Trade Patterns and Endogenous Institutions: Global Evidence

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9 th FIW-Research Conference
December 1-2, 2016

Research questions

- Is the quality of legal institutions (Rule of Law) independent from what a country exports?
- Are complex goods more important than others?

Analysis

- We compile data for a set of over 140 countries containing information about the Rule of Law and export information.
- We create a exogenous measurement that indicates the Rule of law intensity of a country's exports (ROLIX).
- We explain the ROL with ROLIX.

Results

- Countries with a high ROLIX do have a better ROL.
- Trade flows generated by primary (fragmented and other) production exert a significantly negative (positive) influence on RoL.

Contribution

- We introduce a 'better' ROLIX.
- We further characterize traded goods.

Estimation Strategy

Levchenko (2013)'s two-step approach

$$\text{ROL}_i = \alpha + \beta \widehat{ROLIX}_i + \gamma \mathbf{Z}_i + \epsilon_i.$$

That means, we try to explain ROL with a country's ROL intensity of exports (ROLIX_i) and a vector of controls ($\mathbf{Z}_i$).

Estimation Strategies

A) Levchenko (2013), but substituting Nunn's (2007) ISIC-specific complexity measures by trade-based product-specific RoL intensity measurement (Hausman et al., 2007)

B1) As in A, but constructing 3 country-specific measures of RoL intensity of exports for primary, fragmented and other goods categories.

B2) We account for RoL variation only by countries' geographically pre-determined export shares in goods categories (primary, fragmented, and other goods).

Contribution

We ...

- ...generalize Levchenko's (2012) result: countries exporting more RoL-intensive goods exhibit a better RoL.
- ...propose a novel way to measure the institutional intensity of exports at the **product level** based on 1.4 billion disaggregated global bilateral trade flows
- ...consider the production processes in further detail, because we look on the RoL-intensity of goods on primary, fragmented, and other goods seperately.
- ...find that trade flows generated by (fragmented and) other processes of production improve the Rule of Law, while trade flows generated by primary production do not.
- ...think our results motivate qualifications to incomplete contracts foundation of trade theory explanations to why we observe differences in legal institutional quality across countries.

Is the Rule of Law independent from exports

ROL ⇒ Trade: Nunn (2007); Levchenko (2007); Nunn & Trefler (2014)

> *"ROL 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."(World Bank GI)*

Trade (ROLIX) ⇒ ROL

> *"Rule-of-Law intensiveness is described by product(ion) complexity, and proxied by input concentration (Levchenko, 2007), share of user-specified inputs (Nunn, 2007), job complexity (Costinot, 2009), all three (Chor, 2010)."*

Levchenko (2013): investment specificity creates hold-up problems in complex production, resulting in investment inefficiency and rents for non-investors. Higher enforcability of contracts (better Rule of Law) lessens investment inefficiency and rents. International context: with identical technologies, a good Rule of Law generates comparative advantage in industries that are characterized by a high complexity of production processes.

Reversing causality can be justified if non-investors use rents to lobby for a bad Rule of Law

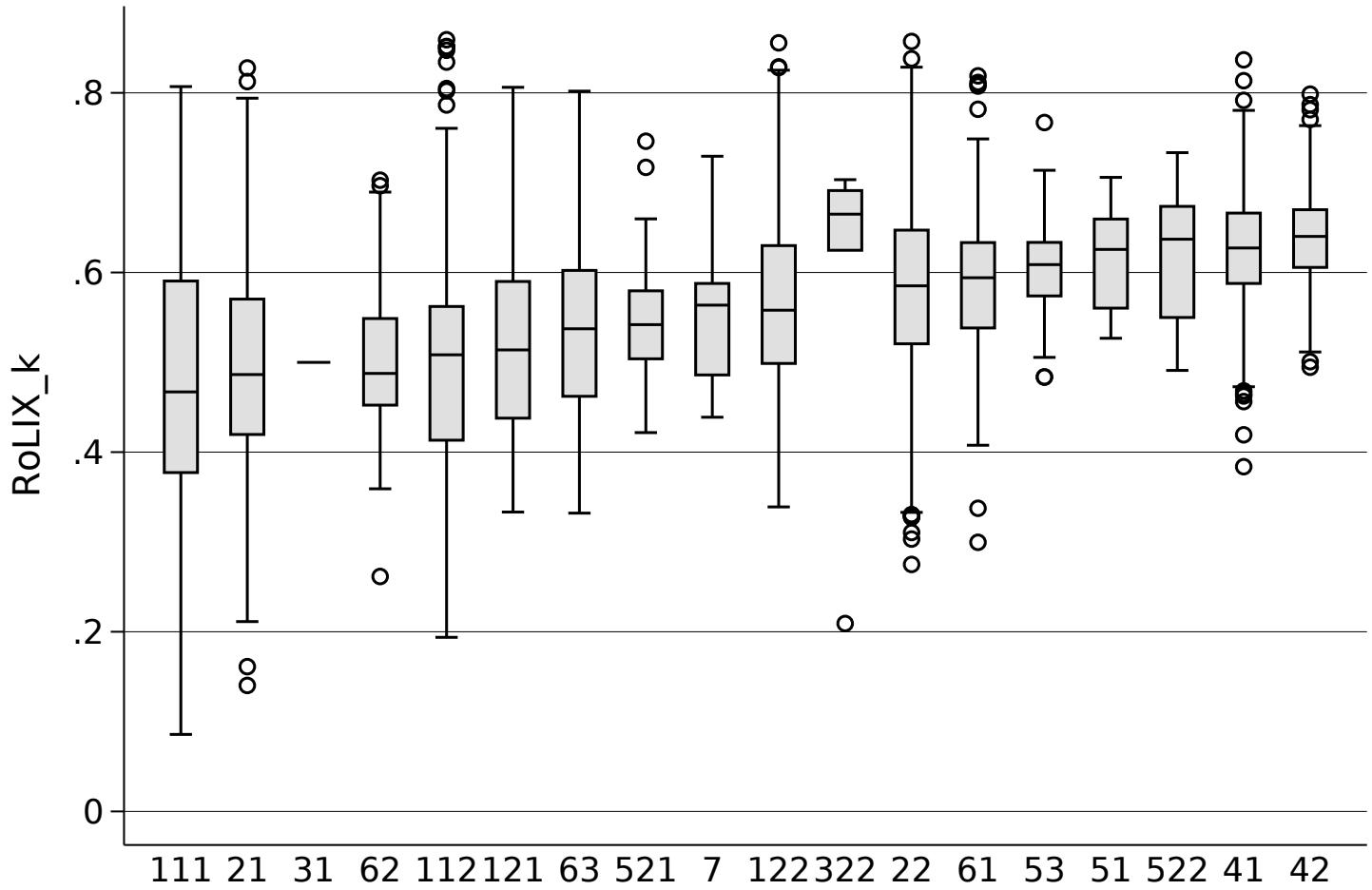
$ROLIX_k$

- Levchenko (2013) uses Nunn's (2007) measure of ROLIX based on Rauch's (1998) product classification, "...defined as the fraction of each industryÂ's inputs not sold on organized exchanges or reference priced and is constructed based on **US Input-Output Tables**."
- We measure the RoLIX of good k as the average global RoL requirement to export k

$$\text{ROLIX}_k = \sum_i \underbrace{\left(\frac{x_i^k / X_i}{\sum_i (x_i^k / X_i)} \right)}_{\text{weight: } \varphi_{ik}} ROL_i,$$

  with $X_i = \sum_k x_i^k$ and φ denoting a variant of Balassa's RCA to ensure that the ordering of the products is not biased by country size (Hausman, 2007; also used in Regolo, 2013).
- Our $ROLIX_k$
  - is not based on technology information from only one country;
  - captures more industries, especially in primary production;
  - is based disaggregated bilateral trade data for >200 countries and >5000 goods (HS 6-digit)

$ROLIX_k$ varies across industries



Data

1. **Bilateral trade flows:** CEPIIÂ's BACI trade data-set, derived from UN-Comtrade: bilateral trade flows in HS Code 92, at the 6-digit level (5,017 goods) for 1995Â–2010 for almost 200 countries (i.e., 1.4 bn. bilateral trade flows).
2. **Bilateral proxies for trade costs:** We use unilateral and bilateral CEPII data to proxy trade costs, mainly on geography (area, distance, common border, landlocked, population).
3. **Country-specific data:** institutional indicators and control variables
   - RoL indicator from the Worldbank Quality of Governance database (see Teorell et al., 2013)
   - GDP per capita and population data from PWT 8.0 (2014)
   - trade liberalization information from Wacziarg and Welch (2008) and
   - legal tradition information from LaPorta et al. (1998)
   - Political regime data from Polity4 database, see Marshall et al. (2011)

$ROLIX_i$

Country-specific RoL intensity of exports is constructed by interacting country-specific (i) with product-specific (k) information

$$\text{ROLIX}_i = \sum_{k=1}^{K} \widehat{X}_{ik} \cdot \text{ROLIX}_k^m$$

where $\widehat{X}_{ik}$ are the predicted exports of country i in good k.
We predict $\widehat{X}_{ik}$ as in Frankel and Romer (1999): we first regress all bilateral export relationships X_{ijk} on uni- and bilateral geographical information only. Then, we aggregate the predicted values according to $\widehat{X}_{ik} = \sum_{j \neq i} e^{\ln \widehat{X}_i jk}$.

Since trade and institutions are interrelated we need to instrument bilateral export flows. To do so, we follow Frankel & Romer (1999) and estimate a gravity like equation which contains only exogenous time invariant explanatory variables:

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

- where x_{ijk} denotes the log of bilateral exports in good k from country i to country j as a share of GDP. Both, exports and GDP are averaged over the years from 1995 to 2010.
- D_{ij} is the distance between countries;
- N_i and N_j is the population of country i and j, respectively;
- A is the size of a country in square meters,
- B is a dummy for common border between two countries,
- L is a dummy for landlocked countries,
- F is a dummy for countries who share a common official language,
- G is a dummy that indicates whether at least 9% of both population speak the same language,
- H is a dummy that indicates whether two countries have a common colonizer post 1945, and ϵ_{ij} is the error term.

To get the predicted exports of country i in good k ($\widehat{X}_{ik}$), we calculate

$$\widehat{X}_{ik} = \sum_{\substack{j=1 \\ j \neq i}} \exp^{\ln(x_{ijk})}.$$

Strategy A)

VARIABLES	(1) RoL_i	(2) RoL_i	(3) RoL_i
$\ln(\text{trade/GDP})_{t=1995}$	0.004	0.003	-0.005
French legal origin	-0.077***	-0.080***	-0.095***
German legal origin	0.058*	0.045	0.028
Scandinavian legal origin	0.092***	0.098***	0.060
Socialist legal origin	-0.128***	-0.125***	-0.154***
$\ln(\text{income})_{t=1995}$	0.108***	0.101***	0.102***
ln(area)	0.014	0.010	0.008
ln(population)	-0.029***	-0.025*	-0.030**
$RoLIX_i$	0.381***	0.267**	0.388***
Polity2		0.005***	
Liberalization			0.044**
Constant	-0.669***	-0.528**	-0.503**
Observations	144	128	119
Adjusted R-squared	0.732	0.734	0.749

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

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.(**??**) into:

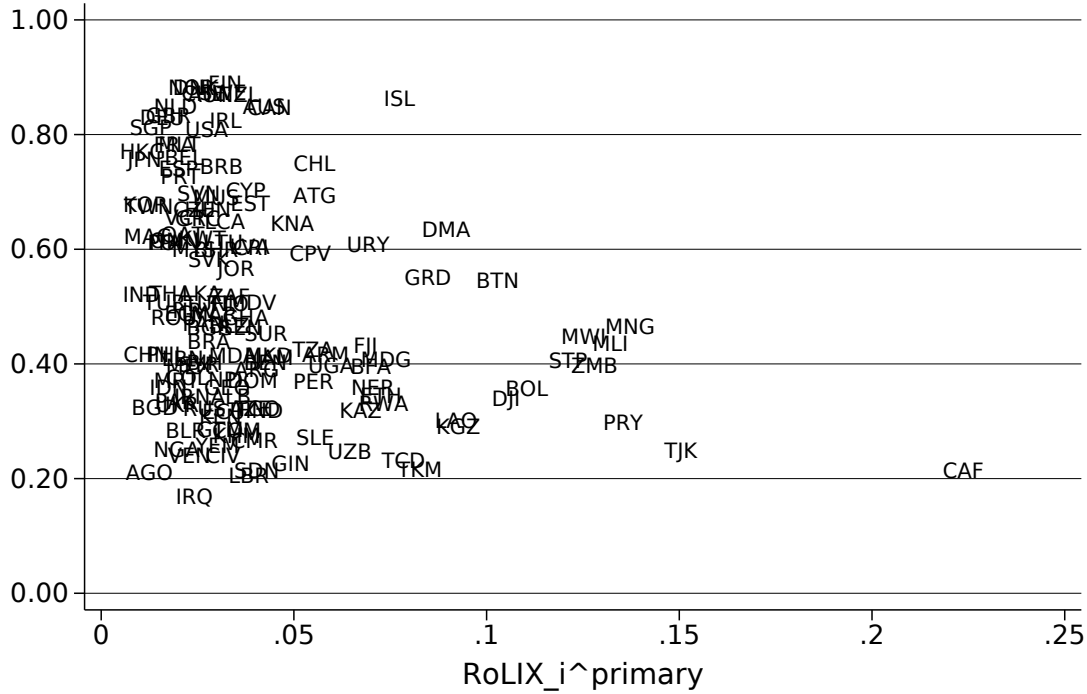
$$\text{RoLIX}_i = \underbrace{\sum_{p \in \text{primary goods}} \widehat{\omega}_{ip} \text{RoLIX}_p}_{RoLIX_i^p} + \underbrace{\sum_{f \in \text{fragmented goods}} \widehat{\omega}_{if} \text{RoLIX}_f}_{RoLIX_i^f} + \underbrace{\sum_{o \in \text{other goods}} \widehat{\omega}_{io} \text{RoLIX}_o}_{RoLIX_i^o} \quad (1)$$

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:

$$\text{RoL}_i = \alpha + \beta^c \text{RoLIX}_i^c + \mathbf{Z}_i \gamma + \epsilon_i, \quad (2)$$

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):

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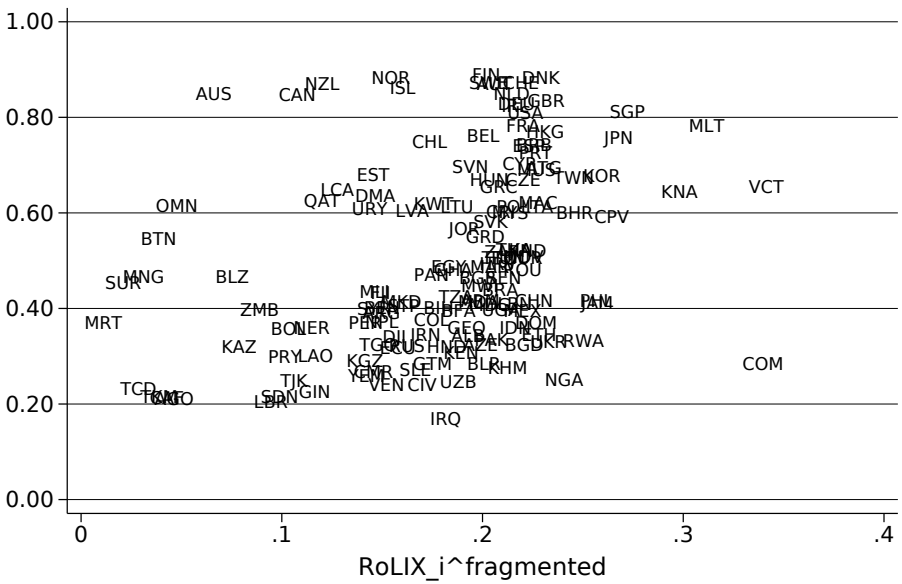
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RoLIX_i^fragmented
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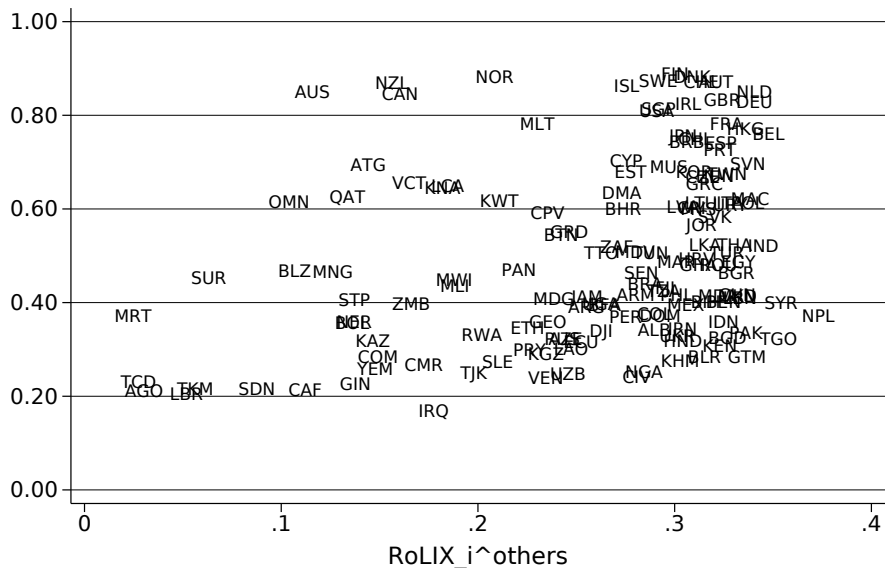
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KAZ
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IRQ

Strategy B1

VARIABLES	(1) RoL_i	(2) RoL_i	(3) RoL_i
$\ln(trade/GDP)_{t=1995}$	0.006	0.003	-0.001
French legal origin	-0.077***	-0.080***	-0.096***
German legal origin	0.059*	0.047	0.029
Scandinavian legal origin	0.088**	0.098***	0.050
Socialist legal origin	-0.128***	-0.126***	-0.155***
$\ln(income)_{t=1995}$	0.107***	0.099***	0.100***
ln(area)	0.018*	0.011	0.016
ln(population)	-0.033***	-0.027	-0.039**
Polity2		0.005***	
$RoLIX_i^p$	0.278	0.149	0.205
$RoLIX_i^f$	0.489**	0.212	0.714**
$RoLIX_i^o$	0.346**	0.306*	0.277
Liberalization			0.044**
Constant	-0.706***	-0.515**	-0.604***
Observations	144	128	119
Adjusted R-squared	0.728	0.729	0.747

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

Strategy B2

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

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 & Romer (1999) regressions (see section 3.2):

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

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).

Strategy B2

VARIABLES	(1) RoL_i	(2) RoL_i	(3) RoL_i
$\ln(\text{trade/GDP})_{t=1995}$	0.005	0.003	-0.002
French legal origin	-0.076***	-0.079***	-0.096***
German legal origin	0.064*	0.048	0.032
Scandinavian legal origin	0.096***	0.102***	0.052
Socialist legal origin	-0.125***	-0.123***	-0.153***
$\ln(\text{income})_{t=1995}$	0.106***	0.099***	0.099***
ln(area)	0.016*	0.008	0.016
ln(population)	-0.032***	-0.024	-0.040**
Polity2		0.006***	
ES_i^f	0.071	-0.055	0.299
ES_i^p	-0.180**	-0.148	-0.135
Liberalization			0.045**
Constant	-0.470***	-0.315	-0.442**
Observations	144	128	119
Adjusted R-squared	0.725	0.729	0.747

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

Conclusion

- In this paper, we test hypotheses against the background of institutional variation across countries and by operationalizing trade patterns as different goods categories by use.
- Our results confirm Levchenko (2013) in that countries exporting more Rule-of-Law intensive goods exhibit a higher quality of the Rule of Law.
- We find that political institutions, legal origin, and level of technology (economic development) matter.
- Using highly disaggregated global product level data, differentiating trade flows on the use side, we go beyond previous results in identifying sectors responsible for the impact of specialization on Rule of Law.
- Our results suggest trade flows generated by other processes of production improve the Rule of Law, while trade flows generated by primary production do not.
- Our results do not robustly confirm the prior of a special effect from specialization and trade in fragmented goods on the quality of the Rule of Law.
- In consequence, our results motivate qualifications to incomplete contracts foundation of trade theory explanations to why we observe differences in legal institutional quality across countries.

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