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The Role of Institutional Environment in International Trade: The Case of Spanish Regions*

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Abstract. We move beyond the nation-state as the unit of analysis and use subnational spatial variation to study the effect of the institutional environment on international trade. Additionally, we address the heterogeneous effect of trade agreements on different regions within a country. Employing a gravity model approach, we use a region-to-country dataset to estimate the determinants of Spanish regional exports and we apply quantile regressions for panel data. We find that better institutional quality of trade agreements leads to an increase in both the intensive and the extensive margins of trade. The institutional quality of trade agreements exerts a differential effect on regional exports at different locations within a country, although differences across Spanish regions seem to be larger for the intensive margin than for the extensive margin. However, we do find a common trend: for the relatively more important exporting regions the institutional quality of trade agreements is less relevant for trade margins. Therefore, our results posit that subnational spatial variation should be added to the analysis of the determinants of international trade flows.

JEL classification: F14, F15, F55, R10

Key words: Trade Agreements; Institutional Environment; Trade Flows; Regions; Gravity Equation; Quantile Regression

1 Introduction

In this research we analyse the role of supranational standard-setting and regulation institutions, i.e. the institutional quality of regional integration agreements, in international trade. More specifically, our interest is in determining whether the increase in regional exports is due to maintaining and enhancing trade relations over time or to the appearance of new markets. Therefore, we study the determinants of the so-called intensive margin (IM) and extensive margin (EM) of trade (Márquez-Ramos et al. 2015). To do so, we

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employ a gravity framework, which is generally considered the workhorse of international trade analyses, focusing on regional exports from a single country (Spain). The notion "regional" has both a subnational (e.g. Valencian Community) and a supranational meaning (e.g. in regional trade agreements) as "regional trade" can be trade flows from a specific community or within a trade agreement. In this paper we refer to the subnational meaning of the notion "regional".

Since the time of Spain's economic integration into the European Union (EU), and since 1986 into the European Economic Community (EEC), there were a number of trade agreements (TAs) with third countries that were signed. For example the Barcelona Process or the Euro-Mediterranean Partnership, which was set up in 1995, as well as bilateral trade agreements with countries in other geographical areas such as Mexico, South Africa and Chile. Additionally, following the accession of new countries to the union there are now 28 EU member states.

It is worth mentioning that a key empirical challenge in assessing the effect of TAs on international trade flows is identification (Márquez-Ramos 2016b). We require exogenous variation in TAs, however it is well known that the TA variable is an endogenous regressor in the conventional gravity approach, i.e. country-to-country (see, for example, Baier et al. 2014).

Using available regional trade statistics for Spain allows us to use panel data and instrumental variables (IV) to test whether TA institutional quality is endogenous. Additionally, we apply quantile regressions (QR) for panel data, which has two identification advantages (Figueiredo et al. 2016). First, QR estimation of log-linear gravity models is robust with respect to heteroskedasticity bias (Santos-Silva, Tenreyro 2006). Second, quantile estimation identifies the effect of TA institutional quality across the entire trade flow distribution. Additionally, this is a suitable methodology to analyse whether the effect of TA institutional quality is heterogeneous at different locations within a country.

This research makes two main contributions to the literature. First, it analyses the effect of TA institutional quality on international trade in a region-to-country dataset and in contrast to mainstream research, we then examine the institutional quality of TAs (Kohl et al. 2013) rather than their creation per se (Cipollina, Salvatici 2010, Head, Mayer 2014). Second, it addresses the importance of dealing with within-country heterogeneity in a gravity framework when analysing the factors behind the variation in the IM and in the EM of trade.

We start the next section by discussing the background of the gravity model and trade margins and formulating our main hypotheses. The third section presents our data and variables as well as the analytical model used in our analyses, while the fourth section details the obtained results. Finally, the last section concludes and provides a discussion of several important caveats to our results, including the fact that the effect of TA institutional quality differs by region within a country.

2 Background and Hypotheses

There are two main streams of literature that explore the relationship between TAs, the margins of trade and the gravity framework. First, a series of papers analysing the effect of TAs on trade flows considers the endogeneity problem of TAs in the gravity approach at country level (see for example Baldwin, Taglioni 2006, Baier et al. 2014). TA variables correlate with the error term, as there is an omitted variable bias due to the multilateral resistance terms, or MRT (Anderson, van Wincoop 2003). At country-level, the most commonly-used solution for solving the endogeneity problem of TA variables is to include country-pair and country-time dummies to control for unobserved effects.

In a recent paper, Márquez-Ramos (2016b) proposes the use of regional trade statistics (region-to-country) as an alternative to country-to-country trade statistics in order to analyse the effect of regional integration on trade flows ("regionalising with regionalism"). When using trade statistics at region-to-country level, introducing the full array of dummies at country level in the gravity equation is not free of cost and it has the shortcoming that it does not allow the analyst to distinguish the effect of those determinants that are collinear with the introduced dummies, as is the case with key determinants such as TAs

or distance (see the discussion about within-country discontinuity in economic space by Beugelsdijk, Mudambi 2013).

Second, a series of empirical studies has concentrated on the effect of trade liberalisation on the margins of trade, although there is no consensus in the literature about how to measure trade margins and what methodology to use. For instance, Baier et al. (2014) and Márquez-Ramos et al. (2015) adopted the intensive versus extensive decomposition proposed by Hummels, Klenow (2005), while Bensassi et al. (2012) based their approach on the decomposition of trade proposed by Hillberry, Hummels (2008). These studies define the EM at sector-product level although it can be defined at different levels of aggregation such as firm or country level (Santos-Silva et al. 2014).

In addition to trade literature, international business literature has also shown the importance of distinguishing between these two margins: the EM refers to the discrete trade decision, while the IM relates to the continuous amount of trade (Beugelsdijk, Mudambi 2013). For the EM we can therefore distinguish between the appearance of trade in new products and in new markets. Although recent gravity literature has mainly focused on product diversification (Bensassi et al. 2012, Baier et al. 2014, Márquez-Ramos et al. 2015), the EM in the pure sense of the term can be defined as those exports that provide new market entrants, while the IM in the pure sense is a result of continued growth in existing exporters' sales to the same destinations (Florensa et al. 2015). Thus, in the present paper we focus on international diversification while acknowledging that there might be a trade-off between product diversification and international diversification due to limited resources (Meyer et al. 2011).

Turning to our hypotheses, we expect that TAs (and more specifically, their institutional quality) can boost exports, but the effect may differ by region within the boundaries of a single country. The two main hypotheses tested in the empirical analysis of this research are:

Hypothesis 1: Better institutional quality of TAs leads to an increase in regional exports.

Hypothesis 2: The institutional quality of TAs exerts a differential effect on regional exports at different locations within a country.

In addition to the two main hypotheses presented above, we test a third hypothesis that makes a distinction between the EM and the IM of trade. It reads as follows:

Hypothesis 3: The institutional quality of TAs exerts a differential effect on the extensive and on the intensive margins at different locations within a country.

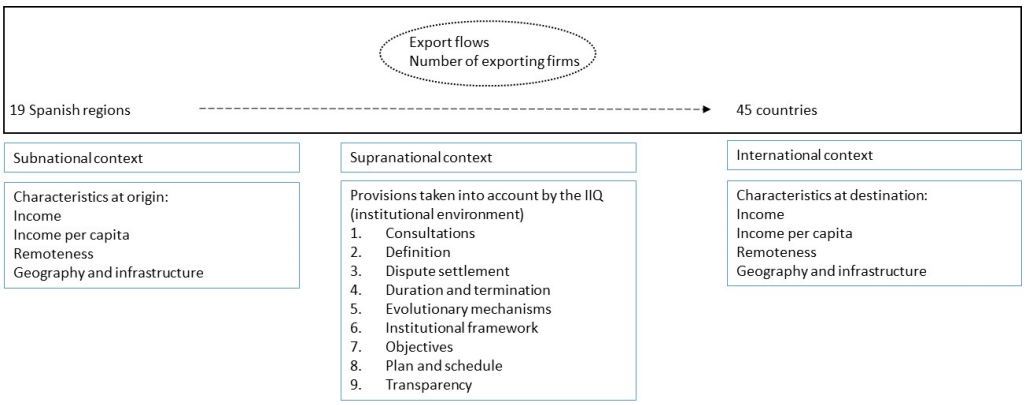
3 Methodology

3.1 Data and variables

In this paper, we use the dataset provided by Márquez-Ramos (2016a), who uses a sample of exports from the 19 Spanish regions to 45 destination countries over the period 2000-2008. These importing countries are: Algeria, Argentina, Australia, Austria, Bangladesh, Belgium, Brazil, Canada, Chile, China, Colombia, the Czech Republic, Denmark, Egypt, Finland, France, Germany, Greece, Hong Kong, India, Indonesia, Ireland, Italy, Japan, Jordan, Lebanon, Malaysia, Morocco, Mexico, the Netherlands, New Zealand, Pakistan, Poland, Portugal, Singapore, South Africa, South Korea, Sweden, Thailand, Tunisia, Turkey, the United Kingdom, the United States, Venezuela and Vietnam.

Characteristics of origins (Spanish regions) and destinations (countries) are taken into account following the gravity theory; MRT are captured using remoteness variables (see the discussion provided by Márquez-Ramos 2016a, pages 333-334). The dataset that we use includes data on bilateral export flows (in terms of value, i.e. the IM) and on a number of explanatory variables that we require in the present research: namely income, income per capita, distance, language, border and coastal dummies, remoteness, and port infrastructure variables.

Additionally, we measure the EM as the number of firms that export to the selected destinations, by region. To do so, we use the Spanish Datacomex – Estadísticas del Comercio Exterior (Foreign Trade Statistics, available at http://datacomex.comercio.es).



Source: Own elaboration

Figure 1: The role of institutional environment in international trade: subnational, supranational and international contexts

We base our analysis on the data provided by Kohl et al. (2013) regarding the institutional quality of TAs in which the EU is involved over the period 2000-2008. The index that reflects an agreement's institutional quality – the index of institutional quality, or IIQ – measures a TA's depth as a function of the number of provisions that are included. The provisions relate to consultations, definition, dispute settlement, duration and termination, evolutionary mechanisms, institutional framework, objectives, plan and schedule, and transparency. The IIQ allows us to examine specific characteristics of a TA that might have a crucial influence on increases in regional exports. It is calculated as the sum of the legally enforceable provisions that are included for each TA divided by the total number of possible provisions, i.e. nine. Appendix B.1 provides a description of these provisions and three clarifications to the notion "institutional quality of trade agreements". The IIQ variable to be included in the regression analysis equals zero when there is not a TA with country j in year t (see Table B.3 in Appendix B.1 for frequencies and TAs involved). Table A.1 in Appendix A shows the descriptive statistics of the dataset.

The subnational context interacts with the supranational context (the EU negotiates TAs as a regional trading bloc) by means of the IIQ, as the institutional quality of TAs might exert a differential effect on the EM and the IM at different locations within a country. Figure 1 summarises the set of variables and interactions taken into account in the empirical analysis.

3.2 Analysis

The present study offers two types of analyses. First, we present a descriptive analysis to illustrate graphically the importance of the variation in export data from different regions within a country. Second, we employ regression analysis to examine the determinants of those regional exports. In particular, we use pooled ordinary least squares (OLS), IV and QR.

In the first part of the regression analysis (pooled OLS and IV) we take into account three excluded instruments, these are the three exogenous variables that are excluded from the gravity equation: 1) the rule of law at country level 2) the interaction between the importance of maritime transport for a Spanish region and the knowledge about trading partners and 3) the quality of government at the regional level. Appendix B.2 details the logic underlying the choice of these instruments.

We proceed as follows. Our first exercise is to test whether our excluded instruments correlate with TA institutional quality. As the first condition for valid instruments is relevance, the excluded instruments should be related to the endogenous explanatory variable, i.e. TA institutional quality. Next we assume that the instruments do not correlate with omitted factors that explain regional exports in a gravity approach. This is because we control for all factors included in international trade models that aim to explain

the determinants of international trade flows. This assumption is related to the second condition for valid instruments, which is exogeneity: the excluded instruments should be uncorrelated with the error term of the gravity equation in order to be considered suitable. In other words, our three excluded instruments affect only regional export flows indirectly through TA institutional quality.

Our second exercise is to estimate a gravity equation for regional exports:

$$\begin{aligned}\ln X_{ijt} = {} & \gamma_0 + \gamma_1 \ln Y_{ijt} + \gamma_2 Yh_{it} + \gamma_3 Yh_{jt} + \gamma_4 D_{ij} + \gamma_5 Lang_j + \\ & \gamma_6 BP_i + \gamma_7 BF_i + \gamma_8 Coast_i + \gamma_9 TA_{jt} + \gamma_{10} rem_{it} + \gamma_{11} rem_{jt} + \\ & \gamma_{12} port_{it} + \tau_t + \omega_{ijt} \end{aligned} \quad (1)$$

where $\ln X_{ijt}$ denotes the logarithm of exports from a Spanish region i to an importing country j in year t; $\ln Y_{ijt}$ is the logarithm of the product of GDP for exporter i and importer j in year t; Yh_{it} (Yh_{jt}) is GDP per capita in the exporting region (importing country) in year t. $Lang_j$, BP_i, BF_i and $Coast_i$ are dichotomous variables that take a value of one when the same language is spoken in i and j (Spanish), when region i shares a border with Portugal (BP) or France (BF), and when i is a coastal region ($Coast$). Our right-hand-side (RHS) variable of interest is TA_{jt}, which takes the value of zero when Spain and the corresponding trading partner have not signed a TA in year t, and the value of the IIQ index provided by Kohl et al. (2013), i.e. TA institutional quality, when a TA is in force. As a baseline regression, however, we also estimate equation (1) by including a TA dummy instead of TA institutional quality.

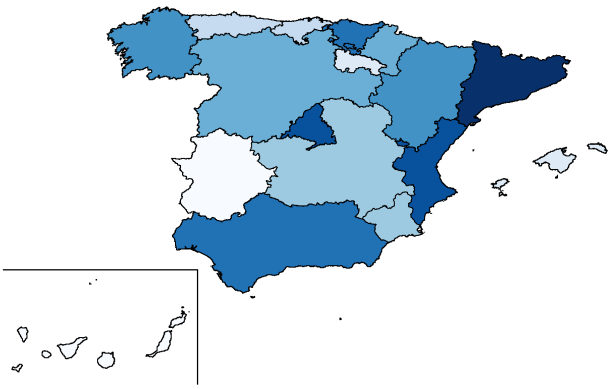
In keeping with Carrère (2006) and Márquez-Ramos (2016a), this study includes remoteness of the exporter (rem_{it}) and importer (rem_{jt}) to proxy for MRT. Port facilities (standardised) variables ($port_{it}$) and year dummies are also included in the regression. By following the strategy of including typical RHS gravity variables in the regression model, we are following the recommendation given by Beugelsdijk, Mudambi (2013) of explicitly distinguishing between discontinuous border (BP and BF) and continuous distance (D) effects.

Benchmarking and further discussion is necessary in terms of testing whether the effect of the institutional quality of TAs differs across regions within a country. We do so in the empirical analysis by using QR (see, for more details, Koenker, Bassett Jr. 1978, Koenker 2004, Figueiredo et al. 2016). One of the advantages of QR is its semi-parametric nature; it is more robust under heteroskedasticity and under non-normal distributions of the response variable (see, for example, the brief outline of QR methods by Peiró-Palomino, Tortosa-Ausina 2013). In the context of the present research, QR allows us to capture heterogeneous effects of TAs for different trade levels across regions. The gravity identification using QR in a country-to-country dataset is discussed by Figueiredo et al. (2016). Similarly, a QR could be carried out in a region-to-country dataset. Our QR analysis is performed by including in the RHS the controls presented in equation (1), together with year fixed effects and the variable of interest; and by using as the left-hand-side (LHS) variable (X_{ijt}), first, the log of the value of regional exports (testing Hypothesis 2) and, second, the log of the number of exporting firms in i (origin region) that export to j (destination country) in year t. By considering this additional variable as the LHS variable in this second (QR) analysis we also study the determinants of the EM of trade in Spanish regions, which allows us to test Hypothesis 3.

4 Results

4.1 Main results

First, we look at regional statistics of total export flows (to proxy for the IM) and number of firms exporting to the selected destinations (to proxy for the EM) within Spain. Figure 2 shows the NUTS2-level regions where the most important international trade flows are concentrated in 2008; these are identified with dark colours (darker blue shades reflect higher levels of flows while lighter blues indicate lower flow levels). Figure 3 shows the evolution over the period 2000-2008 of the number of firms that export to the selected



Source: Own elaboration with data from Datacomex

Figure 2: Average Spanish exports in 2008, by region

destinations by region. The importance of regional heterogeneity is clearly illustrated, in this case study the region of Catalonia (the Valencian Community is included in the same group) is the principal exporting centre within Spain.

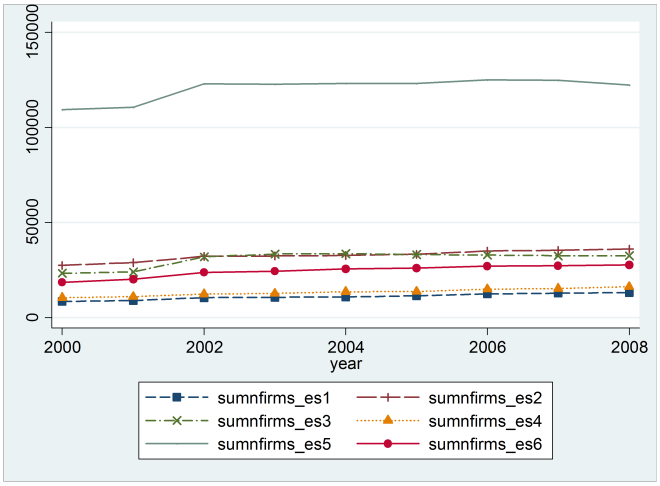
Second, we run a naïve regression of TA institutional quality on nothing more than a constant and the three excluded instruments. The three phenomena that we consider to allow for the use of IV techniques in a regionalised sample when analysing the role of the institutional quality of TAs in regional exports are: the rule of law at country level, the news media and the quality of government at the subnational level (see Appendix B.2). Results displayed in Table A.2 (Appendix A) show that our three excluded instruments significantly affect TA institutional quality and so they correlate with TA institutional quality, thus fulfilling the requirement of instrument relevance. More specifically, the underidentification test shows that we can reject the null hypothesis that the equation is underidentified. Additionally, the F-statistic for the joint significance of the coefficients on the additional instruments shows that they are jointly significantly different from zero. Also, according to the F-statistic obtained, $F(3, 6055) = 51.3422$, the additional instruments have significant explanatory power for TA institutional quality after controlling for the effect of explanatory exogenous variables.

Third, we estimate the gravity equation presented in equation (1) by both pooled OLS and IV. The first and second columns of Table 1 show the results obtained by using pooled OLS for all Spanish regions to estimate equation (1). Specifically, the results obtained show that the estimated TA institutional quality coefficient (column 2) is positive and significant, with a magnitude of 1.086, while the TA dummy (column 1) presents a magnitude of 0.884. These results validate Hypothesis 1, which states that better institutional quality of trade agreements leads to an increase in regional exports.

With regards to the rest of the explanatory variables, the "economic mass" of trading partners has a coefficient approaching one, as theory predicts (Baldwin, Taglioni 2006), and the coefficient of distance displays the expected sign (negative) and is statistically significant. Remoteness, port facilities and the dichotomous variables that are included as extra factors that facilitate trade (sharing a border with Portugal, a border with France, language and coastal region) are significant and have the expected sign, i.e. in line with Márquez-Ramos (2016a).

Given that our main focus is on TA institutional quality, the third column of Table 1 shows the results obtained by IV using this regressor (instead of the TA dummy). The instruments pass the Hansen J-test for exogeneity and the endogeneity test performed confirms that TA institutional quality can be treated as exogenous. Our most "conservative" results are those obtained by pooled OLS and show that an increase in TA institutional quality increases, ceteris paribus, Spanish regional exports. Additionally, as we are unable to reject that our variable of interest is exogenous, this specification is the preferred one (column 2 of Table 1).

There are two possible reasons behind the rationale of TA institutional quality being



Source: Own elaboration with data from Datacomex
Note: A single firm can export to only one or to several destinations. To construct this graph, we exclude islands and we group regions at the NUTS1 level as follows: ES1 for Asturias, Cantabria and Galicia; ES2 for Aragon, the Basque Country, La Rioja and Navarre; ES3 for Madrid; ES4 for Castile-and-Leon, Castile-La Mancha and Extremadura; ES5 for Catalonia and the Valencian Community; ES6 for Andalusia, Ceuta, Melilla and Murcia.

Figure 3: Number of exporting firms exporting to the 45 selected destinations, by region (2000-2008)

an exogenous regressor in a region-to-country framework. First, Spain has been a member of the EEC since 1986, joining after the transition from Franco's dictatorship to democracy. Spain had already requested to join the EEC during the dictatorship, but since a democratic regime was a necessary requirement, its accession was denied. It could therefore be argued that Spain's entry into the EEC at that time was not driven by particular circumstances at regional level. Second, the analysis of the role of TAs in a Southern European country, and specifically a GIIPS country (the Eurozone countries, Greece, Ireland, Italy, Portugal and Spain are denoted here as GIIPS), is an ideal testing ground. For example, a special report by The Economist (2013) that used unit labour costs as a measure of competitiveness traced the evolution of unit labour costs for six countries: Britain, France, Germany, Italy, Spain and the United States. Of those countries, Spain is the only one in which unit labour costs have decreased from 2009 onwards. Indeed, becoming part of the Eurozone – Spain has been a member since 1999 – has limited the ability of GIIPS countries to set national policies to maintain their competitiveness levels. Therefore, it could be argued that TAs are exogenous in a gravity equation that aims to analyse the effect of the institutional quality of TAs on the determinants of subnational exports, at least in the case of Spain.

4.2 Quantile regressions

In Hypothesis 2 and Hypothesis 3, we stated that the effect of TA institutional quality on exports might differ across regions within a country. To test these two hypotheses, we use the methodology recently proposed by Figueiredo et al. (2016) in a gravity framework, the QR approach allows us to capture heterogeneous effects of TA institutional quality for different levels of the IM and the EM.

In fact, in the context of the present research, it is worth considering that the effect of TAs may be heterogeneous across the bilateral trade distribution and affect small trade relationships differently than high-volume trade relationships. Obtaining different results by quantile would be indicative of heterogeneous effects of TA institutional quality for different levels of the IM and the EM in Spanish regions.

Results for the main percentiles for equation (1) in our variable of interest (i.e. TA institutional quality) are displayed in Table 2 and they confirm that location in terms

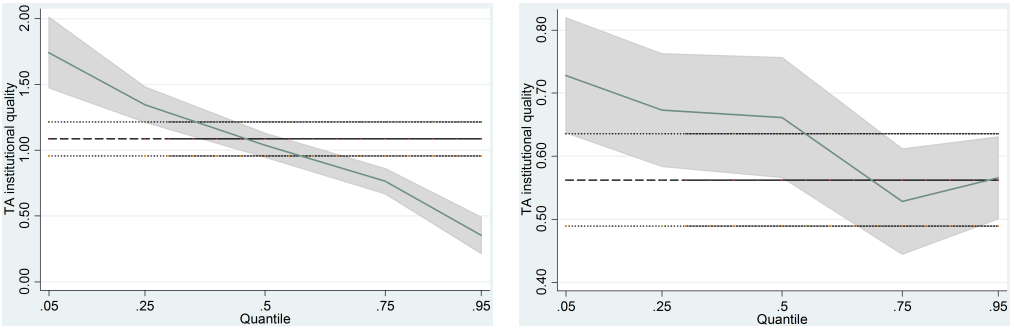
Table 1: Results of the estimation. Equation (1)

	(1) OLS	(2) OLS	(3) IV
VARIABLES	TA dummy	TA instit. quality	TA instit. quality
ly_{ijt}	0.998***	1.004***	1.000***
	[0.0128]	[0.0128]	[0.041]
lyh_{it}	0.135	0.124	-0.165
	[0.120]	[0.119]	[0.160]
lyh_{jt}	0.0945***	0.120***	0.136***
	[0.0165]	[0.0161]	[0.026]
ldist	-0.268**	-0.256**	-0.183
	[0.112]	[0.112]	[0.119]
lang	1.179***	1.155***	1.089***
	[0.0504]	[0.0501]	[0.061]
bportugal	-0.324***	-0.327***	-0.307***
	[0.0507]	[0.0505]	[0.057]
bfrance	0.472***	0.472***	0.597***
	[0.0410]	[0.0408]	[0.043]
coast	-0.392***	-0.392***	-0.069
	[0.0559]	[0.0557]	[0.053]
TA_{jt}	0.884***	1.086***	1.794*
	[0.0542]	[0.0590]	[0.997]
$lrem_{it}$	-26.58***	-26.67***	-24.32***
	[0.787]	[0.782]	[0.826]
$lrem_{jt}$	-0.675***	-0.725***	-0.578*
	[0.116]	[0.116]	[0.326]
$port_{it}$	0.452***	0.449***	0.285***
	[0.0278]	[0.0276]	[0.037]
Constant	204.9***	204.7***	183.0***
	[6.458]	[6.410]	[6.900]
Observations	6,949	6,949	6,077
Adjusted R^2	0.748	0.749	
Hansen J-test of overidentification (p-value)			2.448 (0.2941)
Endogeneity test (p-value)			0.754 (0.3853)

Source: Own elaboration
Note: Robust standard errors in square brackets. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

of subnational region matters. Interestingly, results show that when a region reaches a certain level of intensity of trade, the impact of TA institutional quality (as observed in the estimated coefficient) on export flows is notably reduced. It seems that after the 75th percentile, the estimated coefficient decreases sharply. Note that the same pattern, i.e. lower estimated coefficients for relatively more important exporters, is also obtained when analysing the determinants of the EM for Spanish regional exports (see Figure 4). In this case however, the reduction of the estimated coefficient is lesser than the reduction for the IM. In both cases (i.e. for the IM and the EM), our results corroborate that the magnitude of the coefficients of TA institutional quality does in fact differ across quantiles. In sum, TA institutional quality exerts a differential effect on regional IM and EM therefore our findings provide support for Hypotheses 2 and 3.

Finally, we provide a robustness test estimating equation (1) by the Poisson Pseudo-Maximum-Likelihood (PPML) estimator using our definition of both the IM and the EM. While for the case of the IM our variable of interest is not statistically significant, the estimated coefficient for TA institutional quality on the EM is positive and statistically significant. Specifically, the estimated coefficient is 0.475 (with a robust standard error of 0.064). This coefficient is close to the corresponding value of 0.562 (with a robust standard error of 0.037) obtained in the OLS regression, which is represented with the black solid line in Figure 4 (Fig. 4b).



(a) Intensive margin (b) Extensive margin

Notes: The slopes for TA institutional quality, estimated by QR, are plotted as a function of the different quantiles, represented on the horizontal axis. The vertical axis represents the values of the estimated coefficient of the variable of interest (i.e. TA institutional quality) for each quantile. The shaded area represents the confidence interval of the QR. OLS estimates and the corresponding confidence interval of the OLS regression are represented by the black horizontal lines, constant across quantiles.

Figure 4: Regression quantiles for TA institutional quality

Table 2: Results of the quantile estimation: the role of TA institutional quality in the intensive and extensive margins of trade

LHS: Log of exports					
quantile	0.05	0.25	0.5	0.75	0.95
	1.741***	1.346***	1.037***	0.764***	0.353***
	(0.158)	(0.095)	(0.049)	(0.051)	(0.061)
LHS: Log of number of firms					
quantile	0.05	0.25	0.5	0.75	0.95
	0.728***	0.673***	0.661***	0.527***	0.565***
	(0.046)	(0.049)	(0.046)	(0.039)	(0.032)

Source: Own elaboration
Notes: Standard errors in brackets. *** $p < 0.01$

5 Conclusions

Our study has two main objectives. First, it analyses the effect of the institutional quality of TAs on international trade and, second, it includes subnational spatial variation in the challenging analysis facing international trade researchers examining the effect of regional integration on international trade. Furthermore, it takes into consideration the fact that TA institutional quality might be exogenous in a gravity approach when the dependent variable is bilateral trade from specific regions within a country. By doing so, this paper not only follows the "regionalising with regionalism" strategy recently proposed by Márquez-Ramos (2016b), but is also in line with those econometricians who suggest using the OLS estimator as the default estimation method and who argue that IV should only be used for improving OLS (Dufour 2016). Interestingly, in our framework the partial effect of TA institutional quality on trade flows can be determined by using OLS.

In the empirical analysis, we have used IV techniques to test the endogeneity of TA institutional quality in the case of Spanish regional exports. In the search for valid instruments, we have examined the rule of law at country level, the importance of regional public attention on trade policy affairs and the quality of government at regional level. Our results confirm that TA institutional quality can be treated as exogenous.

Additionally, we have performed a QR analysis. As the magnitude of the coefficients of TA institutional quality does in fact differ across quantiles, we are able to provide evidence that the effects of TA institutional quality differ by region within a country, thus

showing that the effects of TAs cannot be generalised for all regions within a country. This result occurs not only when analysing the determinants of the IM of trade for Spanish regions, but also when the determinants of the EM are analysed.

In light of the obtained results, future research should deal with heterogeneity at the region-partner level when analysing the effect of regional integration on international trade in terms of IM and EM.

This study has several implications for theory building. First, by demonstrating that the effect of TA institutional quality changes by region within the boundaries of a country, this article calls for subnational spatial variation to be taken into account. Second, it has implications for the literature on international trade, as using regional trade data might help to avoid endogeneity biases when analysing the effect of country-level variables (such as regional integration) on trade flows by means of the widely-used gravity equation. Third, it also has implications for research on economic development since if it is the case that the creation (and improvement) of TAs increases the within-country differences in levels of income per capita (or welfare levels), trade may exacerbate agglomeration forces in the largest economic centres. The results of previous research indicating that TAs foster economic development, as they increase exports at country level, might not in fact be so desirable if said increase is only achieved in the largest economic centres or in the less peripheral areas within a country. We believe that what is important in terms of economic development is the TA-generated increase of exports in many regions within the same country.

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A Appendix 1

Table A.1: Descriptive statistics

Variable	Observations	Mean	Std. Dev.	Min	Max
lx_{ijt}	6949	9.572318	2.780863	-7.87534	16.11139
TA dummy	7695	0.5358025	0.4987489	0	1
TA institutional quality	7695	0.4059753	0.3882384	0	1
ly_{ijt}	7695	36.35972	1.988802	29.61949	42.49604
lyh_{it}	7695	-3.962174	0.2406549	-4.608844	-3.467954
lyh_{jt}	7695	9.014545	1.399206	5.870131	11.04452
ldist	7695	8.347339	0.9699618	5.495445	9.897844
lang	7695	0.0888889	0.2846018	0	1
bportugal	7695	0.2105263	0.407709	0	1
bfrance	7695	0.2105263	0.407709	0	1
coast	7695	0.6315789	0.4824077	0	1
$lrem_{it}$	7695	8.857459	0.0404728	8.803171	9.002162
$lrem_{jt}$	7695	-9.245832	0.9438859	-11.16977	-7.643587
$port_{it}$	7695	-4.01E-09	1	-0.751892	2.983713

Source: Own elaboration with data from Márquez-Ramos (2016a) and Kohl et al. (2013)

Table A.2: First-stage regression

	First_all
rule of law	0.065***
	(0.004)
lmedia	-0.091***
	(0.003)
lqog	-0.114***
	(0.039)
Constant term	0.876***
	(0.171)
Observations	6,120
R2	0.0897

Source: Own elaboration
Notes: Robust standard errors in brackets. Pooled regression for Spanish regions. The full sample of regions and importing countries (19 exporting regions × 45 importers × 9 years) is reduced due to missing observations in the rule of law. First instrument: rule of law of importer j in year t. Second instrument: the (standardised) value of the proxy for the importance of regional public attention on trade policy affairs (lmedia). Third instrument: the (log of) quality of government at regional level (lqog).

B Appendix 2

B.1 Provisions and the index of institutional quality of trade agreements

Consultations: Signatories wishing to address issues arising from the implementation of the TA may engage in diplomatic dialogue known as consultations, "with a view to finding a mutually satisfactory solution". When specified, consultation procedures provide details on when and where consultations are to be held, which parties may be allowed to attend, and the issues that may be addressed. In most cases, signatories must first attempt to solve disputes according to consultation procedures before accessing the TA's dispute settlement mechanism.

Definition: By providing definitions of key concepts, signatories increase the clarity, scope and certainty of their commitments.

Dispute Settlement: By agreeing on dispute settlement procedures, signatories reduce ambiguity and create a judicially binding mechanism that ensures the implementation of the TA.

Duration and Termination: Signatories reduce ambiguity about their commitments by specifying the duration of the TA and the means by which it can be terminated.

Evolutionary Clause: Signatories commit themselves to a built-in periodic review mechanism that facilitates amendments and improvements to the original TA.

Institutional Framework: The signatories provide details on the institutional framework that will be used to oversee the implementation of the TA.

Objectives: The signatories enhance the clarity and context of their commitments by specifying the objectives they envision by signing the TA.

Plan and Schedule: The signatories commit themselves to a specific timetable by detailing the schedule according to which the TA is to be implemented.

Transparency: The signatories commit themselves to creating greater institutional transparency.

Three clarifications to the notion "institutional quality of trade agreements" should be added here. First, normally, one would expect such a notion to refer to the breadth and depth of commitments (e.g. average tariff, coverage of agriculture, number of service sectors covered) or to the scope of issues in a TA (e.g. investment, intellectual property rights, domestic regulation). The criteria referred to in the definition used by Kohl et al. (2013) are common features in nowadays' TA language, especially of the European Union, which means that a TA could be of high institutional quality and, paradoxically, still exclude the whole agriculture sector. Second, one might also expect that the more recent an EU agreement is, the more likely it will be that it includes these expressions, leading to a time-trend to a higher IIQ. Finally, many of the TAs are like living organisms and continue to evolve. However, given the characteristics of our sample and the time period taken into account, we believe that the IIQ is a good proxy for institutional quality of EU's TAs.

B.2 An explanation of the chosen excluded instruments

We detail here the logic underlying the choice of the three excluded instruments that are used in the empirical analysis: a dimension relating to country governance, the importance of regional public attention on trade policy affairs and the quality of regional government.

First, we consider information on the rule of law in trading partners' respective countries, which is obtained from the World Governance Indicators database provided by the World Bank (see http://info.worldbank.org/governance/wgi/index.aspx#home). This variable is available at country level and measures the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract

Table B.3: Descriptive statistics of the variable "TA institutional quality"

IIQ	Frequency	Trade agreements involved	Year
0	3572	No TA	–
0.67	2565	European Community, Egypt, Tunisia	1958 (EC); 1973 (Egypt); 1998 (Tunisia)
0.78	285	Lebanon, Turkey	1996 (Turkey); 2003 (Lebanon)
0.89	817	Algeria, Czech Republic, Jordan, Mexico, Poland	1976 (Algeria); 1992 (Czech Republic and Poland); 2000 (Mexico); 2002 (Jordan)
1	456	Chile, Morocco, South Africa	2003 (Chile); 2000 (Morocco; South Africa)
Total obs.	7695		

Source: Own elaboration with data from Kohl et al. (2013).
Notes: Total obs. 7695 = 19 exporters × 45 importers × 9 years

enforcement, the police and the courts. Then, we construct a variable that varies by importing country and year ("rule of law$_{jt}$") and we argue that rule of law in trading partners might affect the institutional quality of trade agreements in which Spanish regions are involved.

Second, in order to have (at least) one overidentifying restriction and to be able to compute both the overidentification test and the test of endogeneity when using IV, we require two exogenous variables that do not appear in the structural equation (i.e. equation 1). In the search for additional valid excluded instruments, and taking into account the importance of news media, the fact that Germany has been qualified as a hegemon in the economic press (The Economist 2013) gives cause for reflection on how important public opinion is to foreign policy, and trade policy in particular. Soroka (2003) shows that issue salience in the media may have a direct effect on policymaking. Previously, Cohen (1963) stated that the press may not be successful much of the time in telling people what to think, but is stunningly successful in telling its readers what to think about. Therefore, the mass media plays a significant role in directing public attention to foreign affairs.

To gain a general idea of what issues concern citizens, we can compare the press salience of trade policy in different EU countries. Specifically, we compare the number of times that the Transatlantic Trade and Investment Partnership (TTIP) is mentioned in both the Spanish and German press (the searches were made through Lexis-Nexis database in May 2014. For German media, we ran searches for "*Transatlantisches Freihandelsabkommen*", while for Spanish media we ran searches for "*Asociación Transatlántica para el Comercio y la Inversión*"). In the case of Spanish news, we found 4 documents in the Newswires & Press Releases category (category 1), 3 documents in the Newspapers category (category 2), 2 documents in the Websites category (category 3) and 1 document in the Treaties & International Agreements category (category 4). For German news, we found 247 in category 1,428 in category 2 and 155 in category 3, with a total of 1,051 documents if we include other categories such as Web-based Publications, Magazines & Journals and Industry Trade Press. On 13 January 2015, the European Commission published a report of findings following an online consultation in which 97 percent of submissions were opposed to the inclusion of a mechanism known as investor-to-state dispute settlement (ISDS) in the TTIP (European Commission 2015). From a total of 149,399 replies, 79.2% of replies were from the UK (52,008 replies), Austria (33,753 replies) and Germany (32,513 replies), while only 1.7% of the replies were from Spain (with a total of 2,537).

In light of these figures, it might be argued that Spain is taking trade policy for granted and that British and German-speaking citizens give greater weight to current TA negotiations. Furthermore, if EU foreign policy changes in response to changing evaluations (Soroka 2003), it could be said that Spanish-speaking citizens do not play an active role in determining European trade policy.

In order to examine the implications of the work of Cohen (1963) and Soroka (2003), we use all articles appearing in *El Mundo* (one of the largest printed daily newspapers in Spain with different editions printed for regions such as Andalusia, Valencia, Castile-and-Leon, the Balearic Islands and the Basque Country) that include mentions of each importing country j during year t. By doing so, we aim to proxy for the knowledge about trading partners in Spain. We interact this variable with a dummy that equals one when maritime exports, by Spanish exporting region, represent at least 50% of total exports in year t. Therefore, the interaction variable has regional-country-time variability, and we use it as a proxy for the importance of regional public attention on trade policy affairs. We believe that if a foreign policy issue is of potential interest for regional public opinion, it might affect the institutional quality of TAs. The reasoning is as follows: Spain is already involved in the EU integration process, but improvements in TA institutional quality at European level might be related to the importance of third countries as destination markets for EU members. As maritime trade is very important for Spain, but most trade with major trading partners is by road (as the main export partners for Spain are from the EU), a number of firms might be particularly interested in increasing the institutional quality of TAs with non-EU partners in order to facilitate commerce and reduce trade costs.

Lastly, the quality of government at subnational level is taken into account. A crucial assumption in this paper is that TA institutional quality (decided by a supranational agency, i.e. the EU) might be exogenous for Spanish regions. This might, however, be considered a rather strong assumption; firms from specific regions can still lobby the EU via their regional governments to have an active involvement in the process of generating new forms of formal institutions (Cantwell et al. 2010). Geographical Indications (GIs) might be mentioned, as the EU has increasingly moved towards securing protection of EU-based GIs through TAs (Engelhardt 2015). Also, according to Nyman-Metcalf, Papageorgiou (2016), regional integration is not an irreversible process (see Brexit, for example) and, with the possible exception of the EU, national governments have a higher degree of legitimacy than regional integration organisations.

So, we use an indicator that proxies for the quality of regional governments as a suitable excluded instrument of TA institutional quality. The underlying logic is that there may be a link between government quality and its capacity to negotiate "favourable" TAs, which might boost exports from specific regions within a country.

We thus use the data provided by Charron et al. (2014), i.e. the European Quality of Government Index, or EQI index (re-scaled from 0-100), which combines indicators of government quality for each European region at NUTS2 level. These data focus on both perceptions and experiences of public sector corruption, along with the extent to which citizens believe various public sector services are impartially allocated or of good quality. This is the first source of data to date that allows a comparison of government quality within countries in a multi-country context.

Additionally, we use the time series available for Spain on rule of law (obtained from the World Governance Indicators), and we multiply the EQI100 index by the rule of law in year t to incorporate time variation to this indicator of government quality at the regional level in Spain.

Although we use these three excluded instruments, it is worth mentioning that to get valid instruments, we do not necessarily need consistent estimates of the parameters of the reduced-form equation as long as we use instruments which are correlated with our (possibly) endogenous regressor in the structural equation but not correlated with the error term (see, for example, Alamá-Sabater et al. 2016). Accordingly, the chosen instruments pass the tests (see column 3 in Table 1).