



Information, incentives and multinational firms

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ABSTRACT

I present a model that explains a multinational firm's choice of organizational form. If a firm in the developed country outsources the production of its intermediate goods to a supplier in the developing country, it faces an adverse selection problem. If it chooses to produce the intermediate goods in its own subsidiary in the developing country, it faces an inefficient monitoring problem. My analysis of this tradeoff provides a new explanation for the observation that FDI is concentrated in capital intensive industries and yields two empirical hypotheses: more firms should adopt outsourcing instead of FDI after trade liberalization; the share of intra-firm trade in total trade should be increasing in the degree of productivity dispersion across intermediate goods suppliers in the developing country.

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1. Introduction

Recent years have witnessed rapid growth of Foreign Direct Investment (FDI).¹ With the rapid growth of FDI, intra-firm trade has become an important feature of international trade.² FDI and intra-firm trade are conducted by Multinational Enterprises (MNEs) which play a key role in the international economy today.³ Other than FDI, MNEs can outsource production by buying intermediate goods from independent suppliers in the developing country. Outsourcing has expanded dramatically in the past two decades, especially in the form of international trade of intermediate goods.⁴

In the comparison between FDI and outsourcing, there is one important finding from the empirical work, “intra-firm trade (FDI) is heavily concentrated in capital-intensive industries.”⁵ This is an

interesting phenomenon which some trade economists have tried to explain. In the seminal work of Antràs (2003b), he uses the incomplete contract theory⁶ to explain this empirical finding.⁷ Because of the incompleteness of contracts between the MNE in the developed country and the intermediate goods supplier in the developing country, the hold-up problem appears. Consequently, both sides underinvest. In capital-intensive industries, the investment of the MNE's input becomes more important compared with the intermediate goods suppliers. Thus, the MNE wants to integrate the intermediate goods supplier to increase its incentive to invest. As a result, the loss of efficiency will be alleviated in the capital-intensive industry, if the MNE integrates the intermediate goods supplier in the developing country.

Although the work of Antràs (2003b) sheds important light on the problem of MNEs' organizational choice, there are other relevant factors that have not been studied very much in the previous literature. Among these is the asymmetric information problem concerning the southern suppliers' products. In 2007, it was reported that toys contaminated with toxic levels of lead were found among exports from China to the U.S.⁸ At the beginning of 2008, dumplings exported to Japan from the Chinese food corporation Tianyang were

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¹ Navaretti and Venables (2004) point out, “FDI grew dramatically in the last 15 years of the twentieth century, far outpacing the growth of trade and income.”

² According to Antràs (2003b), “in 1994, 42.7% of the total volume of U.S. imports of goods took place within the boundaries of Multinational firms, with the share being 36.3% for U.S. exports of goods (Zeile 1997).”

³ It has been reported that MNEs–headquarters and subsidiaries combined–are responsible for 75% of the world's commodity trade (Dunning, 1993).

⁴ Feenstra (1998) reports, “between 1972 and 1990, imported intermediate inputs increased from 5.3% of material purchases to 11.6% of material purchases.” Other papers related to this issue are Audet (1996), Campa and Goldberg (1997), Hummels et al. (2001) and Yeats (2001).

⁵ See Antràs (2003b).

⁶ For details, see Grossman and Hart (1986), Hart and Moore (1990) and Hart (1995).

⁷ Similar approaches applied to international trade theory can be found in Antràs (2005), Grossman and Helpman (2002, 2003, 2005) and McLaren (2000).

⁸ For details, see <http://www.wnd.com/index.php?fa=PAGE.printablepageId=42174>.

found to be poisonous.⁹ The most recent and serious case is the melamine-tainted milk-powder crisis in September 2008. Sanlu and other related firms included melamine which is cheaper than other components of the milk-powder into their products and sold them at high prices. All above cases point out one important issue in international trade, which is the asymmetric information problem regarding the quality of products exported from developing countries.

It is also natural to think that all these quality problems are due to the desire to push down the products' real cost. Interestingly, the New Zealand dairy conglomerate Fonterra that had already held a 43% stake in Sanlu before the crisis was reportedly trying to buy the whole stake of Sanlu after the crisis. This information reveals that the best way to eliminate the asymmetric information problem about the transaction partners' products (e.g., production cost, productivity, quality) is to integrate them. Other than the cases mentioned above, there is a famous example concerning different organizational choices among giant MNEs. Nike outsourced the whole production of making shoes to companies in developing countries. On the other hand, Intel set up its own subsidiaries in China and Costa Rica to assemble and test computer chips. Therefore, a natural question arises: Why do these two famous MNEs behave so differently? In what follows, I will give an explanation for this phenomenon, and it turns out that the key factor is the asymmetric information concerning the southern suppliers' productivity.

In this paper, I use contract theory to explain the economic forces behind multinational firms' choice of organizational form. I focus on comparing two types of production: outsourcing in the developing country and FDI. My model links information asymmetry with the outsourcing decision as follows. Suppose that a potential supplier has private information on his firm's productivity, and furthermore that his workers must be monitored to prevent shirking. An MNE can either outsource to this supplier or acquire his firm through FDI. Outsourcing requires that the MNE pays an information rent, since the supplier must be induced to reveal his productivity. Though FDI would reveal this productivity directly, it has the disadvantage that the monitoring incentives weaken, since the supplier would no longer enjoy the ownership. Obviously, the MNE is not a real MNE in the outsourcing case, as it does not own foreign affiliates. For convenience, I call the final goods makers in the developed country that undertake outsourcing in the developing country the MNEs also.

My model rationalizes empirical findings that FDI is heavily concentrated in capital-intensive industries from the information frictions perspective. The intuition behind this result is that although the adverse selection problem is not related to the capital intensity of production, the inefficient monitoring problem and its importance in the FDI case are significantly affected by the capital intensity. At first glance, it seems that the increase of capital intensity decreases the marginal product of labor and accordingly southern managers' incentive to monitor. Nevertheless, a higher capital intensity incentivizes substitution away from labor, and subsequently reduces monitoring costs. Moreover, it also increases the benefits of monitoring through an increase in the capital–labor ratio. In total, an increase in the capital intensity alleviates the inefficient monitoring problem in the FDI case by inducing the manager of the MNE's subsidiary to choose a higher monitoring intensity. Therefore, the advantage of outsourcing over FDI is less pronounced in capital-intensive industries, and FDI is heavily concentrated in capital-intensive industries. Following this argument, it is straightforward to see that while the main results of this paper are the same as those of Antràs (2003b, 2005), the economic intuition contrasts markedly. Another interesting result is that after trade liberalization, more firms should use outsourcing to produce intermediate goods, since the reduction in the heterogeneity in productivity of the suppliers following trade liberalization reduces the information rent the MNE has to pay which makes outsourcing more attractive. Additionally, my

model predicts that the share of intra-firm trade (i.e., FDI) in total trade should be increasing in the degree of productivity dispersion across intermediate goods suppliers in the developing country. The reason is that the increased dispersion of the suppliers' productivity increases the information rent that the MNE has to pay, and consequently makes the choice of FDI more attractive than outsourcing.

The adverse selection problem in the outsourcing case and the foreign managers' lack of incentive to work in the FDI case are serious problems in practice, although they have been more or less overlooked by trade economists for many years. Admittedly, there is one important exception in the trade literature that considers the asymmetric information problem. Horstmann and Markusen (1996) presents an interesting model in which the MNE has to choose between making a contract with a foreign agent and setting up her own affiliate in order to sell the products. In their model, the MNE is faced with an asymmetric information problem when contracting with a stand-alone agent in the foreign country. Although the MNE can overcome this problem by setting up her affiliate, it is assumed that in the FDI case, the MNE has to pay a fixed cost (e.g., the set-up cost) which is not incurred in the outsourcing case. In this paper, I will give a more explicit explanation about the disadvantage of FDI by introducing the inefficient monitoring problem. Interestingly, in international management literature, some researchers think about the information and incentive issues surrounding MNEs seriously.¹⁰ This paper will shed light on these important issues in international trade theory.

The monitoring issue discussed in this paper is related to a literature in organizational economics, which argues that firms with more hierarchical levels allocate less time and resources to monitoring and lose more control on their workers.¹¹ In this paper, an independent intermediate goods supplier has two layers (i.e., hierarchical levels): the domestic manager who owns the firm and the workers. The MNE's foreign affiliate has an extra layer—the owner in the developed country. Due to the separation of ownership and control in the FDI case, the MNE's subsidiary loses more control of his workers; i.e., the monitoring is less efficient.¹² Subsequent work in this literature derives a hypothesis that workers' wage rate should be higher in firms with more hierarchical levels, as a higher wage rate raises the cost to workers of shirking and accordingly mitigates the loss of control on workers.¹³ This hypothesis is consistent with the result of this paper that a higher wage rate in the FDI case is needed to prevent workers from shirking.¹⁴ Interestingly, Grossman and Helpman (2004) also consider the monitoring issue to be an important factor when comparing outsourcing to FDI. Their stance is that the owner in the developed country can monitor the manager in the developing country more effectively under integration than under outsourcing, which may seem contrary to my assumption that monitoring is less efficient under integration. However, their focus is the owner's monitoring of the manager, not the manager's monitoring of the workers. Both papers focus on monitoring asymmetry from different aspects, and different types of inefficient monitoring may be present at the same time.

¹⁰ Dunning (1993) writes, “such cognitive deficiencies give rise to bounded rationality, opportunism, adverse selection, moral hazard. This kind of market failure is particularly likely to be associated with cross-border transaction” (p.78). Rugman (1981) also writes, “there are presumably more imperfections and greater transactions costs in international than in domestic markets” (p.42).

¹¹ Pioneering work in this literature includes Williamson (1967), Calvo and Wellisz (1978), etc.

¹² Indeed, Williamson (1967) writes, “if, in addition, goals differ between hierarchical levels, the loss in control can be more extensive” (p.135).

¹³ For details, see Mellow (1982), Oi (1983), Brown and Medoff (1989), and Troske (1999).

¹⁴ Although nominal wage rates are the same in both cases, the wage per effective labor unit is higher in the FDI case, as monitoring intensity and workers' effort levels are lower in this case.

⁹ For details, see <http://www.reuters.com/article/latestCrisis/idUST190036>.

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