Multinational Corporation Affiliates, Backward Linkages, and Productivity Spillovers in Developing and Emerging Economies

Evidence and Policy Making

Jacob A. Jordaan
Willem Douw
Christine Zhenwei Qiang
Abstract

Recent research on productivity spillovers from affiliates of multinational corporations in developing and emerging economies finds that backward linkages from affiliates of foreign-owned firms to local suppliers constitute the main channel transmitting productivity spillovers. This finding has important policy implications, given that host economy governments often spend considerable resources on attracting multinational corporation investments and promoting their impact on technological development and economic growth. This paper conducts a new and comprehensive survey of recent empirical studies that focus on the drivers and impacts of backward linkages between multinational corporation affiliates and their local suppliers. The literature survey reveals that several characteristics of multinational corporation affiliates and domestic firms, host economy conditions, and various mediating factors influence the level of use of local suppliers, the nature and degree of technology dissemination, and the materialization of productivity spillovers among domestic firms. These findings are used to identify the main areas where policy making can be effective. The paper discusses various types of soft or light-handed industrial policies that host economy governments can design and implement to foster the extent of linkages between multinational corporations and local suppliers, facilitate technology dissemination, and enhance productivity spillovers among domestic firms.

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Multinational Corporation Affiliates, Backward Linkages, and Productivity Spillovers in Developing and Emerging Economies: Evidence and Policy Making

Jacob A. Jordaan, Willem Douw, Christine Zhenwei Qiang

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Key Words: FDI, MNC affiliates, backward linkages, local suppliers, productivity spillovers, policy making
1. Introduction

The attraction of foreign direct investment (FDI) constitutes a central component of the development strategies of most developing and emerging economies.¹ The reason why is because the entry and operations of MNC affiliates can generate a variety of economic benefits, generating higher levels of capital investment, introducing new industrial activities, and creating direct and indirect employment (Dunning and Lundan 2008; Barba-Navaretti and Venables 2004). By locating components of global value chains (GVCs) in different countries and regions in the world economy, MNCs provide domestic firms with opportunities to link into international markets (Taglioni and Winkler 2016). Furthermore, important dynamic effects can occur when domestic firms learn from and adopt technologies incorporated into MNC affiliates, thereby upgrading their capabilities and benefitting from productivity spillovers. It is this latter effect that is increasingly seen as the most important impact of FDI, fostering technological development and long-term growth in host economies (Keller 2010; Alfaro 2017).

In line with this growing understanding, the past few decades have seen a surge of empirical studies on productivity spillovers from MNC affiliates in a variety of host economy settings. Despite the popularity of development policies attracting MNC investments, the evidence on productivity spillovers is mixed and inconclusive, especially for horizontal spillovers between FDI and domestic firms that operate in the same industries (Irsova and Havranek 2013). In comparison, findings on vertical productivity spillovers between MNC affiliates and domestic firms that supply inputs to or purchase inputs from these affiliates show that that this type of spillover occurs more frequently. In particular, a number of studies identify positive productivity effects between MNC affiliates and domestic firms operating in industries that supply inputs, suggesting that supply linkages between local suppliers and their foreign-owned client firms lead to the dissemination of technologies that foster performance improvements among domestic firms (Havranek and Irsova 2011; Jordaan 2016).

However, the evidence also indicates that vertical productivity spillovers are specific to a given context and do not materialize automatically. Previous surveys have identified a number of factors that influence the materialization of productivity spillovers, but have focused mainly on drivers of horizontal spillovers.² This paper conducts a new and comprehensive survey of empirical evidence focusing especially on drivers of productivity spillovers that occur between MNC affiliates and local

¹ In this paper, a multinational company (MNC) refers to a company with one or more affiliates located in countries (host economies) other than where the company’s headquarters are located (home economy). FDI or MNC affiliates refer to the affiliates located in host economies; local and domestic firms refer to companies that are indigenous to the host economies.

² For studies that focus on horizontal FDI spillovers, see, for example, Aitken and Harrison (1999), Keller and Yeaple (2009), Abraham, Konings, and Sloomakers (2010), and Monastiriotis and Alegra (2011).
suppliers, constituting the type of spillovers that is economically more important in most developing and emerging host economies than spillovers within a single industry.

Another important feature of the survey is that, by focusing on backward linkages, it provides an opportunity to examine empirical evidence from different research strands that are normally not covered in the same survey (Jordaan 2016). In particular, empirical research in the fields of development studies and economic geography, usually based on case studies or small-scale purpose-built surveys, often provides detailed information on the scale and nature of linkages between MNC affiliates and local suppliers (see, for example, Ivarsson and Alvestam 2010; Jordaan 2017). Research in the fields of economic development and international economics is characterized by the use of large firm-level data sets to identify the scale and nature of productivity spillovers, in the form of statistical associations between the presence of MNC affiliates and productivity of domestic firms in industries that supply inputs (see, for example, Javorcik 2004; Blalock and Gertler 2008). In combination, these research strands provide a particularly rich set of empirical findings that allow us to study drivers of the extent and nature of backward linkages and their spillover impacts.

The findings of the survey provide new insights and recommendations for the public policy choices that host economy governments are facing. This is important, as they often dedicate considerable resources to attract MNC investments, facilitate the operations of MNC affiliates, and help domestic firms create supply linkages with foreign firms. Host economy governments are searching for new policy measures, in line with the growing acceptance of the notion that restrictive and interventionist policies aimed at influencing the behavior and impact of MNC affiliates are ineffective and often create detrimental economic effects (Battat, Frank, and Shen, 1996; Stone, Messen and Flaig, 2015). Instead, governments need to design and implement a variety of “soft” (Harrison and Rodriguez-Clare 2010) or “light-handed” (Taglioni and Winkler 2016) industrial policies, within the context of creating and facilitating open and liberalized economic environments. Our survey will identify the main areas that government policy making needs to focus on and the types of policies that can promote economic development by facilitating the extent and productivity impact of linkages between MNC affiliates and local suppliers.

The paper is constructed as follows. Section 2 discusses the concept of productivity spillovers and the various channels that transmit these effects. Section 3 presents the key findings from our survey of empirical studies on MNC sourcing linkages and their effects. This section focuses in particular on how characteristics of MNC affiliates and domestic firms and various host economy conditions and mediating factors influence the degree to which MNC affiliates use local suppliers, the nature and degree of technology dissemination, and the materialization of productivity spillovers.
among local suppliers. Section 4 utilizes the findings from the survey to discuss various types of policies that host economy governments can implement to influence beneficial processes related to attracting suitable MNC investments, their creation of linkages with local suppliers, technology dissemination, and productivity spillovers. Section 5 summarizes the paper and discusses suggestions for further research.

2. MNC Affiliates and Productivity Spillovers

Host economies can experience productivity increases from the entry and operations of MNC affiliates in several ways. First, a host economy’s aggregate productivity can increase when MNC affiliates use resources more efficiently, facilitated by their use of new and modern technologies. Second, MNC affiliates can change demand or supply conditions in host economy markets, triggering changes in conduct among domestic firms that result in productivity improvements (pecuniary externalities) (Jordaan 2016). Third, to some extent, the technologies that are incorporated into MNC affiliates constitute public goods, allowing domestic firms to learn from and adopt these technologies (Blomström and Kokko 2003). The positive productivity effects that result from the adoption and implementation of technologies by domestic firms represent technological externalities, as they are not captured by market mechanisms (Blomström and Kokko 1998).

Productivity spillovers that involve the dissemination of new technologies to domestic firms can occur through various channels (Görg and Greenaway 2004; Smeets 2008). One channel is the demonstration effect, whereby domestic firms observe and learn about new technologies used by foreign firms. Such learning and imitation effects are often facilitated by informal face-to-face contacts, meetings with business organizations, and the dissemination of information through trade journals and industry organizations (Blomström and Kokko 1998). Another type of demonstration effect can occur in the form of market access spillovers, whereby domestic firms use knowledge and experience that they obtain informally from MNC affiliates to start exporting or to increase their exporting activities (Kneller and Pisu 2007).

The second channel consists of processes of labor turnover or labor mobility between firms. Employees of MNC affiliates are likely to gain extra skills from company training programs and learn about new and advanced technologies. When such workers subsequently change employer and start

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3 We use a broad definition of the concept of technology, capturing modern and advanced production processes, knowledge and innovations, product information and standards, organizational practices, and skills, etc. All these elements create productivity spillovers when their adoption and implementation by domestic firms results in performance improvements.
working for domestic firms, these firms can benefit from the knowledge and skills that the workers incorporate. An example of this effect is provided by Görg and Strobl (2005), who estimate drivers of productivity for a sample of manufacturing firms in Ghana and identify a productivity premium among firms whose owners worked for MCN affiliates earlier on in their career. Another example is presented by Poole (2013), who uses a matched establishment-worker data set for Brazil and identifies positive productivity effects among domestic firms that employ workers who were previously employed by MNC affiliates.

The third channel consists of inter-firm linkages between MNC affiliates and domestic firms that supply inputs to (or purchase inputs from) the affiliates. These inter-firm linkages are conducive to the creation of productivity spillovers for various reasons. First, MNC affiliates exercise stronger demands on local suppliers regarding the quality of inputs, their cost-effectiveness, specifications, and so on. Even in the absence of technology dissemination, this can lead to productivity effects when domestic firms respond to these stringent demands by improving their performance. Second, input markets are often characterized by frequent contacts and the sharing of information between buyers and sellers, facilitating demonstration effects and unintentional technology flows to domestic firms (UNCTAD 2001). Third, MNC affiliates are often actively engaged in providing support to their suppliers and customers, fostering technology dissemination and productivity spillovers (Jordaan 2016; UNCTAD 2001). An example of this is provided by Jordaan (2017) who presents findings from a survey in northeastern Mexico showing that MNC affiliates provide a variety of types of support to their local suppliers, which according to these suppliers has been very important in generating performance improvements.

The first waves of quantitative FDI spillover studies were concerned with the econometric estimation of intra-industry (horizontal) spillovers, linking the presence of MNC affiliates to productivity of domestic firms operating in the same industries. The evidence on the general prevalence of these intra-industry spillovers is very mixed and inconclusive, ranging from negative to insignificant to positive (Görg and Greenaway 2004; Smeets 2008). Furthermore, findings from studies that apply meta-analysis regression techniques on large sets of empirical estimates show that on average estimates of intra-industry spillovers are insignificant or economically not important (Havranek and Irsova 2011; Irsova and Havranek 2013).

More recently, studies have started to incorporate estimating for the presence of inter-industry (vertical) productivity spillovers between industries. These spillovers can arise through backward linkages between MNC affiliates and domestic input suppliers and forward linkages between MNC affiliates supplying inputs to domestic client firms. Following the original contribution by Javorcik
(2004), a number of studies present findings that domestic firms operating in industries that supply inputs to industries with a strong FDI presence experience positive productivity effects (see, for example, Blalock and Gertler 2008; Javorcik and Spatareanu 2008; Jordan 2008a; Du, Harrison, and Jefferson, 2014). Findings drawn from meta-analyses on sets of estimates of inter-industry spillovers also show that, in comparison to insignificant intra-industry spillovers, inter-industry productivity spillovers are an important phenomenon. When comparing findings on productivity spillovers through forward and backward linkages, the evidence indicates that productivity spillovers among local suppliers are far more prevalent (Havranek and Irsova 2011). This also indicates that backward linkages between MNC affiliates and local firms constitute the main channel transmitting productivity spillovers.

The convergence of the empirical evidence toward identifying backward linkages as the main channel underlying productivity spillovers justifies a new survey of empirical studies that focus especially on this channel. To structure the survey, we separate the process that underlies productivity spillovers through backward linkages into three (related) components, as depicted in figure 1. The first component consists of the level of local sourcing by MNC affiliates. Only when there is a sufficient amount of MNC investments that interact with local suppliers will there be a meaningful potential for productivity spillovers to occur. The second component focuses on the scope for productivity spillovers, which is related to the nature of the linkages that MNC affiliates create with local suppliers. In particular, this component concentrates on the extent and types of technologies that are transmitted by the foreign firms to their suppliers. The third component relates to the degree that the effects of linkages and technology dissemination materialize in the form of productivity spillovers among local suppliers.
3. Drivers of Backward Linkages, Technology Dissemination, and Productivity Spillovers

To identify relevant studies for the survey, we conducted an extensive literature search, selecting studies that cover host economies in Africa, Asia, Eastern Europe, and Latin America. The main selection criteria that we applied is that the studies need to examine inter-firm linkages between MNC affiliates and domestic firms and/or provide econometric evidence of inter-industry productivity spillovers. The evidence on the drivers of backward linkages and their impacts can be separated into findings on the effects of characteristics of MNC affiliates, characteristics of domestic firms, and several host economy conditions and mediating factors. Table 1 summarizes our key findings on the impact of these sets of factors on the extent of backward linkages, technology dissemination, and productivity spillovers.

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4 We focus on productivity spillovers, constituting the type of effect examined by most studies. For examples of studies identifying market access spillovers among local suppliers, see, for example, Mayneris and Poncet (2013) and Chen, Sheng, and Friday (2013). Examples of studies that find that MNC affiliates positively affect the innovative activities of suppliers include Falk (2015) and Görg and Seric (2016).

5 We conducted our literature search with Scopus and Google Scholar, using search terms including “MNC local sourcing,” “MNC technology dissemination,” “FDI vertical spillovers,” “FDI inter-firm linkages,” “FDI productivity spillovers,” and “MNC supportive linkages.” We confined our literature search to empirical studies that were published—either in academic journals or in reputable working paper series—during the period 2000–19. When studies examine both horizontal and vertical spillovers, we focus on the findings that relate to inter-industry effects. Although we did not apply any restrictions to our search terms regarding the types of economic sectors, most studies analyze operations and effects of MNC affiliates in manufacturing industries.
### Table 1. Key Factors Influencing Backward Linkages, Technology Dissemination, and Productivity Spillovers

<table>
<thead>
<tr>
<th>Affiliates of multinational corporations (MNCs)</th>
<th>Use of local suppliers</th>
<th>Technology dissemination</th>
<th>Productivity spillovers</th>
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<tbody>
<tr>
<td><strong>MNC-related factors</strong></td>
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<td>- Investment motive (market seeking versus efficiency seeking; diverse findings)</td>
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<td>- Entry mode</td>
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<td>- Percent of foreign ownership</td>
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<td>- Level of autonomy of affiliate</td>
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<td>- Nationality</td>
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<td>- Cultural and institutional proximity to host economy</td>
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<tr>
<td><strong>Other firm characteristics</strong></td>
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<tr>
<td>- Size</td>
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<td>- Age</td>
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<td>- Production processes</td>
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<td><strong>Domestic suppliers</strong></td>
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<td>Firm size</td>
<td>Absorptive capacity</td>
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<td>- Unavailability of inputs</td>
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<td>- Experience with supplying MNC affiliates</td>
<td>- Firm size</td>
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<td>- Quality of inputs</td>
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<td>- Experience with international markets</td>
<td>- Export status</td>
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<td>- Cost competitiveness</td>
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<td>- Commitment to develop linkages with foreign-owned clients</td>
<td>- human capital</td>
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<td>- Reliability of supply</td>
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<td>- Selection processes among domestic firms</td>
<td>- R&amp;D involvement</td>
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<td>- Limited scale</td>
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<td>- Employment growth</td>
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<td><strong>Host economy conditions and mediating factors</strong></td>
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<td>Nature of input-output market</td>
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<td>- Level of economic development</td>
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<td>- Participation in global value chains</td>
<td>- Geographical proximity between affiliates and domestic firms</td>
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<td>- Geographical proximity between MNC affiliates and domestic firms</td>
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<td>- Access to finance for suppliers to make investments that support the positive impact of technology dissemination</td>
<td>- Human capital</td>
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<td>- Sector</td>
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<td>- Trade openness</td>
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<td>- Infrastructure</td>
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<td>- Size of host economy</td>
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<td>- Quality of institutions (e.g. contract enforcement, red tape)</td>
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<td>- Access to finance</td>
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### 3.1. Characteristics of MNC Affiliates

Several characteristics of MNC affiliates influence local sourcing, technology dissemination, and productivity spillovers.

*The investment motive.* MNC affiliates may be motivated to operate in a host economy to penetrate and serve the host economy market (market-seeking FDI) or to exploit factor costs differences
between countries (efficiency-seeking FDI), or as a combination of these two motives. Several studies present findings showing that MNC affiliates that sell (most of) their output in host economy markets are characterized by higher levels of local sourcing (Giroud, Jindra, and Marek, 2012; Jindra, Giroud, and Scott-Kennel, 2009; Kiyota et al. 2008). Explanations for this finding include that input requirements and specifications may be less stringent when MNC affiliates produce for host economy markets compared to international markets and that the use of local suppliers makes it easier to adjust products to host economy conditions.  

When it comes to the impact of the investment motive on technology dissemination and productivity spillovers, findings appear somewhat conflicting. Several studies find that efficiency-seeking MNC affiliates are significantly more supportive of their local suppliers (see, for example, Gentile-Ludecke and Giroud 2012; Jindra, Giroud, and Scott-Kennel, 2009). Producing for international markets often entails more stringent product requirements and specifications. When efficiency-seeking MNC affiliates use local suppliers, they may be more inclined to offer support to ensure the quality and cost-competitiveness of local inputs. However, various econometric studies find that MNC affiliates that sell (a substantial share of) their output in host economy markets create larger productivity spillovers (see, for example, Syeda 2016; Xu and Sheng 2012; Le and Pomfret 2011). An explanation for this finding is that market-seeking FDI uses more local suppliers, increasing the exposure of domestic firms to modern technologies. Also, it may be that technologies that are used by this type of MNC affiliate are more suited to host economies, facilitating their absorption and application by local firms.

Mode of entry and percentage of foreign ownership. Findings on the effects of these two dimensions are more uniform. MNC affiliates with some level of host economy participation (such as joint ventures) are commonly found to use more local suppliers. Sanchez-Martin, De Pinies, and Antoine (2015) use firm-level data from the World Bank Enterprise Survey (WBES) for a large number of developing countries and identify a negative effect of the percentage of foreign ownership of MNC affiliates on the percentage of inputs sourced in host economies. Wei et al. (2012) and Amendolagine et al. (2019) report a similar negative effect for samples of firms in China, Sub-Saharan Africa, and Vietnam.

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6 There are recent indications that the effect of the investment motive may be weakening or becoming less clear. One issue is that the level of industry aggregation that is used in studies can affect the classification of MNC affiliates as horizontal or vertical FDI (Alfaro and Charlton 2009). Another issue is that an increasing number of MNC affiliates have both market-seeking and efficiency-seeking characteristics, subject to variation across industries and regions in the world economy (Baldwin and Okuno 2014).
Similarly, Jindra, Giroud, and Scott Kennel (2009) and Amendolagine et al. (2019) find for Eastern Europe and Sub-Saharan Africa that the percentage of foreign ownership is negatively associated with the provision of support, suggesting that some level of host economy participation in MNC affiliates facilitates supportive linkages. In line with these findings, evidence from econometric studies shows that fully foreign-owned MNC affiliates create smaller positive productivity spillovers compared to affiliates with some level of host economy participation (Javorcik 2004; Merlevede, Schoors, and Spatareanu 2014; Javorcik and Spatareanu 2008).

**The level of local sourcing.** This factor can also promote technology dissemination. The use of local suppliers generates economic benefits for MNC affiliates because it lowers costs of transportation and communication and increases flexibility. MNC affiliates are therefore often willing to provide support to local suppliers when they perceive that doing so allows them to obtain such benefits. Overall, the evidence shows that local sourcing exercises positive effects on technology dissemination (see, for example, Jordaan 2011a; Liao and Wei 2013). However, the relationship is often more nuanced. Several studies present evidence that the positive effect on technology transfers becomes smaller when the level of use of suppliers has reached a certain level (Saliola and Zanfei 2009; Franco, Sanfilippo, and Seric 2015; Giroud, Jindra, and Marek 2012). An explanation for these findings is that after some level of local sourcing is established, technological support is no longer required to ensure the quality and cost-competitiveness of local suppliers. Also, levels of local sourcing may be high and levels of supportiveness may be low in cases where MNC affiliates source standard and routine low value added inputs from local suppliers, as suppliers are less likely to need support to supply these types of inputs (Amendolagine et al. 2019).

**The level of autonomy with which affiliates operate.** Affiliates of MNCs that operate centralized sourcing policies are usually characterized by low levels of local sourcing, as evidenced by case study findings on the automotive industry in the Czech Republic (Pavlinek and Zizalova 2016). Affiliates that are allowed to operate with more freedom and greater flexibility tend to use more local suppliers and are able to benefit from opportunities that arise when local supplier bases improve (UNCTAD 2001). Survey findings for several Eastern European countries indicate that MNC affiliates with a relatively high level of autonomy over technological business functions (Giroud, Jindra, and Marek 2012) or supply, logistics, and product development (Jindra, Giroud, and Scott-Kennel 2009) are also characterized by higher levels of local sourcing. Similarly, a high level of autonomy fosters the provision

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7 Foreign participation is important, as shown in a study by Jordaan (2013), who reports results from a survey among MNC affiliates and domestic producer firms in northeastern Mexico, showing that firms with foreign participation are significantly more involved in providing a variety of types of support to their suppliers than domestic firms.
of support to local suppliers, as evidenced by survey findings for China by Liao and Wei (2013) and Poland by Gentile-Ludecke and Giroud (2012).

The nationality or country/economy of origin of MNC affiliates. This factor can affect the use of local suppliers and productivity spillovers in various ways. Wei et al. (2012) report that affiliates from Hong Kong SAR, China; Macao SAR, China; Taiwan, China; and Singapore source more local inputs in China compared to MNC affiliates from other countries, suggesting that cultural proximity facilitates the use of local suppliers. Ni et al. (2017) estimate productivity spillovers among Vietnamese firms and find that only MNC affiliates of Asian origin generate significant effects.

However, it may also be the case that MNC affiliates from home economies located far away from their host economies use more local suppliers, as high transportation costs can prevent the use of suppliers located in the home economies (Rodriguez-Clare 1996). This is in line with findings by Amendolagine et al. (2019) for Sub-Saharan Africa that show that the distance between the MNC affiliates’ home and host economies has a positive effect on local sourcing. It also provides an explanation for findings presented by Javorcik and Spatareanu (2011) for Romania that only MNC affiliates from the United States create significant productivity spillovers. Related to this, Javorcik, Lo Turco, and Maggioni (2018) find in their study on Turkey that only MNC affiliates originating from high-income home economies generate positive productivity spillovers. This finding suggests that affiliates from high-income countries have larger technological capabilities that increase the scope for positive externalities.8

3.2. Characteristics of Domestic Firms

Unavailability of inputs. A key factor that many studies find limits the use of local suppliers by MNC affiliates is the unavailability of particular inputs. As for inputs that can (potentially) be sourced from local suppliers, MNC affiliates often report that various characteristics of these suppliers limit their degree of local sourcing (UNCTAD 2011; World Bank 2018). For example, MNC affiliates operating in Vietnam (Franco, Sanfilippo, and Seric2015) and MNC affiliates operating in the automotive industry in the Czech Republic (Pavlinek and Zizalova 2016) indicate that the low quality of local inputs,

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8 Several other firm characteristics that are not related to affiliates being foreign-owned are found to be important. Firm size tends to exercise a negative effect on the use of local suppliers, as the scale of input demand from large firms often exceeds the capacity of local suppliers (UNCTAD 2001). Lenaerts and Merlevede (2015) use this argument to explain their findings for Romania that large MNC affiliates do not create productivity spillovers. However, large firms are more likely to provide support to their suppliers, as they possess more resources to do so. Age or experience has a positive effect on the level of local sourcing and the provision of support, as it takes time for firms to identify and establish business linkages with suitable domestic firms (Kiyota et al. 2008). The nature of production processes is also important, as there can be substantial differences between sectors in levels of local sourcing and supportive linkages (Sanchez-Martin, De Pinies, and Antoine(2015); Jordaan 2011a).
uncompetitive prices, and unreliable delivery constitute important reasons to import inputs instead of using local suppliers.

Most evidence as to how characteristics of local suppliers restrict the level of local sourcing is based on the perception of foreign firms. An exception is a study (Jordaan 2011b) that utilizes survey information obtained from a random sample of local suppliers of two types of firms: MNC affiliates and large domestic producer firms in northeastern Mexico. For 10 of 11 different problems that local suppliers experience with their client firms, suppliers of MNC affiliates indicate that they experience these problems more frequently. Most suppliers of MNC affiliates indicate that their client firms have very strict price demands. Other problems that these suppliers often encounter include an inflexibility to change product specifications, the need for client-specific investments, and rigid demands regarding product quality.

Improvements in performance triggered by problems with inputs (pecuniary externalities). Although these problems may limit the use of local suppliers, they may also trigger changes in conduct and foster technology dissemination, culminating in productivity spillovers. Positive pecuniary externalities occur when domestic firms respond to stringent input demand conditions by improving their performance. Good examples of this effect are provided by Atkin, Khandelwal, and Osman (2017) and Godart and Görg (2013). The latter use WBES data for more than 1,000 domestic firms in a number of emerging economies to estimate drivers of productivity, including variables that capture whether domestic firms supply to MNC affiliates, whether their client firms have put pressure on them to lower production costs and/or supply better products, and an interaction term between having foreign-owned client firms and experiencing pressure to improve. Their findings show that of these three control variables, only the interaction term carries a significant and positive coefficient, suggesting that the strict requirements that foreign firms apply to their demand for inputs result in positive productivity effects among domestic suppliers.

Support to local suppliers from MNC affiliates. As for technology dissemination, MNC affiliates often provide support to (potential) local suppliers when they perceive that doing so provides them with higher-quality and more cost-competitive inputs. A variety of types of support can be distinguished related to product technologies, process technologies, and organizational and managerial know-how (UNCTAD 2001). Although the provision of specific types of support is context specific and conditional on characteristics of MNC affiliates and domestic firms, evidence for a variety of host economies indicates that support that is focused directly on improving the quality and cost-
competitiveness of inputs is offered most frequently (Jordaan 2013; Ivarsson and Alvstam 2010; Franco, Sanfilippo, and Seric 2015; Alfaro-Urano, Manelici, and Vasquez2019).\(^9\)

To enhance the effectiveness of support, MNC affiliates screen (potential) local suppliers to ensure that they identify those firms that are most likely to be able to benefit from the support. Characteristics of domestic firms that facilitate the impact of support include firm size, high employment growth, having previous experience with working as supplier to MNC affiliates, and having experience with producing for international markets (Jordaan 2011b; World Bank 2018). Importantly, selection effects also occur among domestic firms, as firms with more capabilities are more likely to commit to (try and) become suppliers to MNC affiliates (Javorcik and Spatareanu 2009). As a result of these selection effects, the impact of the support that MNC affiliates provide is enhanced, as it is targeted to those firms that are motivated and more likely to be able to use the support to improve performance.

**Firm-level capabilities (absorptive capacity).** The importance of firm-level capabilities is also indicated by findings on drivers of productivity spillovers. It is increasingly accepted that productivity spillovers are facilitated or even conditional on domestic firms having sufficient capacity to absorb and implement new technologies (Crespo and Fontoura 2007; Jordaan 2016). Because absorptive capacity cannot be directly observed, econometric studies use a variety of firm-level characteristics that are assumed to be related to this concept. For instance, World Bank (2018) uses WBES data for 122 developing host economies and finds that productivity spillovers materialize only among the more dynamic domestic firms, characterized by high employment growth.

**Firm size.** Evidence on the effect of firm size is more mixed. Several studies examine the notion that larger domestic firms are more likely to benefit from spillovers, given that they have more resources to invest in absorbing and implementing new technologies. For various host economies, Farole and Winkler (2014), Gorodnichenko, Svejnar, and Terrell (2014), and Xu and Sheng (2012) present findings confirming that productivity spillovers are concentrated among large domestic firms. However, other studies present contrasting evidence. For Romania and Eastern Europe, Merlevede, Schoors, and Spatareanu (2014) and Damijan et al. (2013) do not find any evidence that productivity spillovers differ between small, medium, and large domestic firms. Ni et al. (2017) find for Vietnam that productivity spillovers are mainly concentrated among small and medium-sized firms.

**Export status of domestic firms.** Evidence on the export status of domestic firms is more uniform. Firms that have experience with producing for international markets are more accustomed

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\(^9\) Such support includes feedback on product performance, the sharing of product designs and specifications, technical support to improve existing production processes, and support with product quality upgrading.
to dealing with stronger product demands and may be more familiar with modern technologies, facilitating the absorption of new technologies from foreign-owned client firms. Farole and Winkler (2014) estimate productivity spillovers for a large number of host economies and identify a positive productivity effect of an interaction variable between the presence of MNC affiliates and the share of exports in a domestic firm’s total sales. For China, Xu and Sheng (2012) find that it is mainly exporting local suppliers that experience productivity spillovers.

*Human capital and involvement in research and development (R&D) activities.* These factors are also found to exercise positive impacts on productivity spillovers. Firms with a high level of human capital or R&D activities are more likely to know about new technologies and to have the knowledge and skills to absorb them. Anwar and Nguyen (2014) find for Vietnam that local suppliers with a high level of human capital experience larger productivity spillovers. For Indonesia, Blalock and Simon (2009) report positive productivity effects from interaction variables between the inter-industry presence of MNC affiliates and the level of local suppliers’ human capital or their involvement in R&D. Marcin (2008) reports a similar positive productivity effect from an interaction variable between a local supplier’s R&D involvement and the inter-industry presence of MNC affiliates in Poland.

### 3.3. Host Economy Conditions and Mediating Factors

#### 3.3.1 Host economy conditions

Alongside the evidence that clearly indicates the importance of the characteristics of MNC affiliates and domestic firms, studies also present findings that characteristics of host economies play an important role.

*The level of development of a host economy.* Various aspects have been found to enhance backward linkages and productivity spillovers. Sanchez-Martin, De Pinies, and Antoine (2015) and Amendolagine et al. (2013) find that a country’s *level of GDP* is positively associated with MNC affiliates’ use of local suppliers. Farole and Winkler (2014) report a positive productivity effect of an interaction variable between the presence of MNC affiliates and the *level of spending on education* in host economies. Developing countries with relative high levels of GDP and education expenditures can be expected to incorporate larger pools of suitable suppliers—suppliers that are also more likely to be able to benefit from technology dissemination and productivity spillovers.

*Institutional characteristics of host economies.* These characteristics also affect the use of local suppliers and productivity spillovers. Amendolagine et al. (2013) find that the quality of institutions in Sub-Saharan African countries is important for local sourcing, indicated by an estimated positive effect
of the quality of the legal system and a negative effect of bureaucratic costs on the level of use of host economy suppliers. Related to this, Perez-Villar and Seric (2015a) and Amendolagine et al. (2019) find that the level of institutional proximity between home and host economies exercises a positive effect on the extent of backward linkages. Using firm-level data for 28 transition economies, Monastiriotis (2016) estimates productivity spillovers from MNC affiliates from different home economies and finds that positive effects materialize only from affiliates originating in European Union (EU) member countries, indicating that institutional proximity fosters productivity spillovers.

**Adequate financial markets.** The presence of financial markets that function well is also important. Javorcik and Spatareanu (2009) find for a sample of domestic firms in the Czech Republic that, whereas in general domestic firms experience financial constraints, domestic firms that operate as supplier to MNC affiliates do not. Furthermore, MNC affiliates that provide support to improve their suppliers expect domestic firms to make investments themselves to enhance the impact of supportive linkages (Alfaro-Urano, Manelici, and Vasquez 2019; Jordaan 2011b, 2013). To be able to make such investments, which can facilitate the effects of technology dissemination, domestic firms need access to finance.

**Trade policy.** Several studies present findings that trade policy generates positive productivity effects. For instance, Farole and Winkler (2014) report an estimated positive effect of an interaction variable between a host economy’s level of trade and the presence of MNC affiliates. For China, Du, Harrison, and Jefferson (2014) report a significant positive effect of an interaction variable between the level of inter-industry MNC participation and a dummy variable capturing the year that China joined the World Trade Organization (WTO). They also find a negative effect of an interaction variable between inter-industry MNC and tariff levels. These effects of trade openness are likely to capture the presence of pecuniary externalities. Access to international markets makes it easier for MNC affiliates to source inputs from international markets, placing local suppliers in direct competition with international suppliers. The estimated positive effects of trade openness suggest that domestic suppliers respond to this change in market conditions by improving their performance, which takes the form of positive productivity effects.

### 3.3.2 Mediating factors

**Global value chains.** GVCs constitute an important factor promoting linkages between domestic firms and MNC production networks (UNCTAD 2013). GVC participation is considered to be an important mode of export-based development, given that domestic firms that join GVCs obtain access to international markets (Taglioni and Winkler 2016, World Bank 2020), creating opportunities to learn
about new knowledge and technologies that may result in technological upgrading and productivity effects (Sturgeon and Lester 2004). However, evidence on productivity spillovers that originate from direct and voluntary technology dissemination by MNC affiliates in GVCs is rather weak. Pipkin and Fuentes (2017) examine findings from a large number of case studies on GVCs and find not only that technological upgrading does not occur in many cases, but when it does occur it is primarily domestic firms that are responsible for creating this effect. Furthermore, except for a few more advanced developing countries, most developing economies are linked to GVCs primarily by supplying commodities and routine, low value-added inputs. These types of inputs usually provide only limited scope for technology dissemination and productivity spillovers. Accordingly, MNCs in charge of such GVCs use pure market transactions to coordinate their international production networks (UNCTAD 2013). Such transactions that are not conducive to the dissemination of technologies or the creation of purposeful supplier development programs (Altenburg 2006).

**Technology gaps.** The level of technological differences—*the technology gap*—between MNC affiliates and domestic firms has traditionally been seen as potentially important for the occurrence of productivity spillovers (Smeets 2008; Jordaan 2016). MNC affiliates are usually technologically more advanced than domestic firms, given that the use of new and modern technologies enables MNC affiliates to operate in host economies. Opinions on the expected effect of the technology gap differ (Jordaan 2017). One argument is that a small technology gap fosters productivity spillovers, as a small gap implies that the absorptive capacity of domestic firms will be relatively large. Although there is no disagreement with the notion that absorptive capacity is important and that very large technological differences will prevent productivity spillovers, a small technology gap also implies that the scope for learning and improvement among domestic firms is limited, lowering possible productivity spillovers. In contrast, the alternative argument is that a large technology gap promotes productivity spillovers, as it reflects the large scope for potential spillovers that may occur (Jordaan 2017).

Overall, the evidence is more in support of the notion that a large technology gap promotes technology dissemination and productivity spillovers. For instance, Perez-Villar and Seric (2015b) examine drivers of the provision of support by MNC affiliates in Sub-Saharan African countries and find that, while controlling for a range of firm-level and host economy characteristics, the technology gap between MNC affiliates and local suppliers increases the probability that the foreign firms will provide support. For northeastern Mexico, Jordaan (2011a, 2013) presents related findings: whereas the technology gap in general lowers the provision of support, MNC affiliates that are experiencing large technology gaps with their local suppliers are significantly more likely to provide support. An explanation for this positive effect is that MNC affiliates interpret the size of the technology gap as an
indicator of the scope for improvement among their local suppliers, which they try to close by providing support.

Findings from productivity spillover studies also indicate that the technology gap can exercise a positive effect. Blalock and Simon (2009) estimate productivity spillovers in Indonesia and find that, compared to less productive firms, more productive local suppliers—firms with a smaller technology gap with MNC affiliates—experience smaller backward spillovers. A similar finding is presented for Romania by Merlevede, Schoors, and Spatareanu (2014). For the same host economy, Jude (2016) finds that a large technology gap positively impacts upon spillovers from horizontal, forward, and backward FDI. For Mexico, Jordaan (2008a) also identifies a significant positive productivity effect of an interaction variable between the technology gap and the level of inter-industry MNC participation.

**Geographic dimensions.** Factors related to geography are increasingly being found to influence FDI productivity spillovers (Jordaan and Monastiriotis 2018). \textit{Agglomerations of economic activity} are characterized by productivity premiums because they facilitate inter-firm linkages and the occurrence of knowledge spillovers (Duranton 2015). This suggests that MNC affiliates that locate in such agglomerations within host economies will generate larger positive impacts, as they will find it easier to identify local suppliers and create input-output linkages. Also, \textit{the proximity between FDI and domestic firms} facilitates and intensifies communication and technology dissemination, resulting in larger productivity spillovers.

Several studies present evidence that productivity spillovers vary across regions within host economies. Anwar and Nguyen (2014) estimate productivity spillovers in eight Vietnamese regions and find that positive backward spillovers materialize in only half of these regions. Their findings also indicate that the effects of the technology gap and human capital on productivity spillovers are not constant across the regions. Jordaan (2008b) reports similar findings of regional heterogeneity across states in Mexico of productivity spillovers among local suppliers. Altmonte and Colantone (2008) report for Romania that positive productivity spillovers occur only in the three regions that incorporate the largest shares of the host economy’s manufacturing sector. Similarly, Monastiriotis (2016) finds for EU transition economies that productivity spillovers only materialize in the core regions within these countries.

Another set of studies examines whether productivity spillovers from MNC affiliates are facilitated by geographical proximity between MNC affiliates and local suppliers. Jordaan (2008b) reports for Mexico that positive backward spillovers materialize both within states and between neighboring states. For China, Madaragia and Poncet (2007) find that spillovers are transmitted between neighboring cities. Wang, Ning, and Zhang (2017) also use data for Chinese cities and identify
a negative effect of distance between cities on spatial spillovers. Thang, Pham, and Barnes (2016) estimate productivity spillovers in 61 provinces in Vietnam and find that although there is evidence of spillovers between provinces, spillovers within provinces are much larger, reflecting the positive effect of spatial proximity between MNC affiliates and local suppliers. For India, similar findings of a positive effect of proximity between the two types of firm are presented by Song and Son (2019). Merlevede and Purice (2016) report for Romania that spillovers from backward linkages within regions are larger and occur faster compared to productivity spillovers that materialize between regions.

3.4. Evidence from Rich Data Sets

The evidence discussed in the previous sections is characterized by certain limitations. In particular, studies tend to examine only parts of the processes depicted in figure 1. Studies that provide detailed information on the extent of backward linkages and technology dissemination use mostly small-scale, firm-level surveys (often only containing MNC affiliates) and do not examine whether inter-firm linkages materialize as productivity spillovers among local suppliers. Quantitative studies that estimate productivity spillovers usually do not have information on the actual size and nature of linkages that exist between MNC affiliates and domestic firms and rely on national input-output tables to calculate indirect indicators of the magnitude of these linkages. Some recent studies attempt to address these shortcomings by combining various firm-level data sets and/or by using large-scale firm-level surveys that contain information on both the level and nature of linkages between MNC affiliates and local suppliers and information that allows for the estimation of productivity effects of these linkages.

A good example is the detailed study on productivity spillovers in Costa Rica by Alfaro-Urena, Manelici, and Vasquez (2019). They combine an administrative data set that tracks all firm-to-firm transactions in this host economy for the 2008–16 period with other firm-level data sets containing information on profits, revenues and costs, inputs, human capital, and exports and imports. To identify spillovers, they conduct event study estimations, comparing productivity changes among local firms that start to supply inputs to MNC affiliates with samples of local firms that do not supply to foreign firms during the period under investigation. The estimations identify positive productivity effects among the supplying local firms, clearly identifying backward linkages as the transmission channel. The authors also find evidence of other effects, including increases in the volume of sales and the number of other domestic firms that the suppliers establish business relationships with, suggesting that the
positive effects from productivity spillovers among suppliers are transmitted to the wider host economy.10

Another example is a study using data from the 2010 Vietnam Investor Survey by the United Nations Industrial Development Organisation (UNIDO) (Tusha, Jordaan, and Seric 2018). For a large sample of foreign and domestic firms, this data set contains information on output and inputs; the sourcing and selling behavior of the firms; the extent and intensity of inter-firm linkages; and the number, nationality, and location of buyers and suppliers. Tusha, Jordaan, and Seric (2018) find that MNC affiliates are more likely to create business relationships with other MNC affiliates located in Vietnam, thereby lowering the scope for productivity spillovers among local suppliers. At the same time, local firms that do have MNC affiliates as client firms are significantly more likely to receive support, indicating that foreign firms are a source of technology dissemination to their local suppliers. When analyzing productivity effects from supplying to foreign firms, the estimations show that these effects materialize only from having foreign client firms that are located in Vietnam and not from foreign client firms located outside the host economy. This indicates the importance of the physical presence of MNC affiliates in the host economy for meaningful technology dissemination and productivity spillovers.

Three other recent studies present findings that indicate that the impact of MNC affiliates can extend beyond productivity spillovers. Javorcik, Lo Turco, and Maggioni (2018) use firm-level data for Turkey that includes information on the products that the firms produce. Their estimations show that domestic firms that operate in industries that supply inputs to MNC affiliates experience increases in the complexity of their products, as captured by the complexity indicator by Hidalgo and Hausman (2009). This suggests that technology dissemination and support from MNC affiliates enables local suppliers to introduce new and more complex products. Using the product sophistication index by Hausman, Wang, and Rodrik (2007), Eck and Huber (2016) obtain similar evidence for India. For Romania, Bajgar and Javorcik (2019) combine firm-level data on output and inputs with customs data containing information on annual exports at the firm-product-destination level, allowing them to calculate indicators of within-product quality improvements. Their estimations reveal that both forward and backward linkages of MNC affiliates generate significant product quality improvements among domestic firms.

4. Backward Linkages and Productivity Spillovers: The Scope for Policy Making

10 Other studies that report findings of such wider dissemination effects include Kee (2015) and Jordaan (2017).
The heterogeneity of the evidence on the drivers and impacts of interfirm-linkages strongly suggests that there is substantial scope for host economy governments to design and implement policies to facilitate backward linkages and their positive impacts. Along with the growing body of evidence, recognition is spreading that industrial policy instruments play important roles in fostering productivity, economic growth, and development (Naude 2010; Chang and Andreoni 2020; Warwick 2013). As Rodrik (2004) discusses, processes of structural transformation and economic growth are characterized by a prevalence of coordination and informational market failures that require the implementation of industrial policy. Moreover, governments can foster growth and development by providing a variety of public goods that benefit economic activity (Rodrik 2007; Pack and Westphal 1986) and by facilitating the dissemination of knowledge and technologies from MNC affiliates (Lall 1992; Lall and Narula 2004). As the discussion that follows will show, these considerations also play an important role in government policy making to promote FDI backward linkages and their positive impacts on productivity.

To identify the various areas that governments can target and to better understand the types of policies that are suitable, figure 2 provides a visualization of the main areas and relationships that we distil from the survey of the evidence. We distinguish between four main areas: (1) activities to attract and target MNC affiliates; (2) inter-firm linkages between MNC affiliates and local suppliers; (3) technology dissemination and productivity spillovers; and (4) host economy conditions affecting the operations and performance of MNC affiliates and domestic firms.

**Figure 2. MNC Affiliates, Backward Linkages, and Productivity Spillovers: Areas for Policy Making**
4.1. Activities to Attract and Target MNC Affiliates

The physical presence of a sufficient amount of MNC activity is a prerequisite for the creation of meaningful backward linkages and productivity spillovers. Important market failures related to information can block the flow of MNC investments. Given that the collection of information is costly, MNCs often have incomplete and imperfect information about possible locations for new investments. Similarly, host economy governments that want to attract new MNC investments have imperfect information about all the location factors that are important for MNCs and how their economy compares to other potential locations. Such imperfect information is likely to result in lower levels of MNC investments, thereby constraining the scope for backward linkages and productivity spillovers.\(^{11}\)

Host economy governments can play an important role in addressing these informational problems by actively engaging and consulting with MNCs to provide them with more information and learn about their specific investment needs.

Furthermore, host economy governments need to target those MNC investments that are likely to lead to the creation of inter-firm linkages and productivity spillovers. As the survey of the evidence shows, certain characteristics of MNC affiliates are positively associated with the use of local suppliers and spillover effects. Host economy governments need to find out what the attitude of MNCs is toward the use and development of local suppliers and what type of MNC affiliates they are planning to establish.

For instance, MNC investments that result in the creation of affiliates with some level of host economy participation (such as joint ventures) that operate with a substantial level of autonomy and produce for host economy markets are much more likely to create backward linkages than affiliates that produce exclusively for export markets, while having little control over sourcing decisions and concentrating on the assembly of imported inputs. As host economy governments often implement FDI policies that help the start-up, continued operations, and impact of MNC affiliates on local firms, it is very important that they try to attract MNC investments that are conducive to creating backward linkages or have the potential to increase their use of local suppliers when the local supplier base has improved. If MNC investments create affiliates with characteristics that are less conducive to the use of local suppliers, host economies can also use the available evidence to devise and implement policies

\(^{11}\) A good example is provided by Harding and Javorcik (2011), who examine the impact of Investment Promotion Agencies (IPAs) on US MNC investments in a large number of host economies. Not only do they find that sectors that were subject to promotional efforts by IPAs received higher levels of investment, but they also find that this positive effect of IPAs is particularly pronounced in host economies characterized by high levels of information asymmetry and bureaucratic red tape.
to address problems. For instance, the evidence that host economy participation increases local sourcing suggests that affiliates that are fully foreign owned will need extra assistance linking into the local economy to facilitate the use of local suppliers. More generally, host economy governments may have to accept that levels of local sourcing will be constrained (at least in the short term) when MNC affiliates have few characteristics that foster local sourcing and adjust the goals of their policy making accordingly.

Another issue that host economy governments need to consider when targeting MNC investments is the variation in the relationships between local sourcing, technology dissemination, and productivity spillovers. Especially in cases where host economies have a comparative advantage in commodities and routine inputs with low value added, MNC affiliates may be able to source a high degree of their inputs from local suppliers. Such local sourcing provides limited opportunities for technology dissemination, however. In such cases, host economy governments need to devise strategies to use the short-term economic gains from high levels of local sourcing to promote long-term technological development. Alternatively, attracting MNC affiliates that are technologically substantially more advanced than domestic firms may limit the level of use of local suppliers in the short term but creates a larger scope for positive productivity spillovers. In such cases, host economy governments need to devise long-term strategies aimed primarily at promoting backward linkages, facilitating technology dissemination, and increasing absorptive capacity of domestic firms.

4.2. Inter-Firm Linkages between MNCs and Local Suppliers

Markets for intermediate inputs are characterized by market failures that constrain the use of local suppliers. One market failure is related to imperfect information and information asymmetry. Especially when MNC affiliates are new to their host economies, markets will provide incomplete information regarding the availability, quality, and reliability of local firms that may (potentially) provide them with inputs. Potential suppliers are usually subjected to testing and screening procedures before they can be integrated into supply networks. This creates additional costs for the MNC affiliates, as they need to invest time and resources to search, identify, and assess potential local suppliers.\(^{12}\) Similarly, domestic firms often do not know what types of inputs the affiliates may want to source locally, what their product requirements and standards are, and so on. Solving these informational restrictions is costly and curtails the creation of backward linkages.

\(^{12}\) For example, MNC affiliates often have dedicated “talent scouts” tasked with the search for local firms that have the potential to be integrated into their local supply network (World Bank 2018).
Backward linkages between MNC affiliates and local suppliers are also constrained by market failures in coordination. Input markets usually have limited numbers of buyers and sellers that trade products that are subject to frequent changes (Lall 1980; UNCTAD 2001). This creates situations where the performance of buyers and sellers becomes strongly interdependent, requiring measures to coordinate current and future operations. For instance, MNC affiliates that want to improve a product or change product specifications are dependent on the ability of local suppliers to change their products and production processes accordingly. More generally, successful inter-firm linkages often require investments from both selling and buying parties that depend on each other’s willingness and commitment to make these investments. This increased interdependence and the need for coordination introduces extra costs, lowering the extent of backward linkages between MNC affiliates and local suppliers.

Host economy governments can address these market failures in a variety of ways. To lower the costs of identifying (potential) buyers and suppliers of inputs, they can create databases containing information on local firms that are interested in becoming a supplier to MNC affiliates. Furthermore, host economy governments can work with MNC affiliates to create qualification and certification programs for local firms that will help foreign firms identify suitable local suppliers (Moran 2015). Another option is to organize matchmaking and networking events that bring MNC affiliates (buyers) and local firms (sellers) into direct contact, facilitating the sharing of information and exploring the possibilities to create input-output linkages (UNCTAD 2006). Ascertaining which local firm characteristics enhance the likelihood of becoming a supplier to MNC affiliates will help governments identify suitable local firms to be included in such supplier databases, as well as these matchmaking events. It is important that host economy governments are closely involved in these events to obtain a better understanding of the needs of MNC affiliates and the deficiencies and limitations of local suppliers.

Host economy governments can also foster backward linkages by improving the local supplier base. In this regard, this survey has two major implications for policy making. First, a central finding of research on the extent of backward linkages is that the unavailability of inputs restricts the use of local suppliers. Together with MNC affiliates and domestic firms, host economy governments need to develop a solid understanding of industries and global value chain organization to be able to realistically assess the feasibility and necessity of trying to promote local production of new inputs. Alternatively, host economy governments may decide to try attracting international suppliers that can competitively produce these inputs, thereby improving the local supplier base and increasing the attractiveness of the host economy for further MNC investments.
Second, as the literature survey reveals, MNC affiliates indicate that several characteristics of local suppliers limit the extent of backward linkages. Likewise, domestic firms indicate that product demands, specifications, and requirements from MNC affiliates are often more stringent compared to domestic client firms. This suggests that, even without technology dissemination, positive productivity effects may occur when domestic suppliers are able to improve their performance in response to the more stringent demand conditions exercised by foreign client firms. Host economy governments can assist local suppliers in making such improvements. In more general terms, it is important that governments ensure that their policies to improve the local supplier base are addressing limitations of suppliers as experienced by MNC affiliates, actively involving the affiliates in the design and implementation of relevant policies and supplier development programs.

4.3. Technology Dissemination and Productivity Spillovers

In order to assist MNC affiliates in their efforts to disseminate technologies and other forms of support to their local suppliers, governments need to recognize that these efforts are the outcome of cost-benefit analyses, whereby MNC affiliates compare the costs of providing support with the benefits of obtaining higher quality and more cost-effective local inputs. Systematic supplier development programs, in which MNC affiliates and local firms participate jointly, provide good settings to identify the types of support that are most needed and to ensure that foreign firms benefit from the support that they provide to local suppliers (UNCTAD 2006; Arraiz, Henriquez, and Stucchi 2013). When local suppliers commit to using technologies and support that they receive to improve the quality and cost-effectiveness of inputs for participating MNC affiliates, foreign firms will be more inclined to provide the necessary support. Host economy governments can also work with MNC affiliates to facilitate technology dissemination and support to further lower the costs for the foreign firms.

Furthermore, host economy governments need to support efforts to improve the absorptive capacity of local suppliers to absorb and implement the more advanced technologies and knowledge from their foreign client firms—especially given the evidence that a large technology gap between MNC affiliates and local suppliers increases the potential scope for productivity spillovers. This is also important as MNC affiliates expect domestic firms to make independent investments to improve their performance. Host economy governments can help by facilitating information dissemination between MNC affiliates and domestic firms, given that domestic firms often lack information about the types of improvements that they need to make and/or what the priority areas of investment are. Host economy governments also need to implement policies that create and facilitate access to investment funds and other financial resources to domestic firms. These efforts will address a market failure:
domestic firms often need to make investments while having little to no guarantees that these investments will result in increased supply linkages or larger productivity spillovers.

4.4. Host Economy Conditions

Host economy conditions play an important role as they affect the operations of MNC affiliates and local suppliers, their willingness and ability to interact on local input markets, and how these interactions generate productivity spillovers. Broadly speaking, host economy governments should focus on three types of policy making to create an economic environment that is conducive to the materialization of positive economic effects from backward linkages.

First, governments need to put in place a clear FDI policy that creates a business environment that is conducive to the entry, start up, and long-term operations of MNC affiliates. As mentioned, host economy governments need to engage with MNCs to learn about their specific needs and requirements for new investments. Governments need to commit to and pursue transparent and long-term policies that support new MNC investments and provide a variety of services that facilitate the successful entry and continued operations of MNC affiliates.

Second, host economy governments need to provide an economic environment that allows MNC affiliates and domestic firms to operate efficiently. This is in line with contemporary development strategies that are based on creating open and liberalized economies that allow the most efficient and productive firms to grow and thrive. Host economy governments need to invest in the creation and improvement of economic and legal institutions that support such an economic environment, facilitating investment and access to international markets. Furthermore, in light of the market failures and constraints identified, governments should consider the merits of introducing market-friendly incentives that help reduce the risks for both MNC affiliates and local firms to engage in technology dissemination and upgrading activities. Doing so enables MNC affiliates and domestic firms to pursue business opportunities and establish effective and efficient inter-firm linkages.

Third, host economy governments need to invest in components of the economic environment that are characterized by indivisibilities and public good dimensions (Te Velde 2019). A good example is education. MNC affiliates often contribute to improving the level of human capital in host economies by providing training and educational programs to their employees. However, the scale of these investments in human capital is insufficient considering the societal returns to investment in education. Therefore, host economy governments need to invest in providing educational programs that allow entire industries and sectors to benefit from having well-trained workforces. Other
components that will benefit from such investments include infrastructure, labor markets, financial services, and research and development activities. In designing and implementing policies to invest in these components, governments need to work with MNC affiliates and local suppliers to find the right balance between ensuring that these investments can generate beneficial effects for a wide range of local firms, while addressing the specific needs of the foreign firms and their suppliers (Lall 2000).

4.5. Some Guiding Principles for Government Policy Making

Host economy governments can implement various types of soft industrial policy that target different parts of the processes underlying the creation of backward linkages and their impacts, by addressing various market failures, constraints, and host economy conditions. The discussion that follows distills guiding principles for effective policy making on backward linkages and their productivity effects.

There is a growing recognition that traditional interventionist policies to enhance backward linkages are not effective and economically harmful and that instead host economy governments need to design and implement a variety of soft industrial policies that promote competitiveness and foster linkages and their impacts.

Governments need to be selective in attracting and facilitating operations of those MNC affiliates that have an interest in utilizing local suppliers and improving these suppliers. Governments need to target MNC affiliates that are substantially more advanced than domestic firms in terms of technology, so that there is sufficient scope for technology dissemination and productivity spillovers.

As for local firms, government should target policies to those firms that are most suited to act as long-term suppliers to MNC affiliates and improve their capabilities to enhance the materialization of productivity spillovers. Suitable local firms have a clear commitment to operating as a supplier to MNC affiliates and are willing to take ownership of the performance improvements that backward linkages can help create.

Market failures should be addressed at the micro level. The level of use of local suppliers is negatively affected by a number of market failures related to information and coordination and weak local firm capabilities and competitiveness. Government policies that aim to solve these market failures and weaknesses need to be targeted at the micro level where possible, lowering the costs for individual foreign and domestic firms to establish and maintain inter-firm linkages.

The use of local suppliers is directly related to the competitiveness of MNC affiliates. MNCs use clear cost-benefit considerations to decide on their level of local sourcing. They will increase their use
of local suppliers when the gains from doing so outweigh the costs. Therefore, policies that aim to increase backward linkages need to focus on measures that lower the costs and increase the benefits that MNC affiliates can obtain from using more local suppliers.

*Technology dissemination must benefit both local suppliers and MNC affiliates.* Policies that aim to increase technology dissemination and support from MNC affiliates to local firms are most effective when they ensure that foreign firms also clearly benefit. Supplier development programs that commit local suppliers to use support and new technologies to establish performance improvements that are directly linked to the quality and cost-effectiveness of inputs of MNC affiliates will increase the level and quality of support that foreign firms are willing to provide.

*Supplier development programs need to be clearly targeted at MNC affiliates and (potential) suppliers and have transparent goals.* Clear targeting ensures that policies to improve local suppliers are not confused for or mixed with other policy making. For instance, supplier development programs often also include policy measures to help micro, small, and medium enterprises (MSMEs). In most cases, MSMEs do not constitute the type of domestic firm that is most suited to act as supplier and benefit from productivity spillovers. Furthermore, supplier development programs need to have clear and transparent goals so that all participating firms know the types of supplier improvement that programs aim to establish and what benefits participating MNC affiliates can expect to obtain.

*Location matters.* Agglomeration fosters inter-firm linkages, technology dissemination, and productivity spillovers. Therefore, policies to attract MNC investments, support backward linkages, and facilitate spillover impacts among local suppliers need to be integrated into regional development policies that promote and facilitate the location and operations of MNC affiliates and domestic firms in agglomerations of economic activity within host economies.

*Long-term goals and a long-term commitment to soft industrial policies should be supported and sustained.* Host economy governments need to recognize that it takes time to attract suitable MNC investments, for inter-firm linkages to be created, and for productivity spillovers to occur. This is especially important in cases where governments need to invest in developing the capabilities and absorptive capacity of domestic firms before meaningful linkages and productivity effects have materialized. Governments need to openly commit to and devise soft industrial policies that have clear and long-term goals, to enhance the willingness of MNC affiliates and local suppliers to commit to
developing backward linkages and investing in efforts to facilitate and enhance their economic impact.\textsuperscript{13}

5. Summary and Suggestions for Further Research

5.1 Summary

The attraction and facilitation of MNC investments constitutes a key component of the development strategies of most developing and emerging economies. One of the main reasons for this is that host economy governments expect that domestic firms will benefit from the entry and operations of MNC affiliates through the materialization of productivity spillovers. The large body of empirical evidence indicates that spillovers within a single industry are of limited economic importance. In contrast, evidence on positive spillovers between industries is more prominent; in particular, a number of studies identify productivity spillovers among domestic firms that produce inputs for industries with a large participation by MNC affiliates. These findings indicate that backward linkages between MNC affiliates and local suppliers constitute the main channel transmitting productivity spillovers.

However, the evidence on backward spillovers is also mixed and indicates that these spillovers do not occur automatically and are context specific. This is an important policy issue, given that host economy governments often dedicate considerable resources to attracting and facilitating MNC affiliates and promoting linkages between foreign firms and local suppliers. More case studies would help us better understand what policy interventions have proven effective in a particular country and industry context.\textsuperscript{14} Furthermore, there is a growing recognition that host economy governments need to design and implement a variety of soft industrial policies to foster linkages and their impacts.

The convergence of the evidence identifying productivity spillovers through backward linkages as the main productivity effect from MNC affiliates, in combination with the policy choices that host economy governments are currently facing, motivates the need for a fresh survey of empirical studies on backward linkages. The available evidence on linkages and productivity spillovers is particularly rich, stemming from different research fields that provide evidence and insights into drivers of the level of

\textsuperscript{13} For concrete examples of such policies and their impact, see the *World Development Report 2020* on global value chains (World Bank 2020, 178).

\textsuperscript{14} Ongoing research by the World Bank Group’s Investment Climate unit, “Global Value Chains: An Investment Perspective,” should help shed more light on this question (publication forthcoming). The research examines not only what policies promote linkages and integration of local firms in international production networks, but also what combination and sequence of specific policy interventions and measures yield better results.
use of local suppliers, the extent and nature of technology dissemination by MNC affiliates, and the materialization of productivity spillovers among domestic firms.

The findings from our survey show that various characteristics of MNC affiliates and domestic firms, host economy conditions, and several mediating factors are important. Considering the characteristics of MNC affiliates, research finds that the investment motive has mixed effects. Whereas market-seeking FDI tends to source more inputs from local suppliers and generates larger productivity spillovers, efficiency-seeking FDI is found to be more supportive to local suppliers. Findings on the mode of investment and the percentage of foreign ownership are more consistent: MNC affiliates with some level of host economy participation/investment (such as joint ventures) use more local suppliers, engage more in technology dissemination, and generate larger productivity spillovers. Nationality or country/economy of origin is also important, as cultural and institutional proximity exert positive effects on the level of local sourcing and the creation of productivity spillovers. A large distance between home and host economies also fosters the extent of backward linkages and productivity spillovers. MNC affiliates that operate with a certain level of autonomy are reported to create more extensive and supportive backward linkages.

Findings on the effects of characteristics of domestic firms on local sourcing show that MNC affiliates identify local suppliers’ main area of underperformance to be the unavailability of inputs. Other constraints include low product quality, uncompetitive pricing, and unreliable delivery systems. As for technology dissemination, MNC affiliates target their support to local firms based on their (potential) capacity to use this support to provide higher-quality and more cost-effective inputs. Similar selection processes occur among domestic firms, with only the more capable and motivated domestic firms trying to become suppliers to MNC affiliates. Characteristics of these firms include firm size, level of human capital, involvement in R&D activities, having previous experience with supplying to MNC affiliates, and being familiar with producing for international markets. Similar characteristics of domestic suppliers—perceived to be related to their level of absorptive capacity—are found to be positively associated with the occurrence of productivity spillovers.

Most of the host economy conditions that the survey identifies as influencing the extent and impact of backward linkages relate to the level of development of host economies. The level of GDP and human capital have positive effects on backward linkages and productivity spillovers, reflecting the availability and the quality of local supplier bases. High-quality legal systems and low levels of corruption and bureaucracy foster the creation of inter-firm linkages. Financial markets that function adequately are important, especially because domestic suppliers need to make independent investments to establish supply linkages with MNC affiliates and benefit from technology
dissemination. It is also important that host economies adhere to policies of economic liberalization and trade openness. Not only does this provide MNC affiliates (and domestic firms) access to international input and output markets, but it also creates competition effects between local suppliers and international suppliers that can generate performance improvements among the domestic firms.

The survey finds several mediating factors to be important. Although GVCs provide domestic firms with opportunities to link into international markets, for most developing and emerging economies there is currently only limited evidence that MNCs that coordinate GVCs generate technology dissemination to domestic suppliers. Next, the size of the technology gap between MNC affiliates and domestic firms has positive effects on technology dissemination and productivity spillovers. Findings of such positive effects of the size of the technology gap emphasize the importance of domestic firms having sufficient capacity to absorb and implement new technologies. The extent to which MNC affiliates and domestic firms are co-located in agglomerations of economic activity within host economies is also found to play a role, given that agglomeration facilitates the creation of inter-firm linkages, and geographical proximity between foreign-owned firms and local suppliers fosters technology dissemination and productivity spillovers.

Based on these key findings from the survey, four areas can be identified where host economy governments can implement policies to promote backward linkages and their effects. The first area concerns the attraction and targeting of MNC affiliates. Attracting a sufficient amount of MNC investments is a prerequisite for meaningful linkages and productivity spillovers. Furthermore, host economy governments need to target MNC affiliates with characteristics that favor the use of local suppliers and the dissemination of technologies. To achieve this, host economy governments need to actively engage with MNCs to provide information on host economy conditions and to learn about their specific investment needs and intentions to use and develop local suppliers.

Second, the extent of backward linkages is curtailed by market failures related to imperfect and asymmetric information and coordination. Governments can implement a variety of policies to address these market failures, improving information on (potential) demand and supply of local inputs. It is also important that host economy governments facilitate selection processes to improve the matching of buyers and sellers. Based on a solid understanding of the input needs of MNC affiliates and the existing capabilities and shortcomings of local suppliers, governments can help improve the local production of available inputs. Regarding inputs that are not produced in the host economy, governments need to devise realistic strategies supporting the local production of new inputs, facilitating the importation of these inputs, or attracting MNC affiliates that can produce these inputs efficiently in the host economies.
Third, policies to promote technology dissemination and productivity spillovers need to be based on the recognition that MNC affiliates compare the costs of providing support with the benefits of obtaining higher-quality and more cost-effective local inputs in return. Therefore, host economy governments need to devise policies that lower the costs and increase the benefits for MNC affiliates. This can be done by creating programs in which MNC affiliates and domestic firms jointly participate so that performance improvements that result from technology dissemination are used to improve inputs for the foreign-owned firms.

Fourth, regarding host economy conditions, it is important that a clear and transparent FDI policy is in place, helping MNC affiliates with their entry, start-up, and continued operations. Furthermore, governments need to support and continue to institutionalize a liberalized and open economic environment that fosters competition and allows the most productive firms to thrive. In cooperation with MNC affiliates and domestic firms, this also involves investing in areas of the economy that are characterized by indivisibilities and public good dimensions, including education, infrastructure, finance, and research and development.

5.2 Suggestions for Further Research

Our survey of the available evidence suggests several avenues for future research. The voluminous econometric literature on productivity spillovers in general and on the effects of characteristics of MNC affiliates and local firms is still characterized by a substantial bias toward intra-industry spillovers. Given that the available evidence indicates that productivity spillovers between MNC affiliates and local suppliers are much more prevalent in a wider variety of host economy settings, more research is required into the occurrence and the drivers of this type of spillover. Given the strong implications for policy making, research into backward linkages needs to include a further examination of the effects of the technology gap and the geographical dimensions of productivity spillovers. Also, research on backward linkages will benefit from adopting broader definitions of their economic impact on local suppliers, including productivity spillovers, effects on exporting activities, innovation, and product complexity and quality.

Another aspect that needs further attention concerns the decision processes that MNC affiliates apply in determining their use and support of local suppliers. Although it is clear from the available evidence that such decisions involve economic cost-benefit considerations, more detailed research will help further clarify the context and the critical factors that play a role in these decisions. In analyzing these processes, more attention needs to be paid to the impact of continuing processes of international economic liberalization that make it easier for MNC affiliates to source from
international suppliers instead of relying on local suppliers. Similarly, more research is needed into cost-benefit assessments conducted by individual local firms that underlie their decisions on investments to create business relationships with MNC affiliates, absorb technologies, and improve their performance.

Related to this, more research is needed on conditions that constrain MNC-induced technology dissemination to suppliers in global value chains. GVCs are responsible for an increasing share in world trade and are linking many firms in developing and emerging countries to international markets. However, the currently available evidence indicates that most of these firms do not experience meaningful productivity spillovers that can be linked to MNCs that organize and coordinate these GVCs. This suggest that although in the short-term domestic firms can benefit from increasing sales to international markets, in the long term effects on technological development and economic growth may be lower than expected. More research is needed into examining the key factors that hinder technology dissemination and on policy measures that, in the absence of meaningful technology dissemination, host economy governments can implement to help domestic firms use the economic gains from participating in GVCs to generate technological upgrading.

There is also substantial scope to improve the data that are used to measure and analyze backward linkages and identify their impacts. On the one hand, case studies and small-scale, purpose-built surveys provide detailed information on the nature and scale of backward linkages. However, most of these studies focus only on MNC affiliates, making it very difficult to assess to what extent foreign-owned firms differ from comparable domestic firms in their use and support of local suppliers. Also, local suppliers are typically not included in the samples, preventing analysis of the impacts of backward linkages. On the other hand, although econometric studies do provide quantitative evidence on the occurrence of productivity spillovers among domestic firms, the evidence is mostly indirect, given that it is not based on actual indicators of the scale and nature of linkages between MNC affiliates and local suppliers. Furthermore, information on firm-level characteristics is also often limited in these data sets, restricting the analysis of the impact of characteristics of MNC affiliates and local suppliers on productivity spillovers.

As indicated by findings from some recent studies that benefit from using rich data sets, one way forward is to conduct larger-scale, purpose-built surveys to obtain information on the extent and nature of inter-firm linkages, as well as information on performance indicators of local suppliers. The World Bank Enterprise Survey (WBES) could play a central role in this endeavor, given its extensive coverage of a large variety of developing and emerging economies. The growing evidence identifying backward linkages as the main channel transmitting productivity from MNC investments suggests that
the WBES could start to incorporate a standard list of questions on the extent and nature of inter-firm linkages, types and levels of technology dissemination, and their effects. Another option is to combine various firm-level data sets to improve the estimation of productivity spillovers and other impacts on local suppliers. Disadvantages of this second option are that most of these data sets are confidential, that access is provided only to a limited number of researchers, and that these data sets usually do not contain information on the actual magnitude and nature of linkages.

Finally, in all these research efforts, special attention needs to be paid to the policy implications of new evidence and to directly analyzing the effects of government policies that are implemented to promote backward linkages and productivity spillovers. Host economy governments face important public policy choices in attracting MNC investments and promoting their impact on domestic suppliers and are searching for new policies that help achieve these goals. By examining government policies in different industries and for a larger number of different host economy contexts, we can improve our understanding of the types of policies that are effective. This will help host economy governments design and implement effective mixes of soft industrial policies to further facilitate and promote the extent and economic impact of input-output linkages between MNC affiliates and local suppliers.
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