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## Contracting institutions and vertical integration: Evidence from China's manufacturing firms

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## ABSTRACT

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The existing studies on vertical integration focus on factors at the transaction parties' level, such as asset specificity and contractual incompleteness. What is overlooked is the quality of the underlying institutions, in particular, contracting institutions. In this paper, using a World Bank data set of manufacturing firms in China, we find that poorer contracting institutions cause firms to be more vertically integrated. Our results are robust to various checks, especially the inclusion of the quality of financial institutions. *Journal of Comparative Economics* 40 (1) (2012) 89–107. Department of Economics, Chinese University of Hong Kong, Hong Kong; Department of Economics, National University of Singapore, Singapore; Faculty of Business and Economics, University of Hong Kong, Hong Kong.

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### 1. Introduction

The choice of vertical boundary is a key decision for firms, as it has been found to affect firm performance and consequently economic growth (Novak and Stern, 2008; Forbes and Lederman, 2010). Indeed, this issue has been extensively studied since Coase's seminal work in 1937, with a focus on the relationship specificity of investments and the degree of contractual incompleteness. In recent years, researchers have begun to pay attention to the impacts of institutional quality on the organization of production. Khanna and Palepu (1997, 2000) notice the prevalence of large and highly vertically integrated firms in developing countries such as India. By studying Indian business groups, they find that affiliates of business groups often outperform unaffiliated firms. They suggest that the poorly functioning market-supporting institutions in India make the benefits of business groups dominate the costs of group affiliation under certain circumstances. Although their studies are related to vertical integration, the authors did not explicitly examine the impacts of institutions, particularly contracting institutions, on vertical integration in developing countries.

In this paper, using a cross-region data set from the world's largest developing economy, China, we aim at identifying the direct impact of contracting institutions on vertical integration.<sup>1</sup> Meanwhile, following Acemoglu et al. (2009), and

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<sup>1</sup> Fan et al. (2007) also examines how institutional quality (i.e., contract enforcement, government service, and market development) affects the make-or-buy decision. However, they use data of China's publicly-listed firms, which is not a representative sample in China as these publicly-listed firms are large, vertically-integrated and politically connected. Meanwhile, they do not even control for industry dummies in their estimation, which is found to be important in identifying the impact of contracting institutions on vertical integration (Acemoglu et al., 2009).

Macchiavello (2010, 2011), we also investigate how contracting institutions may interact with financial institutions in determining the vertical boundary.

Our empirical analysis uses the data of a World Bank survey of 1566 firms located in 18 cities and 9 manufacturing industries in China. China offers an ideal setting in which to study the impacts of the quality of contracting institutions on vertical integration, because there exist substantial variations in the de facto quality of contracting institutions across regions in China as a result of substantial disparities in economic and institutional development (e.g., Du et al., 2008; World Bank, 2008; Lu and Tao, 2009).<sup>2</sup> Specifically, we measure the quality of contracting institutions as the perceived likelihood that the legal system would uphold contract and property rights in business disputes (e.g., Johnson et al., 2002; Cull and Xu, 2005). Meanwhile, we measure the degree of vertical integration in two ways. One is the ratio of value added to sales, which is the most widely-used measure in the literature (Adelman, 1955; Davies and Morris, 1995; Holmes, 1999). The other is constructed on the basis of the reply to the survey question of how large a proportion of inputs are produced in-house by the firm itself.

Our basic OLS regression results show that the quality of contracting institutions has a direct, specifically, negative and significant, impact on firm vertical integration. However, endogeneity could be a serious concern. For instance, there could be a possibility of reverse causality. Entrepreneurs of vertically integrated firms might have less need for outsourcing intermediate goods, and thus have smaller chances to encounter commercial disputes with their business partners. Then they might have less need to ask for court adjudication; and this lack of experience with court resolution may cause those entrepreneurs to have misperceptions of the quality of contracting institutions based on some stereotypes, which may well result in an underestimation of the impact of contracting institutions. In addition, we could have omitted variable bias. For example, a more capable entrepreneur may on one hand have better connections that help her/him secure better de facto contract enforcement, and on the other hand be capable of managing a more vertically-integrated business. Hence, the lack of control for entrepreneurial capability may again lead to an underestimation of the impact of contracting institutions. To mitigate the potential biases stemming from the endogeneity problem, we conduct a series of econometric analyses and robustness checks.

First, we check whether our results are biased due to some omitted variables. Specifically, we include a list of control variables reflecting the CEO characteristics (such as human capital and political capital) and firm characteristics (such as firm size, firm age, percentage of private ownership, access to bank loans, and degree of computerization) as well as industry and city dummies. Our results remain robust to the inclusion of these controls.

Second, to further deal with the possible endogeneity issue, we use the two-step generalized method of moments (GMM) with two alternative instruments, viz., the average response by other firms located in the same city regarding the quality of contracting institutions, and a dummy variable indicating whether the respective city was administered by the Great Britain in the late Qing Dynasty of Imperial China. The two-step GMM estimation results reinforce our findings that the quality of contracting institutions has a negative impact on vertical integration.

Third, we apply the heterogeneous response method of Rajan and Zingales (1998). According to Acemoglu et al. (2009), the quality of contracting institutions has a greater impact on vertical boundary for firms that are more susceptible to supplier hold-up problems. To proxy a firm's reliance on external suppliers, we use two alternative measures: number of suppliers as in Blanchard and Kremer (1997) and Raghuram and Subramanian (2007), and capital intensity as in Acemoglu et al. (2009). Our results show that indeed the negative impact of the quality of contracting institutions on vertical integration is greater for firms with more external reliance.

Finally, in further robustness checks, we repeat the analysis using an alternative measure of vertical integration, an alternative measure of the quality of contracting institutions, and three sub-samples of firms (i.e., firms with focused businesses, private firms, and small firms). Again our results remain robust in all these specifications.

Our results point to a fairly robust direct impact of contracting institutions on firm vertical boundary.<sup>3</sup> As argued by Coase (1937), the decision of vertical boundary hinges upon the external environment, the most important component of which is arguably the institutional quality. Nonetheless, the theoretical prediction of the direct effect of institutions on vertical boundary is ambiguous.<sup>4</sup> There are two leading theories regarding the vertical boundary of firm: the transaction cost theory (Williamson, 1971, 1985; Klein et al., 1978) and the property rights theory (Grossman and Hart, 1986; Hart and Moore, 1990). According to the transaction cost theory, firms are more likely to be vertically integrated when the market transaction cost is higher. When legal institutions for contract enforcement are weak, transaction costs in arms-length transactions are expected to be high. Given that the transaction cost theory is largely silent about the transaction cost within a firm, it predicts that an improvement in contracting institutions will lead to less vertical integration. In contrast, the property rights theory holds the view that the imperfection of contracting institutions affects both in-house production and arms-length transaction. When a firm deals with an independent input supplier in arms-length transaction, the firm is subject to the supplier's holdup problem. When the input supplier becomes an employee in in-house production in the scenario of vertical integration, the firm still faces the potential

<sup>2</sup> For example, in coastal cities, it takes an average of 230 days to resolve an uncomplicated commercial dispute, whereas the corresponding number for Northeastern China is 363 days (World Bank, 2008).

<sup>3</sup> Our results differ from those of the existing studies such as Acemoglu et al. (2009) primarily because of the lack of regional industry specialization in China and the different approaches to measure vertical integration and contracting institutions. See Section 3 for more detailed discussion.

<sup>4</sup> Instead, Acemoglu et al. (2009) and Macchiavello (2010) find that contracting institutions have an indirect effect on vertical integration through the development of financial institutions (see below for more discussions of these two studies).

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