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Judiciary efficiency and trade in tasks

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JUDICIARY EFFICIENCY AND TRADE IN TASKS

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Abstract

A growing literature suggests that institutional quality is an important determinant of trade flows. Theoretical models of international trade with incomplete contracts predict that firms will not source intermediate inputs signing arm's length contract if ex-post they cannot enforce the contract. Contract enforcement ultimately depend on the quality of institution. Prior empirical evidence support this idea using cross country data. We study how institutional quality at the local level influences the ability of firms to become international subcontractors using firm-level data. Using a sample of Italian firms and the trial length of civil disputes to proxy for contract enforcement, we find that firms located in courts with higher trial length have a lower probability to supply customized intermediate inputs to foreign firms.

JEL: F10, F14, L14

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1 Introduction

Contract insecurity shapes the organisation of production across countries (Antras [2003]; Antràs and Helpman [2004]). Contract incompleteness might prevent firms to sign arm's length contracts to buy customised intermediate inputs from foreign suppliers. Once the contract is signed the foreign supplier has an incentive to reduce its costs and deliver a good that does not satisfy the contractual obligations. Any product incompatibilities or delivery delay can substantially reduce the buyer's profit. Firms might want to specify in the contract which court will solve any controversy, nonetheless, the enforceability of any court decisions ultimately depends on the quality of the institutions in the supplier country.

Institutional quality is often assumed to be country specific. Several empirical studies show how contract incompleteness determines trade flows across countries and the pattern of comparative advantages (Anderson and Marcouiller [2002]; Nunn [2007]). In a recent paper, Acemoglu and Dell [2009] show that institutions at the local level are a strong determinant of productivity differences within countries. Local institutions can vary greatly in countries with federal systems or within countries where national laws must be enforced by local authorities that influence *de facto* institutions.

In this paper, we study how contract enforcement at the local level affects a firm's ability to supply customised intermediate inputs to foreign firms. Using Italian firm-level data, we show that firms located in courts with higher judicial trial length in civil disputes, which is our measure of contract enforcement, are less likely to supply customised inputs to foreign firms. The effect is stronger in contact-intensive sectors. Our work is the first, to our knowledge, that looks at the impact of contract incompleteness at the local level from the perspective of the exporting firm misbehaviour using firm-level data.

In our empirical exercise we take advantage of two important characteristics of the Italian legal system. First, law determines the courts for disputes. This corresponds to the court where the plant is located. In Italy there are 165 courts. Trial length varies from less than one year in the most efficient court to more than seven years in the least efficient one.

According to doing business report Italy ranked 160 out of 185 countries in term of contract enforcing, in the public debate judicial efficiency is often cited as one of the causes of the economic slowdown. We observe large heterogeneity in court efficiency, despite the fact that law should be uniformly applied over the country. Second, the Italian law codifies a specific contract type for the supply of customised intermediate inputs (“*contratto di subfornitura*”). This contract is widely used in the Italian context (Lazerson [1999]). In our data, firms report if they supply intermediate inputs to foreign customers under this type of contract. We deem it to be a very good approximation of the firm-to-firms relations in a Global value chain (GVC, henceforth).

Empirically, we are able to document two main findings. We first provide descriptive evidence of firms that supply intermediates inputs. Only 6% of firms in our sample supply customised intermediate inputs abroad (about 8,4% of exporters). Subcontractors are on average larger than domestic firms, but smaller relative to exporters in term of employment, revenues, and value added per worker. We also find that on average subcontractors have a larger shares of export over total revenues. Second, in a regression framework we show that, when firms are located in inefficient courts, the probability to supply intermediate inputs abroad decreases. The effect are stronger for firms that operate in industries that are contract intensive. Following Nunn [2007], for each industry we measure contract intensity as the share of products that are not sold on organised markets according to the Rauch [1999] classification. We find that a standard deviation increase in trial length decreases the probability to supply customised inputs by 1.7 to 3 percentage points in industries at the 25th and 75th percentile of contract intensity, respectively.

This is, to our knowledge, among the few studies that provides firm-level evidence supporting the predictions of theoretical models of contract enforcement and international trade (see Antràs and Yeaple [2014] for a review of theoretical models). In these models, contract incompleteness shape international trade among firms because of the hold up problem. Driven by the richness of our data, our main focus is on exporting misbehaviour. Suppose that two firms located in different countries decide to sign a cash-in-advance contract for the supply of a specialised intermediate

input (see Antràs [2014] pp. 78–82 for a detailed discussion). After the contract is signed, and the payment is received, the exporter can increase its profits by reducing production costs. In the extreme case, the exporter maximises its ex post profits if no production takes place at all. The exporter incentive to deviate from its contractual obligations depends on the punishment it will incur if the importer recurs to a court to enforce the contract. When the exporter is punished with certainty, it has no incentive to deviate, otherwise the importer faces ex-ante contract insecurity. In this particular setting, the quality of institutions that matters is the one of the exporter country. This is true even when the contract specifies a *choice-of-law* clause. Local courts may be unwilling to enforce a contract signed between residents of two countries, particularly if unfavourable to the local firms.

The bulk of the empirical literature on contract incompleteness and international trade (see Nunn and Treffer [2013] for a detailed review of the empirical literature) uses cross country data. Anderson and Marcouiller [2002] show that contract incompleteness can be an important determinate of international trade. Nunn [2007] and Levchenko [2007], further develop this idea and show that countries with better institutional quality have a comparative advantage in the production of goods that are contract intensive. Helpman et al. [2008] estimate a gravity equation to show that countries that share the same legal institutions have a higher probability of establish trade relationships. The use of cross country data can be problematic because there two possible sources of institutional quality heterogeneity. Countries have different legal system and they differ in institutional enforcement. Our focus on a single country has the advantage of keeping the legal system fixed, while allowing us to focus on the impact of *de facto* institutions within country in the level of law enforcement.

Few other works explore the relationship between the quality of institution and international trade using firm-level data. Using data from 28 developing countries, Ma et al. [2010] show that firms located in areas with better institutional quality export more goods that are contract intensive. They results replicates Nunn [2007] finding using firm level data. Araujo et al. [2012] show that the importer country's institutional quality affects the export of Belgian firms. In a similar approach, Aeberhardt et al.

[2014] use French firm-level data to show that better institutional quality improves the persistence of trade relationship for firms operating in industries with severe contracting problems. All these studies, although from different perspectives, assume that institutional quality is country specific.

Our paper also contributes to the literature on the importance of institutions in determining economic outcomes (Acemoglu et al. [2001]; Acemoglu et al. [2005]). Acemoglu and Dell [2009] document substantial within-country income per capita and productivity differences and show that local institutional quality is an important determinant of such differences. In our paper, we show that local institutions are a determinant of exporting behaviour.

The remainder of the paper is organised as follows. In section 2, we introduce the Italian legal system. In section 3 and 4, we describe the data and the identification strategy. Section 5 discusses the results.

2 The legal framework

In this paper, we explore the relationship between local court efficiency and the probability of a firm to start supplying customised intermediate inputs to foreign firms. We argue that a foreign buyer is less likely to sign an arm's length contract with a firm located in an inefficient judicial district, as measured by the average duration of civil trials. For this argument to work, the possibility of being summoned to the supplier's court in case of controversy has to be regarded as a concrete threat by the buyer, which would thus be prevented from signing the contract.

To overcome this problem, the rules of international private law allow the parties to agree on either a tribunal or an arbitration court and to empower it to judge on any controversy arising from the contract. Such courts must not necessarily be located within the jurisdiction of either the buyer's or the supplier's tribunal.

Once a verdict is issued, however, the local court of the subcontractor may still play a role. In the Italian system, in particular, the enforcement of the sentence in most of the cases is carried out by the local court. Article 26 of the Italian Code of Civil Procedure states that the court responsible for enforcement is the one where the majority of the firm's properties are

located. If we momentarily assume that all the firm’s assets are concentrated in the judicial district where the firm has its headquarters (which is the localisation we observe in our data), the court in charge of enforcement is determined by the location of the subcontractor. If that court is inefficient, the buyer may foresee a substantial reduction of its profits, arising from both the incentive of the subcontractor to deviate from the contract and the delayed compensation in case of controversy.

Such argument may be partially flawed when considering multi-plant firms, that may therefore have their properties spread over different judicial districts. We will directly tackle this issue in the robustness checks part of our work, where we argue that accounting for multi-plant firms does not significantly affect our results.

3 Data description

In our empirical exercise, we merge the firm-level data of the Bank of Italy’s “Survey of Industrial and Service Firms” (Invind, henceforth), and the information on the efficiency of civil justice provided by the Italian Ministry of Justice.

Invind is a survey of industrial and service firms with at least 20 employees, and contains a wide range of information on nationality, location, age, sector of activity, ownership structure, employment (annual average), investment (realised and planned) and sales (domestic and foreign).¹ Invind data are merged with the Cerved Group database to recover information on the firm’s value added.

We use the 2007 wave of the survey, which collects detailed data on the exporting behaviour of 2,878 firms; in particular, we are able to observe whether a firm has supplied customised intermediate inputs to foreign companies (we will label these firms as “international subcontractors” in what follows).² If the firm belongs to a foreign group, the survey also records if the majority of these supplies were realised on behalf of other firms of the

¹Data are available upon request through the BIRD system at <http://www.bancaditalia.it/statistiche/indcamp/sondaggio/bird>.

²One limitation of our data is that we do not observe the content of the contract, the value of the transaction and the identity of the partners. We are only able to identify, among exporters, those that supply customised inputs abroad.

group. Our database contains 225 firms engaged in international subcontracting; out of these, 187 realise their sales out of the group's boundaries.

Data on the actual duration of civil proceedings are not directly available. Following Giacomelli and Menon [2013], we build a proxy of the average civil trial length in 2002, using the caseflow data provided by the Ministry of Justice. For each of the 165 Italian judicial districts, we calculate the index as follows:

$$D_{2002} = \frac{P_{2002} + P_{2003}}{E_{2002} + F_{2002}} \quad (1)$$

where P are pending cases at the beginning of the year, F are the new cases filed throughout the year, and E are the cases ended with a judicial decision or withdrawn by the parties during the year. The data only refer to ordinary civil proceedings and are expressed in years.

Since we expect the effect of local courts' efficiency on the probability of engaging in international subcontracting to scale up with the contract intensity of the goods provided, we interact the index of trial duration with a sectoral index of relationship specificity derived from the Rauch's classification [Rauch, 1999]. We measure the contract intensity as the share of differentiated products produced within each sector, using both the liberal and the conservative classification.

Table 1 contains some basic statistics on our sample of firms. The average size in terms of employees is 248, while average revenues and exports amount to roughly 98 and 39 million Euros; it is apparent, though, that these statistics are inflated by the presence of some large firms in our sample. The distribution of productivity, roughly proxied by value added per worker, is more symmetric, though still being skewed to the right. The 79% of the firms in our sample are exporters, and the average firm exports 30% of its revenues.

In table 2, we show how firm characteristics vary with the exporting status. In line with the theory, domestic firms are on average smaller and less productive, while pure exporters, which are the more numerous category in our sample, are characterised by the largest average size (both in terms of employees and revenues) and by the highest value added per worker. International subcontractors, instead, are smaller and significantly

less productive than pure exporters, though outdoing domestic producers on all dimensions; moreover, the share of revenues arising from exports is slightly higher for international subcontractors than for pure exporters. Most interestingly for our purposes, domestic producers are on average located in judicial districts characterised by a higher length of civil proceedings, hinting at a potential role played by local court efficiency on the exporting behaviour of a firm.

To further explore this point, Figure 1 displays two maps highlighting the geographical distribution of subcontractors and the duration of civil proceedings by judicial district. The comparison of the two panels reveals a relevant negative correlation between the two variables. Subcontracting is more frequent in the North and the Centre, and is limited to very narrow zones of the South, which is instead characterised by a longer duration of civil trials. Both the data on subcontracting and trial length, however, display a large amount of variation even within the same macroregion.

4 Identification Strategy

We estimate the following equation:

$$y_{isc} = \alpha + \beta Trial - Len_c * CI_s + \gamma_1 D_c + \gamma_2 D_s + \gamma_3 X_{isc} + \varepsilon_{isc} \quad (2)$$

where y_{isc} is a dummy indicating whether firm i , located in area (court) c , and operating in sector s has engaged in international subcontracting. $Trial - len_c$ is a measure of quality of law enforcement (trial length) in court c ; the higher $Trial - len_c$ the more inefficient is the court. CI_s proxies for the contract intensity of sector s , as computed by Rauch [1999]. D_c and D_s are a set of area and sector dummies, while X_{isc} is a matrix containing firm level controls.

In this equation the access to GVC is explained by the interaction between an industry characteristic with an area characteristic. This resembles the empirical specification used by Rajan and Zingales [1998] to test the relationship between financial development and dependence on external financing, and by Nunn [2007] in his study on law enforcement as a source of country level comparative advantages.

We expect $\beta \leq 0$ if court inefficiency (long trial length) negatively impacts the probability of a firm to engage in international subcontracting in contract-intensive sectors, holding fixed all other characteristics. These characteristics include industry and area features and a bunch of firm level controls (size, productivity, and whether the firm already sold produced-to-order goods and belongs to a group).

For a number of reasons, we have to be quite cautious in interpreting β as a causal parameter. The first relates to omitted variables that may influence both trial length and the access to GVC. For example contract intensive sectors are generally more skilled-labor intensive, that is a crucial determinant for the access to international markets and, in Italy, is concentrated in areas in where the law enforcement is more efficient; this may create a downward bias in the estimate of β . For this reasons, we control for other determinants of international subcontracting like size, productivity and share of total exports over sales.

The second one relates to reverse causality issues. Areas in which international sourcing is very diffuse may successfully lobby the Italian Ministry of Justice to maintain a good contracting environment by keeping there the most efficient judges, court officers and clerks, thus negatively affecting β . While we cannot exclude this occurrence, this issue looks much more relevant in cross-country analyses rather than in within country regressions. The reason is that, in Italy, decisions on the composition of local courts are made by the High Council of the Judiciary (HCJ);³ HJC decides according to the dispositions of two major laws: the first is the Royal Decree n. 12 issued on January 30th, 1941, the second is Law 195, published on March 24th, 1958. Both laws were issued in a completely different economic setting, well before problems related to international sourcing could even arise. To be sure, HCJ still retains some discretionary powers in the assignment of judges; yet HCJ is an extremely independent body, its autonomy is warranted by the Constitution and jealously defended by its components.

The third is relative to the problems of sorting or self-selection. Firms with an intense international contracting activities might be induced to

³Two-thirds of the HJC are made by judged, which are elected by all Italian judges. One-third is instead elected by the Parliament among University Professors of Law or Lawyers.

relocate in areas in which courts are more efficient. This would generate a negative bias in β . We can test this issue by checking whether areas with a better quality of law enforcement tend to be more specialized in contract-intensive sectors. Figure 2 plots the average contract intensity at court level against the average trial length.⁴ We use both liberal and conservative definition of contract intensity as defined by Rauch [1999]. It is apparent that the correlation between the two measures is zero thus rejecting the sorting hypothesis.

5 Results

Baseline results are reported in Table 3. The first two columns report the estimates by using the liberal definition of contract intensity proposed by Rauch [1999]. Third and fourth columns use instead the conservative one. Column (1) reports the estimates of equation 2 for the most parsimonious specification that includes the interaction between trial length and contract intensity and the full set of sector and area dummies only. The coefficient of interest is negative and significant thus implying that firms in contract-intensive sectors have a lower probability to operate in a GVC as suppliers when they happen to be located in areas in which courts are particularly inefficient.

This result is confirmed when we insert other firm level controls. These include a measure of size (log of employees) and productivity (log of sales per worker); these aim to control for firm productivity that is a crucial variable to understand the role of firms in international markets. We also control for a dummy equal to one if the firm has operated as a specialised supplier either home or abroad as a control for the self-selection in to the supplier status; the last explanatory variable is a dummy equal to one when sales in the GVC mostly occur within the same group. As expected, size positively correlates with the probability to be engaged in international subcontracting; similarly having signed a contract of (domestic or international) *subfornitura* and group membership also positively impact on the participation to a GVC. Despite the statistical significance of these con-

⁴Similar results, available upon request, can be obtained by using the median or the highest contract intensity in the area.

trols, the point estimate of the interaction of interest remains very similar to the parsimonious specification.

Similar results are obtained when we look at the conservative Rauch classification. Point estimates now are slightly larger (in modulus), even if confidence intervals largely overlap.

As for the magnitude of the coefficients, a standard deviation increase in the trial length reduce the probability to operate as an international subcontractor by 1.7 percentage points for firms belonging to sectors at the 25th percentile of the (liberal) Rauch classification; the fall is almost double (-3 percentage points) for industries at the 75th percentile. A similar magnitude can be obtained when we look at the conservative definition; in this case a standard deviation increase in trial length reduces the participation to GVC by 2 percentage points for sectors at the 25th percentile of the (conservative) contract intensity and by 3.3 percentage points in sectors at the 75th. These are not negligible effects as average participation to GVC is 8%.

Table 4 presents the first set of robustness checks. Dependent variable in equation 2 equals to one if the firm is an international subcontractor; zero is instead attributed to both domestic firms and exporters which do not operate in a GVC. A possible concern relates to the fact that the negative coefficient found in Table 4 actually depends on the self-selection into the exporter status, thus detecting a mere Nunn [2007] effect. In order to reject this hypothesis we re-run equation 2 on the exporters only. Results in Table 4 actually reject this concern. The coefficient of the interaction remains negative and significant with a point estimate very close to the previous results.

Another possible concern relates to the presence of multi-plant firms. In section 2 we have discussed that in that case the court in charge of the execution may vary according to the relative size of the firm's assets across plants. Invid database is collected at firm level, while production activity (and participation to GVC) might be influenced by the quality of law enforcement at plant level. This would generate an attenuation bias in the estimates. In order to rule out this hypothesis, we make use of an information in the Invid dataset on the geographical distribution of

employees across Italian macroregions.⁵ We discard all companies reporting this information as (with certainty) multi-plant firms. Before showing the results two cautionary notes should be considered. The first is that multi-plant firms can also have all establishments within the same macroregion and, in our analysis, they would be incorrectly coded as single-plant. We interpret our measure of multi-localization as a simple lower bound of the true variable. The second is that this information is available for larger firms only (with more than 49 employees); we have decided to discard all firms between 20 and 49 employees despite the fact that their probability to be multi-plant is indeed quite low.

Results are presented in Table 5. Columns (1) and (3) report the estimates of equation 2 for the sub-sample of firms with at least 50 employees; columns (2) and (4) report the results by excluding firms with (certainly) other plants outside the macroregion. Estimates confirm the attenuation bias due to measurement error. Point estimates for both definitions of contract intensity are larger (in modulus) even if the standard error for the liberal partition has more than doubled. For the conservative definition, instead, the point estimate has become almost twice the baseline one.

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⁵Italy is made of four (NUTS1) macroregion: North-West, North-East, Center, and South.

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Tables

Table 1: Summary statistics about the sample

	mean	sd	p25	p50	p75
employees	248	834	38	72	178
revenues	97990	546089	6500	15836	51000
export	38501	246095	70	3000	15994
VApw	65.87	117.59	39.73	53.50	73.92
dummy exporter	0.79	0.41	1.00	1.00	1.00
share exported revenues	0.30	0.30	0.01	0.20	0.55

Source: Survey of Industrial and Service Firms (Invind), Bank of Italy.

Table 2: Summary statistics by firm status

	#	empl	revs	export	VApw	share exp. revs	trial length
Domestic	599	89	23587	0	53.02	0.00	3.23
Exporting	2018	289	122916	49591	70.22	0.38	2.65
Subcontr.	187	263	61036	32751	58.14	0.44	2.70
Total	2804	244	97570	37874	65.87	0.30	2.78

Source: Survey of Industrial and Service Firms (Invind), Bank of Italy; data on trial length provided by the Italian Ministry of Justice. Firms belonging to a foreign group are excluded from the computation of these statistics. The first column shown the numerosity of each group, while all the other statistics are group averages. The last column displays the average trial length in the judicial districts where the firms are located.

Table 3: Baseline regressions

	(1)	(2)	(3)	(4)
interact liberal	-0.0317** [0.0147]	-0.0330*** [0.0125]		
interact conserv.			-0.0357** [0.0153]	-0.0348*** [0.0130]
log employees		0.0105** [0.0050]		0.0104** [0.0049]
log revenues		0.0114 [0.0076]		0.0114 [0.0076]
dummy subcontr.		0.3957*** [0.0220]		0.3958*** [0.0220]
group subcontr.		0.1072* [0.0590]		0.1064* [0.0590]
R^2	0.184	0.470	0.184	0.470
N	2720	2720	2720	2720

Robust standard error in parentheses.

Table 4: Regression on the subsample of exporters

	(1)	(2)	(3)	(4)
interact liberal	-0.0354 [0.0223]	-0.0372** [0.0171]		
interact conserv.			-0.0395* [0.0236]	-0.0390** [0.0181]
log employees		0.0116** [0.0056]		0.0115** [0.0056]
log revenues		-0.0044 [0.0093]		-0.0044 [0.0093]
dummy subcontr.		0.5252*** [0.0270]		0.5252*** [0.0270]
group subcontr.		0.0811 [0.0659]		0.0807 [0.0659]
R^2	0.202	0.578	0.202	0.578
N	2132	2132	2132	2132

Robust standard error in parentheses.

Table 5: Regressions controlling for multi-plant firms

	(1)	(2)	(3)	(4)
interact liberal	-0.0358 [0.0259]	-0.0516 [0.0323]		
interact conserv.			-0.0452* [0.0257]	-0.0668** [0.0321]
R^2	0.229	0.286	0.230	0.287
N	1654	1285	1654	1285

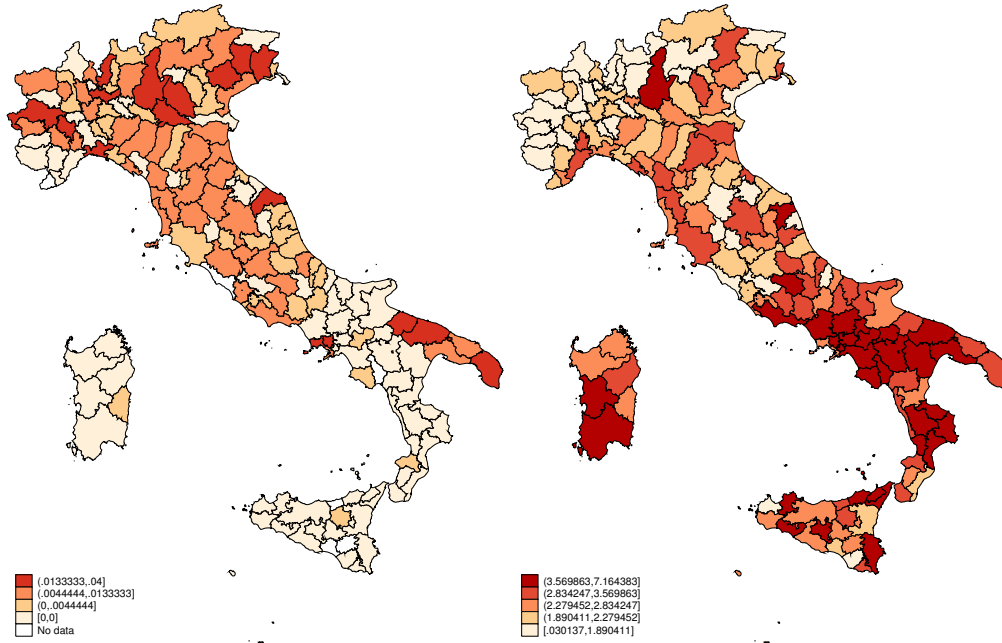
Robust standard error in parentheses.

Figures

Figure 1: The geography of subcontracting and judiciary efficiency

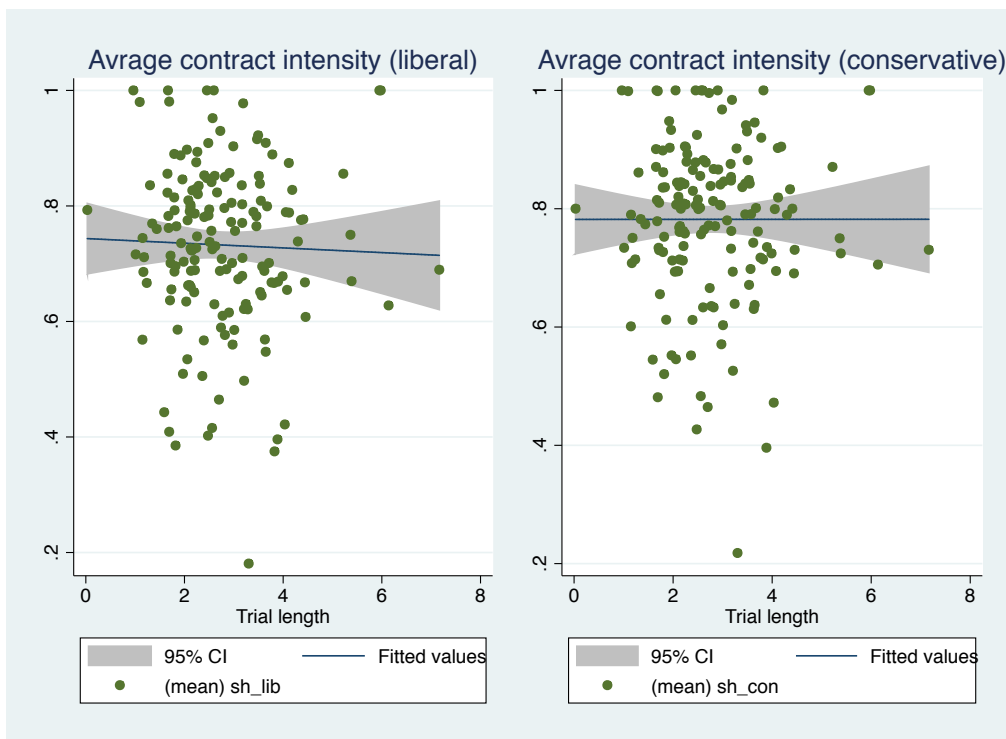
(a) *Share of subcontractors*

(b) *Average trial length*



Source: Survey of Industrial and Service Firms (Invind), Bank of Italy, and Italian Ministry of Justice. The left panel shows the share of firms involved in international subcontracting within each judicial district.

Figure 2: Controlling for sorting



Source: Italian Ministry of Justice.