



Technology transfers, foreign investment and productivity spillovers



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ARTICLE INFO

Article history:

Received 14 January 2014

Accepted 27 February 2015

Available online 11 March 2015

JEL classification:

D22

F21

O12

O3

Keywords:

Foreign direct investment

Productivity spillovers

Direct linkages

Technology transfers

Vietnam

ABSTRACT

This paper explores the relationship between foreign direct investment (FDI) and the productivity of host country domestic firms. We rely on a specially designed survey of over 4000 manufacturing firms in Vietnam, and separate out productivity gains along the supply chain (obtained through direct transfers of knowledge/technology between linked firms) from productivity effects through indirect FDI spillovers. In addition to identifying indirect vertical productivity spillovers from FDI, our results show that there are productivity gains associated with direct linkages between foreign-owned and domestic firms along the supply chain not captured by commonly used measures of spillovers. This includes evidence of productivity gains through forward linkages for domestic firms which receive inputs from foreign-owned firms.

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1. Introduction

Attracting foreign direct investment (FDI) is a significant policy priority in developing countries. This is so with a view to creating jobs and injecting capital into the domestic economy. Moreover, FDI often comes with new technologies and innovations. They are potentially an important source of productivity growth as they may help host country domestic industries catch up with the international technology frontier. Given the policy attention and resources invested by governments in attempting to attract FDI, establishing whether there is positive evidence of externalities or productivity spillovers from FDI has become the topic of a vast and influential empirical literature.

The basic premise underlying the existence of FDI spillovers is that foreign-invested firms are technologically superior and that knowledge is transferred through their interactions with domestic firms, which, in turn, leads to productivity improvements.¹ There are many well-explored mechanisms through which such spillovers may be realised. Horizontal, or intra-sector, spillovers are those that result from knowledge and technology used by FDI firms transferred to competing

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¹ See [Caves \(1974\)](#), [Rodriguez-Clare \(1996\)](#) and [Markusen and Venables \(1999\)](#) for seminal work on the theoretical underpinnings of productivity spillovers from foreign to domestic firms.

firms in the same sector. Vertical, or inter-sector, spillovers are those that transfer through the supply chain from foreign intermediate suppliers to domestic producers or more commonly from foreign-invested firms to domestic input suppliers.

Most of the recent literature in developing country contexts finds no evidence of horizontal spillovers and emphasizes vertical spillovers through backward linkages from foreign firms to domestic suppliers as the main source of productivity effects (see, for example, [Blalock and Gertler, 2008](#); [Javorcik, 2004](#); [Kugler, 2006](#)). The available evidence also suggests that the type of the foreign investor, whether a joint venture or a wholly foreign-owned firm, matters for the extent of spillovers ([Javorcik, 2004](#)).² Overall, however, the empirical literature is inconclusive as to the nature and extent of FDI spillovers. This is highlighted in review papers by [Görg and Greenaway \(2004\)](#) and [Görg and Srobl \(2001\)](#); and conclusions drawn largely depend on the specific country context, the data used, and the methods applied.

In his overview of the literature on FDI spillovers in developing countries, [Smeets \(2008\)](#) points out that technology transfers and technology spillovers are distinct, albeit related, concepts, which should be treated as such in empirical analysis. The [Giroud et al. \(2012\)](#) criticism of the current literature is that it focuses on externalities from FDI rather than on identifying the direct effects of linkages between foreign and domestic firms. In this paper we address both of these issues by considering (i) the extent to which direct linkages between domestic and foreign firms lead to productivity improvements and (ii) whether such linkages explain FDI spillovers. In other words, we separate out productivity spillovers from FDI that are due to direct linkages from other externalities.

We use panel data from a specially designed survey of over 4000 manufacturing firms in Vietnam covering the 2009–2012 period. It allows us to directly identify supply chain linkages and technology transfers between foreign and domestic firms, using a two stage econometric approach. In the first stage we estimate productivity, and subsequently we explore the relationship between productivity and direct and indirect spillovers from FDI.

Our results provide evidence for positive indirect productivity spillovers from FDI firms in downstream sectors. Similarly, there is strong evidence to suggest that a dominance of foreign firms upstream has a negative impact on the productivity of downstream domestic firms. While these results are broadly consistent with the existing body of empirical evidence, our analysis adds a new dimension to the understanding of the nature of these spillovers. We find that direct forward linkages from foreign-invested input suppliers to domestic customers are positively related to productivity. Moreover, having a direct link with an upstream FDI firm (where the link is associated with a technology transfer) mitigates part of the negative externality from the dominance of wholly-foreign owned firms in upstream sectors. Our findings suggest that the standard measures used in the literature to capture FDI spillovers do not adequately account for the effects of direct linkages or technology transfers between foreign and domestic firms.

The remainder of this paper is structured as follows. [Section 2](#) provides an overview of related literature and some background on the Vietnamese context. [Section 3](#) outlines the empirical approach, while [Section 4](#) describes the data. [Section 5](#) presents results, and [Section 6](#) concludes.

2. Related literature and country context

The argument for state intervention to attract foreign investors hinges in part on the existence of positive externalities. Technology externalities from FDI can occur through a number of different mechanisms (see [Blalock and Gertler \(2008\)](#), [Kugler \(2006\)](#) and [Javorcik \(2004\)](#) for concise overviews of the various channels). Horizontal spillovers within sectors may arise when workers move from foreign-invested firms to domestic firms, bringing with them knowledge learned. Similarly, domestic firms may observe foreign-invested firms operating in their sector and copy the technologies used. It is generally agreed, however, that intra-industry externalities of this kind are unlikely to exist. Within sectors, foreign-invested firms compete with domestic firms and so have every incentive to prevent their embodied knowledge and technologies from leaking to their domestic competitors ([Javorcik, 2004](#)). Indeed, there is a large body of empirical literature that has been unable to find robust evidence for productivity gains accruing to domestic firms through horizontal spillovers.³

In contrast, spillovers between sectors may be more likely to occur. Spillovers through vertical linkages are desirable if the productivity gains exceed those internalized through deliberate arrangements between domestic and foreign firms. [Fig. 1](#) illustrates how technology spillovers from foreign firms to domestic firms in other sectors are defined.

Backward spillovers occur when domestic firms experience productivity improvements as a result of an increase in the presence of foreign firms in downstream sectors. Such spillovers are most likely to occur where there are direct backward linkages, i.e. when domestic firms that supply inputs to foreign-owned firms experience productivity improvements. This may happen through a number of different channels, the most likely being deliberate knowledge transfers from foreign firms to domestic input suppliers.⁴ It is also possible that firms which are not directly linked with foreign firms downstream might experience productivity improvements. This could be due to domestic suppliers having greater incentives to improve the quality of their inputs or the efficiency with which they are provided due to increased competition for foreign

² There is also a literature that explores the extent to which the absorptive capacity of firms matters for the realization of spillovers ([Giroud et al., 2012](#); [Marin and Bell, 2006](#)).

³ For recent examples see [Barrios et al. \(2011\)](#), [Blalock and Gertler \(2008\)](#), [Bwaly \(2006\)](#), [Damijan et al. \(2008\)](#), [Javorcik \(2004\)](#), and [Kugler \(2006\)](#), all of whom find no evidence of horizontal spillovers.

⁴ [Moran \(2001\)](#) uses a number of different case studies to show that deliberate technology transfers of this kind are common with foreign firms often offering, for example, technical assistance, management experience or quality assurance systems to their suppliers.

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