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## Subsidiary roles, vertical linkages and economic development: Lessons from transition economies

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## ABSTRACT

Vertical supply chain linkages between foreign subsidiaries and domestic firms are important mechanisms for knowledge spillovers, contributing to the economic development of host economies. This paper argues that subsidiary roles and technological competences affect the extent of vertical linkages as such as well as their potential for technological spillovers. Using survey evidence from 424 foreign subsidiaries based in transition economies, we tested for the effect of subsidiaries' autonomy, initiative, technological capability, internal and external technological embeddedness on the extent and intensity of forward and backward vertical linkages. The evidence supports our main argument that the potential of technology diffusion via vertical linkages depends on the nature of subsidiary roles. We discuss the implications for transition as well as other developing countries.

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### 1. Introduction

Through technology transfer, spillovers and linkages, multinational enterprises (MNEs) are of critical importance for economic development, especially for developing and transition economies (Hoekman & Javorcik Smarzynska, 2006; Ivarsson & Alvstam, 2005; Kugler, 2006; UNCTAD, 2001). A widely supported explanation for this is that MNEs possess superior technological and managerial advantages, and when this knowledge is diffused to local firms, it enhances endogenous firms' own capabilities (Giroud, 2003; Hoekman & Javorcik Smarzynska, 2006; Lall & Narula, 2004). However, this is not an automatic process;

for instance, the potential for linkages and spillovers has been linked to individual subsidiaries' objectives and activities (Cantwell & Mudambi, 2000; Marin & Bell, 2006).

Studies suggest that the developmental impact of foreign subsidiaries via vertical linkages is highest when these firms demonstrate enhanced autonomy and initiative, and when they possess technological competencies (Cantwell & Iguchi, 2005; Giroud & Mirza, 2006; UNCTAD, 2001: 137). There is limited evidence in the literature on how subsidiaries' roles or strategies affect linkage creation in developing countries (Meyer, 2004) or indeed, in developed countries (Scott-Kennel, 2007). The aim of this paper is to contribute to the literature by investigating the relationship between subsidiaries' roles, technological competences and linkages formation in developing transition economies, thereby leading to a better understanding of when and how foreign firms contribute to the local economy and local firms' development.

This paper offers an analysis of a unique dataset on 424 foreign subsidiaries based Estonia, Slovenia, Hungary, Slovakia and Poland with in-depth data on subsidiary

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characteristics and vertical linkages to the domestic economy. We characterise subsidiary roles by the degree of autonomy in selected business functions and by the level of initiative in relation to changes in the product scope. Our focus is on technological sources of subsidiaries, differentiating between their own capability, their technological embeddedness with the MNE network as well as with the external environment in the host economy. Vertical linkages are defined as backward linkages with the local supply industries and forward linkages with customers; with a distinction between the extent of linkages formation (or how much is being bought or sold locally) and linkages intensity (or the developmental potential for local firms). With a series of OLS regression, we test for the effect of subsidiary roles, technological competences and vertical linkages. We account also for host country, industry and other firm specific effects in the corresponding estimations.

The results suggest that the potential for technology diffusion via vertical linkages depends on the nature of subsidiary roles. Higher levels of subsidiary autonomy, initiative and own technological capability increases the potential for technology diffusion to local customers. In contrast, potential diffusion to local suppliers is linked to own technological capability and intense technology sourcing from the MNE. Subsidiaries endowed with a product development mandate tend to form fewer vertical linkages locally.

Given that the evidence on vertical technological spillovers in transition economies is very mixed (see Jindra, 2006), our results hint at some possible explanatory variables at subsidiary level. These have to be put into perspective by consideration of the far reaching organisational changes in MNEs over the past few years, whereby often key suppliers with regional or global reach dominate linkages and foreign subsidiaries tend to be tightly controlled and specialised. On the other hand, MNE entry into transition economies is fairly recent and economic development ongoing. Therefore, there might be scope for changes to subsidiary roles in terms of attaining more central positions within the MNE network under the condition that technological capabilities are going to be upgraded. This is also dependent upon the technological development of local firms as the strength of external technological network in the host economy can lead to an enhanced position of the subsidiary in the MNE's internal network (Belderbos, Capannelli, & Fukao, 2001; Cantwell & Iguchi, 2005; Hood & Young, 2000; Javorcik, 2004; Scott-Kennel & Enderwick, 2004).

Our evidence on the link between subsidiary roles and technology diffusion relates to transition countries, which in the developing country context form a distinct group due to above average industrial employment, human capital and physical infrastructure compared to countries with similar income levels (Gros & Suhrke, 2000; Yamin & Sinkovics, *in press*). Many transition economies are developing economies, but not all developing countries are in transition from a centrally planned to a market system (Mirza & Freeman, 2007). The countries under study in this paper are still in a development process and belong to the middle-income group (World Bank, 2007), except for Slovenia. Because the

potential for vertical linkages increases with the level of development of the host economy (Giroud, 2003), middle-income countries are best suited for our study. This analysis on the relationship between subsidiary roles and vertical linkages in transition economies is further relevant to other lower and upper middle-income economies in the developing world.

The following section outlines briefly key developments in transition countries of Eastern Europe. This is followed by a review of literature on the impact of MNEs via vertical linkages on the host economy. We then argue in detail how subsidiary roles are related to vertical linkages and derive corresponding hypotheses. This part is followed by sections on methodology, estimation results, discussion of key findings, and finally, conclusions, policy implications and recommendations for future research.

## 2. Vertical linkages by MNEs on host economies

### 2.1. Framing vertical linkages

Many studies point to the technological superiority of the MNE and its unique competitive advantages to explain why the vertical linkages they create differ from those created by indigenous firms (Javorcik, 2004; Scott-Kennel & Enderwick, 2005), unless those indigenous firms are MNEs themselves, in which case spillover on the home economy can be greater than that of foreign MNEs (Castellani & Zanfei, 2006). Vertical linkages can be assumed to promote economic development (Hoekman & Javorcik Smarzynska, 2006; Kugler, 2006; Lall, 1996; Moran, Graham, & Blomström, 2005; Scott-Kennel & Enderwick, 2005), particularly in transition economies, which exhibit high participation of MNEs in economic activity (Campos & Kinoshita, 2002; Günther, 2005; Holland, Sass, Benacek, & Gronicki, 2000; Uhlenbruck, 2004).

*Vertical linkages* embody all value chain relationships created between MNE subsidiaries and local firms in the host economy. The impact of MNEs on the local economy through vertical linkages will occur predominantly amongst industries (*inter-industry* impact) rather than within industries (*intra-industry* impact) (Kugler, 2006). Vertical linkages can be further categorised into backward and forward linkages. *Backward linkages* include all upstream relationships with local one-off suppliers, key suppliers or subcontractors (UNCTAD, 2001). Local suppliers gain more than the pecuniary benefits of selling their products to MNEs. They also benefit from the inter-firm exchange of technological and managerial knowledge (Giroud, 2007). Although MNEs are reluctant to compromise firm-specific assets through such exchanges with local competitors, there are mutual benefits from the transfer of selected knowledge to local suppliers of intermediate products (Hoekman & Javorcik Smarzynska, 2006).

*Forward linkages* include all downstream relationships developed between foreign subsidiaries and customers, (sales) agents and distributors in a host economy. Domestic firms can benefit from spillovers and transfer of knowledge embodied in products, processes and technologies of the MNE. Many enhance their productivity as a result of access to and/or use of new enhanced products and inputs offered

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