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Institutions and Local Supplier Quality

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Abstract

A large literature has examined the relationship between institutional dimensions (such as property rights, corruption, etc.) and foreign direct investment (FDI). An emerging literature also explores the relationship between local supplier quality and FDI. We contribute to this literature by empirically examining, for the first time, the relationship between social and political institutions and local supplier quality. Our main findings are that: (a) weak property rights and low bureaucratic quality degrade the development of an effective supply chain, and (b) the effect of corruption may depend on whether corruption is 'centralized' or 'decentralized'. These results concerning local supplier quality may have important implications for FDI as well as overall economic development.

Dedication: We dedicate this article to the memory of our beloved co-author and friend, Dr. Michael Webb. Acknowledgement: We would like to thank Yi-Yin for her research assistance. We are responsible for any errors.
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1. Introduction

A large literature in economics has examined the relationship between institutional dimensions (such as property rights, corruption, etc.) and important economic variables such as foreign direct investment (FDI). For example, Brunetti and Weder (1998), Javorcik and Wei (2009) and Brada et al (2012) find that corruption has a negative effect on FDI inflows. Similarly, Ali et al (2010) find that institutional quality, especially good property rights, has a positive impact on FDI in manufacturing and services. An emerging literature has also explored the relationship between local suppliers and FDI. Alam and Bagchi (2011) observe that a country's supply chain capability plays an important role in attracting FDI. Giroud et al (2012) study 424 foreign subsidiaries in five East European countries and find that the technological sophistication of their foreign operations depends on the technological capability of local suppliers. Local suppliers are, of course, not only important for FDI inflows, they are also essential for the economy as a whole, since more efficient supply chains are associated with lower inventory, better customer support and access to raw materials, labor, and modern transportation.

Given the importance of both (1) institutions and (2) local supplier quality in the economy and especially in attracting FDI, we examine how institutions themselves impact local supplier quality. An institutional environment characterized by weak property rights, inefficient bureaucracy and frequent bribes can impede local suppliers by increasing their costs of doing business, by increasing uncertainty and by making it difficult for them to plan long-term investments. To the best of our knowledge, this is the first study to investigate the relationship between institutions and local suppliers.

2. Empirical Model

We have not come across any studies that empirically explore the *determinants* of local supplier quality. In his seminal work on institutions, North (1990) argues that institutions affect the operating environment of firms and inefficient institutions can raise production costs by disrupting the supply chain. So, we expect that weak property rights, widespread corruption, and low bureaucratic quality degrade the development of an effective supply chain. We also expect that local supplier quality is dependent on various economic factors, such as a country's level of development (measured in terms of GDP per capita), the quality of its skilled labor force (measured by the level of tertiary education in the country), and the quality of overall infrastructure in the country. Thus, our basic model can be summarized as follows:

$$\begin{aligned}(\text{Local supplier quality})_i = {} & \alpha_0 + \alpha_1 (\text{Infrastructure quality})_i + \alpha_2 \ln (\text{GDP per capita})_i \\ & + \alpha_3 (\text{Tertiary education})_i + \alpha_4 (\text{Institutions})_i + \varepsilon_i\end{aligned}$$

Based on the preceding discussion, we expect that the presence of better institutions is associated with better local supplier quality, after controlling for infrastructure quality, GDP per capita and tertiary education. In other words, we expect α_4 to be positive and statistically significant.

3. Data

Our initial sample consists of 122 countries in the year 2005.[1] We obtain data on local supplier quality and overall infrastructure quality from the *The Global Competitiveness Report* 2005-2006, published by the World Economic Forum. Local supplier quality is rated 1 through 7, from "they are inefficient and have little technological capability" to "they are internationally competitive and assist in new product development and process development." Likewise, overall infrastructure quality (in terms of railroads, ports, electricity supply, etc.) is rated from 1 ("underdeveloped infrastructure") to 7 ("the general infrastructure in the country is as extensive and efficient as the world's best"). Data on institutions such as property rights, corruption and bureaucratic quality comes from the *International Country Risk Guide* 2005 (ICRG); data on economic indicators, such as GDP per capita in 2005 (measured in constant 2000 U.S. dollars) and public spending on tertiary education in 2005 (calculated as percentage of GDP per capita) come from the World Bank's *World Development Indicators* database.

4. Results

Table 1 presents the results of estimating equation (1) via ordinary least squares. In columns (2)-(4), we examine the impact of institutional dimensions such as property rights, control of corruption and bureaucratic quality respectively on local supplier quality. Each of these regressions also take into account the potential impact of economic variables, such as GDP per capita, tertiary education and overall infrastructure quality on local supplier quality. To provide a basis for comparison, we solely examine the impact of the economic variables in column (1). All regressions are estimated with heteroskedasticity-robust standard errors and include dummies for Africa, East Asia, South Asia, Middle East and North Africa, Europe and Central Asia, South America and North America. [2] Constant terms are not reported in any of the tables due to space limitations.

Across all four columns in Table 1, we observe that GDP per capita and overall infrastructure quality have a positive and statistically significant relationship with local supplier quality. We do not find any statistically significant relationship between tertiary education and local supplier quality, possibly because the quality of a country's tertiary education may already be captured by aggregate economic indicators such as GDP per capita. [3]

More pertinently, we observe in columns (2) and (4) of Table 1 that property rights and bureaucratic quality have positive and statistically significant relationships with local supplier quality. However, we do not find any statistically significant relationship between control of corruption and local supplier quality as shown in column (3) of Table 1.

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[1] We restrict our data to the year 2005 since some of the variables in our dataset are only available in 5 year increments and we wanted to exclude data for the years 2000 and 2010 considering that some variables may have been affected by any instability resulting from the 1997 Asian economic crisis and the 2008 global financial crisis. While cross-section analysis only provides a snapshot and can sometimes make it difficult to make causal inferences, we do not expect the cross-sectional nature of our data to be a major issue since institutions, such as property rights, corruption and bureaucratic quality, are more likely to vary across countries than over time.

[2] Regressions excluding these region dummies yield similar results; hence, these results are not reported in the interest of space.

[3] In fact, tertiary education is not statistically significant in most of our regressions. We observed a correlation coefficient of 0.62 between tertiary education and GDP per capita. So, we re-estimated the regressions by dropping GDP per capita. We found that our main results still hold while tertiary education becomes statistically significant in most of these regressions. The results, not reported here due to space limitations, are available upon request.

Table 1: Institutions and Local Supplier Quality

	(1) Without Institutions	(2) Property rights	(3) Control of corruption	(4) Bureaucratic quality
Infrastructure quality	0.29***	0.12**	0.26***	0.26***
	(0.05)	(0.05)	(0.05)	(0.05)
GDP per capita (natural log)	0.20***	0.14**	0.15**	0.13*
	(0.06)	(0.06)	(0.07)	(0.07)
Tertiary education	0.01	0.01	0.01	0.01
	(0.01)	(0.01)	(0.01)	(0.01)
Property rights		0.32***		
		(0.06)		
'Control' of corruption			0.09	
			(0.05)	
Bureaucratic quality				0.14**
				(0.07)
Observations	106	106	106	106
Adjusted R-squared	0.70	0.77	0.72	0.72

Note: The notations ***, ** and * denote statistical significance at 1, 5 and 10 percent level respectively.

According to the literature on institutions, the effects of corruption can be more nuanced than those of other institutional dimensions (Bliss and Di Tella, 1997, Shleifer and Vishny, 1993). For example, when corruption in a country is primarily 'decentralized' in nature, each government official is essentially a self employed bribery contractor. Consequently, this type of fragmented corruption can be more harmful for business by serving as a bribe tax and by creating a more uncertain business environment, thus increasing the cost of transactions. On the other hand, under 'centralized' corruption, government officials work together to provide a public service in exchange for bribes. Although any corruption is potentially harmful in the end, this type of corruption can help decrease costs for businesses by helping them avoid excess regulations and gain other privileges (such as access to credit). Furthermore, this type of corruption allows firms to determine the transaction costs associated with corruption with more certainty and plan their long-term investments accordingly. Since the nature of corruption may be different in different countries, it is possible that we are unable to pick up the effect of corruption on local supplier quality in column (3) of Table 1, because the effects of decentralized corruption in some countries may be offset by those of centralized corruption in other countries.

To examine this possibility further, we split our sample of countries into two groups depending on the extent of decentralized corruption in those countries. We consider the "irregular payments and bribes" indicator from the *Global Competitiveness Report* as a measure of decentralized corruption (i.e. a more uncertain business environment). This variable is rated

from 1 (irregular payments are very common) to 7 (irregular payments never occur). Countries with higher than median scores are classified as experiencing less decentralized corruption (i.e. less uncertain business environments) and vice-versa.

Table 2: Corruption and Supplier Quality: Split Sample Analysis

	(1) High-income countries	(2) Lower-income countries	(3) Countries with less decentralized corruption	(4) Countries with more decentralized corruption
Infrastructure quality	0.22***	0.35***	0.25***	0.37***
	(0.06)	(0.09)	(0.06)	(0.09)
GDP per capita (natural log)	0.13	0.02	0.04***	0.14**
	(0.13)	(0.13)	(0.01)	(0.06)
Tertiary education	0.01	0.01	0.07	0.02*
	(0.01)	(0.02)	(0.07)	(0.01)
'Control' of corruption	0.10	0.20*	0.07	0.20*
	(0.07)	(0.11)	(0.06)	(0.10)
Observations	60	46	53	46
Adjusted R-squared	0.60	0.38	0.67	0.47

Notes: Heteroskedasticity-robust standard errors are in parentheses. The notations ***, ** and * denote statistical significance at 1, 5 and 10 percent level respectively.

The estimation results are reported in columns (3) and (4) of Table 2. The results in column (4) suggest that better control of corruption has a positive and statistically significant effect (at the 10 percent level) on local supplier quality in countries with more decentralized corruption, but the effect disappears when we look at countries with less decentralized corruption in column (3). These results are consistent with the idea that corruption may be harmful to local suppliers by creating a more uncertain business environment.

In columns (1) and (2) of Table 2, we split our sample into high-income and low-income countries, depending on whether their per capita income is higher or lower than the median per capita income in our sample ($3,975). The results reported in column (2) show that that better control of corruption has a positive and somewhat statistically significant effect (at the 10 percent level) on local supplier quality in low-income countries (which may experience decentralized corruption to a greater extent), but the effect disappears when we look at high income countries in column (1). This suggests that improving the level of corruption in high-income countries may not have a considerable effect on local suppliers either because they may already have an already established supply chain network and/or because these countries may experience less decentralized corruption (i.e. a more certain and predictable business

environment).[4] In sum, considering the level of statistical significance of our findings, it seems that unlike property rights and bureaucratic quality, corruption has less of an impact on local supplier quality.

Table 3 shows the results of several robustness checks. In column (1) of Table 3, we include all the institutional variables – property rights, corruption and bureaucratic quality – together in our estimating model.

Table 3: Robustness Checks

	(1) With all institutions together	(2) Excluding education	(3) Including Education and Openness to Trade	(4) Excluding top 10% and bottom 10% of local supplier quality ratings (i.e. outliers)
Infrastructure quality	0.10 (0.06)	0.11* (0.06)	0.12** (0.05)	0.06** (0.06)
GDP per capita (natural log)	0.08 (0.05)	0.10** (0.04)	0.08* (0.05)	0.08* (0.05)
Tertiary education	0.08 (0.01)		0.01 (0.01)	0.01 (0.01)
Property rights	0.25*** (0.07)	0.26*** (0.07)	0.27*** (0.06)	0.23*** (0.07)
'Control' of corruption	0.02 (0.06)	0.02 (0.05)	0.01 (0.06)	0.01 (0.06)
Bureaucratic quality	0.16** (0.06)	0.13* (0.07)	0.16** (0.06)	0.13** (0.06)
Openness to trade (natural log) (data obtained for 2005 from Penn World Tables)			0.24*** (0.06)	0.14* (0.07)
Observations	102	116	102	83
Adjusted R-squared	0.74	0.74	0.76	0.63

In column (2) of Table 3, we exclude education from the estimating equation since it appears to be strongly correlated with GDP per capita in our sample (with a correlation coefficient of 0.65). In both cases, we find that the magnitude and significance of the institutional

[4] In fact, anecdotal evidence suggests that low-income countries, such as those in Africa, may be more likely to experience unpredictable, unorganized and decentralized corruption (Gyimah-Brempong, 2002).

variables are similar to those in Table 1. Both property rights and bureaucratic quality seem to have positive and statistically significant effects on local supplier quality. In column (3) of Table 3, we include a measure of "openness to trade" (obtained from the *Penn World Tables*) to account for the possibility that more open countries may have access to better resources and technology and hence, have better supplier quality. We find that openness to trade has a positive and statistically significant relationship with local supplier quality, while the coefficients of property rights and bureaucratic quality still remain statistically significant and positive. Finally, in column (4) of Table 3, we drop from our sample the top and bottom 10% of the countries with local supplier quality ratings in order to eliminate what could be outliers. Again, the results remain similar.

5. Conclusion

According to the institutional economics literature, uncertain and unpredictable state actions can impose large costs on the private sector as private firms react by cutting back on long-term investment under regulatory and policy uncertainty (Brunetti and Weder, 1998). In this paper, we find some evidence consistent with this idea. Using cross-country data from 106 countries, we observe that weak property rights and inefficient bureaucracy lead to lower quality local suppliers while corruption may also degrade local supplier quality in countries where corruption is mostly decentralized and unpredictable. Our results suggest institutional reforms that may lower uncertainty and improve the business environment can also help local suppliers improve their quality, which in turn, can benefit the economy in a multitude of ways.

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