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Cross sectoral FDI spillovers and their impact on manufacturing productivity☆

Edvard Orlic[a,*], Iraj Hashi[b], Mehtap Hisarciklilar[b]

[a] Faculty of Management, Bournemouth University, 89 Holdenhurst Road, BH8 8EB, United Kingdom
[b] School of Business, Leadership and Economics, Staffordshire University, Leek road, ST4 2DF, United Kingdom

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ABSTRACT

This paper explores the relationship between FDI spillovers and productivity in manufacturing firms in five European transition countries. The novelty of our approach lies in exploring different mechanisms of horizontal spillovers and disentangling the impact of backward and forward vertical spillovers from services and manufacturing sectors. We rely on firm level data obtained from the Amadeus database and annual input-output tables. The results from dynamic panel model estimations reveal that local manufacturing firms benefit from the presence of foreign firms in upstream services, especially in the knowledge intensive services, and in downstream manufacturing sector. Demonstration effect is found to be negatively associated with domestic firms' productivity, while worker mobility and increased competition appear to be the main channels of horizontal knowledge diffusion. The firms' productivity is also influenced positively by human capital and intangible assets. Finally, we show that the direction and intensity of both vertical and horizontal spillovers depend on the absorptive capacity of domestic firms.

1. Introduction

FDI is often recognised as a catalyst for economic development; hence countries of Central and Eastern Europe have put considerable effort in attracting FDI through financial, fiscal and/or other incentives (Jindra & Rojec, 2014; OECD, 2005). The incentives offered to multinational corporations (MNCs) are based on the premise that FDI makes important contributions to economic development through either voluntary or involuntary knowledge transfer to local firms within and across industries, resulting in productivity improvements (Blomström & Kokko, 2001; Caves, 1974; Hallin & Holmstrom-Lind, 2012; Javorcik, 2004; Markusen & Venables, 1999). However, the empirical evidence has been rather inconclusive, with the estimated impact varying from positive for backward linkages to insignificant or even negative for horizontal and forward spillovers (Görg & Greenaway, 2004; Havránek & Iršová, 2011; Iršová & Havránek, 2013). Several reasons have been put forward to explain this ambiguity: the measurement of FDI spillovers (Barbosa & Eiriz, 2009; Barrios, Görg, & Strobl, 2011; Ben Hamida & Gugler, 2009; Driffield & Jindra, 2012), empirical methodologies employed (Görg & Strobl, 2001), the heterogeneity of domestic and foreign firms in terms of absorptive capacity and potential for spillovers (Blalock & Simon, 2009; Damijan, Rojec, Majcen, & Knell, 2013: Ha & Giroud, 2015; Javorcik & Spatareanu, 2011), the difficulty of disentangling unintentional knowledge spillovers from intentional knowledge diffusion (Smeets, 2008), and competition effects (Garcia, Jin, & Salomon, 2013).

Although a great deal of research has been devoted to understanding of FDI spillovers, some significant knowledge gaps remain. Most of the existing empirical literature has treated FDI spillovers as a black box and has settled so far to identify an overall net effect. Therefore, implications of the existing empirical studies for policy makers are not well understood due to a plethora of different results. In this paper we aim to disentangle the role of different spillover channels. To this end, we extend the traditional empirical framework by including different channels of horizontal spillovers and by exploring the role of services that might be responsible for significant forward spillovers due to their strong orientation towards the domestic market (Javorcik, 2007). Contrary to previous studies which limited FDI spillover analysis to either backward manufacturing (Blalock & Gertler, 2008; Damijan et al., 2013; Merlevede, Schoors, & Spatareanu, 2014) or forward services linkages (Arnold, Javorcik, & Mattoo, 2011; Fernandes & Paunov, 2012) we consider both sectors.

FDI in services now accounts for almost 65 per cent of the total worldwide inward FDI stock (UNCTAD, 2014). Despite the broad

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* Corresponding author.
E-mail addresses: eorlic@bournemouth.ac.uk (E. Orlic), I.Hashi@staffs.ac.uk (I. Hashi), M.Hisarciklilar@staffs.ac.uk (M. Hisarciklilar).

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consensus that the growth of services is crucial for economic growth and the development of other sectors (Francois, 1990; Eschenbach & Hoekman, 2006), little emphasis has been put on foreign firms in services. In addition, although the increasing role of services in economic output, employment and production processes at different levels of the value chain has been acknowledged (Hoekman & Mattoo, 2008; UNCTAD, 2008), spillovers from service sector firms to manufacturing customers and suppliers have been, with few exceptions, neglected (e.g. Arnold et al., 2011; Fernandes & Paunov, 2012; Mariotti, Nicolini, & Piscitello, 2013; Mariotti, Mutinelli, Nicolini, & Piscitello, 2015; Miozzo & Grimshaw, 2008; Miozzo, Yamin, & Ghauri, 2012).

There are several reasons why FDI in services may have beneficial effects on domestic firms' productivity. First, given the limited scope for services trade, it is assumed that opening services to FDI brings advanced technology, know-how and other advanced inputs that may improve the performance of downstream domestic firms. (Kox & Rubalcaba, 2007; UNCTAD, 2004). Moreover, many of the skills acquired by employees working for MNCs in services may be directly transferable to other sectors in the economy (Javorcik, 2007). Second, services are also direct inputs in the production function (Antonelli, 1999) and determine the productivity of factors of production, thus acting as a strong determinant of the competitiveness, innovation and growth (Francois & Wörz, 2008; Guerrieri & Meliciani, 2005; Hoekman & Mattoo, 2008). Third, knowledge intensive services (KIS) may particularly have positive spillover effects on other industries if MNCs are not able to fully internalize the market for technology (Arnold et al., 2011; Camacho & Rodriguez, 2007; Griliches, 1992; Mariotti et al., 2013, 2015).

CEEC offer an interesting case for the analysis of FDI spillovers due to the massive expansion of the service sector – which played a minor role under socialism (Gabrisch & Hölscher 2006) – and the recent increase in FDI in services that is particularly relevant for increased efficiency, competition and quality of their service sector. Furthermore, governments of these countries invested significant resources in attracting MNCs (Jindra & Rojec, 2014). However, to date there has been no systematic investigation of the potential benefits of FDI in services on the productivity of manufacturing firms in these countries. Hence, this study aims to inform policy makers about productivity implications of FDI so that they can identify the industries that provide the largest potential for technology spillovers and adjust their investment incentives accordingly. It also provides important information for the management of domestic firms – that in order to benefit from FDI spillovers, they need to invest and improve the quality of their human resources and intangible assets.

We contribute to the existing literature in several ways. First, we argue that prevailing measurement of vertical linkages does not allow proper identification of entire spillover benefits as it fails to differentiate between the channels through which spillovers occur. This is, to our best knowledge, the first study that investigates the spillover effects of foreign firms on the total factor productivity of local manufacturing firms by using four measures of vertical FDI spillovers: two related to backward linkages and two to forward linkages, each arising from manufacturing and service sectors, respectively. This enables us to shed more light on the customer-supplier relationship between domestic and foreign firms in two main sectors of the economy. Second, drawing on the notion of absorptive capacity (Cohen & Levinthal, 1990; George & Zahra, 2002; Narula & Marin, 2003), which highlights that ability of local firms to absorb the external knowledge depends on the interaction between the mechanisms by which they occur and the existing absorptive capacity (Blalock & Simon, 2009; Sanchez-Sellero, Rosell-Marinez, & Garcia-Vasquez, 2014), we evaluate the moderating role of domestic firms' investment in intangible assets and human capital. By using interaction terms between foreign presence and human capital, we explore the additional channel of horizontal spillovers related to worker mobility. Third, we investigate the heterogeneity of forward linkages in services which depends on the knowledge intensity of the service sector.

The analysis is based on firm level data in five small transition economies[1] (the Czech Republic, Estonia, Hungary, Slovakia and Slovenia) for the period 2002–2010. These countries are characterised by strong penetration of foreign investment. Unlike other empirical studies, we use annual input-output tables for the calculation of spillover measures thus relaxing the restrictive assumption of fixed customer-supplier relationships at industry level. Our empirical strategy is based on a two-stage approach. In the first stage, we estimate firms' total factor productivity (TFP) using a semi-parametric method. In the second stage, we explore productivity spillovers using a dynamic model that tackles the problem of endogeneity.

The next section explains the motivation for investigating FDI spillovers in selected Central and Eastern Europe Countries (CEECs) and justifies our focus on vertical spillovers from FDI in services. In Section 3, we review the current literature and relevant theoretical background, and formulate our hypotheses. Section 4 explains the variables used, the data and the empirical methodology, and presents the baseline empirical model. Section 5 details empirical findings and discusses the results of alternative model specifications. The last section contains concluding remarks including policy implications and suggestions for further research.

2. Services FDI in CEEC

At the beginning of the 1990s, the CEECs went through a process of transition from centrally planned to market oriented economies. FDI was one of the main drivers of this process, and constituted the main element of industrial policy in these countries (Myant & Drahokoupil, 2010). The reliance on FDI was especially pronounced in small CEECs (except Slovenia) where it was expected to bring the necessary capital, technology and know-how in an environment characterized by low investment and savings. Although foreign investors had to deal with political and economic instability, weak institutional framework and low quality of infrastructure, they were attracted by huge unsaturated market (e.g. Poland), skilled but cheap labour and privatization opportunities. MNCs successfully restructured the companies they acquired (Djankov & Murrell, 2002), increased their efficiency (Jindra, 2006) and international competitiveness (Rugraff, 2006). By early 2000 s the increased integration of CEECs in Global Value Chains, especially into German automotive supply chain, led to increased embeddedness of foreign subsidiaries into local economies and promoted the upgrading of domestic manufacturing suppliers through the creation of backward linkages (Jindra, Giroud, & Scott-Kennel, 2009) and spillovers associated with it (Damijan et al., 2013; Merlevede et al., 2014).

In the first decade of transition, foreign service providers undertook mainly horizontal demand-led investments (Hardy, Sass, & Pollakova-Fifekova, 2011) that generally involved joint ventures or takeovers of domestic firms to draw on domestic firms' expertise and access to their clients (Dicken, 2003; Dossani & Kenney, 2007). However, with increased fragmentation and reallocation of production activities, many Western MNCs have moved their service operations to CEECs, the bulk of it going to the Czech Republic, Hungary and Poland to achieve cost efficiencies (Sass, 2008). These countries emerged as locations for outsourcing and offshoring of specific business functions (Fillipov & Kalotay, 2009).

Given the far reaching organizational changes in MNCs over the past decade, embedding domestic firms into production networks and fostering network-type linkages that are based on knowledge sharing is high on policy agenda of many governments in CEECs. In this context, services FDI offer opportunities for local firms to participate in the

[1] There are a few other small transition economies in Central and Eastern Europe, notably the Baltic states, but the unavailability of full data for these countries restricts the analysis to the five CEE countries.