Trade and institutions: extensive and intensive margins*

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Abstract

In this paper we use a unique firm level trade database on Slovenian exports to disaggregate total exports into an intensive (volume per firm or volume per product) and extensive margin (number of firms or number of products). We examine the structure of Slovenian exports ind detail and also highlight the differences between both margins and model them empirically in a gravity model. We find that export margins explain more variance of total exports, and that the explanatory power of a gravity model with extensive margins is much higher than its counterpart using intensive margins. We particularly focus on the effects of institutions and institutional distances on total exports and export margins, and find that political institutional distance has a negative effect on total exports, which is based on its negative effect on the intensive margins. We do not find any other institutional effect, but find that one of the reasons for these difficulties in finding general effects may be in institutions having very heterogenous effects, which are hard to detect. In the gravity estimations, we control for multilateral resistance and the endogenous nature of institutions.

Keywords: bilateral trade, intensive margin, extensive margin, gravity equation, institutions, institutional distance.
JEL classifications: F14, B52

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1 Introduction

The importance of institutions is by now well taken for granted, as they have large explanatory power for cross country differences and long run growth potential (Hall and Jones, 1999; Acemoglu et al., 2001; Easterly and Levine, 2003). International trade has not avoided this influx of institutional literature, with a consensus now building building around the notion that institutional quality matters for bilateral trade flows (Anderson and Marcouiller, 2002; Belloc, 2006; Berkowitz et al., 2006), with some findings that what also matters, if not more, is the institutional distance of the trading countries (de Groot et al., 2004; Kunčič, 2012a).

The aim of this paper is to provide a thorough overview of Slovenia's trade and to take the literature on trade flows and institutions one step further, disentangling exports into an intensive trade margin (volumes on existing trade) and extensive trade margin (new trade), and discovering in more detail, where the institutional effect in fact lies. For that, we make use of a unique firm level database on Slovenian exports for the past seventeen years, and show that the extensive export margin on a country level can be represented by the number of firms exporting to a particular country, or the number of product varieties, while the intensive export margin is then the average value of exports per firm or product. We combine this data with selected institutional quality measures, and concentrate not only on the effect of institutional quality, but also institutional distance, that is the difference between institutional quality in two partner countries.

The results show that there are interesting differences between the extensive and intensive export margins revealed with summary statistics. They are tested formally within a gravity model, and we find that the standard gravity coefficients do differ between the two margins. We also find that in this setting, the effect of institutional quality variables as well as institutional distances is hard to detect. We do find a general negative effect of political institutional quality distance. The results also imply that institutions might have a lot of heterogenous effects, and so the general effect can be difficult to detect statistically.

Section 2 of this paper presents the theoretical framework for gravity estimation and disaggregation of trade flows. Section 3 presents the data and summary statistics, while section 4 deals with the empirical estimations and discusses the results. Section 5 summarizes and concludes.

2 Theoretical framework

We rely on the theoretical models which yield a gravity trade specifications, such as the CES national product differentiation models, CES monopolistic competition (Dixit-Stiglitz-Krugman) models, models with heterogeneous consumers, models with heterogeneous industries (comparative advantage) and the newest set of models with heterogeneous firms (Melitz-Chaney type models).

Head and Mayer (2011a) and Head and Mayer (2011b) show how a gravity relationship can be derived by combining some relatively simple accounting conditions on the importer and exporter side. Their approach is also compatible with all of the complete, general equilibrium models.

Expenditures of country j are spent on goods from different countries, where Π_{ij} is the share of expenditures in country j being spent on goods from country i, so total trade from i to j can be

written as $X_{ij} = \Pi_{ij} X_j$. Moreover, if follows from theoretical models with imperfect competition, that Π_{ij} can be expressed multiplicatively as $\Pi_{ij} = \frac{A_i \phi_{ij}}{\Phi_j}$, where $0 \leq \phi_{ij} \leq 1$ measures the accessibility of the market (and is analogous to total trade costs), A_i are the characteristics of the exporter and Φ_j denotes how competitive market j is. Using the two equations together yields $X_{ij} = \Pi_{ij} X_j = A_i \frac{X_j}{\Phi_j} \phi_{ij}$.

On the exporter side, simple accounting implies that the sum of exports to all destinations equals the total value of exports, which we can write at the world level as $Q_i = X_i = \sum_j X_{ij}$. As it follows, production equals consumption on the world level, so country j's share in the world expenditures is the same as it's share in the world production $\frac{X_j}{X} = \frac{X_j}{Q}$. Based on this, we can rewrite production of country i as $Q_i = \sum_j \Pi_{ij} X_j = A_j \sum_j \frac{X_j \phi_{ij}}{X \Phi_j} X = A_i \Phi_i^* Q$, where Φ_i^* is the market access term.

Finally, since expenditures of country i X_i are equal to the consumption Q_i in a closed system, we can write $A_i = \frac{Y_i}{\Phi_i^* Y}$ and substitute it in the equation for exports X_{ij} which leaves us with a theoretical gravity equation for bilateral trade flows such as the one in Equation 1, where the bilateral trade depends on some constant term, exporter and importer characteristics, and some bilateral frictions.

$$X_{ij} = \frac{1}{Y} \frac{Y_i}{\Phi_i^*} \frac{X_j}{\Phi_j} \phi_{ij} \tag{1}$$

The institutional effect on trade can be placed in monadic (exporter and importer) terms, when we examine the effect of institutional quality on trade, or in the bilateral trade costs terms, when we examine the effect of institutional distance.

It is also possible to disaggregate trade flows on the extensive and intensive margins. In this line of research, Eaton et al. (2004) were early in incorporating the extensive margin in a trade model with more countries. Also one of the most influential papers, including the extensive margin in a Krugman heterogenous firms model (Krugman, 1980) is the paper by Chaney (2008), who shows the theoretical underpinnings of trade flows disaggregation. Extensive margin has considerable explanatory power in bilateral gravity specifications of trade, the finding of many papers in the past years, such as Hummels and Klenow (2005) or Helpman et al. (2008), however, the literature is not yet in agreement on the relative importance of gravity determinants for intensive and extensive margins.

We disaggregate trade flows broadly as in Bernard et al. (2007) or Mayer and Ottaviano (2008), who describe the trade flows with very insightful summary statistics and also some general gravity specifications. More specifically, focusing solely on gravity, we follow approaches such as Lawless (2010) and Buono and Lalanne (2012), who disaggregate exports for traders from a particular country i on the extensive margin: number of firms, and the intensive margin: trade volumes per firm. We can write the disaggregated trade flow on a yearly basis as in Equation 2. X_{ij} are the exports from country i to country j, N_{ij} is the number of exporting firms in country i, and $\bar{X_{kij}}$ is the average value of exports per firm from country i to country j.

$$X_{ij} = N_j \bar{X_{kij}} = N_{ij} \frac{\sum_k X_{kij}}{N_{ij}} \tag{2}$$

Alternatively, we can also look at another disaggregation of trade flows such as in Martincus et al. (2011) or Debaere and Mostashari (2010). The intensive margin for traders from country i can be represented as trade volumes per product variety exported to each country j - $\bar{X_{kij}}'$, and the extensive margin proxied with the number of product varieties exported from country i to country j - N'_j, as in Equation 3.

$$X_{ij} = N'_j \bar{X_{kij}}' = N'_{ij} \frac{\sum_k X'_{kij}}{N'_{ij}} \tag{3}$$

The question this paper deals with is where this effect lies in the trade dynamics, in terms of the extensive margin of trade: number of firms and number of varieties, or in terms of the intensive margin of trade: value of exports per firm and value of exports per variety. The literature, although not in agreement which institutions are the ones actually most important, or whether it is both the institutional quality and institutional distance that matters, has established that institutional factors do indeed have an effect on trade, but has not pin pointed this effect to either of the margins.

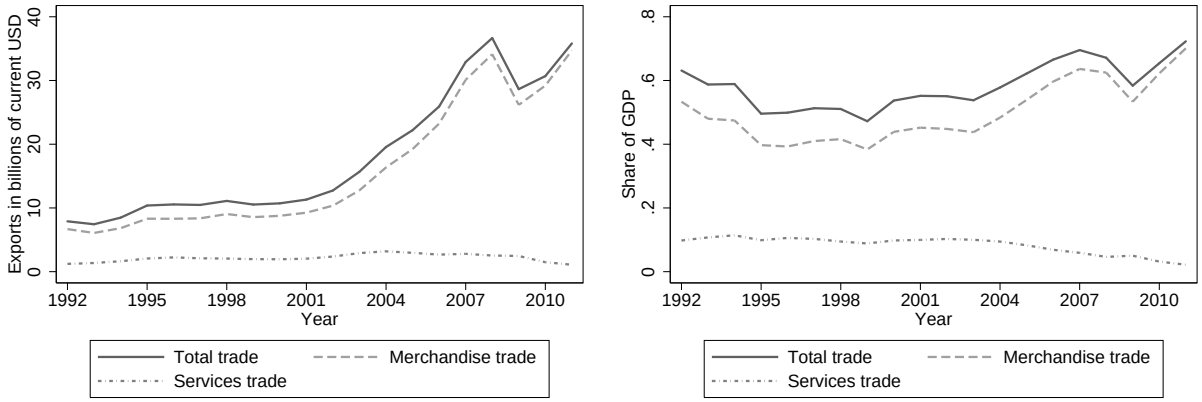
3 Data and summary statistics

We combine several data sources. We firstly some of World Bank macro data to provide an overview of Slovenian trade dynamics and structure, and also for some gravity variables. The export status and number of firms in manufacturing are calculated from the balance sheet and income statement database of the Agency of Republic of Slovenia for Public Records and Related Services (AJPES). Much more than that, we rely on a firm level trade database from the Slovenian Statistical Office to get the Slovenian trade flows which can be disaggregate on the intensive and extensive margin. For the standard gravity controls in trade flows estimation, we use the squared gravity controls dataset of Head et al. (2010), which we extend to 2010, with the addition of a variable indicating countries sharing a common political entity in the past from CEPII (Mayer and Zignago, 2011). Finally, the institutional data comes firstly from a new institutional dataset which bases the empirical institutional proxies in the New Institutional Economics literature Kunčič (2012b). The sources and the data used are further described below.

For an overview, total exports can be disaggregated into merchandise exports and exports of services. Their dynamics are shown in Figure 1 in absulute values and as a share of GDP, for all available years. Total exports as a share of GDP have increased from under 50% to over 70% in the period in question. 85% of total exports are merchandise exports on average, and out of those, almost 90% are manufacturing products. Due to this reasons and data availability, our analysis of Slovenian data concentrates on examining manufacturing exports, which represent more than 70% of all export value. Consequently, we refer to merchandise exports in the data simply as exports. In terms of volumes, Slovenian total merchandise exports experienced a practically exponential growth in the period from 1992 to 2008, going from 6 billion current USD to almost 34 billions, averaging to an 11% annual nominal growth. Due to the crisis, we can see a drop in merchandise export in 2009, but in 2010 it already bounces back.

The main data source on firm level trade is the statistical database at Slovenian Statistical Office. From this source, we have rich firm level data on bilateral trade flows from Slovenian Customs Administration (CARS) for the period of 1994 - 2010. Due to a changed system of recording trade

Figure 1: Exports disaggregation



Source: World Bank

flows, there is a break in the series from Slovenia's accession to EU in 2004. Before 1st of May 2004, all trade flows were recorded by CARS, while only flows of firms with trade exceeding 100 000 Euros on an annual level were recorded after that. This curtails the sample then on for all the smaller firms not being able to make the cut, which might still be exporting but are left out of the database, so caution is needed when trying to control for that and interpreting those results. This database is used to calculate the extensive trade margin for Slovenia - number of firms exporting and number of products exported, and intensive margin - average value of exports per firm and average value of exports per product. Additionally to simply having the net state numbers for the extensive margin, we also calculate the number of products and firms entering a particular market anew, and the number of products and firms exiting a particular market.

An important note with the firm level data at Slovenian Statistical Office is to account for the changes in the Statistical classification of economic activities in the European Community (NACE) for industries and Combined Nomenclature for product classifications the official statistics uses for industry groupings and product groupings. In the first case, NACE Rev. 1.1 changed starting with 2008 into NACE Rev. 2, and in order to have consistency in industry classifications through time, we reclassified the newer data using the older version of NACE. In the case of the Combined Nomenclature for products, we always use the 6-digit product number for groupings of relatively similar or related products. The 6-digit product codes have also changed through time, due to splits and mergers in the nomenclature, so to be able to measure correctly the introduction of new product varieties and the extinction of old product varieties, a series of inter year classification tables has been used and product codes have been either extended forward from the starting classification, extended backwards from the newer classification, or were left intact in the case of creation of completely new products. Most changes, however, occurred on the 8-digit level, with less disturbances on the 6-digit level, which we use in this paper.

The universe of firms in manufacturing according to the Statistical Classification of Economic Activities in the European Community (two digit codes from 15 to 37) in the period 1994 - 2010

is shown in Table 1. A large share of firms exports every year, ranging from 34% at the lowest, to 46% at the highest, which also explains why up to 70% of Slovenian GDP are exports (foreign consumption).

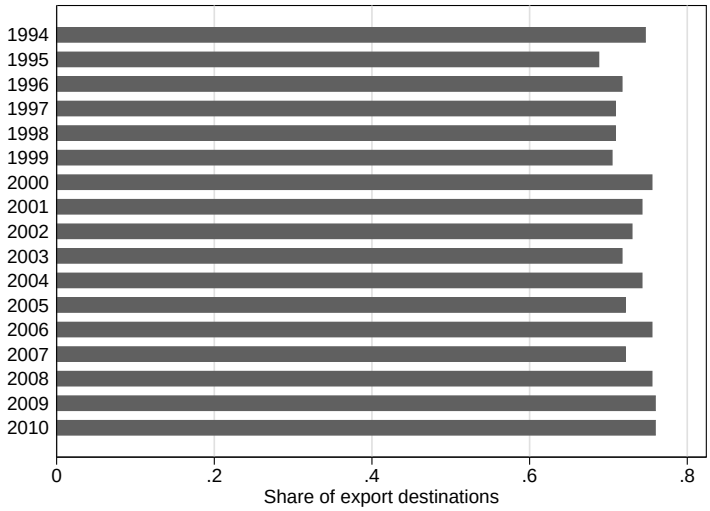
Table 1: The universe of manufacturing firms

Year	Non-exporters	Exporters	Total	Share of exporters
1994	3710	1883	5593	33.67%
1995	3496	2097	5593	37.49%
1996	3743	2132	5875	36.29%
1997	3909	2212	6121	36.14%
1998	4032	2212	6244	35.43%
1999	3906	2377	6283	37.83%
2000	3790	2460	6250	39.36%
2001	3668	2514	6182	40.67%
2002	3734	2647	6381	41.48%
2003	3918	2678	6596	40.60%
2004	3966	2816	6782	41.52%
2005	3932	2907	6839	42.51%
2006	3919	3020	6939	43.52%
2007	4087	3114	7201	43.24%
2008	3231	2760	5991	46.07%
2009	3353	2762	6115	45.17%
2010	3504	2873	6377	45.05%

Source: AJPES and own calculations.

Next, trade is not the rule in world, rather an exception, as clearly shown in the paper by (Bernard et al., 2007), so it is important to note, that Slovenian manufacturing exporters do not trade with every country in every year. There are 237 countries in every year, and Figure 2 shows on a per year basis, the share of destinations actually receiving exports from Slovenia. Trading with between 70% and 80% of possible destinations each year, Slovenia trails France with a share of around 80% (Buono and Lalanne, 2012).

Figure 2: Share of export destinations

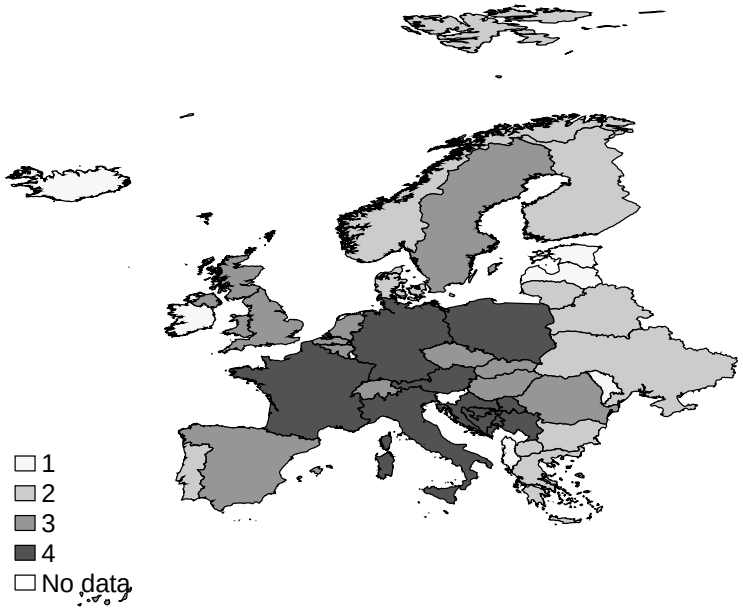


Source: CARS, own calculation

Trade patterns can best be examined on a map of Europe, where there is a high concentration of

trading partners, which we show for the year 2010. Figure 3 shows total manufacturing exports to location across Europe, while Figure 4 shows the intensive margin and Figure 5 the extensive export margins. In all figures, the portrayed variable is divided into ordinal quartiles, the first quartile having lowest export intensity and the forth quartile the highest. Slovenia does not have an export value and is thus categorized in the figures as not having any data.[1] The comparison of Figure 3, displaying total export flows, with Figures 4 and 5, showing the intensive and extensive export margins respectively, depicts that there are more similarities between total exports and intensive margin, than total exports and extensive margin. Moreover, it is interesting to note, that both extensive margins, number of exporting firms as well as number of products, being concentrically stacked around Slovenia on their intensity, follow the gravity distance expectations much more, than the intensive margins, which vary more across Europe and do not show such a clear pattern.

Figure 3: Export intensities in 2010, total value

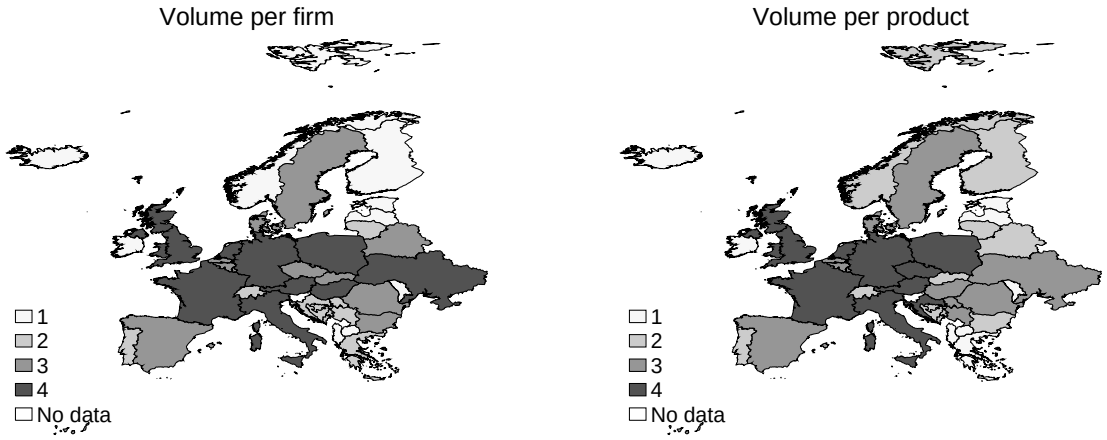


Source: CARS, own calculation

Besides the CARS database of firm levels exports, we depend heavily on the gravity dataset offered by Head et al. (2010) (with the data on sharing political past from Mayer and Zignago (2011), and data on RTA's from de Sousa, 2012), and the Institutional Quality Dataset from Kunčič (2013) (based on Kunčič (2012b)). From the supplemented square trade database, we draw the standard gravity controls for all destination countries and their relation to Slovenia: distance, shared border, shared legal origins, sharing a regional trade agreement, being members of the WTO, sharing a currency, and sharing political history (common country). The gravity trade controls are extended to 2010 to match our sample, and variables that capture country's size and development (GDP)

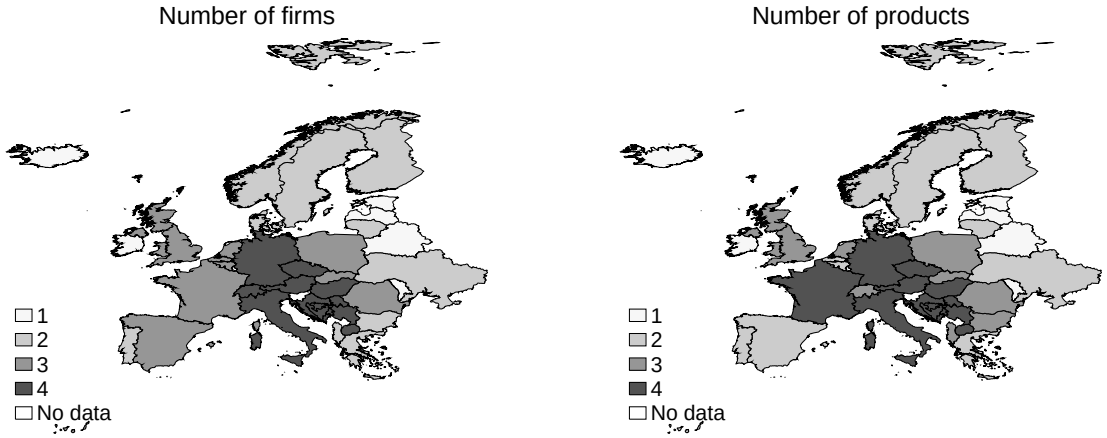
[1] Montenegro and Kosovo also do not have any data. Slovenian exports to those two countries are, due to consistency reasons in later analysis (from a time perspective), combined with exports to Serbia. They are also ascribed to Serbia in maps and subsequent analysis, since Serbia has been the leading political entity of former Yugoslavia in different varieties.

Figure 4: Intensive export margin in 2010



Source: CARS, own calculation

Figure 5: Extensive export margin in 2010



Source: CARS, own calculation

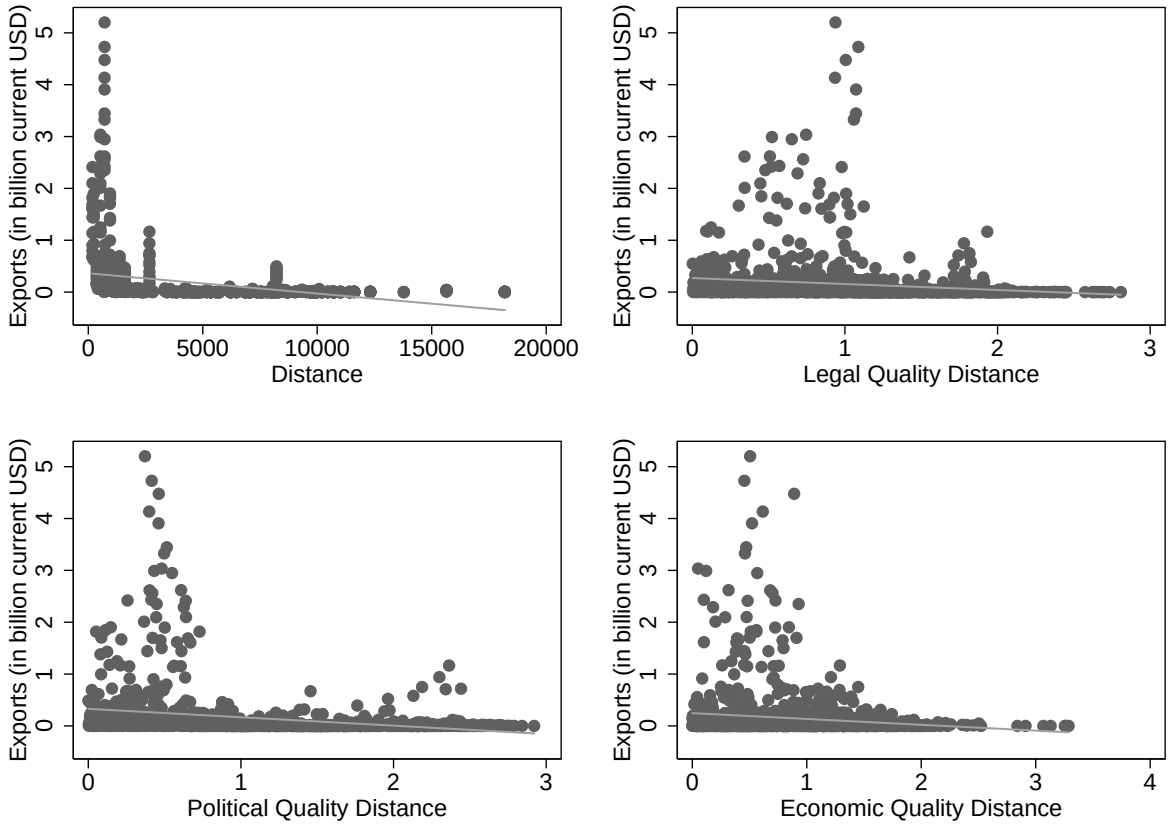
are added from the World Bank World Development Indicators. Following the focus on the institutional effects on the extensive and intensive margins, the institutional quality variables are drawn from Kunčič (2013), who on the basis of more than 30 institutional proxies, calculates the relative quality of formal institutional environment for all countries in the world in the period 1990 - 2010. The formal institutional environment is captured by the quality of legal, political and economic institutions and is calculated in the paper for each country in every year, relative to all others. We use these values to additionally compute a measure of legal, political and economic institutional distance for each country pair and year, by subtracting the destination's quality of each institutional environment to the origin's one and taking the absolute value.

Total manufacturing exports can also be plotted against the four concepts of distance we use in

this paper: geographical distance, legal, political and institutional distance. This is shown, for the entire period, in Figure 6. The total export value plotted against distances shows a slight negative correlation with geographical as well as institutional distances, as predicted by theory. More interestingly, we can depict the same relationship when disaggregation total exports into the extensive and intensive margin.

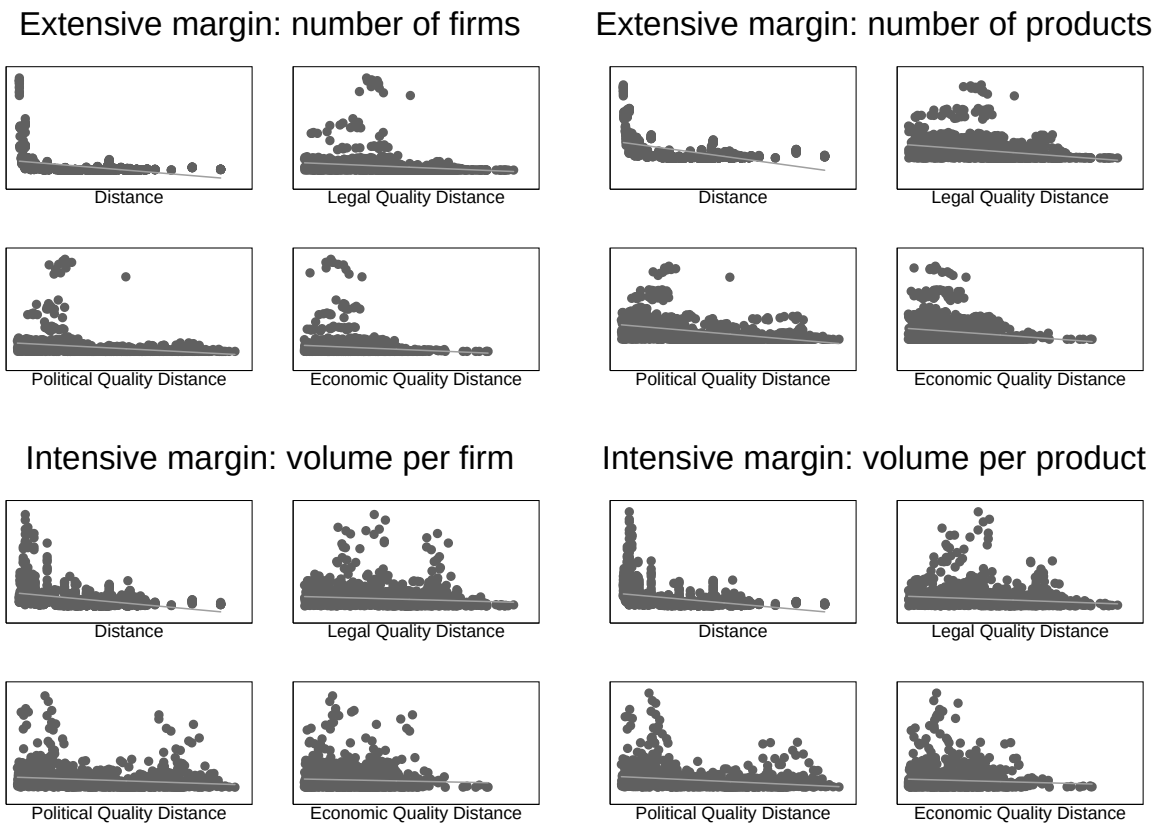
The gravity implications of distance, not only geographical, but also institutional, can be seen on Figure 7, which shows sixteen scatter plots of export measures against geographical distance, legal, political and economic distance. The top eight scatter plots represent the two extensive trade margins, plotting number of exporting firms and number of exported products against distance measures, while the bottom eight scatter plots represent their counterparts on the intensive margin. The scatter plots are consistent with what the maps have already implied, which is that the extensive margin is more susceptible to the effect of geographical distance, but now also that institutional distance affect negatively total trade flows as well as both margins.

Figure 6: Total exports against distances



Source: CARS, Head et al. (2010) and Kunčič (2013); own calculation

Figure 7: Export margins against distances



Source: CARS, Head et al. (2010) and Kunčič (2013); own calculation

Finally, Table 2 show some summary statistics for the entire period. It shows the number of observations, min, max and mean values and standard deviation for total exports, two extensive (number of firms and varieties) and two intensive margins, and also variables which show the movement of extensive margins. The extensive margins only show the state of each margin, while it can be the case that the margin does not change, although some new firms (varieties) show up and some old ones go out of the market. This is captured separately by the births and deaths of firms, and births and deaths of product varieties. These statistics are shown for the coverage of the sample in a regression including all explanatory variables. To put names on some values in the sample, the highest value of total exports was in 2008 to Germany, the lowest in 1999 to Togo. The largest number of exporters and the most varieties were being exported to Croatia in 2007 and 2008, respectively. In terms of dynamics, the largest exit and entry of firms from and to a particular market was in Croatia in 2009 and 2004, respectively. The highest number of new varieties were introduced to Albania in 2009, while the most varieties were pulled out of the market from Russia in 1999.

Table 2: Summary statistics

variable	N	mean	sd	min	max
export (bill current USD)	1169	0.15	0.48	0.00	5.20
firms	1169	225.28	581.39	1.00	5178.00
products	1169	369.56	579.57	1.00	3652.00
volume_firm (mill current USD)	1169	0.31	0.46	0.00	3.88
volume_product (mill current USD)	1169	0.15	0.24	0.00	2.10
firms_birth	1169	69.76	168.29	0.00	1515.00
firms_death	1169	68.80	176.56	0.00	1590.00
products_birth	1169	103.13	111.66	0.00	483.00
products_deaths	1169	91.28	102.15	0.00	497.00
gdp_d (bill current USD)	1169	439.51	1390.94	0.20	14419.40
gdpcap_d (current USD)	1169	11655.71	15214.50	140.56	95189.87
distance	1169	5427.59	4048.38	180.34	18192.70
common_border	1169	0.04	0.20	0.00	1.00
common_country	1169	0.05	0.22	0.00	1.00
common_legal	1169	0.18	0.38	0.00	1.00
rta	1169	0.32	0.47	0.00	1.00
wto	1169	0.92	0.26	0.00	1.00
common_currency	1169	0.04	0.20	0.00	1.00
legal_inst_d	1169	-0.01	0.96	-2.15	1.93
political_inst_d	1169	0.22	0.94	-1.83	2.04
economic_inst_d	1169	0.01	0.95	-2.89	1.89
abs(legal_diff)	1169	1.05	0.60	0.00	2.81
abs(political_diff)	1169	1.10	0.72	0.00	2.92
abs(economic_diff)	1169	0.86	0.57	0.00	3.29

Source: CARS, Head et al. (2010) and Kunčič (2013); own calculation.

4 Empirical framework, estimations and discussion

Equation 1 with the additional time dimension, expressed for a Slovenia as the exporter, can be log linearized and estimated. The time varying term $ln\frac{1}{Y_t}$ is captured with time dummies, while the destination monadic terms (that vary on the jt dimension) are log of GDP per capita and log of population, which accounts both for size of the country and its level of the development. The most interesting term is the bilateral trade openness term ϕ_{ijt} which is proxied with a set of control variables from Head et al. (2010), some of which are time invariant dyadic controls, and some are time variant dyadic controls. The first group of controls (which vary on the ij dimension) are log of distance, shared border, sharing legal origins, common country in the past, while the second group of controls (which vary on the ijt dimension) are regional trade agreeement (RTA), both countries being members of the WTO and sharing a currency.

The disaggregation the total value of exports for Slovenia, as in Equation 2 (and Equation 3), and log-linearization of the equation, yields Equation 4. This additive form implies that the partial coefficients in a total exports gravity estimation will be the sum of the partial coefficients on specific variables in extensive and intensive export margin regressions. The coefficients can be added together to get their effect on the total exports depending on exports disaggregation, volume of exports per firm and number of firms, or volume of exports per product and number of products.

$$ln(X_{ij}) = ln(N_j) + ln(\bar{X_{kij}}) \tag{4}$$

A first look into the relative importance of intensive and extensive margins for gravity exports can be measured by decomposition of a variance of a sum of correlated variables, that is decomposing the sum of variance of exports into the two export margins and their covariance, as Equation 5 shows. We find that out of the total variance of exports, the first disaggregation yields that 34% of total variance can be attributed to the number of firms, 28% to the volume per firm, while the rest is due to their covariance. The second disaggregation yields a variance of number of products at 38%, variance of volumes per product at 26%, and the rest is again the result of their covariance. These numbers imply that the extensive margin has an even higher explanatory power than the intensive margin, which is also a finding of Lawless (2010).

$$Var[ln(X_{ij})] = Var[ln(N_j)] + Var[ln(\bar{X_{kij}})] + 2Cov[ln(N_j), ln(\bar{X_{kij}})] \tag{5}$$

We continue with gravity regression estimations, where a particular concern in the literature is how to correctly control for the problematic multilateral resistance (also called remoteness) term $\frac{1}{\Phi^*_{it}\Phi_{jt}}$ in the log-linearized version of Equation 1, which, if not properly controlled for, can bias the trade costs term ϕ_{ijt}, that we are most interested in. The literature takes two different approaches, either using the multiplicative nature of the gravity equation to divide trade flows between each other and through that canceling the problematic multilateral resistance, such as the friction specification in Head and Ries (2001) or the tetrads specification in Head et al. (2010), or alternatively, using a variety of fixed effects to control for the bulk of the multilateral resistance. Since the disadvantages of the friction and tetrads specification, which are having to construct additional problematic variables such as distance to oneself, low explanatory power (a typical tetrads specification explains only a couple percents of total variation), the elimination of all variance but at the ijt dimen-

sion in tetrads, and a questionable use when a dataset only has one exporter (Slovenia), seem to outweigh the benefits, we proceed with the first route, controlling for multilateral resistance with fixed effects. Completely controlling for the multilateral resistance with fixed effects would involve including origin-year dummies (17) and destination-year dummies (more than 4000), but this leaves as no degrees of freedom in our case of export data for Slovenia only, and even in the case of more variables, it is computationally to intensive for the standard equipment (in a full macro gravity dataset with 200 countries and 50 years, this would result in 20000 dummies). We thus control for the average multilateral resistance, when we include time fixed effects, and additionally with exporter, importer and dyadic fixed effects.

Table 3 shows the baseline gravity estimations with the inclusion of year fixed effects, while 4 shows the results with the inclusion of exporter, importer and dyadic fixed effects. In both tables, the first column regresses log of exports on standard gravity controls, while columns two to five regress both extensive and intensive margin on the same gravity regressors. Note that the sum of the partial coefficients on both margins yields the combines effect of a variable on total exports. Also, in Table 4, identification of dyadic time invariant variables (ln(distance), common_border, common_country, common_legal) is not possible.

Results in Tables 3 and 4 imply that indeed, as foreshadowed by the decomposition of variance, the gravity variables better explain extensive margins than intensive margins, having having in all cases a much higher R^2 than intensive margins. The main coefficients are consistent with the literature, the GDP of the destination country having a positive effect and distance a negative effect. In Table 3, the common border is mostly insignificant, except with the number of products, where it unexpectedly has a significant and negative partial coefficient. The common country dummy (former Yugoslavia) has a positive effect on total exports, but when disaggregated, we find that this effect is a result of the extensive margins, not the intensive margins, that is those markets have a higher number of firms and products than other markets, but not higher volumes. The common legal origin is positive and significant for both total exports and the extensive and intensive margins. Finally, RTAs do not seem to have an effect on exports, common currency a positive effect on one intensive margin and sharing a membership in the WTO even some negative effects, which is a consequence of not controlling for multilateral resistance properly. Also, the dummy from the year 2004 has mixed effects due to the fact the country and country pair fixed effects are not controlled for, and that there are two opposing effects being captured by the dummy (one being the change in statistical reporting, one being Slovenian entry into the EU). Thus, exports should be analyzed more robustly with the inclusion of all fixed effects.

Table 4 shows the gravity estimations for total exports, and disaggregated exports into extensive and intensive margins, but controlling for all fixed effects. In relation to Table 3, the differences in removing the biases are that the coefficients on WTO are now positive and significant (as expected) for total exports and both extensive margins, implying that the effect of WTO is purely on the increase of number of exporters and number of exported products, while the opposite can be seen for sharing a currency, which besides affecting total exports, works only through the intensive margins, increasing both volumes per firm as well as volumes per product. Including all the fixed effects in the analysis also makes the year 2004 dummy insignificant, and sharing an RTA remains insignificant as before.

Table 3: Extensive and intensive margins: year FE

	1 ln(exports)	2 ln(firms)	3 ln(exports_firm)	4 ln(products)	5 ln(exports_product)
ln(gdp_d)	1.042***	0.624***	0.418***	0.622***	0.421***
	(0.0418)	(0.0239)	(0.0274)	(0.0270)	(0.0276)
ln(distance)	-1.356***	-0.884***	-0.472***	-0.957***	-0.399***
	(0.108)	(0.0754)	(0.0702)	(0.0887)	(0.0622)
common_border	-0.597	-0.446	-0.151	-0.792*	0.195
	(0.535)	(0.574)	(0.152)	(0.412)	(0.173)
common_country	1.115**	1.674***	-0.559***	1.041**	0.0738
	(0.540)	(0.544)	(0.143)	(0.469)	(0.135)
common_legal	1.131***	0.469***	0.663***	0.876***	0.256**
	(0.217)	(0.143)	(0.154)	(0.171)	(0.127)
rta	0.178	0.192	-0.0142	0.0949	0.0830
	(0.164)	(0.120)	(0.108)	(0.121)	(0.106)
wto	-0.341*	0.0265	-0.368***	0.0140	-0.355***
	(0.192)	(0.128)	(0.128)	(0.129)	(0.129)
common_currency	0.209	-0.128	0.337**	-0.0315	0.241
	(0.175)	(0.157)	(0.149)	(0.158)	(0.151)
dummy2004	0.133	-0.232**	0.365***	0.318***	-0.184
	(0.169)	(0.102)	(0.121)	(0.113)	(0.126)
Constant	-5.606***	3.939***	-2.637***	4.855***	-3.553***
	(1.062)	(0.746)	(0.671)	(0.873)	(0.635)
Observations	2,563	2,563	2,563	2,563	2,563
R-squared	0.784	0.855	0.463	0.808	0.445
Time FE	YES	YES	YES	YES	YES
Exporter FE	NO	NO	NO	NO	NO
Importer FE	NO	NO	NO	NO	NO
Dyadic FE	NO	NO	NO	NO	NO

Country pair robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1
Source: own calculation

Table 4: Extensive and intensive margins: year, exporter, importer and dyadic FE

	1 ln(exports)	2 ln(firms)	3 ln(exports_firm)	4 ln(products)	5 ln(exports_product)
ln(gdp_d)	0.980***	0.492***	0.488***	0.577***	0.488***
	(0.152)	(0.0664)	(0.132)	(0.0909)	(0.132)
rta	0.0441	0.0698	-0.0258	-0.0405	-0.0258
	(0.127)	(0.0538)	(0.106)	(0.0668)	(0.106)
wto	0.403*	0.383***	0.0204	0.302**	0.0204
	(0.225)	(0.137)	(0.176)	(0.148)	(0.176)
common_currency	0.225*	-0.0435	0.268**	0.0544	0.268**
	(0.125)	(0.0851)	(0.117)	(0.0708)	(0.117)
dummy2004	0.192	-0.167	0.359	0.183	0.359
	(0.287)	(0.115)	(0.247)	(0.156)	(0.247)
Constant	-16.62***	-2.136***	-7.578***	-2.483***	-7.578***
	(1.442)	(0.646)	(1.255)	(0.875)	(1.255)
Observations	2,563	2,563	2,563	2,563	2,563
R-squared	0.882	0.960	0.630	0.926	0.630
Time FE	YES	YES	YES	YES	YES
Exporter FE	YES	YES	YES	YES	YES
Importer FE	YES	YES	YES	YES	YES
Dyadic FE	YES	YES	YES	YES	YES

Country pair robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1
Source: own calculation

Since the maps and scatter plots representation of exports and distances imply that distances affect total exports and export margins negatively, we proceed with the preferred specification from Table 4 which controls for the average multilateral resistance and include institutional variables. Table 5 shows the results of gravity regressions including institutions on total exports, both extensive and both intensive margins. Firstly, the sample size more than halves, due to worse availability of institutional quality variables, but still remains well over one thousand observations. Secondly, a general and surprising finding is, that institutional levels do not seem to have a statistically significant effect on export flow or margins. However, we find interesting results on the terms capturing absolute institution distance between Slovenia and its partners. Namely, the absolute difference in the quality of legal institutions has a negative effect on both extensive trade margins (slightly missing significance for the number of products), and a positive effect on both intensive trade margins. Furthermore, absolute political institutional distance has a negative effect on total exports, which is based solely on both intensive margins (again slightly missing significance in the case of exports per product), while it does not effect the extensive margins.

Table 5: Extensive and intensive margins with institutions

	1 ln(exports)	2 ln(firms)	3 ln(exports_firm)	4 ln(products)	5 ln(exports_product)
ln(gdp_d)	1.075***	0.427***	0.648***	0.556***	0.518*
	(0.236)	(0.0921)	(0.222)	(0.144)	(0.270)
rta	0.184	0.152***	0.0320	0.0761	0.108
	(0.120)	(0.0513)	(0.117)	(0.0751)	(0.123)
wto	0.0612	0.0180	0.0432	0.0292	0.0321
	(0.231)	(0.0934)	(0.216)	(0.139)	(0.244)
common_currency	0.135	-0.0851	0.220**	0.0117	0.123
	(0.0899)	(0.0620)	(0.0912)	(0.0654)	(0.102)
dummy2004	-0.125	-0.118**	-0.00724	-0.107	-0.0183
	(0.135)	(0.0550)	(0.125)	(0.0748)	(0.125)
legal_inst_d	0.197	-0.0522	0.249	-0.00227	0.199
	(0.224)	(0.117)	(0.196)	(0.137)	(0.244)
political_inst_d	-0.403	-0.00503	-0.398	0.0438	-0.447
	(0.270)	(0.132)	(0.246)	(0.163)	(0.271)
economic_inst_d	-0.0603	0.0545	-0.115	0.175	-0.236
	(0.134)	(0.0687)	(0.118)	(0.149)	(0.183)
abs(legal_diff)	0.289	-0.157*	0.446***	-0.0271	0.316*
	(0.184)	(0.0795)	(0.166)	(0.0844)	(0.181)
abs(political_diff)	-0.454*	0.00814	-0.462**	-0.0874	-0.366
	(0.260)	(0.121)	(0.228)	(0.129)	(0.248)
abs(economic_diff)	-0.119	-0.0273	-0.0915	0.124	-0.243
	(0.168)	(0.0666)	(0.144)	(0.170)	(0.238)
Constant	-16.67***	-0.720	-9.048***	-1.618	-8.150***
	(2.553)	(0.979)	(2.402)	(1.520)	(2.899)
Observations	1,169	1,169	1,169	1,169	1,169
R-squared	0.935	0.981	0.757	0.954	0.750
Time FE	YES	YES	YES	YES	YES
Exporter FE	YES	YES	YES	YES	YES
Importer FE	YES	YES	YES	YES	YES
Dyadic FE	YES	YES	YES	YES	YES
Orthog. Inst.	NO	NO	NO	NO	NO

Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1
Source: own calculation

Due to the proven endogenous nature of institutional quality variables in the literature on institutions, growth and incomes, we also replicate the results from Table 5, using orthogonalized institutions. As in Benassy-Quere et al. (2007), we regress every institutional measure on GDP per capita as a capture all development variable, and collect the residuals, which are then the part of institutional measures orthogonal to development. The results of the gravity regressions using orthogonalized institutions are reported in Table 6. We find significant changes in terms of the effect of legal institutional distance, which now looses its significance in all regressions. Political institutional distance, on the other hand, keeps its negative sign and significance on total exports,

confirming the previous result since it is based solely on both intensive margins (again slightly missing significance in the case of exports per product).

Table 6: Extensive and intensive margins with orthogonal institutions

	1 ln(exports)	2 ln(firms)	3 ln(exports_firm)	4 ln(products)	5 ln(exports_product)
ln(gdp_d)	1.061***	0.478***	0.582***	0.580***	0.480*
	(0.216)	(0.0832)	(0.205)	(0.144)	(0.253)
rta	0.200	0.159***	0.0411	0.0952	0.105
	(0.123)	(0.0518)	(0.118)	(0.0782)	(0.129)
wto	0.0671	0.0229	0.0442	0.0325	0.0345
	(0.235)	(0.0925)	(0.231)	(0.140)	(0.258)
common_currency	0.0820	-0.0708	0.153	0.0655	0.0165
	(0.113)	(0.0681)	(0.108)	(0.0676)	(0.131)
dummy2004	-0.214	-0.108*	-0.107	-0.103	-0.111
	(0.156)	(0.0587)	(0.143)	(0.0824)	(0.148)
legal_inst_d	-0.00629	0.0686	-0.0749	-0.00105	-0.00524
	(0.223)	(0.0971)	(0.199)	(0.132)	(0.232)
political_inst_d	-0.107	-0.00919	-0.0975	0.0615	-0.168
	(0.177)	(0.0969)	(0.165)	(0.142)	(0.183)
economic_inst_d	-0.0635	0.0594	-0.123	0.0852	-0.149
	(0.151)	(0.0752)	(0.131)	(0.112)	(0.150)
abs(legal_diff)	-0.0282	-0.00612	-0.0221	-0.00244	-0.0258
	(0.183)	(0.0725)	(0.162)	(0.112)	(0.188)
abs(political_diff)	-0.310*	-0.0319	-0.278*	-0.0379	-0.272
	(0.179)	(0.0883)	(0.147)	(0.126)	(0.168)
abs(economic_diff)	0.107	-0.00219	0.109	0.0197	0.0873
	(0.178)	(0.0647)	(0.168)	(0.117)	(0.210)
Constant	-16.74***	-1.445	-8.383***	-1.897	-7.930***
	(2.285)	(0.895)	(2.167)	(1.540)	(2.671)
Observations	1,169	1,169	1,169	1,169	1,169
R-squared	0.935	0.981	0.758	0.954	0.751
Time FE	YES	YES	YES	YES	YES
Exporter FE	YES	YES	YES	YES	YES
Importer FE	YES	YES	YES	YES	YES
Dyadic FE	YES	YES	YES	YES	YES
Orthog. Inst.	YES	YES	YES	YES	YES

Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1
Source: own calculation

We continue with our focus on institutional distance and test for possible nonlinear effects of institutional distance, but find none. We also test for heterogenous effects of institutional distance depending on whether the trade is predominantly intra industry trade or inter industry trade. For that purpose, we utilize a CEPII TradeProd (de Sousa et al., 2012), which includes 26 industrial sectors according to the three digit ISIC Revision 2 (International Standard Industrial Classification) from 1980 to 2006. For each country-year, we calculate the bilateral Grubel-Lloyd (GL) index for each trading partner, according to Equation 6, where i is the exporter cuntry, j the importer country, k the sector, X exports and M imports.

$$GL_k^{ij} = 1 - \frac{|X_k^{ij} - M_k^{ij}|}{X_k^{ij} + M_k^{ij}} \tag{6}$$

We only use the values for Slovenia as an exporter in this paper, and to have the coverage we want, we use the average GL index for each of Slovenia's trade partner. The ten top intra industry trade partners for Slovenia, and the ten lowest ones (top inter industry trade) with values larger than zero are shown in Table 7, along with the values of the intra-industry trade index, while Figure 1 in the Appendix shows the average intra industry intensity on a map of Europe, in quartiles.

The gravity estimations, concentrating on the effect of institutional distance and thus leaving out the institutional quality levels (as they remain insignificant even when included), with the addition of an interaction effect for each institutional distance, are shown in Table 8. The dummy *intra*

Table 7: Top and bottom intra-industry trade partners

	Top partners	avg. Grubel-Lloyd		Bottom partners	avg. Grubel-Lloyd
1	France	0.7571	1	Turkmenistan	0.0001
2	Austria	0.7015	2	Somalia	0.0002
3	Italy	0.6739	3	Burkina Faso	0.0004
4	Germany	0.6672	4	Congo, Rep.	0.0006
5	Croatia	0.5652	5	Paraguay	0.0006
6	Netherlands	0.5481	6	Armenia	0.0007
7	Czech Republic	0.5462	7	Myanmar	0.0007
8	Hungary	0.5454	8	Senegal	0.0010
9	United Kingdom	0.5038	9	Mali	0.0011
10	Sweden	0.5036	10	Sierra Leone	0.0015

Source: de Sousa et al. (2012) and own calculation

is defined as one if the particular trading partner of Slovenia is in the top 50 percentiles of intra-industry trade. Since the partner countries of Slovenia with whom Slovenia trades predominantly in intra-industry goods are very different on their level of development than the countries where inter-industry trade is more important, it is not all that surprising that we can find a differential effect of institutional distance. We find that the negative effect of political institutional distance found in Table 6 is in fact based on intra-industry trade, as the effect of the interaction is negative and significant for $intra = 0$, whereas the heterogenous effect of political institutions distance for intra-industry trade is in fact positive. In both cases, it is still based on the intensive margin.

Table 8: Differential effect of institutional distance

	1 ln(exports)	2 ln(firms)	3 ln(exports_firm)	4 ln(products)	5 ln(exports_product)
ln(gdp_d)	1.100***	0.505***	0.595***	0.613***	0.487*
	(0.220)	(0.0737)	(0.206)	(0.143)	(0.261)
rta	0.165	0.144***	0.0218	0.103	0.0627
	(0.126)	(0.0542)	(0.118)	(0.0795)	(0.128)
wto	0.0149	0.0245	-0.00951	0.0539	-0.0390
	(0.238)	(0.0845)	(0.231)	(0.135)	(0.261)
common_currency	0.202**	-0.0947	0.297***	0.0222	0.180*
	(0.0944)	(0.0677)	(0.105)	(0.0588)	(0.0995)
dummy2004	-0.168	-0.130**	-0.0376	-0.146*	-0.0215
	(0.144)	(0.0525)	(0.131)	(0.0795)	(0.127)
abs(legal_diff)	-0.0974	-0.0991	0.00178	-0.0342	-0.0631
	(0.319)	(0.0928)	(0.295)	(0.190)	(0.354)
abs(legal_diff)*intra	0.0341	0.0228	0.0114	-0.00771	0.0418
	(0.334)	(0.133)	(0.312)	(0.216)	(0.360)
abs(political_diff)	-0.669**	-0.197	-0.472*	-0.0960	-0.573
	(0.334)	(0.157)	(0.272)	(0.235)	(0.373)
abs(political_diff)*intra	0.700*	0.274	0.426	0.0903	0.610
	(0.414)	(0.187)	(0.343)	(0.269)	(0.435)
abs(economic_diff)	0.246	-0.0848	0.331	0.00749	0.239
	(0.321)	(0.0947)	(0.300)	(0.215)	(0.395)
abs(economic_diff)*intra	-0.297	0.143	-0.440	0.00878	-0.306
	(0.348)	(0.115)	(0.324)	(0.230)	(0.415)
Constant	-17.12***	-1.662**	-8.553***	-2.212	-8.004***
	(2.320)	(0.785)	(2.173)	(1.503)	(2.741)
Observations	1,169	1,169	1,169	1,169	1,169
R-squared	0.935	0.981	0.758	0.954	0.750
Time FE	YES	YES	YES	YES	YES
Exporter FE	YES	YES	YES	YES	YES
Importer FE	YES	YES	YES	YES	YES
Dyadic FE	YES	YES	YES	YES	YES
Orthog. Inst.	YES	YES	YES	YES	YES

Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1
Source: own calculation

5 Conclusion

The aim of this paper is to examine exports of Slovenia and to pay particular attention to the differences in intensive and extensive margins. We also examine what the effect of institutions and institutional distances is on exports, with micro, firm level export data from Slovenia, which allows us to look at both the intensive and the extensive export margin. We disaggregate exports in two ways, yielding two intensive and two extensive trade margins. The first disaggregation is on volumes per firm and number of firms, and the second one is on volumes per product and number of products.

A thorough examination of Slovenia's export activity reveals some interesting facts. Firstly, Slovenia is a small open economy and as such very much dependent on exports, which represent up to 70% of its GDP. Out of those, a majority share are manufacturing exports, which represent also around 70% of total export value. Out of all the firms in manufacturing, we find that up to 45% of firms export, which is a high percentage as compared to other countries. Out of all possible export markets (countries), in every year, Slovenian firms export to around 70% of them, having no exports to the others.

Summary statistics also show that in terms of intensity of exports on both margins, distance is a decisive factor, especially so with the extensive margins. We also show that scatter plots of total exports, intensive or extensive margins against the four concepts of distances: geographical distance, legal, political and economic quality distance, imply that there is a negative relationship between export measures and distances. We test this notion within a gravity model, where total exports and disaggregated exports on the intensive and extensive margins are analyzed.

In terms of variance of total exports explained by the two margins, the extensive margin fares better. Also, all gravity specifications with extensive margins have a much better explanatory power as compared to the gravity regressions with intensive margins. We show that it is important to control for multilateral resistance with enough fixed effects, and firstly replicate the results of the literature, yielding amongst other, standard positive and significant estimates on GDP and negative and significant estimates on geographical distance.

We focus particularly on the effect of destination's quality of legal, political and economic institutions, and the effect of absolute institutional distance in all three institutional groups. We show that it is important to take not only multilateral resistance into account, but also the inherent endogenous nature of institutions, which we purge of the most problematic part. The results on the effects of institutions and institutional distances leave something to be desired for, as we are unable to replicate the more salient effects from the literature.

We find that the quality of institutions in the destination country is not a significant determinant of exports, and that out of institutional distances, only distance in the quality of political institutions affects exports negatively. This negative effect is based on the intensive margin, whereas no institutional variable seems to have an effect on the extensive margin. We also find heterogeneities in the effect of political institutional distance. Although the general effect is negative, when including the interaction between political institutional distance and intra-industry trade dummy, we find that besides the general negative effect is based on inter-industry trade, while in intra-industry trade, this effect is positive.

In conclusion, there are differences in the estimations of gravity coefficients between the intensive and extensive margins. Institutional factors in this paper have only a modest effect, but the summary statistics and later estimations suggest there might be a lot of heterogeneity, which makes it harder to statistically detect general effects.

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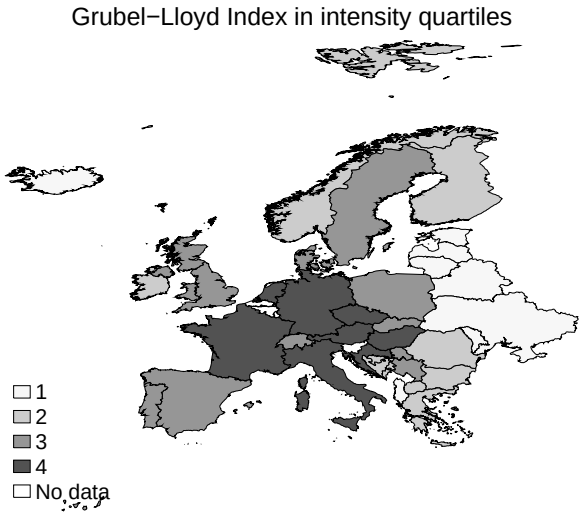
A Appendix 1

Figure 8: Average intra-industry trade intensities



Source: de Sousa et al. (2012), own calculation