Institution-driven comparative advantage and organizational choice

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ABSTRACT

The theory of the firm suggests that firms can respond to poor contract enforcement by vertically integrating their production process. The purpose of this paper is to examine whether firms' integration opportunities affect the way contract enforcement institutions determine international trade patterns. We find that the benefits of judicial quality for the exports of contract-intense goods are more muted in industries that have a greater propensity towards vertical integration arrangements with input suppliers. We show that our results are not driven by primitive industry characteristics. Our results confirm the role of judicial quality as a source of comparative advantage and suggest that this depends not only on the technological characteristics of the goods produced but also on the way firms are able to organize the production process.

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1. Introduction

A substantial body of empirical work has established that the quality of a country's institutions has a profound effect on its economic performance. Several influential works have studied and explored the idea that legal, financial and other types of institutions are indeed "inputs" to the production process and give a nation a comparative advantage in industries relatively intensive in the use of the services provided by these institutions. These papers show that judicial quality (Nunn, 2007; Levchenko, 2007), financial development (Svaleryd and Vlachos, 2005; Manova, 2008) and labor market flexibility (Cuñat and Melitz, 2010) contribute to a country's comparative advantage in the same way as more traditional sources such as factor endowments and technology.[1]

One important matter that these empirical contributions do not account for, however, is that firms' organizational form may help them to cope with the limitations of the institutional environment. Namely, firms that are more vertically integrated with input suppliers will be less reliant on the external contracting environment to alleviate hold-up problems. We thus test the hypothesis that vertical integration is a substitute for well-functioning contract enforcement institutions

when producing contract-intense goods. Accounting for organizational form allows us to better understand the effect of judicial quality on the composition of exports.

In this paper, we investigate the effect of judicial quality on comparative advantage across industries that vary in their contract intensity and their propensity to vertically integrate with input suppliers. A contract-intense good is defined as a good whose production process is intensive in the use of highly specialized and customized inputs. We measure industry contract-intensity using Nunn's (2007) measure of contract intensity. The trade of contract-intense goods has grown substantially over the past three decades, making its study all the more relevant for the modern economy.

The main methodological contribution of this paper is that we use a new measure of industry-level "vertical integration propensity" based on observed vertical integration outcomes from the U.S. firm-level data. This measure has the advantage that it is a direct measure of vertical integration based mainly on sector characteristics. In contrast, previous literature has used proxy measures such as the number-of-inputs or industry value-added.

Our analysis extends the work of Nunn (2007) and Levchenko (2007), who show that countries with better legal systems export relatively more of "complex goods" that are contract-intense and thus more sensitive to poor contract enforcement.[2] Using the "Rule of Law" from

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[1] See also Chor (2010) for a quantification of the importance of various sources of comparative advantage.

[2] See Levchenko (2007) and Acemoglu et al. (2007) for a theoretical analysis.

Kaufmann et al. (2008) as our measure of judicial quality, we test if this effect is diminished for industries that also have a high propensity to vertically integrate with their input providers. This should hold if firms are vertically integrating around the problem of contract incompleteness resulting from poor judicial quality. The analysis thus tests the role of incomplete contract theory in explaining trade flows.

Our results show that the sensitivity of contract-intense industries' exports to judicial quality is affected significantly by how vertically integrated the industry is with its suppliers. In other words, the exports of contract-intense industries that are also highly vertically integrated are not sensitive at all to judicial quality, whereas the exports of contract-intense industries that exhibit low degrees of vertical integration are highly sensitive to judicial quality. Our results are robust to several control variables and are not driven by primitive industry characteristics such as capital intensity or skill intensity. In our specifications we also control for other potential sources of comparative advantage, such as factor endowments and the possibility that countries specialize in different goods according to their level of development.

The paper is organized as follows. The theoretical background is described in Section 2. Variable descriptions and data sources are discussed in Section 3. The empirical specification and main results are explained in Sections 4 and 5 respectively. The details of several robustness checks are explained in Section 6. Conclusions follow in Section 7.

2. Theoretical background

The idea that countries with better judicial quality have a comparative advantage in contract-intense goods finds theoretical support in the incomplete contract literature. The argument, pioneered by Williamson (1979) and further developed by Grossman and Hart (1986), is the following: when contracts are not fully enforceable ex post, the contracting parties tend to under-invest ex ante and this problem, the "hold-up problem", is bigger the more the investment is relationship-specific. Consider the case of an upstream firm (U) and a downstream firm (D) that transact a customized intermediate good. U's investments in customization and D's effort in adapting its production process to use that specific input are both relationship-specific because their value is higher within this buyer–seller relationship than outside it. If the contract is not enforced and the trade agreement falls apart then U is left with a good that has a lower value for any other buyer, while D will find it difficult to procure a good substitute from another supplier. Given such a risk both parties in the transaction will under-invest in the relationship and the production of the final good will be inefficient. The better contract enforcement institutions are the higher the probability for the contract to be enforced and the lower the efficiency loss due to underinvestment. The resulting cost advantage will be greater the more important relation-specific inputs are in the production of the final good. From this it follows that countries with better legal institutions have a comparative advantage in the production of those goods intensive in relationship-specific inputs where contract enforcement is important. Although this hypothesis has found strong empirical support, it takes into account only part of the theoretical predictions. The hold-up problem entails a transaction cost associated with market exchanges and, as Coase (1937) suggested, the transaction cost may be avoided or reduced by choosing the optimal organizational structure. This idea is fully developed by Williamson (1971, 1979) who suggested vertical integration as an organizational response to the hold-up problem. Williamson posits that moving the transactions of the specific inputs inside the firm's boundaries should alleviate the dependence on contract enforceability. If this is true then judicial quality should have a muted effect in driving comparative advantage of contract-intense goods when the firms producing them are more vertically integrated. This is the hypothesis that we test.

Our analysis focuses on testing Williamson's transaction cost theory and abstracts from alternative theories of organization such as the

Property Rights Theory (PRT) developed by Grossman and Hart (1986) and Hart and Moore (1990).[3] The PRT approach emphasizes that backward vertical integration may not lead to a more efficient outcome since it erodes the suppliers' incentives to invest in the relationship. As a consequence, according to the PRT it is not entirely clear whether relationship-specific investments should induce more or less backward vertical integration.[4,5]

3. The data

To examine the effect of judicial quality on comparative advantage we combine data on countries' characteristics, industries' characteristics and countries' exports by industry. We employ a cross section analysis, mainly based on the data set from Nunn (2007), which uses observations for 1997. This section illustrates the sources and the definitions of our main variables and controls.[6]

3.1. Contract intensity

According to the theoretical framework we have in mind, the sensitivity of a given industry to the quality of contract enforcement institutions is an exogenous industry characteristic and it derives from the relative importance in the production process of those inputs that, due to some specificity, suffer from hold-up problems. A direct measure of such a variable does not exist and we use the proxy constructed and employed by Nunn (2007). As an indicator of whether or not an input requires relation-specific investments he considers Rauch's (1999) commodity classification. This consists of three groups: goods traded on organized exchanges, goods not traded on organized exchanges but nevertheless possessing a reference price in trade publications, and all other goods. Nunn defines an input as being relationship-specific if it is neither purchased on an organized exchange nor reference-priced. Using this information, together with information from the U.S. Bureau of Economic Analysis (BEA) Input–Output (I–O) Table on input use, Nunn constructs for each final good the following measures of the proportion of its intermediate inputs that are relationship-specific:

$$z_i = \sum_j \theta_{ij} R_j^{neither}$$

where θ_{ij} is the weight of input j in the production of the final good i and $R_j^{neither}$ is the proportion of input j that is neither sold on an organized exchange nor reference priced.[7]

Although there are several alternative measures of contract intensity in the literature, we choose this measure because it most clearly captures the problem of asset specificity with upstream suppliers. Levchenko (2007), for example, uses the Herfindahl index of intermediate input use as an inverse measure of product contract-intensity. The motivation for using the Herfindahl index is that the more suppliers a firm has and the less they are concentrated, the more the firm depends on good contract enforcement because it has to deal with a higher number of equally important contracts. Costinot (2009) instead bases its measure of contract-intensity on survey data on the length of time needed to

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[3] See Gibbons (2005) for a comparison of the two theories.

[4] As noted by Lafontaine and Slade (2007), Williamson's transaction costs approach to vertical integration, perhaps because of its more testable predictions, has stimulated much more empirical work and has found considerable support in the data.

[5] In addition, we do not consider the Antràs et al. (2009) hypothesis that multinational firms are more reliant on within-firm technology deployment in countries with poor investor protection.

[6] Descriptive statistics for the main variables are presented in an online appendix.

[7] Rauch's original classification groups goods into 1189 industries according to the 4-digit SITC Rev.2 Classification. These data are aggregated into 342 industries following the BEA's I–O industry classification. This explains why $R_j^{neither}$ is a proportion and not simply a 0/1. We refer to Nunn (2007) for a detailed description of the indicator and its construction.