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Journal of International Economics 74 (2008) 402 – 421

Journal of INTERNATIONAL ECONOMICS

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Welfare gains from Foreign Direct Investment through technology transfer to local suppliers ☆

Garrick Blalock [a,]*, Paul J. Gertler [b,c]

[a] Cornell University, Department of Applied Economics and Management, 346 Warren Hall, Ithaca, NY 14853, USA
[b] University of California, Berkeley, Haas School of Business, USA
[c] NBER, USA

Received 5 July 2005; received in revised form 30 January 2007; accepted 21 May 2007

Abstract

We hypothesize that multinational firms operating in emerging markets transfer technology to local suppliers to increase their productivity and to lower input prices. To avoid hold-up by any single supplier, the foreign firm must make the technology widely available. This technology diffusion induces entry and more competition which lowers prices in the supply market. As a result, not just the foreign-owned firm, but all firms downstream of that supply market obtain lower prices. We test this hypothesis using a panel dataset of Indonesian manufacturing establishments. We find strong evidence of productivity gains, greater competition, and lower prices among local firms in markets that supply foreign entrants. The technology transfer is Pareto improving — output and profits increase for firms in both the supplier and buyer sectors. Further, the technology transfer generates an externality that benefits buyers in *other* sectors downstream from the supply sector as well. This externality may provide a justification for policy intervention to encourage foreign investment.
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Keywords: Foreign Direct Investment; Technology transfer; Productivity; Supply chain

JEL classification: F23; O14; O12; H41

1. Introduction

Many countries try to attract Foreign Direct Investment (FDI) with costly public programs such as tax holidays, subsidized industrial infrastructure, and duty exemptions. Is this enthusiasm for FDI warranted? In this paper, we

☆ We are indebted to Indra Surbakti, Fitria Fitrani, Kai Kaiser, and Jack Molyneaux for their assistance in compiling the data. We received helpful advice from David I. Levine, David C. Mowery, Pranab Bardhan, Ann Harrison, Mary Amiti, Nina Pavcnik, James E. Blalock, Haryo Aswicahyono, Thee Kian Wei, and two anonymous referees. We thank the Institute of Business and Economic Research (IBER) and Management of Technology (MOT) program, both at the University of California, Berkeley, for their generous financial support. We received helpful comments from seminar participants at The Pennsylvania State University and the London School of Economics and Political Science. Finally, we are grateful to the factory managers in Indonesia who kindly participated in interviews.
* Corresponding author. Tel.: +1 607 255 0307; fax: +1 607 255 9984.
E-mail addresses: garrick.blalock@cornell.edu (G. Blalock), gertler@haas.berkeley.edu (P.J. Gertler).

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doi:10.1016/j.jinteco.2007.05.011

investigate the hypothesis that multinational firms transfer technology to their domestic suppliers and that this transfer generates greater competition and lower prices that benefit the entire economy. If true, the effect on competition may justify public encouragement of FDI.

Recently, a number of authors have argued that that multinationals may deliberately transfer technology to local suppliers as part of a strategy to build efficient supply chains for overseas operations (Pack and Saggi, 2001; Blalock, 2002; Javorcik, 2004). By transferring technology to local suppliers the downstream multinationals lower the cost of non-labor inputs. This cost-reduction motive implies that multinationals transfer technology to suppliers because it confers a private benefit to them. However, unless there is an additional social benefit, there is no case for public subsidies to stimulate technology transfers from multinationals.

How might social benefits develop? The primary motivation for multinationals to transfer technology to suppliers is to enable higher quality inputs at lower prices. One problem with this strategy is that if the enabling technology is transferred to only one upstream vendor, then the multinational is vulnerable to hold-up. To mitigate hold-up risk, the multinational could diffuse the technology widely—either by direct transfer to additional firms or by encouraging spillover from the original recipient. Wide diffusion of the technology would then encourage entry into the supplier market, thereby increasing competition and lowering prices. However, the multinational cannot prevent the upstream suppliers from also selling to others in downstream markets. The lower input prices may induce entry and therefore more competition in downstream markets, which lowers prices and increases output. Pack and Saggi (2001) show that theoretically, as long as there is not too much entry, profits will rise in both the downstream and upstream markets. If so, the new surplus generated from increased productivity and the deadweight loss reduced from increased competition will be split between consumers and producers in a Pareto-improving distribution.

In this paper we test the hypotheses that FDI leads to a Pareto-superior increase in welfare *via* these mechanisms. Specifically, we examine whether there were transfers of technology along the supply chain, whether the technology transfer leads to increased competition, and whether the increased competition induced welfare improvements in terms of lower prices, greater production, and higher profits in both the supply market and in industries downstream of the supply market. Our chief contribution is to establish and quantify the welfare enhancing externalities of vertical technology transfer.

The analysis is in two parts. The first part measures the effect of FDI on local supplier productivity by estimating a production function using a rich panel dataset on local- and foreign-owned Indonesian manufacturing establishments. In a number of industries, the realized productivity gain is more than 2%. The second part of the paper examines the market and welfare effects of technology diffusion from FDI. We find that downstream FDI increases the output and profits of upstream firms, and decreases prices and concentration of upstream markets. We also find increased output and profits among downstream firms, and decreased prices and market concentration in markets downstream of markets supplying multinationals. In sum, our findings suggest several welfare effects—*i.e.*, benefits for consumers in terms of lower prices and for firms in the form of greater profitability—transmitted both up and down the supply chain from the adoption of technology brought with FDI.

2. Conceptual framework

Policymakers often cite technology diffusion to host country firms as a benefit of Foreign Direct Investment (FDI). This belief proliferates in part because of impressive claims of technological development from FDI, such as those of the World Bank (1993), p. 1, which says that “[FDI] brings with it considerable benefits: technology transfer, management know-how, and export marketing access. Many developing countries will need to be more effective in attracting FDI flows if they are to close the technology gap with high-income countries, upgrade managerial skills, and develop their export markets.”

The proponents offer three explanations for how technology spillovers occur from multinationals to domestic firms. First, local firms may be able to learn simply by observing and imitating the multinationals. Second, employees may leave multinationals to create or join local firms. Third, multinational investment may encourage the entry of international trade brokers, accounting firms, consultant companies, and other professional services, which then may become available to local firms as well.

However, a number of recent empirical studies, which find mixed evidence of technology transfer from FDI, have prompted many observers to question its existence. Rodrik (1999), p. 37, in a summary of the evidence, comments, “today’s policy literature is filled with extravagant claims about positive spillovers from FDI, [but] the hard evidence is

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