	.5630847	USA	.5396077	DMA	.5091363	CAN	.3119327
DNK	.5624326	CHL	.5395302	LVA	.5077515	GIN	.3032552
MLT	.5619968	MDV	.5394925	TTO	.5040612	MNG	.294558
BGD	.5615283	BLR	.5379436	IRN	.4993272	KAZ	.2926813
ROU	.5610555	EGY	.5374608	UZB	.4982959	QAT	.2748474
PAK	.5598891	ARM	.5374014	COL	.4868742	SDN	.2270091
CHE	.5592477	TZA	.5363795	AZE	.4822988	AUS	.224301
IDN	.5586807	MKD	.5350348	CIV	.4822967	BLZ	.2154382
CZE	.5586711	GHA	.5348692	PER	.471817	LBR	.1847308
DOM	.558591	FIN	.5343503	KGZ	.4687493	TKM	.1779723
LKA	.5579617	MAR	.5337657	MLI	.4665916	OMN	.1708848
JAM	.55764	GRD	.5326642	PRY	.4630987	TCD	.1345483
BGR	.5571522	LTU	.5324938	EST	.4618342	SUR	.1270535
CRI	.5566244	UGA	.5312767	GEO	.4603824	AGO	.0892016
SVN	.556488	CYP	.5311445	LAO	.4562139	MRT	.055348

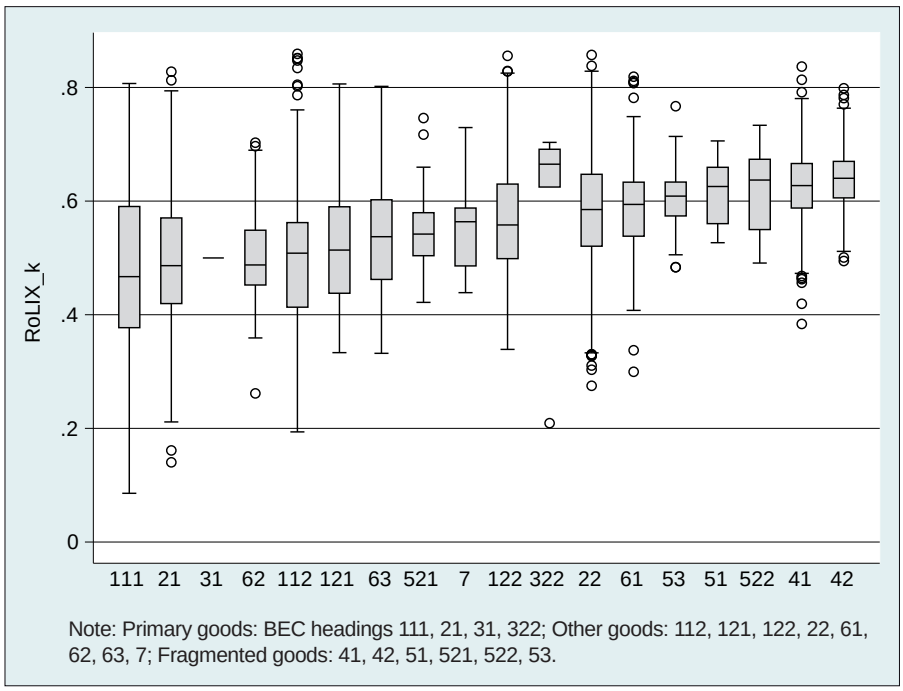

Figure A2: Rule of Law Intensity of Exports at the Goods Level: Broad Economic Categories

Table A5: Effects of RoLIX_i^c and ES_i^c on Rule of Law, Without GDP

VARIABLES	(1) RoL_i	(2) RoL_i	(3) RoL_i	(4) RoL_i	(5) RoL_i	(6) RoL_i
French legal origin	−0.082**	−0.078*	−0.077**	−0.068*	−0.097**	−0.094**
	(0.038)	(0.040)	(0.039)	(0.040)	(0.039)	(0.040)
German legal origin	0.215***	0.230***	0.181***	0.187***	0.139***	0.144***
	(0.044)	(0.046)	(0.047)	(0.050)	(0.047)	(0.048)
Scandinavian legal origin	0.236***	0.288***	0.217***	0.271***	0.168***	0.197***
	(0.050)	(0.050)	(0.049)	(0.051)	(0.049)	(0.050)
Socialist legal origin	−0.128***	−0.119***	−0.107***	−0.095**	−0.112***	−0.102**
	(0.039)	(0.042)	(0.038)	(0.040)	(0.041)	(0.042)
ln(area)	0.026	0.010	0.019	−0.002	0.028	0.017
	(0.017)	(0.016)	(0.026)	(0.025)	(0.025)	(0.024)
ln(population)	−0.064***	−0.037**	−0.051*	−0.019	−0.053**	−0.036
	(0.019)	(0.018)	(0.029)	(0.027)	(0.026)	(0.026)
RoLIX_i^p	−1.442***		−1.500***		−1.019***	
	(0.349)		(0.384)		(0.322)	
RoLIX_i^f	0.357		−0.082		0.501	
	(0.324)		(0.473)		(0.425)	
RoLIX_i^o	0.764***		0.558**		0.489**	
	(0.221)		(0.255)		(0.244)	
ES_i^f		−0.088		−0.262		0.143
		(0.252)		(0.350)		(0.319)
ES_i^p		−0.369***		−0.250*		−0.242*
		(0.123)		(0.140)		(0.136)
Polity2			0.011***	0.012***	0.011***	0.011***
			(0.003)	(0.003)	(0.003)	(0.003)
Liberalization					0.078***	0.083***
					(0.029)	(0.030)
Constant	0.172	0.615***	0.317	0.684**	0.077	0.335
	(0.197)	(0.186)	(0.328)	(0.298)	(0.307)	(0.276)
Observations						
Adjusted R-squared	144	144	128	128	115	115
	0.434	0.372	0.493	0.438	0.588	0.562

Robust standard errors in parantheses
*** p<0.01, ** p<0.05, * p<0.1

Table A6: Effects on Rule of Law, Exclusion of Poor Countries

VARIABLES	(1) no poor	(2) no poor	(3) no poor
$\ln(\text{trade/GDP})_{t=1995}$	0.004	0.009	0.006
	(0.019)	(0.020)	(0.020)
French legal origin	–0.086***	–0.091***	–0.088***
	(0.028)	(0.030)	(0.030)
German legal origin	0.022	0.027	0.028
	(0.034)	(0.034)	(0.034)
Scandinavian legal origin	0.051	0.043	0.053
	(0.035)	(0.035)	(0.035)
Socialist legal origin	–0.111***	–0.117***	–0.112***
	(0.028)	(0.030)	(0.030)
$\ln(\text{income})_{t=1995}$	0.141***	0.136***	0.139***
	(0.015)	(0.015)	(0.015)
ln(area)	0.015	0.021*	0.017
	(0.010)	(0.012)	(0.011)
ln(population)	–0.031**	–0.040***	–0.035**
	(0.013)	(0.015)	(0.014)
RoLIX_i^p		–0.147	
		(0.466)	
RoLIX_i^f		0.331	
		(0.313)	
RoLIX_i^o		0.564***	
		(0.200)	
RoLIX_i	0.436***		
	(0.133)		
ES_i^f = o,			–
ES_i^o			0.070
			(0.204)
ES_i^p			–0.209
			(0.155)
Constant	–1.005***	–1.015***	–0.789***
	(0.266)	(0.271)	(0.254)
Observations	112	112	112
Adjusted R-squared	0.726	0.724	0.721

Robust standard errors in parantheses
*** p<0.01, ** p<0.05, * p<0.1

Note: Columns (1) to (3) provide the results for countries with average GDP per capita values above 2000$ from 1995–2010. For the list of poor countries, refer to Table A1.

Table A7: Effects of RoLIX_i^c and ES_i^c on Rule of Law, Alternative Goods Categorisation

VARIABLES	(1) RoL_i	(2) RoL_i	(3) RoL_i	(4) RoL_i	(5) RoL_i	(6) RoL_i	(7) RoL_i	(8) RoL_i
$\ln(\text{trade/GDP})_{t=1995}$	0.007	0.006			0.004	0.004	–0.000	–0.001
	(0.018)	(0.018)			(0.019)	(0.020)	(0.019)	(0.020)
French legal origin	–0.077***	–0.076***	–0.082**	–0.078*	–0.080***	–0.079***	–0.096***	–0.096***
	(0.022)	(0.022)	(0.038)	(0.040)	(0.025)	(0.025)	(0.026)	(0.026)
German legal origin	0.058*	0.063*	0.215***	0.230***	0.047	0.048	0.029	0.032
	(0.034)	(0.034)	(0.044)	(0.046)	(0.036)	(0.036)	(0.035)	(0.035)
Scandinavian legal origin	0.087**	0.095***	0.236***	0.288***	0.096***	0.099***	0.049	0.050
	(0.034)	(0.033)	(0.050)	(0.050)	(0.033)	(0.033)	(0.041)	(0.041)
Socialist legal origin	–0.128***	–0.125***	–0.128***	–0.119***	–0.126***	–0.123***	–0.154***	–0.152***
	(0.025)	(0.025)	(0.039)	(0.042)	(0.027)	(0.027)	(0.029)	(0.029)
$\ln(\text{income})_{t=1995}$	0.107***	0.106***			0.099***	0.099***	0.100***	0.099***
	(0.009)	(0.009)			(0.009)	(0.008)	(0.010)	(0.010)
ln(area)	0.018**	0.017*	0.026	0.010	0.012	0.010	0.018	0.018
	(0.009)	(0.009)	(0.017)	(0.016)	(0.015)	(0.015)	(0.012)	(0.013)
ln(population)	–0.034***	–0.032***	–0.063***	–0.037**	–0.028	–0.026	–0.041**	–0.042***
	(0.012)	(0.011)	(0.019)	(0.018)	(0.019)	(0.018)	(0.016)	(0.015)
RoLIX_i^p (alt. classification)	0.287		–1.443***		0.156		0.212	
	(0.322)		(0.350)		(0.350)		(0.340)	
RoLIX_i^f (alt. classification)	0.525**		0.376		0.275		0.763**	
	(0.210)		(0.324)		(0.326)		(0.348)	
RoLIX_i^o (alt. classification)	0.320**		0.767***		0.283		0.239	
	(0.156)		(0.232)		(0.185)		(0.192)	
ES_i^f (alt. classification)		0.101		–0.073		–0.004		0.352
		(0.152)		(0.260)		(0.235)		(0.253)
ES_i^p (alt. classification)		–0.168*		–0.366***		–0.136		–0.112
		(0.087)		(0.129)		(0.102)		(0.101)
Polity2					0.005***	0.005***		
					(0.002)	(0.002)		
Liberalization							0.044**	0.045**
							(0.022)	(0.022)
Constant	–0.721***	–0.495***	0.175	0.609***	–0.538**	–0.350	–0.629***	–0.492**
	(0.176)	(0.164)	(0.200)	(0.199)	(0.226)	(0.224)	(0.222)	(0.224)
Observations	144	144	144	144	128	128	119	119
Adjusted R-squared	0.729	0.725	0.434	0.371	0.729	0.729	0.748	0.748

Robust standard errors in parantheses
*** p<0.01, ** p<0.05, * p<0.1

Note: This table contains the results of the alternative classification scheme, as explained in Table A1.