Assessment of productivity spillovers from economic activities of emerging market MNEs in advanced countries. Evidence from Germany

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List of Abbreviations

AMNE	Advanced market multinational enterprise
EMNE	Emerging market multinational enterprise
FDI	Foreign direct investment
MNE	Multinational enterprise
GMM	General method of moments
GUO	Global ultimate owner
HMT	Hong Kong, Macao and Taiwan
IB	International Business
LLL	Linkage–Leverage–Learning
M&A	Mergers and acquisitions
NACE	Nomenclature générale des Activités économiques dans les Communautés européennes
OECD	Organisation for Economic Co-operation and Development
OLI	Ownership–Location–Internalization
RBV	Resource-based view
R&D	Research and development
SPE	Special purpose entity
TFP	Total factor productivity
UNCTAD	United Nations Conference on Trade and Development

1 Introduction

In recent decades, global investment patterns have experienced some significant changes. One is the a remarkable rise in foreign direct investment (FDI) outflows from emerging countries targeting advanced economies – so–called South–North investment. A major role in these processes belongs to the emerging countries' multinationals (EMNEs), which engage actively in both greenfield investments and mergers and acquisitions (M&A) in developed countries (UNCTAD, 2017). Views on the investment dynamics of EMNEs range from strong support to vague fears. On the one hand, considering the current period of slow growth in developed countries, capital inputs are welcome as they boost economic activity in the host markets. On the other hand, investments from the emerging countries, especially in light of aggressive takeovers in advanced markets, might be seen as an attempt to gain access to key technologies and strategic assets that could be harmful for competitiveness in the host country's economy and even threaten its national security (Die Welt, 2011; Focus Online, 2011; The Economist, 2018).

The impact of EMNE FDI activities on the economy of developed countries has many facets. One possible approach to discovering the consequences of EMNE investment is to look closer at their influence on the host country firms. Particularly useful for these purposes is the concept of spillover effects or the potential benefits to host country companies from the activities of foreign firms. These effects can be assessed through local firm productivity gains as a consequence of the foreign firms' presence in the host country economy (Driffield and Love, 2005).

According to recent contributions to internationalization theory, companies from emerging countries enter the advanced markets in order to gain new competencies and catch–up on technology (Mathews, 2017; Luo and Tung, 2018). Under these circumstances it is reasonable to suppose that their role in the process of productivity enhancement of host country companies remains insignificant. But recent studies on EMNEs represent them as powerful and flexible global market players, casting some doubt on the validity of these straightforward conclusions.

The recent economic literature on EMNEs operating in advanced markets has

predominately focused on the motives and forms of investment activities, paying little attention to the question of spillover effects between EMNE subsidiaries and indigenous firms. The answer to this question is important to understand both short– and long–term consequences of EMNE presence in advanced countries from the point of view of the host country.

The purpose of the present thesis is to contribute to understanding the outcomes of South–North investments by addressing the question of whether productive activities of EMNE subsidiaries in advanced countries have a positive influence on the productivity of local companies.

The starting point for the spillovers estimation is the identification of productivity advantages of foreign subsidiaries in comparison with local companies as a precondition for positive spillover effects. After identification of significant productivity differences, the analysis proceeds to an estimation of the impact of productive activities of foreign companies on indigenous firms. The level of development of the MNE's home country is considered a decisive factor, differentiating between emerging markets MNEs and multinationals from advanced countries (AMNEs). The spillover effects are estimated from both EMNE and AMNE activities. The AMNEs serve as a reference group for analysis, given their longer history of operations in advanced countries and presumably different motives for entry.

The aim of this thesis is to question the common view transmitted by the media that EMNEs entering advanced countries lack any positive influence on advanced host country companies as opposed to companies from advanced countries (The Economist, 2011; Woolsey, 2017; Ikenson, 2018; Shiraishi, 2018). The main contribution of this thesis is the empirical evidence of productivity advantages as well as positive spillover effects from EMNE activities, which are observed in some sectors of an advanced country economy, namely Germany.

The thesis is structured as follows. Chapter 2 provides a brief overview of trends in outward investment from emerging countries and reviews the relevant theoretical concepts that explain the internationalization patterns of EMNEs. Chapter 3 concentrates on spillover effects that may emerge in host country firms as a consequence of foreign presence. The chapter describes the main concepts and characteristics related to spillovers

and pays special attention to the studies on spillover effects in the cases of AMNEs and EMNEs. Further, it investigates the preconditions for productivity spillovers from activities of EMNEs in Germany from both the host country and the subsidiary perspectives. Chapter 4 presents the study's conceptual framework, integrating the theoretical concepts from Chapter 2 and preconditions for spillovers described in Chapter 3. On the basis of these chapters the thesis provides a formulation of research propositions and expectations about the results of the investigation. The research hypotheses are formulated in Chapter 5, which also describes the methodology and empirical data used for the analysis. Given the research question addressed here, the econometric analysis is conducted taking as its base the concept of total factor productivity (TFP) as a residual from the Cobb–Douglas production function using secondary firm–level panel data. Chapter 6 shows the results of analysis and Chapter 7 discusses the results and their consistency with made assumptions. Chapter 8 summarizes the findings and discusses the contributions, limitations and suggestions for future research.

2 EMNEs internationalization in advanced markets

2.1 Outward FDI from emerging economies

The beginning of the twenty-first century is remarkable because of the unprecedented international expansion of MNEs from emerging countries (see Figure 1). In 2014, the annual FDI outflows from emerging economies reached a record level of almost $458 billion, corresponding to 36% of world FDI outflows. In 2016, China, with an outward FDI of $183 billion, ranked as the world's second largest investing country. In that same year, nine EMNEs were ranked among the top hundred MNEs. Besides, more than fifteen companies from emerging markets were mentioned among the next fifty global MNEs (UNCTAD, 2017).

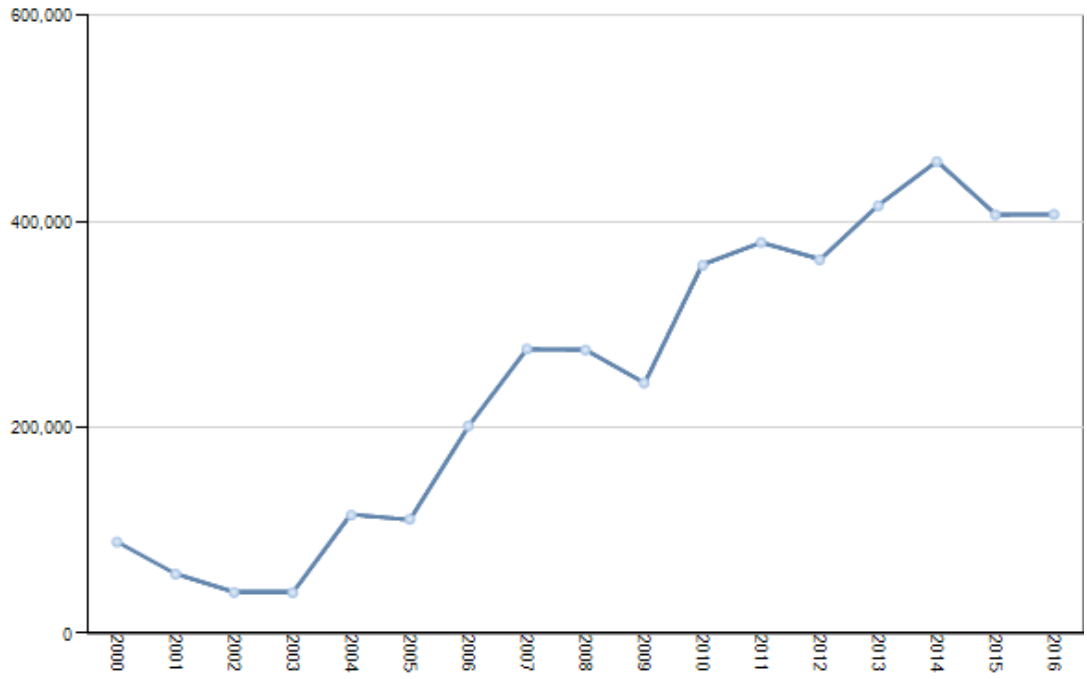

Figure 1. Outward FDI from developing countries by year, 2000–2016 (Mio. USD)
Source: UNCTAD Stat http://unctadstat.unctad.org/ (Accessed 22.09.2018)

The phenomenon of FDI by EMNEs is not new. It it possible to identify three waves of FDI by companies from emerging countries: the late 1960s until the early 1980s, the 1980s and since the 1990s. The last wave of investments has attracted special attention from

scholars for a distinctive feature, namely the growing importance of M&A activities to acquire new capabilities and competencies with an emphasis on technology and brands (Amighini et al., 2015). This behavior of EMNEs in advanced countries is reflected in the academic literature. For instance, von Zedtwitz (2005) has proposed the matrix of internationalization strategies of MNEs considering the home country of MNE and primary FDI destination (see Figure 2).

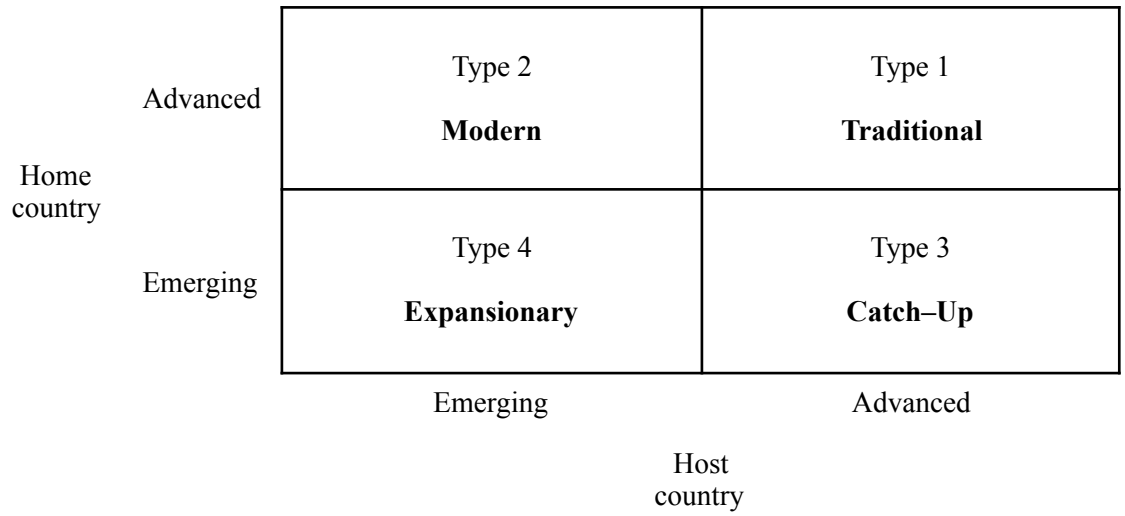

Figure 2. Four types of internationalization strategies of MNEs

Source: adapted from the matrix of R&D internationalization by von Zedtwitz (2005)

According to the matrix, the FDI flows originating in emerging economies and directed toward advanced countries are aimed at catch–uping in technology and productivity. These economic activities, also known as South–North investments, have attracted special attention from academics, engendering vivid discussions over whether the existing theories of international business are still suitable to explain EMNE internationalization processes. Before proceeding with the discussion of common theoretical approaches explaining EMNE FDI, however, it would be useful to define EMNE in the context of the present study.

The academic literature proposes different approaches to identify a company as EMNE. In the context of this work, EMNEs are defined following Luo and Tung's (2007) definition: EMNEs are companies that originate in emerging countries and operate internationally engaging in outward FDI in at least one foreign country; and in the course of their value–

adding activities the companies exercise effective control over their overseas operations. This definition excludes those companies participating in joint ventures by means of minority investments, with no significant influence of the subunits abroad and enterprises engaging in investments in tax havens for fiscal evasion or preferential re–investment in their home country.

2.2 Theoretical concepts of EMNE internationalization

The economic literature provides diverse approaches to explain the internationalization path and strategy of MNEs and EMNEs in particular (Amighini et al., 2010). Those of special interest for the present study are: Uppsala internationalization process model, eclectic paradigm, linkage–leverage–learning concept, springboard perspective and evolutionary perspective (see Table 1).

Table 1. Selected theoretical concepts explaining internationalization of EMNEs

Theoretical concept	Selected papers	Main insights
Uppsala model	Johanson and Vahlne (1977)	Explains the expansion of EMNEs in other emerging countries. EMNEs internationalize gradually and increase their commitment to foreign market with accumulation of knowledge about operations in the host country
Eclectic OLI–paradigm with extensions	Dunning (1977, 1980, 1988, 1995, 2015), Cantwell and Narula (2001), Dunning and Lundan (2008), Cantwell et al. (2010)	EMNEs internationalize relying on ownership, location and internalization advantages. EMNEs have ownership advantages in creation and effective management of value chains. Their location advantages lie in effective positioning of their subsidiaries for acquisition of new competences. The internalization advantages comprise access to new resources, knowledge and technology abroad through acquisition.
LLL–framework	Mathews (2002, 2006, 2017)	EMNEs internationalize by means of accessing resources they initially lack through linkages. They gain advantages through effective use and management of their resources. They learn continuously in order to gain new advantages and improve the leveraging process.
Springboard theory	Luo and Tung (2007 and 2018), Madhok and Keyhani (2012)	EMNEs use internationalization as a springboard for intensive development in order to overcome their initial lack of ownership advantages and the “liability of emergingness”.

Theoretical concept	Selected papers	Main insights
Evolutionary perspective	Ramamurti (2012)	EMNEs and AMNEs represent companies at different stages of their development – early and mature accordingly. The recent changes in global environment contribute to explanation of differences in internationalization path.

Source: own summary based on the academic literature

The Uppsala internationalization process model has been considered one of the leading models explaining the firm internationalization process in MNE theory. Accordingly, firm internationalization occurs gradually and depends on the company's knowledge accumulation. As the MNE knowledge base of the foreign market grows, the company increases its commitment to this market proceeding from less risky investment forms to those requiring more involvement and carrying additional risks (Johanson and Vahlne, 1977). In the case of emerging market multinationals, the Uppsala Model provides sound argumentation for the investments directed toward other emerging countries — the expansionary investments in the terminology of von Zedwitz (2005) or South–South investments. The Uppsala model has been criticized for failing to offer a salient explanation for South–North investment flows (see e.g. Yilmaz et al., 2015).

The ownership–location–internalization (OLI) framework, also called the eclectic paradigm and proposed by John Dunning in 1977, has experienced further development over time (Eden and Dai, 2010) and received later extensions (Dunning and Lundan, 2008; Cantwell et al., 2010). The eclectic paradigm explains companies' decisions to engage in FDI considering three types of firm's specific advantages: ownership, location and internalization. According to the theory, FDI is justified if a company possesses ownership advantages over other firms (O), which can be exploited to successfully benefit from the local characteristics of the host country (L) and it is more profitable to exploit the advantages internally (I) rather than arm's length transactions in the market. The ownership advantages comprise the possession of or access to valuable assets both tangible and intangible (Oa), the transactional advantages that allow coordination of value–adding activities at the international scale (Ot) and companies' specific norms and values, which have been developed under the influence of institutional environment of the home country (Oi) (Eden and Dai, 2010). In the literature, vivid discussions regarding the validity of the

OLI–framework for explanation of EMNE internationalization patterns include the argument that EMNEs do not show evidence of possessing ownership advantages in the customary sense (e.g. Mattews, 2002; Rugman, 2009; Madhok and Keyhani, 2010). Opponents have argued that EMNEs posses competitive advantages, which are non–conventional and less obvious (see e.g. Narula, 2006; Williamson, 2015). EMNEs possess initially scarce asset–type ownership advantages relative to their counterparts from developed countries. Their rapid internationalization is aimed to acquire and to augment the Oa advantages. At the same time, EMNEs are claimed to possess the outstanding Ot advantages showing their superior ability to structure their value chains in a new way and organize the value–adding activities across borders, combining different resources from different locations, such as low cost labor and financial resources (for instance, provided by governments of home countries) with sophisticated technologies acquired abroad. Another source of Ot advantage lies in completely new business models developed by EMNEs in which the sourcing, production, distribution and service of existing products are organized in new ways, creating new offerings with a better fit to customer needs in both emerging and advanced markets. The Oi advantages of EMNEs lie in their ability to operate in uncertain and unstable environments of their home countries. Their headquarters are often highly embedded in home locations, implementing the innovation strategies with the support of local governments. Besides, they usually have excellent linkages with domestic institutions providing solid financial and research background.

Location advantages of EMNEs are closely connected to their Ot advantages. EMNEs position their international subsidiaries to secure access to new capabilities and knowledge and to serve better the needs of the customers. They do not follow the pattern of AMNEs disaggregating the value adding activities for the purpose of cost saving, but integrate and often duplicate abroad the activities already existent in the home country in order to acquire new competences. Through internalization in the form of intense cross–border M&A in advanced markets, EMNEs access the complementary resources, especially knowledge and technology that improves their innovative competences, augment their capabilities in the home countries and adjust their value chains to the institutional environment of host countries. EMNEs' distinctive feature is that that their most advanced knowledge resources are usually situated in distant developed countries in contrast to AMNEs, which develop gradually and concentrate their core competences near to their

headquarters (Cantwell and Narula, 2001; Narula, 2006, Williamson, 2015).

The alternative **linkage–leverage–learning (LLL) framework** proposed by John A. Mathews (2002, 2006, 2017) is aimed at closing the gaps left by other theories, especially the eclectic paradigm, and in the author's opinion, providing a better explanation of MNE internationalization from emerging markets. The LLL–framework originates in a resource–based view (RBV) and explains EMNE internationalization from the Asia–Pacific region, which the author refers to as the "dragon multinationals."

At an initial phase of internationalization, the incumbent emerging market companies lack resources, which they can access through linkages in the form of collaboration in joint ventures and strategic alliances. EMNEs' global orientation is seen as the main source of their advantage; partnerships and joint ventures are considered as a source of leakage of new knowledge and intangible assets. After integration into the global value chains through linkages, EMNEs leverage their resources and cost advantages. In contrast to conventional RBV, the LLL–perspective does not concentrate on sustaining the existing competitive advantage, but rather how the barriers to resource acquisition may be overcome by incumbent firms. The newcomer companies learn how to efficiently organize their international operations and discover new competitive advantages. Expansion abroad is seen not as the result of accumulated resources, but reaching for resources is considered the driving force that facilitates and accelerates the internationalization process.

The contribution of the LLL–framework has been criticized in the academic literature for generalizing the findings on the internationalization path of fast growing Asian EMNEs to all multinationals from emerging countries (Narula 2006). While other research recognizes the usefulness of the LLL–framework for its contribution to the explanation of how newcomer MNEs shape competitive advantages in the knowledge–driven global economy (see Amighini et al., 2010; 2013).

Another remarkable theoretical concept explaining the internationalization of EMNEs that closely follows Matthews' (2002) argumentation is referred to as the **springboard perspective** (Luo and Tung, 2007). This concept opposes the OLI–framework's explanation to argue that the reason that EMNEs internationalize is not due to their ownership advantages, but rather their disadvantageous latecomer position in the world economy. They use international expansion as a springboard to compensate for the lack of

competitive advantages and engage in risky and aggressive acquisitions in advanced markets in order to appropriate technology together with other important resources and gain rapid access to key customers abroad. This approach allows companies to transform the "liability of emergingness" into the "asset of emergingness," which can be described as entrepreneurial alertness and learning agility. In combination with high responsiveness and structural flexibility due to low cost operation base in their home countries, the companies are able to bring better "value for money" offers to the market (Madhok and Keyhani, 2012). The concept's authors emphasize the meaning of acquisitions in the capability–building process, which enables fast access to technology, key components and brands, tacit knowledge and local managerial expertise.

In contrast to the OLI–concept, the springboard perspective does not consider the unstable institutional environment in EMNE home countries an advantage for their operations. On the contrary, the problems and constraints of local institutions forces EMNEs to go abroad and operate in more stable and transparent environments favorable to the development of new advantages and competences. The M&A in advanced markets allow EMNEs to mitigate the liability of foreignness and operate conveniently in physically distant locations (Luo and Tung, 2007).

Ramamurti (2012), who has criticized both the springboard perspective as well as Mattews' (2002) postulate that EMNEs represent new species, has proposed the **evolutionary perspective** that synthesizes the ideas of OLI–paradigm, LLL–concept and springboard perspective. According to Ramamurti, EMNEs do posses ownership advantages initially, but they are different from ownership advantages attributed to advanced countries' MNEs. He suggests that a company's internationalization strategy is dependent not only on the country of origin, but also on its global context, stage of evolution and industry. Ramamurti explains that EMNEs and AMNEs are developing along the same evolutional trajectory whereas EMNEs occupy aspiring position and AMNEs represent the mature stage. Apart from that, the differences in ownership advantages are explained by the nature of the modern global economic environment, which requires the development of different capabilities compared with those developed by AMNEs in their early stage.

The importance of EMNE investments is reflected in growing interest in the academic

literature toward diverse aspects of FDI by emerging market companies (see Appendix A). The number of papers dedicated to EMNEs in major international business journals more than doubled from 2007 to 2016 (Luo and Tung, 2018). As studies reveal, EMNE activities abroad influence both home and host countries. The influence on host countries can be expressed on both macro– and institutional and micro–levels. At the micro–level influence of FDI by EMNEs on indigenous companies can take the form of spillover effects. The next chapter is dedicated to the topic of spillover effects from EMNEs' activities in host countries, providing a definition and taxonomy of spillovers as well as a closer look at the preconditions for their existence.

3 Spillover effects: definition, typology and determining factors

3.1 Definition of spillovers

The overall effects that FDI produce on host countries can be distinguished into two broad categories – direct and indirect. The most important direct effects comprise capital inflow into the host country, creation of employment opportunities and the increase of trade flows due to new FDI projects (Ruane and Ugur, 2005). For some time, inward FDI has been recognized as capable of producing less obvious indirect effects on the local economy and ingenious companies. The indications about the existence of indirect effects has been found in the economic literature starting in the second half of the twentieth century (e.g. MacDougall, 1960; Corden, 1967). But the first **definition of spillover effects** in the modern sense was that of Caves (1974), who described spillovers as potential benefits for the local economy from the productive activity of multinational corporations. The author argued that the presence of EMNEs contributes to better allocation of local resources through competition, improvements in technical efficiency by means of introduction of new technologies and the establishment of higher technical standards and speeding up of the technology diffusion in the economy through cooperation and competition with local companies.

Globerman (1979) further investigated and deepened the idea of spillovers, defining them as indirect economic benefits from foreign direct investment, including the increase of competition level in local industries, investments in human capital of host country, faster adoption of new technology and new management practices by local companies, which engenders an increase in mobility of resources in the economy. Globerman indicates that components of spillovers from FDI are very different from each other and difficult to measure.

Among the more recent contributions is Blomström et al.'s (2001) demand and supply concept that focuses on appropriable technology, which represents "embodied or disembodied knowledge about production and distribution." Foreign subsidiaries represent the supply side of appropriable technology, with host country companies the demand side in the model. The resources that local companies invest for adoption of new technology is considered the price of this technology. The spread of technology in the economy is

determined by interaction of supply and demand for the appropriable technology as well as the costs of the adaptation when compared with the usefulness of technology.

The next section takes a closer look at spillovers to consider their direction, level of economic interaction between the companies, channels of spreading and their determinants (see Figure 3).

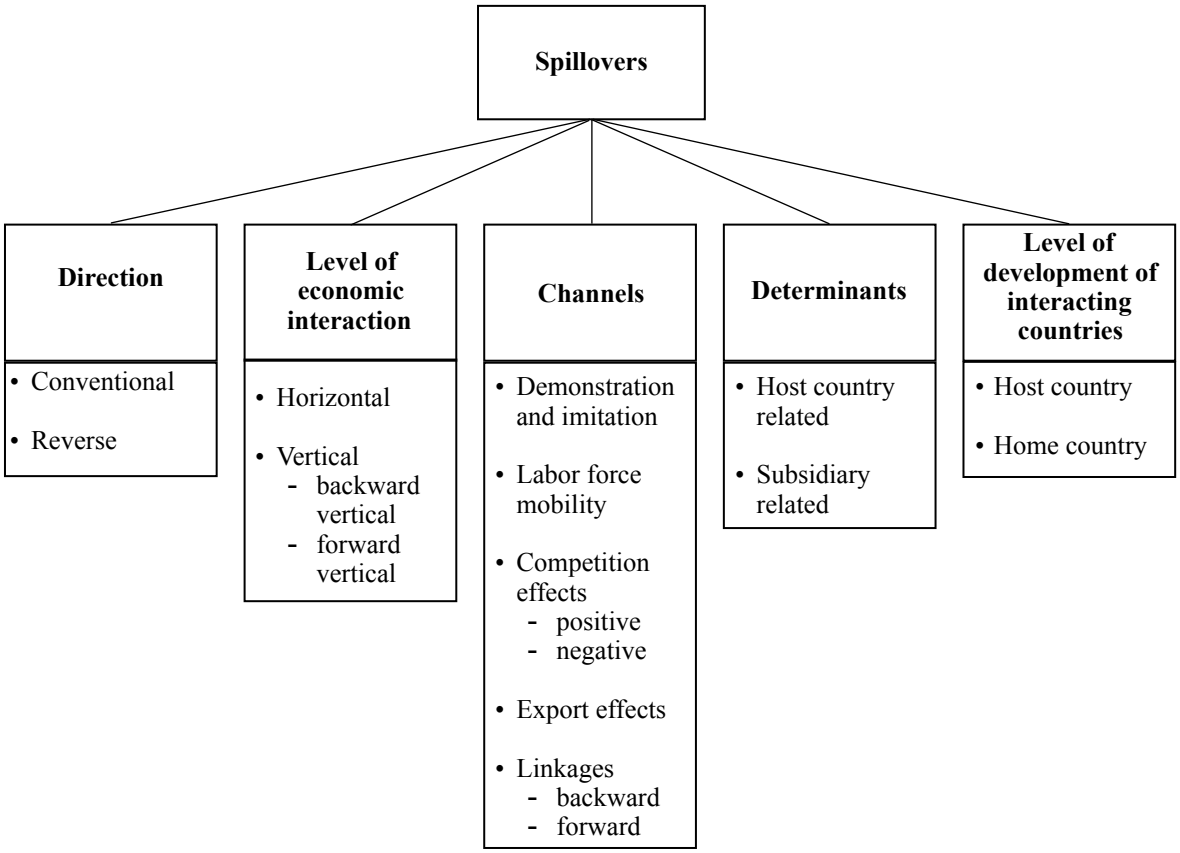

Figure 3. Selected categories for classification of spillover effects

Source: based on own summary of academic literature

3.2 Conventional and reverse spillovers

The spillover effects directed from foreign to local companies are usually referred to in the literature as **conventional or direct spillover effects**. But the vector of spillovers is not always oriented toward indigenous companies. In that context, scholars discuss **reverse spillovers**, which represent positive economic effects directed from domestic to foreign companies that do not cause the productivity gains not in local firms, but for MNEs subsidiaries operating in host country (Driffield et al., 2014). The academic studies link the

existence of reverse spillovers predominantly with the technology sourcing motivation for FDI (van Pottelsberghe de la Porterie and Lichtenberg, 2001; Driffield and Love, 2006; Chen et al., 2012; Driffield et al., 2014).

3.3 Horizontal and vertical spillovers

Spillover effects may occur at different levels of economic interaction. Thus, authors distinguish between horizontal and vertical spillovers. **Horizontal** spillovers occur at the intra–industry level whereas **vertical** at inter–industry level affecting upstream or/and downstream sectors (Reganati and Sica, 2005).

Within the category of vertical spillovers the literature differentiates between backward and forward spillovers. **Backward vertical spillovers** occur when local suppliers benefit from cooperation with foreign companies operating in the country. MNE subsidiaries that source their inputs from indigenous partners usually provide them with technical assistance, training and more efficient management practices. This may lead to optimization of production processes and higher quality of supplied products. **Forward vertical spillovers** may take place if MNE subsidiaries supply local companies with intermediate goods providing additional benefits compared with local sources, for instance higher quality, lower production costs or possibility of technological upgrade (Reganati and Sica, 2007). Some authors believe that vertical spillovers are more likely to happen as compared with horizontal spillovers, meaning that EMNEs' positive impact on domestic firms' production might be observable in non–competing and complementary sectors (Kugler, 2006; Reganati and Sica, 2005).

3.4 Channels of spillovers

Foreign and local companies operating in host country exert an influence on each other through different channels, such as demonstration/imitation, labor mobility, exports, competition and backward and forward linkages with domestic firms. Some channels may function in both ways transfusing spillover effects from MNE subsidiaries to local companies and vice versa (Resmini and Nicolini, 2007).

The demonstration and imitation effects take place when a foreign company introduces

superior technology to host country market. However, subsidiaries of MNEs may enter foreign markets to gain access to technologies available there. Usually this context implies that subsidiaries of MNEs from emerging countries enter advanced markets with higher overall levels of technology (Chen et al., 2012). Some studies indicate that advance market MNEs also pursue the same strategy when operating in the environment of other advanced countries (Javorcik, 2004).

Labour force mobility refers to the movement of the labor force between foreign and indigenous companies. In the conventional sense, the employees previously working for MNE subsidiaries transfer to domestic companies bringing their knowledge, production experience and management practices to a local company (Crespo and Fontoura, 2005). In the case of reverse spillovers, MNE subsidiaries hunt for experienced professionals, scientists and engineers in the host country as well as graduates of local universities in order to gain access to innovations (Chen et al., 2012).

The entry of MNE subsidiaries into the host country market may create both positive and negative **competition effects**. An increase in competition due to the entry of new market players from abroad may stimulate local companies to boost their productivity through investments in new technology and adoption of new management practices. On the other side, the presence of foreign companies may lead to a decrease in productivity of domestic firms through crowding–out effects, such as growing resource prices and market stealing through the offering of products of higher quality or at a lower price (Pittiglio et al., 2016).

Through observation or participation in the **export activities** of foreign companies, local firms may gain access to foreign markets or reduce their overall export costs (Crespo and Fontoura, 2005).

Backward and forward linkages emerge through integration of domestic companies into supply chains of MNE subsidiaries or vice versa. MNEs attempting to receive an appropriate quality of intermediate goods or services at local market may share their knowledge with indigenous suppliers through labor training or operating management instructions, thus creating the backward linkages. Spillover effects through forward linkages occur if MNEs supply local customers with new or superior products, possibly at lower prices, induce new after–sales services and support engagement of local firms in this process (Pittiglio et al., 2016).

Spillover effects may simultaneously occur through several channels, producing oppositely directed effects. Often the channels cannot be clearly distinguished from one another because of complexity of spillovers mechanism and interdependent effects (Crespo and Fontoura, 2005).

3.5 Determinants of spillovers

The described spillover effects are not a guaranteed consequence of foreign presence. The possibility of the effects and their direction cannot be predicted beforehand (van Pottelsberghe de la Porterie and Lichtenberg, 2001). The occurrence of spillovers depends on several conditions extensively discussed in the academic literature. From the host country perspective, the determinants might be formally organized into two groups of elements: subsidiary related and host country related.

Subsidiary related determinants comprise the elements subject to decisions of a foreign company that undertakes the investment and choses a specific host country namely: motives for FDI, entry mode, degree of foreign ownership and the geographical and technological distance between home and host countries.

Host country related determinants refer to the conditions of local environment at the macro and micro levels. The macro level comprises a set of conditions in the economy with which a foreign company interacts: absorptive capacity and overall level of technology in host country, competition at host market, government policies and protection of intellectual property rights. At the micro level, spillovers are preconditioned by size and motivation of local companies as well as their absorptive capacity.

The potential for spillovers is determined by a proper match of the conditions on the host country side and on the subsidiary side. The main determinants are comprised in Table 2 and briefly described below. Each component is considered separately whereas in the real world they are usually intertwined and the effect of each component cannot be isolated (Crespo and Fontoura, 2005).

Table 2. Subsidiary related and host country related determinants of spillovers

Host country related determinants	Subsidiary related determinants
Macro level	Motivation of foreign company
Absorptive capacity of host country economy	Entry mode of FDI
Competition at host country market	Degree of foreign ownership
Government polices	Geographical distance
Intellectual property rights protection	Technology gap and economic distance
Micro level	
Size and export capacity of local companies	
Absorptive capacity of local companies	
Motivation of local companies	

Source: own summary based on academic literature

Absorptive capacity at the macro level refers to the level of development of the host country and its local institutions which create a framework for operations of foreign firms. Especially important are the country's quality of labor force and overall level of education, as qualified workers represent one of the main channels for spillovers transfer to local companies (Crespo and Fontoura, 2005). Another relevant factor is the level of development of the financial system, which provides local companies with necessary resources for technological investments and allows them to pay higher wages in order to take on and retain professionals and leading experts (Meyer and Sinani, 2009).

The influence of **competition in the host country market** on spillovers is twofold. First, foreign companies entering a highly competitive host country market are forced to use new technology in order to gain a market share. At the same time, intense competition urges local companies to take a lively interest in new technologies and practices that foster efficiency, otherwise they might lose their market share (Blomström et al., 2001). The occurrence of spillovers may be inhibited by subsidiaries' unwillingness to share technology in order to protect their leading position in a highly competitive environment (Crespo and Fontoura, 2005).

The degree of **protection of intellectual property rights** in a host country influences MNEs' decision to bring advanced technologies to this market and increases the possibility of spillovers to domestic firms (Lee and Mansfield, 1996; Crespo and Fontoura, 2005). **Local companies' motivation** determines that spillover effects from foreign presence is

closely connected to institutions established in a host country. MNEs' subsidiaries usually intensify competition in host country markets. Local companies in turn are eager to find a way to access new technology in order to boost their productivity and preserve their positions. Company motivation is linked to a host country's **government policies:** if local institutions are tailored to protect indigenous companies from negative influence of competition, then the latter would have no incentive to pursue the strategies of technological upgrading (Meyer and Sinani, 2009).

Absorptive capacity of indigenous companies represents their internal capability to identify, internalize, adopt and exploit external knowledge created by others and available in the economic environment. Absorptive capacity depends in the first instance on previously accumulated knowledge and a company's skills and routines of knowledge processing (Crespo and Fontoura, 2005; Flatten et al., 2011). It is not easy to determine a necessary level of absorptive capacity. Empirical studies indicate that companies with very low absorptive capacity suffer from negative externalities of foreign presence. As absorptive capacity grows, the productivity of local companies grows with an increasing pace, but its rate of growth diminishes with higher absorptive capacity. Finally, companies at the highest end of this arbitrary scale show little evidence of productivity increase due to positive externalities, as they probably have nothing to learn from foreign firms (Girma, 2005). Host country companies' competitiveness and the absorptive capacity are closely linked to their **size**. Smaller companies generally have less chance to benefit from spillovers as they possibly lack the necessary resources to employ new technology and could be crowded out from the market after the entrance of MNEs (Crespo and Fontoura, 2005).

Export capacity of domestic firms is another criterion reflecting their economic and technological power. Exporting companies usually have higher absorptive capacity compared with firms with purely local operations while they face more pressure to remain at the technological frontier in order to preserve their positions, dealing with competition in the local market and abroad (Crespo and Fontoura, 2005). Empirical studies that consider exporters and non–exporters separately provide evidence that exporters have higher absorptive capacity as they are more perceptive for spillovers. But with already high productivity and dwelling at the technological frontier, exporters have less incentive to

adopt knowledge from incoming MNE subsidiaries (Girma, 2005).

From the subsidiary's perspective, a relevant factor exerting an influence on spillovers is **foreign company motivation** underlying investment decisions. The FDI may be motivated by conventional asset–exploiting considerations, bringing new technology to the host country, which is generally associated with positive spillovers from the foreign to the domestic sector (Driffield et al., 2014). Alternatively, companies may have asset–seeking motivation and pursue the strategy of technology sourcing, aiming to receive access to advanced technology (Siotis, 1999; Fosfuri and Motta, 1999). In the latter case, possible externalities for the domestic sector would be either non–significant or negative (Driffield and Love, 2003; 2006). However, the asset–seeking and asset–exploiting motives of MNE operations in the host country are not necessary mutually exclusive (Girma, 2005).

The choice of **entry mode of FDI** might have two opposite effects on potential spillovers. By entering through merger or acquisition, an MNE subsidiary uses established vertical and horizontal linkages with other domestic companies, which is more favorable for spillovers compared with greenfield investment. However, in the case of a merger or acquisition, new technology is introduced to the market slowly and in small portions whereas greenfield investment brings technology to the market at once (Harms and Méon, 2017). EMNEs entering developed countries usually choose M&A to join industrial clusters and benefit from innovation trends through reverse knowledge spillovers (Anderson and Sutherland, 2015).

The degree of ownership is an important factor as well. The main argument is that minority ownership with limited capacity for decision making provides low incentives for MNEs to transfer technology to the host country market and diminishes the possibilities for spillovers to local companies (Crespo and Fontoura, 2005; Driffield et al., 2014).

Geographical distance between the source of technology and potential recipient exerts influence on total cost of technology transfer. Indigenous companies located closer to foreign firms have more possibilities to observe and benefit from new technologies and practices as more distantly located ones (Resmini and Nicolini, 2007). The opposite is also true: foreign companies seeking to source technologies from local firms usually try to place their affiliates close to the host country's centers of excellence, such as industrial cities, innovative clusters, universities and research laboratories (Blomström et al., 2001).

The technology gap, sometimes referred to as economic distance, means the relative backwardness of local companies compared with MNE subsidiaries (or vice versa) in terms of technological advancement (Pittiglio et al., 2016; Resmini and Nicolini, 2007). The economic literature disagrees over the optimal technological gap for spillovers. If the technological gap is relatively narrow, then the potential for deriving benefits from foreign presence is weak (Crespo and Fontoura, 2005). However, a broad gap may prevent local companies from gaining advantages to the full extent as they will be unable to adopt advanced practices at the existing level of their technological development. Diverse econometric studies conclude that the moderate technological gap between MNE subsidiaries and local firms represents the most favorable condition for spillover effects (Pittiglio et al., 2016).

The existing empirical evidence on most listed factors is ambiguous and still insufficient to draw clear–cut conclusions. The best–investigated factor in the literature is absorptive capacity, which provides the most convincing empirical results for it is a major precondition for deriving benefits from the multinational presence (Crespo and Fontoura, 2005).

3.6 Level of development of interacting countries as determining factor

Scholars recognize that the **level of development of the host country** for MNEs' presence represents an important factor for productivity and technology spillovers. Alfaro et al. (2004) as well as Meyer and Sinani (2009) provide comprehensive overview of academic studies on this topic. Both papers show considerably more studies on spillovers in developing countries and transition economies than studies on developed countries.

Alfaro et al. (2004) show that econometric evidence of developing countries consistently negates the existence of positive productivity effects. There is either no evidence of spillovers or the overall effect is negative. And, Meyer and Sinani's (2009) study puts forward a hypothesis of linkages between the host country's level of development and the potential for spillover effects from the foreign presence. The authors conclude that the correlation between spillover effects and the host country's development level has a U–shaped form (see Figure 4).

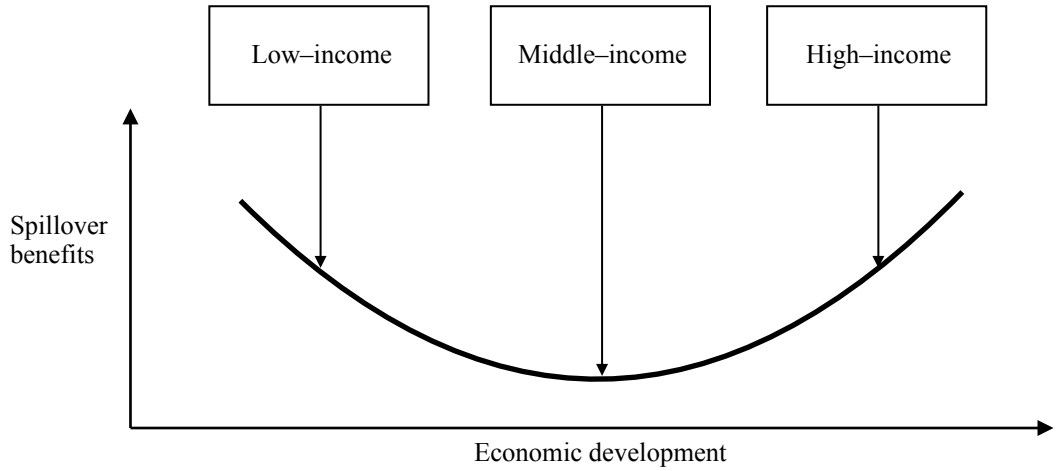

Figure 4. Level of development of host country economy and spillover benefits
Source: Meyer and Sinani (2009)

The logic behind the curve of economic advantages from spillovers is as follows. Companies in low–income economies with a large technology gap are likely to benefit from positive spillovers in the form of standardized knowledge that can be copied through observation or interaction. This knowledge diffusion is usually not constrained by multinational subsidiaries as it does not constitute a part of their core competences. In middle–income economies the presence of MNEs makes competition in the local market more intense. Basic knowledge is of little importance and advance technologies crucial to gaining a market share are well–guarded by foreign firms. The likelihood of spillovers in these circumstances is rather low. In high–income economies local companies are well–established, possessing advanced knowledge and developed human capital. They are eager to learn from newcomers from abroad to keep their market share. Thus, the potential for positive spillovers in favor of indigenous firms is high (Meyer and Sinani, 2009).

Few studies attempt to find linkages between the **level of development of the MNE home country** and level of spillovers. Most studies related to this topic investigate the influence of FDI nationality rather than level of development for the country of origin on spillover effects. For instance, Crespo and Fontoura (2005) argue that factors, such as culture, language, social and legal differences, can influence spillovers and provide the overview of studies that try to identify nationality–specific components of spillovers. Tables 3 and 4 comprise selected studies on the topic of spillovers according to the level of development of MNE home country and host economy.

Table 3. Selected academic studies on the topic of spillover effects from activities of AMNEs in advanced and emerging host countries

Studies	Main focus	Findings	Evidence and direction of spillovers
AMNEs in advanced host countries			
van Pottelsberghe de la Porterie and Lichtenberg (2001)	FDI and reverse technology spillovers in advanced economies	Through outward FDI technology spills over and benefits other industrialized countries. Inward FDI flows do not influence the technological base of the host economies significantly.	0
Karpaty and Lundberg (2004)	Spillover effects from FDI in Sweden	Strong evidence for the existence of positive spillover effects from inward FDI. US and Japanese investments have stronger positive effect on productivity in Swedish owned firms than FDI from the rest of the world.	+
Ruane and Ugur (2005)	Productivity spillovers from FDI in the Irish manufacturing sector	No evidence of significant positive productivity spillovers from foreign firms.	0
Griffith et al. (2006)	Spillovers to UK firms investing in US for gaining of tacit knowledge	Strong evidence for the existence of reverse knowledge spillovers associated with technology sourcing.	–
Murakami (2007)	Influence of foreign sector on productivity of local companies in Japan	In the short run an increase in share of foreign sector lowers the total factor productivity growth of local firms in the industry. In the long run the entry of foreign–owned firms has positive effect on the productivity of local firms as a result of technology spillovers.	0*/+
Damgaard (2011)	Spillover effects from FDI in Denmark	Domestic firms benefit more from the presence of Scandinavian than other MNEs. Negative spillovers arise from MNEs outside Scandinavia	+ / 0*
AMNEs in emerging host countries			
Hu and Jefferson (2002)	Spillover effects from FDI in electronic and textile industries in China with comparison between OECD and HMT–FDI	In both the electronics and textile industries, OECD–FDI has a significant negative effect on firm productivity.	0*
Wei et al. (2006), Wei et al. (2008)	Spillovers between domestic firms in China and investing firms from OECD and HMT countries	Evidence of mutual productivity spillovers between OECD firms and domestic market oriented Chinese firms.	+ / –
Montobbio and Sterzi (2011)	Spillover effects from R&D that is performed in the G–5 countries to Latin American countries	International knowledge spillovers from the G–5 countries (France, Germany, Japan, United Kingdom, and United States) are a significant determinant of inventive activity in Argentina, Brazil, Chile, Colombia, and Mexico	+
Javorcik and Spatareanu (2011)	Study on the origin of foreign investors as determinant of vertical spillovers from FDI in Romania	Positive association between the presence of US American companies in downstream sectors and the productivity of Romanian firms in the supplying industries. No significant relationship in the case of European affiliates.	+ / 0

Source: own summary of the academic literature

Note: "+" – conventional positive spillovers, "–" – reverse spillovers, "0" – no significant positive spillovers, "*" – negative effects

Table 4. Selected academic studies on the topic of spillover effects activities of EMNEs in advanced and emerging host countries

Studies	Main focus	Findings	Evidence and direction of spillovers
EMNEs in advanced host countries			
Chen et al. (2012)	Reverse knowledge spillovers to subsidiaries of emerging market firms in developed markets and knowledge transfer from subsidiaries in developed markets to parents in emerging markets	Investments in host markets that are rich in technological resources contribute to the technological development of EMNEs. Reverse knowledge transfer from subsidiaries in countries with rich R&D input resources leads to increased R&D spending by emerging markets parent firms at home.	–
Hamida and Khairallah (2016)	Benefits to local firms in Switzerland from entry and the presence of EMNEs in services/ construction industry	Presence of EMNEs reduces the productivity of local services/construction firms in Switzerland. No benefit is found from competition effects.	0*
EMNEs in emerging host countries			
Hu and Jefferson (2002)	Spillover effects from FDI in electronic and textile industries in China with comparison between OECD and HMT–FDI	In neither industry does FDI from Hong–Kong, Macao and Taiwan have any impact on Chinese firm productivity.	0
Wei et al. (2006)	Spillovers between domestic firms in China and investing firms from OECD and HMT countries	HMT presence has negative impact on export–oriented Chinese firms. No significantly positive effects of Chinese presence are detected on Hong Kong, Macao and Taiwan invested firms.	0
Wei et al. (2008)	Spillovers between domestic firms in China and investing firms from OECD and HMT countries	Mutual positive productivity spillovers between Chinese and Hong Kong, Macao and Taiwan invested firms.	+ / –
Abraham et al. (2010)	Spillovers to Chinese firms from HMT investments	FDI from HMT–countries has higher positive effect on domestic firm productivity in China than FDI originating from other countries.	+

Source: own summary of the academic literature

Note: "+" – conventional positive spillovers, "–" – reverse spillovers, "0" – no significant positive spillovers, "*" – negative effects

It is obvious from tables 3 and 4 that the results of academic studies on spillover effects from the activities of EMNEs and AMNEs in both advanced and emerging countries are ambiguous. The detailed research overviews on the topic of spillovers provided by Blomström and Kokko (1998) and Meyer and Sinani (2009) supplemented by Tülüce and Doğan (2014), show similar results. And, studies find: significant positive FDI externalities, significant negative effects on domestic productivity and spillovers vary from

weak to non–existent (Crespo and Fontoura, 2005; Ruane and Ugur, 2005; Driffield and Love, 2007).

This thesis aims to contribute to existing studies examining the differences between spillovers emerging from EMNE and AMNE subsidiaries' activities in advanced countries. For this purpose, Germany was chosen as an example of a developed country richly endowed with technological resources and human capital. The next section briefly considers the preconditions for the occurrence of spillovers from the point of view of the FDI recipient country.

3.7 Advanced country as FDI recipient from emerging countries with the example of Germany

This section takes a closer look at preconditions for occurrence of externalities from a host country perspective and from a foreign company perspective in assessing the endowment of Germany as a FDI location according to the determining factors listed in Table 2 of Section 3.5.

In considering **absorptive capacity and level of technology** at macro and micro levels in Germany it would be helpful to refer to *Global Competitiveness Report 2017–2018,* which contains information on the different aspects of each country's environment. According to the report's data, Germany ranks among the top five of the most powerful economies in the world considering market size. For overall innovation capacity and business sophistication Germany country ranks 5th in the world and is characterized by high technological readiness (8th in the ranking) and developed macroeconomic environment and financial system (12th in the world). Germany's educational system ranks 9th in the world, which is an argument in favor of highly qualified labor forces (ranks 15th in higher education and training). And, the country shows a high ranking in the index describing training in companies – placed sixth – indicating that local firms intensively invest in qualification of their labor forces (World Economic Forum, 2018).

Regarding firm–level technology absorption, Germany ranks 12th in the world, meaning that German executives are convinced that business in Germany adopt the latest technologies to a high extent. An important role they attribute to FDI in technology transfer

(Germany ranks 11th). At this point it should be mentioned that a relatively high degree of the technological sophistication of German companies may be a reason for moderate positive spillovers from foreign companies as indicated by Blomström et al. (2001). A possible explanation is that the companies already possessing advanced technologies have little to learn from incomers from abroad. Another likely explanation is the propensity of indigenous companies to rely on locally developed knowledge and rigidity toward learning from foreign newcomers that possess fundamentally different technologies.

Germany is characterized by well–developed **institutions** and solid **intellectual property protection** (place 21 and 20, respectively, among 137 countries). The **absorptive capacity** of local companies is very high as they show a high level of overall spending on R&D (rank 4th) and intense collaboration with universities on R&D (rank 7th). The German market is characterized by intense **competition** (rank 10th) with very high rankings for quantity and quality of local suppliers (4 and 5, respectively).

Despite some changes in foreign investment legislation in 2009, **government policy** in Germany remains benevolent toward foreign investments from both advanced and emerging economies, preserving its high attractiveness as a location for FDI (Jost, 2013).

Summing up the determinants described above, Germany as a FDI host country meets all the necessary criteria for good preconditions for positive spillover effects to local companies from the economic activities of foreign entities.

Next, it is reasonable to evaluate determinants from the subsidiary perspective in order to consider the possibility of positive spillovers from activities of EMNEs in Germany. It is worth mentioning that companies from abroad, even those coming from the same country and industry, may pursue diverse strategies with different motives. The determinants described below attempt to capture the general tendency without claiming to be true in all cases. The considered determinants for EMNEs refer mostly to studies of Chinese companies in advanced markets as they are predominantly the focus of recent economic literature. The information about EMNEs from other countries is scarce. This general conclusion in the case of Germany is justified, as China is the leading foreign investor in Germany among the emerging countries, according to the number of projects and FDI stock (Hanemann and Huotari, 2015; Deutsche Bundesbank, 2016).

Regarding the **motivation** of investing firms, Giuliani et al.'s (2013) survey and García–

Vega et al.'s (2011) study reveal that most examined companies from emerging markets are interested in sourcing advanced technology from European countries. McKinsey & Company's study of cross–border deals of emerging and advanced market companies between 2000 and 2013 in Germany shows that most acquirers from emerging countries (56%) are motivated by acquisition of strategic resources, such as know–how, brand and technology (Cogman et al., 2015). Noteworthy is that the study indicates that since 2010 emerging market companies have substantially changed their motivation. From 2000 to 2003, 77% of 1,100 acquisition deals were motivated by gaining access to new technology. This number decreased over time reaching 44% in the period 2010 to 2013. Recently the focus of emerging market firms has shifted to winning new markets. The share of deals with this motive grew from 9% in 2000 to 2003 to 28% in 2010 to 2013.

As investing companies' motives are not obvious, it might be helpful to consider linkages between motivation of foreign investors and entry mode of FDI. Klossek et al.'s (2012) case study reveals that the main motive of M&As by Chinese firms in Germany is gaining quick access to new technology or other intangible assets. The Chinese greenfield investments are predominantly explained by market–seeking motives. Bertelsmann Stiftung's study indicates that number of Chinese greenfield investments despite public opinion and view of the media clearly dominates the number of M&A projects, but the amounts invested in M&A projects are often substantially higher (Jungbluth, 2016). According to Mercator Institute for China Studies' report, most Chinese FDI comes to Germany through M&A deals – 82% of overall FDI volume (Hanemann and Huotari, 2015). The report confirms that an important driver of Chinese acquisitions in Germany is access to technology and know–how, especially information technology and high–technology manufacturing, such as automotive and aviation. At the same time, Germany is the main recipient of Chinese greenfield investment in Europe. The recent trend indicates growing expenditures of Chinese companies on greenfield investments for R&D facilities and other higher value–added services.

A closer look at the **degree of foreign ownership** allows us to offer suggestions about dedication and degree of involvement of foreign companies into economic activities in the host country. Chinese projects in Germany from 2014 to 2016 reveals that investors prefer a high degree of ownership. Most projects are characterized by 75% to 100% of foreign

ownership (Jungbluth, 2016). According to Deng (2012), Chinese firms prefer wholly owned subsidiaries in two cases: the first is linked to severe competition in the host market and the second is connected to the investment's asset–seeking purposes.

Regarding the issue of distance between China as the source country and Germany as the recipient, it is obvious that both **geographical and cultural distances** are substantial, resulting in high liability of foreignness for Chinese companies. Anderson and Sutherland (2015) generally agree with findings that indicate that EMNEs do not rely on cultural similarity and ethnic ties expanding their activities to new markets. The cultural distance in South–North investments is obviously higher than North–North investments, which might pose some obstacles to spillovers.

In order to assess the **technology gap** between Germany and EMNE home countries it is possible to use the indicators of the *Global innovation index,* which in 2017 ranked Germany 9th among the 127 countries. The main inward investors in Germany among emerging countries – China and India – were ranked 22nd and 60th, respectively. The *Global innovation index* provides another interesting indicator – the average expenditure on R&D of the top three global companies in the country. According to this measure, Germany ranks 2nd. Surprisingly, China and India are ranked rather high in 6th and 14th place, respectively (Cornell University, 2017).

Table 5. Likelihood of spillovers in case of FDI by EMNEs in Germany

Host country related determinants	Possible spillovers	Subsidiary related determinants	Possible spillovers
Macro level		Motivation of foreign company	– / +
Absorptive capacity of host country economy	+	The entry mode of FDI	+ / –
Competition at host country market	+	The degree of foreign ownership	–
Government polices	+	Geographical distance	0
Intellectual property rights protection	+	Technology gap / Economic distance	–
Micro level			
Size of domestic companies / Export capacity of domestic comps	+		
Absorptive capacity of local companies	+		
Motivation of local companies	+ / 0		

Note: "+" – conventional positive spillovers, "–" – reverse spillovers, "0" – no spillovers

Table 5 briefly summarizes predictions about the possibility of spillovers according to the preconditioning factors. All in all, Germany as a host country is very well endowed with human, technological and economic resources, providing good preconditions for positive externalities from activities of foreign subsidiaries in the country. Considering the factors related to EMNE subsidiaries the result is ambiguous: both positive and negative spillovers are possible. It is important to keep in mind that the interaction among factors as well magnitude of the effects will define the final result.

Drawing upon the conclusions regarding the relevant determining factors for spillovers from EMNEs in Germany, the next chapter will formulate research propositions for the investigation of externalities.

4 Conceptual framework and research propositions

This chapter presents the thesis' conceptual framework followed by research propositions that will help to answer the question of whether the inward FDI originating from emerging countries and targeting advanced countries contribute positively to the productivity of host country companies.

As described in the Chapter 2, one possible approach adopted in the academic literature to assess the influence of foreign companies on the productivity of domestic companies is the investigation of spillover effects. As Section 3.5 shows, the existence of positive or negative externalities is determined by a variety of factors. For the purposes of estimation, this thesis focuses only on productivity differences between interacting companies as the main precondition of spillovers between indigenous firms and EMNE subsidiaries operating in the country. It is reasonable to suppose that the achieved level of productivity of domestic and foreign companies is determined to a large degree by the development of their capabilities. In the simplest scenario it means that well–developed capabilities result in high productivity, in which lagging capabilities lead to comparably lower productivity. It is also assumed that foreign companies with lagging capabilities are aiming at augmenting them in order to achieve higher productivity and a competitive position in the market.

The concept map on Figure 5 depicts in a concise manner how possible differences in the productivity of interacting companies may lead to spillover effects from the point of view of theoretical concepts described in the Chapter 2 and the determining factors listed in Chapter 3. A simplified consideration of the linkages between productivity of interacting companies and spillover effects leads to the following cases:

- direct positive spillovers are possible if productivity of foreign companies is higher compared with productivity of domestic firms;
- reverse spillovers may occur if productivity of foreign companies is lower compared with productivity of domestic ones;
- if productivity of both groups of companies is at a similar level there would be no incentives for spillover effects.

For reasons of simplicity, the possibility of mutual productivity spillovers is excluded from

consideration.

To make an assumption about the productivity level of indigenous companies in an advanced country, it is helpful to refer to the case of Germany, described in Section 3.7. It allows for the assumption that local companies operating in a highly competitive economic environment possess well–developed technological, managerial and other capabilities as well as a high level of productivity.

For foreign companies entering the advanced host country, for simplicity reasons considered are only two cases – high productivity and low productivity. The EMNE subsidiaries with low productivity are characterized by lagging capabilities and enter advanced countries for the purposes of catching–up, as von Zedwitz (2005) has proposed (see Figure 2 in Section 2.1). Companies from emerging markets that have passed the standard of catching–up, as assumed by evolutionary perspective, are supposed to posses a high productivity level due to developed technological and other capabilities and pursue market–seeking strategies in advanced countries.

In order to make predictions about the motivation and behavior of EMNEs in advanced countries it is helpful to refer to the IB theories described in the Section 2.2, namely to the OLI–framework, LLL–concept and springboard perspective. Following the logic of OLI–framework, EMNEs engage in catching–up to FDI in advanced markets by augmenting their firm specific advantages through an internalization of knowledge and technology through M&A or collaboration with host country firms. Both the LLL–concept and the springboard perspective share the idea that initially EMNEs are scarcely endowed by competitive advantages valuable for operations in international markets and internationalize in order to acquire both tangible and intangible assets crucial to further successful operations. Considering the theories mentioned, it is reasonable to suppose that EMNEs entering the advanced market possess less sophisticated technology with lower productivity than host country companies.

To sum up, it is assumed that emerging market companies operating in an economic environment of advanced countries possess either the same or lower level of productivity compared with indigenous firms. In these circumstances it is logical to suppose that EMNEs in advanced countries either create no positive externalities toward local companies or enjoy reverse productivity spillovers.

In order to provide an answer to the question about the influence of EMNE subsidiaries on indigenous host country companies, this thesis will present further research concentrating on the identification of positive productivity spillover effects. For this purpose it is necessary at the first stage to estimate the productivity differences between the EMNE subsidiaries and indigenous companies in the host country in order to determine the possibility and direction of spillover effects. At the second stage, the investigation will proceed to an estimation of direct spillover effects linking the productivity of indigenous companies to the productivity level of emerging country companies' subsidiaries operating in the host country.

The hypotheses for testing the research propositions are formulated in the following chapter. The next chapter further provides an overview of the the methodology and the data used for analysis.

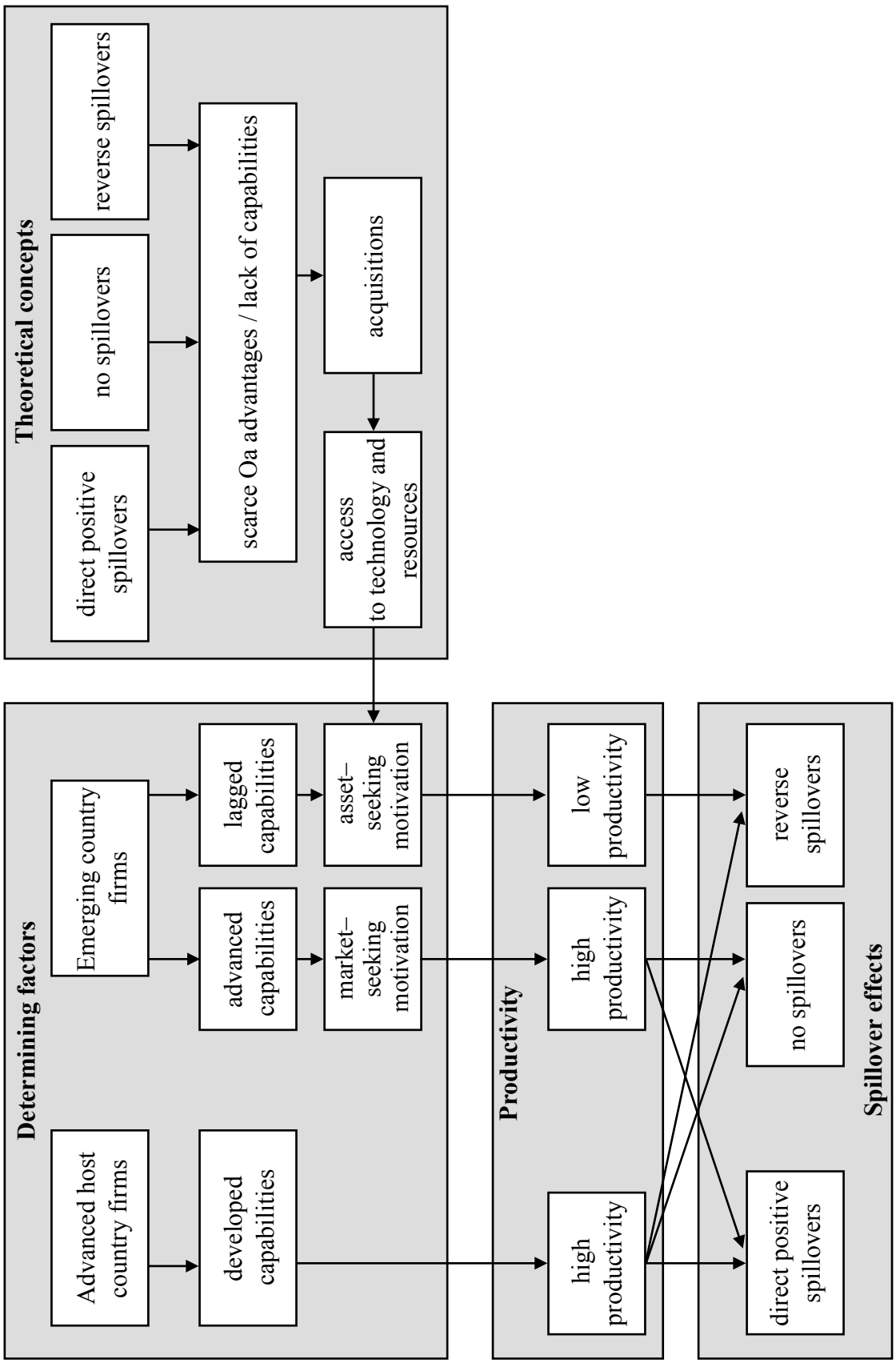

Figure 5. Concept map of productivity spillovers in advanced host country from activities of EMNEs

5 Methodology and data

5.1 Methodology

This chapter describes the methodology for an assessment of productivity spillovers to indigenous host country companies from activities of foreign country firms. Starting with the formulation of the research hypothesis, it further describes the procedure of empirical testing and then proceeds with a description of the data used for analysis.

The investigation of spillover effects from activities of EMNEs in developed countries was conducted using the example of Germany. This country choice was explained by Germany's long history of MNE operations in its economic environment on the one hand and very good endowment with necessary preconditions at the macro and micro levels for the existence of positive externalities from a foreign presence on the other hand.

The empirical analysis was based on Blomström et al.'s (2001) and Hubert and Pain's (2002) idea that spillover effects are not common for all types of inward investors. The present investigation's main feature, which distinguishes it from other research in the field, is in division of the inward investors into two groups based on the level of development of their home country: companies originating in advanced and emerging markets. The AMNEs served as the control group in the analysis because they have a longer history of operations in Germany and presumably are more likely to generate positive spillover effects to the indigenous companies (see Figure 5).

The estimation of spillover effects was conducted in three basic steps:

- estimation of TFP of foreign and local groups of companies,
- identification if differences in TFP between local and foreign companies are significant,
- estimation of spillover effects.

The first and second steps were preparatory and necessary to formulate predictions about the possibility and direction of spillover effects. The estimation of spillovers at the third step was based on an important assumption: companies with higher productivity tend to generate spillovers to the companies with lower productivity (Blomström et al., 2001). The analysis should identify the existence of significant productivity advantages of foreign companies toward local ones as a precondition for conventional spillovers and vice versa

for reverse effects. The third step addressed explicitly the research question of how the productive activities of EMNEs (and AMNEs as a reference group) influence the productivity of German companies. At this stage, the existence of direct spillover effects from foreign companies to local firms was tested empirically, based on the correlation between productivity of foreign companies in chosen sector and indigenous ones.

For the purposes of an estimation, foreign multinationals were divided into two groups: AMNEs and EMNEs, according to classification of countries in the *World Economic Situation and Prospects 2016*. MNEs originating from developed economies were defined as AMNEs. MNEs originating from developing economies and economies in transition were considered EMNEs. A list of countries of origin in the sample is provided in Appendix B. A special case was represented by companies originating in so called tax havens. Analyzing the FDI flows, UNCTAD excludes from its data the investment flows to offshore financial centers and special purpose entities (SPEs), which are characterized by "little or no real connectivity to the economy in which they are resident but serve an important role within an MNE's web of affiliates by holding assets or liabilities or by raising capital" (UNCTAD, 2016). Therefore, the companies from tax havens were omitted from further consideration.

The indigenous companies in the present investigation, in contrast to earlier studies (see e.g. Griffith,1999), were not treated as a homogeneous group but divided into two groups: purely local firms and German MNEs. The empirical studies have already confirmed the idea that companies engaged in multinational activities usually have higher levels of productivity in comparison with purely domestic companies and might be even more productive than foreign firms (Temouri et al., 2008).

To provide an answer to the question whether the preconditions for spillovers exist and to determine the direction of possible externalities, the preparatory steps of the investigation addressed the productivity differences between foreign and indigenous host country companies. The following hypotheses were tested empirically:

H1: *Productivity levels of EMNEs and German local companies are significantly different.*

H2: *Productivity levels of AMNEs and German local companies are significantly different.*

H3: Productivity levels of EMNEs and German MNEs are significantly different.

H4: Productivity levels of EMNEs and German MNEs are significantly different.

For an estimation of firms' productivity level, the economic literature commonly suggests application of the Cobb–Douglas production function of the form

$$Y_{it} = A_{it} K_{it}^{\beta_k} L_{it}^{\beta_l} X_{it}^{\beta_x}, \quad (1)$$

where a firm i produces an output Y at a time t. In Equation (1) K is capital input, L is labor input and X represents intermediate inputs. β_k, β_l and β_x indicate the elasticity of the output according to relevant factor (Griffith, 1999). Parameter A indicates the level of efficiency of establishment i the year t, which the researcher did not observe from the available data (Eberhardt and Helmers, 2010).

For purposes of estimation, the equation was transformed to log–linear form

$$y_{it} = \beta_k k_{it} + \beta_l l_{it} + \beta_x x_{it} + a_{it}, \quad (2)$$

where the k_{it}, l_{it} and x_{it} are logs of variables K_{it}, L_{it} and X_{it} from (1). The residual a_{it} can be interpreted as total factor productivity (TFP) of the establishment i in the year t (Griffith, 1999; Driffield et al., 2014). The interpretation of the residual as TFP goes back to the work of Solow (1956) and comprises all unobserved determinants of output (Eberhardt and Helmers, 2010).

Following Driffield et al. (2014), intermediate inputs were dropped from Equation (2) in order to maximize the sample size, as this data is not available for all companies in the sample (mostly non–existent by foreign companies):

$$y_{it} = \beta_k k_{it} + \beta_l l_{it} + a_{it}. \quad (3)$$

The residual a_{it} can be decomposed into the following elements

$$a_{it} = \eta_i + t_t + \omega_{it}, \quad (4)$$

where η_i represents firm–specific productivity differences, which are fixed over time, t_t stands for year effects that capture macro–productivity shocks and ω_{it} stands for firm–specific differences in productivity which are variable over time. The researchers' main concern was that firm–specific productivity shocks ω_{it} from Equation (3) might not be idiosyncratic and serially uncorrelated, but may persist over time. One possible way to overcome this problem is to assume that this component of the error term to be serially correlated and model it as the autoregressive process of the first order AR(1)

$$\omega_{it} = \rho\,\omega_{it-1} + u_{it}\,, \tag{4}$$

where u_i represents an idiosyncratic error term and $|\rho| < 1$. The production function can be modeled in dynamic form, which allows to mitigate the problem of serially correlated total factor productivity (Eberhardt and Helmers, 2010):

$$y_{it} = \rho\,y_{it-1} + \beta_k k_{it} - \rho\beta_k k_{it-1} + \beta_l l_{it} - \rho\beta_l l_{it-1} + (1-\rho)\eta_i + (1-\rho)t_t + u_{it}\,. \tag{5}$$

The parameters β_l and β_k are estimated from the dynamic Equation (5) using the system generalized method of moments (GMM) estimator. This estimator is chosen as it is considered in the academic literature as one of the most efficient methods when dealing with a dynamic panel data as in present sample (e.g. Griffith, 1999; Eberhardt and Helmers, 2010; Driffield and Love, 2005; Arnold, 2005).

Next, the total factor productivity $\widehat{TFP_{it}}$ ($\hat{\omega}_{it}$) for each observation of company *i* in year *t* is calculated using the obtained parameter estimates $\hat{\beta}_l$ and $\hat{\beta}_k$ and the observable variables in logarithmic form (Eberhardt and Helmers, 2010):

$$\widehat{TFP_{it}} = \hat{y}_{it} - \hat{\beta}_l l_{it} - \hat{\beta}_k k_{it}\,. \tag{6}$$

The average TFP was calculated separately within following subgroups of companies in

the sample: EMNEs, AMNEs, tax havens, German MNEs and German local companies.

After the estimation average TFP values of EMNEs and AMNEs were compared with average productivity values of German local companies and German MNEs in order to identify direction of spillovers. Companies with their headquarters in tax havens are omitted from further consideration for the reasons indicated previously. It is necessary to test whether the obtained differences in productivity are significant. The following null hypotheses are tested by means of a two–sided independent sample t–test (provided normal distribution of the data within the groups):

a) *average TFP values of EMNEs are equal to average TFP values of German local companies,*

b) *average TFP values of AMNEs are equal to average TFP values of German local companies,*

c) *average TFP values of EMNEs are equal to average TFP values of German MNEs,*

d) *average TFP values of AMNEs are equal to average TFP values of German MNEs.*

The cases for which the null hypothesis is rejected and the the productivity of foreign companies is significantly higher than domestic companies show the potential for direct spillover effects from foreign to German companies.

The estimation of spillover effects relies on the approach proposed by Driffield et al. (2014), which links the TFP of local companies to average TFP of foreign companies operating in the same industrial sector. This method is based on an assumption about the causal relationship between productivity of foreign and domestic firms in the same sector. The problem of endogeneity arises along with this assumption, as both productivity of domestic sector firms and productivity of foreign sector companies may be influenced by external macroeconomic shocks. This effect could be mitigated by using the panel data generalized method of moments instrumental variables estimator (GMM–IV), which allows for instrumenting average TFP of foreign companies by means of average sector sales and average fixed assets within each sector (Driffield et al., 2014).

The following model is used for testing direct spillovers running from EMNEs to local

German companies:

$$TFP_{it}^{l} = \beta_1 TFP_{csy}^{EMNE} + \beta_2 X_{it} + \alpha_i + \gamma_t + e_{it}\,, \tag{7}$$

where the independent variable TFP_{it}^{l} stands for productivity of a local company *i* in year *y*. The dependent variable TFP_{csy}^{EMNE} indicates the average total factor productivity of EMNEs in each cell of the corresponding sector and year. The variable X_{it} is capital per worker of local company *i* in year *t* measured in log units. The equation controls also for other fixed effects: local company fixed effects (α_i) and year effects (γ_i). e_{it} is a residual. According to Driffield et al. (2014), the crucial variable over which companies have control in adjusting their productivity is ratio of capital to labor, which reflects the company's input strategy. Other possible control variables, such as intangibles, debt, material inputs and labor quality, have been dropped from estimation because of the unavailability of relevant data for many companies in the sample. The coefficient β_1 indicates elasticity of productivity of local companies in relation to productivity of EMNEs in the same industrial sector and serves as an indicator of direct spillover effects.

For the purposes of comparison, spillover effects from productive activities of AMNEs in Germany are estimated using the average TFP of AMNEs:

$$TFP_{it}^{l} = \beta_1 TFP_{csy}^{AMNE} + \beta_2 X_{it} + \alpha_i + \gamma_t + e_{it}\,, \tag{8}$$

where the dependent variable TFP_{csy}^{AMNE} indicates the average total factor productivity of AMNEs in each cell of the corresponding sector and year and all other variables are the same as in Equation (7).

The estimation of spillovers to German MNEs from the economic activity of EMNEs follows the same methodology:

$$TFP_{it}^{GMNE} = \beta_1 TFP_{csy}^{EMNE} + \beta_2 X_{it} + \alpha_i + \gamma_t + e_{it}\,, \tag{9}$$

where TFP_{it}^{GMNE} is productivity of a German MNE *i* in year *y*, all the other variables are as described previously. The spillovers to German MNEs from AMNEs are estimated using the same approach and the following model:

$$TFP_{it}^{GMNE} = \beta_1 TFP_{csy}^{AMNE} + \beta_2 X_{it} + \alpha_i + \gamma_t + e_{it} \quad . \tag{10}$$

The next section describes the data used for the analysis.

5.2 Data

The analysis was conducted using firm level data, following the recommendation of Görg and Strobl (2001). The data originated from the *Amadeus Database* and possesses the following characteristics especially important for the present econometric estimation:

- contains the records of main performance indicators at firm level;
- provides information about domestic and overseas subsidiaries of the firms;
- indicates ultimate owners of the companies;
- includes information about the share of ownership of the entities.

From all the available data, only companies with information on sales, capital and employment were considered. The obtained sample represents the unbalanced panel that covers from 2007 to 2015 with most observations in 2015.

All companies in the sample with a German global ultimate owner (GUO) were considered German companies. All firms with GUO owing at least 50% of the company and originating from another country were considered foreign MNEs. The threshold of 50%, not 10% as is usually measured by UNCTAD, was chosen following Mattes (2010). He argues that in the case of majority ownership, the influence of foreign investment on strategy and corporate culture is more pronounced and not limited to a merely financial contribution. This idea is supported by the *Foreign Affiliates Statistics Recommendations Manual* by Eurostat, which indicates that “the ability to determine a strategy can be

excised by a single investor holding a majority (more than 50%) of the voting power or of the shares, directly or indirectly" (Eurostat, 2012).

The German companies with at least one foreign subsidiary were considered German MNEs. The German firms with no subsidiaries or those having only German affiliates were regarded as purely domestic companies. The companies for which the relevant data was unavailable or country of origin was unknown are excluded from consideration. Bearing in mind the size of MNEs it is reasonable to use for comparison only large- and medium–sized local companies (Temouri et al., 2008). Firms were selected based on satisfying at least one of the following criteria: number of employees equal to at least 20 and total operating revenues and total assets equaling to at least €1.5 million and €3 million, respectively. This criteria excludes from the sample very small companies that are probably predominantly local.

After the described manipulations the sample comprised 14,707 companies, among which 10,450 are considered as purely local companies, 1,498 are German multinationals and 2,759 are foreign companies. The selected firms were classified according to the NACE Rev. 2 industry classification at the two–digit level. The company distribution was provided in Appendix C. Spillovers are analyzed within each of two–digit industries following Griliches' (1998) argument that companies' technological and productivity advances in the same two–digit segment are more valuable to the other firms within the sector when compared with an industry as a whole.

The following two–digit divisions have been selected for further analysis because they are characterized by the highest number of EMNEs compared with other divisions:

- 20 – manufacture of chemicals and chemical products,
- 28 – manufacture of machinery and equipment (not elsewhere classified),
- 46 – wholesale trade, except of motor vehicles and motorcycles,
- 70 – activities of head offices; management consultancy activities.

Table 6 shows the number of companies in each country category for each group. Two of the selected groups comprise companies with a main activity in manufacturing and the other two in services. Both divisions of the manufacturing industry have medium–high technological intensity according to classification by *Eurostat*. The services divisions were

categorized by *Eurostat* as follows: wholesale trade is referred to as less knowledge intensive services whereas the activities of the head offices are in the category of knowledge–intensive services.

Table 6. Number and percentage of companies in each of four divisions of the sample

	Manufacture of chemicals and chemical products (20)		Manufacture of machinery and equipment (28)		Wholesale trade (46)		Activities of head offices; management consultancy activities (70)	
	no.	%	no.	%	no.	%	no.	%
EMNEs	5	2,0	14	1,8	26	1,5	18	1,8
AMNEs	89	36,5	186	23,3	512	29,1	166	16,8
Tax Havens	11	4,5	12	1,5	43	2,4	10	1,0
German MNEs	36	14,8	133	16,7	156	8,9	301	30,5
Domestic companies	103	42,2	453	56,8	1025	58,2	493	49,9
Total	244	100,0	798	100,0	1762	100,0	988	100,0

Note: Own calculations, see Appendices C and D for details

The following data on companies has been collected for the purposes of modeling: total sales (output), number of employees to serve as the labor variable and book value of the fixed assets as capital variable. The data on material inputs is not available for the whole sample, but only for less than one half. As mentioned previously, this data is omitted from consideration following the approach of Driffield et al. (2014), otherwise the sample would have been reduced substantially.

All monetary values are converted by the *Amadeus Database* into euros and adjusted to 2010 using the producer price index for corresponding industrial products for manufacturing (on a two–digit level) and the consumer price index for services. The respective price indices are provided by *German Federal Statistical Office* (see Appendix E).

The average TFPs are calculated using Equation (6) for each of the four two–digit divisions according to NACE Rev. 2, and within each division separately for described subgroups of the companies: EMNEs, AMNEs, tax havens, German MNEs and German

local companies. The dependent variables TFP_{csy}^{EMNE} and TFP_{csy}^{AMNE}, which are used in Equations (7) to (10), indicate the average total factor productivity of EMNEs and AMNEs, accordingly in each cell of the corresponding sector and year and are calculated at the three–digit level of NACE Rev. 2. In this way, the total factor productivity of local German firms and German MNEs are linked to average total factor productivity of foreign companies operating within the same industrial group at three–digit level.

The next chapter describes the obtained results, starting with estimates of the Cobb–Douglas production function and proceeds to estimates of productivity differences and direct spillover effects.

6 Results

The econometric analysis of the data was conducted according to methodology outlined in the previous chapter using the *Stata* software package. This chapter describes the results of analysis. It begins by representing the estimates of the production function, then moves to see the differences in average TFP between the companies within each of the selected devisions and further proceeds to results of spillovers estimation.

The Cobb–Douglas production function in the dynamic form from Equation (5) is estimated using panel data system GMM estimator *xtabond2.* The results of the estimation are summarized in the second column of the Table 7. Alternatively, the parameters β_l and β_k are estimated for the purposes of comparison using the *prodest* function in *Stata* developed and described by Mollisi and Rovigatti (2017). Table 7 shows the results in the third column. The results of the both estimation methods are comparable and seem plausible.

Table 7. Results of estimation of dynamic Cobb–Douglas production function

Dependent variable: output y_{it}	xtabond2	prodest
Instruments		
l_{it}	0.449** (0.170)	
l_{it-1}	–0.329** (0.117)	
k_{it}	0.195** (0.085)	
k_{it-1}	–0.165* (0.085)	
y_{it-1}	0.863*** (0.111)	
$\hat{\beta}_l$	0.433*** (0.131)	0.415*** (0.097)
$\hat{\beta}_k$	0.239*** (0.065)	0.143*** (.021)
ρ	0.959*** (0.031)	
AB Test AR(1)	0.000	
AB Test AR (2)	0.072	
Hansen Test	0.508	
COMFAC	0.270	
Number of observations	23273	27350
Number of instruments	83	
Number of groups	3776	3778

Notes: The results are obtained in *Stata*. The second column shows the results of panel data system GMM estimator *xtabond2* (Roodman, 2006); capital is treated as predetermined and labour and lagged output as endogenous (Griffith, 1999; Eberhardt and Helmers, 2010); the parameter estimates at the bottom part have been obtained using Mans Söderbom's code for implementation of minimum distance procedure (Eberhardt and Helmers, 2010; http://www.soderbom.net); the third column provides the results of *prodest* function (Mollisi and Rovigatti, 2017); numbers in parenthesis are one–step robust standard errors; year dummies included, coefficients not reported; for all test statistics (serial correlation, Sargan and Difference–in–Sargan tests) p–values are reported; significance levels: *: 0.10; **: 0.05; ***: 0.01.

Using the estimates from the second column and Formula (7), the average TFP is calculated separately for each of the four two–digit divisions according to NACE Rev. 2 and for the subgroups of the companies: EMNEs, AMNEs, tax havens, German MNEs and German local companies. Table 8 summarizes the results.

Table 8. Average TPF values of companies in selected 2-digit divisions (NACE Rev. 2)

	Manufacture of chemicals and chemical products (20)	Manufacture of machinery and equipment (28)	Wholesale trade (46)	Activities of head offices and management consultancy activities (70)
EMNEs	6.014	6.496	8.747	6.826
AMNEs	6.847	6.528	7.223	6.528
Tax havens	6.720	6.319	7.313	6.659
German MNEs	6.971	6.509	7.016	6.796
German local companies	6.347	5.949	6.742	6.480

Note: Own calculations using *Stata*

Table 8 reveals that in the manufacturing of chemical products, German MNEs have the highest average productivity when compared with other companies in the sample and EMNEs show the lowest average productivity. In manufacturing of machinery, the highest average productivity is observed for AMNEs, closely followed by German MNEs and EMNEs, with the lowest average productivity in the group obtained for German local companies. In both divisions in the services sector, EMNEs are characterized by the highest and German local companies by the lowest average productivity in their groups.

In order to investigate whether the obtained differences in average productivity within each of the two–digit divisions are significant, average TFP values of EMNEs and AMNEs are compared with average productivity values of German local companies and German MNEs. The companies with their headquarters in tax havens are omitted from further consideration for the reasons discussed previously. As the TPF values within each subgroup are normally distributed, it is possible to test whether the differences shown in Table 8 are significant using the independent sample t–test. Table 9 summarizes the results.

Table 9. Results of independent sample t-test with unequal variances for groups of companies by two-digit industry (NACE Rev. 2)

Hypothesis: *The average TFP values are not equal*	Two–tailed p–value			
	Manufacture of chemicals and chemical products (20)	Manufacture of machinery and equipment (28)	Wholesale trade (46)	Activities of head offices; management consultancy activities (70)
a) EMNEs and German local firms	0.002	0.000	0.000	0.000
b) AMNEs and German local firms	0.000	0.000	0.000	0.126
c) EMNEs and German MNEs	0.000	0.849	0.000	0.663
d) AMNEs and German MNEs	0.011	0.462	0.000	0.000

Note: Own calculations using *Stata*

According to the Table 9, the differences in average productivity are significant in the following cases. In the manufacturing of chemicals the TFP mean of EMNEs is significantly different from the average TFP of German local companies and German MNEs (confidence level α=0.01). The TFP mean of AMNEs is significantly different from the average TFP of German local companies (confidence level α=0.01) and from the average productivity value of German MNEs (confidence level α=0.05).

In the division of machinery manufacturing, the TFP mean of EMNEs and of AMNEs are both significantly different from average productivity of German local firms (α=0.01). In comparing the average productivity of German MNEs with the TFP means of EMNEs and AMNEs, respectively, the null hypotheses cannot be rejected.

For the companies operating in the sector of wholesale trade the null hypotheses are rejected in all four cases (α=0.01). In other words, the productivity mean of EMNEs is significantly different from average productivity of German local companies and German MNEs. The same is true for the TFP mean of AMNEs.

For the division that comprises activities of head offices and management consultancy the average productivity of EMNEs is significantly different from the average TFP of German local companies (α=0.01). The TFP mean of AMNEs is significantly different from the average TFP of German MNEs (α=0.01). In the other two cases the null hypotheses cannot be rejected.

Combining the information provided by Tables 8 and 9 it is possible to express suggestions about the possibility of direct and reverse spillovers from the activities of foreign companies in the German economy. Table 10 presents the findings and they are described below.

Table 10. Potential for direct and reverse spillover effects between German and foreign companies in four divisions of the sample

Case	Manufacture of chemicals and chemical products (20)	Manufacture of machinery and equipment (28)	Wholesale trade (46)	Activities of head offices; management consultancy activities (70)
EMNEs and German local firms	–	+	+	+
AMNEs and German local firms	+	–	+	0
EMNEs and German MNEs	–	0	+	0
AMNEs and German MNEs	–	0	+	–

Note: "+" – potential for direct spillovers, "–" – potential for reversed spillovers, "0" – no potential for spillovers

According to the data, the differences in average productivity between EMNEs and German local companies are significant for all four divisions in the sample. For manufacturing of machinery as well as for wholesale trade and head office activities, the average TFP values of EMNEs are higher than the average TFP levels of German local companies, indicating a potential for direct externalities. For manufacturing of chemicals, the average productivity of German local companies is higher than the mean TFP of EMNEs revealing a potential for reverse spillovers. The differences in productivity of AMNEs and German local companies suggest that the potential for direct spillovers exists in both manufacturing sectors in the sample and in wholesale trade. Considering the differences in average productivity between EMNEs and German MNEs, the data shows the likelihood of direct spillover effects for companies occupied with wholesale trade and reverse spillovers for chemicals manufacturing. At last, comparing the average productivity of AMNEs and German MNEs it is possible to suggest that direct spillovers are likely in wholesale trade. In chemicals manufacturing and the division of head office activities the data indicates a possibility of the reverse spillover effects for the benefit of AMNEs.

Next, direct spillover effects are estimated for all sectors and all groups of companies using equations 7 to 10, accordingly. Tables 11 to 14 summarize the results and are further compared with predictions in Table 10.

Table 11. Productivity spillovers to local German companies from EMNEs by sectors (NACE rev. 2, two-digit)

	Manufacture of chemicals and chemical products (20)	Manufacture of machinery and equipment (28)	Wholesale trade (46)	Activities of head offices; management consultancy activities (70)
TFP (average) of EMNEs	–0.065 (0.205)	0.065 (0.115)	0.132*** (0.051)	0.015 (0.069)
Capital per worker	–0.164* (0.096)	–0.220*** (.0013)	–0.186*** (0.013)	–0.210*** (0.026)
Firm fixed effects	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
Number of observations	614	2510	6390	3905
Number of groups	95	451	1021	490
F statistics	16.23	43.09	66.94	31.08
R–squared	0.188	0.315	0.245	0.201
Under–identification test	7.962	18.857	103.553	67.739
P value	0.01	0.000	0.000	0.000
Weak identification test	50.104	20.282	251.601	2585.468
Over–identification test	6.268	5.668	5.293	0.024
P value	0.012	0.017	0.021	0.877

Note: Own calculations using *Stata*. Dependent variable: TPF of local companies. Values in parenthesis are robust standard errors. Significance levels: *:0.10; **:0.05; ***:0.01.

In the case of productivity spillovers from EMNEs to purely local German companies the results of estimation reveal statistically significant positive effects only for the wholesale trade. This outcome agrees with the forecast provided in Table 10. In two other groups that have potential for positive spillovers – manufacturing of machinery and activities of head offices – the parameter β_1 shows the predicted sign, but the results are not statistically significant.

Table 12. Productivity spillovers to local German companies from AMNEs by sectors (NACE Rev. 2, two-digit)

	Manufacture of chemicals and chemical products (20)	Manufacture of machinery and equipment (28)	Wholesale trade (46)	Activities of head offices; management consultancy activities (70)
TFP (average) of AMNEs	–0.382* (0.210)	0.336 (0.314)	0.287*** (0.079)	–0.029 (0.140)
Capital per worker	–0.136 (0.098)	–0.220*** (0.013)	–0.193*** (0.012)	–0.210*** (0.026)
Firm fixed effects	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
Number of observations	650	2510	6390	3905
Number of groups	100	451	1021	490
F statistics	14.89	46.40	68.74	31.07
R–squared	0.166	0.316	0.269	0.201
Under–identification test	13.096	8.451	228.168	64.527
P value	0.001	0.015	0.000	0.000
Weak identification test	51.920	153.417	1566.641	9603.619
Over–identification test	5.857	5.188	0.001	0.029
P value	0.016	0.023	0.973	0.864

Note: Own calculations using *Stata*. Dependent variable: TPF of local companies. Values in parenthesis are robust standard errors. Significance levels: *:0.10; **:0.05; ***:0.01.

In the case of productive activities of AMNEs in Germany, the results of the estimation in Table 12 show that statistically significant positive spillover effects are observable as predicted for wholesale trade. It is remarkable that positive and statistically significant externalities in favor of German local companies from the activities of AMNEs and EMNEs both appear in the same sector. In the case of AMNEs, the obtained coefficient shows that the magnitude of the effect is larger than the spillovers from the EMNEs.

Further, the significant results (α=0.10) are obtained in case of chemicals manufacturing, but the parameter β_1 has a negative sign, which contradicts expectations.

Table 13. Productivity spillovers to German MNEs from EMNEs by sectors (NACE Rev. 2, two-digit)

	Manufacture of chemicals and chemical products (20)	Manufacture of machinery and equipment (28)	Wholesale trade (46)	Activities of head offices; management consultancy activities (70)
TFP (average) of EMNEs	0.011 (0.079)	–0.255 (0.178)	0.022 (0.088)	–0.067 (0.105)
Capital per worker	–0.136*** (0.035)	–0.121** (0.056)	–0.143*** (0.040)	–0.188** (0.080)
Firm fixed effects	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
Number of observations	285	1028	1202	2615
Number of groups	35	133	156	301
F statistics	20.27	15.68	19.44	13.29
RMSE	0.092	0.201	0.276	0.312
Under–identification test	20.163	10.720	15.297	12.383
P value	0.0000	0.0047	0.0005	0.0020
Weak identification test	125.780	6.068	87.806	1883.944
Over–identification test	7.191	0.243	6.189	3.402
P value	0.007	0.622	0.013	0.065

Note: Own calculations using *Stata*. Dependent variable: TPF of local companies. Values in parenthesis are robust standard errors. Significance levels: *: 0.10; **: 0.05; ***: 0.01.

The estimates in Table 13 show that no statistically significant productivity spillover effects to German MNEs from the activities of EMNEs have been found in the chosen four sectors of the sample. This result is unexpected for the sector of wholesale trade, for which Table 10 predicts the existence of positive externalities. For the other three considered divisions, the obtained results are in line with expectations.

Table 14. Productivity spillovers to German MNEs from AMNEs by sectors (NACE Rev. 2, two-digit)

	Manufacture of chemicals and chemical products (20)	Manufacture of machinery and equipment (28)	Wholesale trade (46)	Activities of head offices; management consultancy activities (70)
TFP (average) of EMNEs	–0.295*** (0.110)	–0.384 (0.360)	0.392** (0.167)	0.087 0.229
Capital per worker	–0.143*** 0.035	–0.120** 0.051	–0.168*** (0.043)	–0.194** (0.080)
Firm fixed effects	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
Number of observations	294	1028	1202	2615
Number of groups	36	133	156	301
F statistics	24.39	15.68	19.51	13.30
RMSE	0.090	0.201	0.275	0.312
Under–identification test	13.558	5.909	50.997	12.418
P value	0.0011	0.0521	0.000	0.0020
Weak identification test	119.316	101.826	247.405	7285.390
Over–identification test	0.174	0.037	1.655	3.707
P value	0.677	0.849	0.198	0.054

Note: Own calculations using *Stata*. Dependent variable: TPF of local companies. Values in parenthesis are robust standard errors. Significance levels: *:0.10; **:0.05; ***:0.01.

Table 14 reveals that statistically significant positive spillover effects to German MNEs from the economic activities of AMNEs are observable as expected in the wholesale trade sector. In the manufacturing of chemical products sector, statistically significant negative productivity effect is observed. The negative sign is in line with predicted reverse spillovers in this sector. Despite that result, the estimated parameter should not be interpreted as reverse spillover effect. For an estimation of reverse spillovers should be used another form of equation, which has productivity of EMNE as a dependent variable and average total factor productivity of German MNEs in each cell of the corresponding sector at the three–digit level and year as an independent variable (see Driffield et al., 2014 for details). As the number of EMNEs in every one of the four sections of the sample is very small, the number of observations is not sufficient to receive convincing regression results for reverse spillovers.

Considering the obtained results it should be mentioned that consistency of the used for an estimation of spillovers using the panel data depends on a large number of observations in the sample (Griffith, 1999). For the sector of wholesale trade the number of observations is substantially larger than the other three groups. In these circumstances, the lack of significant results in the sample's other three divisions might be caused by a limited number of observations in the case of spillovers to local companies and an even smaller number of observations in case of German MNEs. The next chapter discusses the meaning of the obtained results in the context of the research question, namely whether productive activities of MNEs from emerging countries have a positive influence on the economy of the advanced host country using the example of Germany.

7 Discussion

This chapter takes a closer look at the obtained results of spillovers estimation for four industrial divisions in Germany in the context of their meaning for assessment of influence of productive activities of EMNEs on the host country economy.

Regarding the theoretical concepts of EMNE operations in advanced economies discussed in Section 2.2, it is reasonable to expect that EMNEs possess a predominantly asset seeking motivation in developed markets. It has been argued that they are lagging behind companies from advanced countries in terms of technology and productivity and aiming to catch–up through their operations in developed markets. The described preconditions together with high technological endowment and productive advantages of companies in developed countries led to the assumption that EMNEs are unable to create positive externalities for the advanced host country companies. In order to check the validity of these assumptions the analysis conducted used the AMNEs as the reference group. The main reason for the analysis is the presumption that AMNEs differ from EMNEs in their influence on indigenous companies because they rely on a longer history of operations in advanced countries, apparently possess more sophisticated technology and are likely motivated by resource exploiting and market seeking.

The analysis has shown that in chosen industrial divisions of the sample, despite expectations, the EMNEs maintain productive advantages over the purely domestic companies in Germany in both manufacturing and services sectors. Moreover, in the wholesale trade sector the EMNEs also enjoy productivity advantages over the German MNEs. The companies from emerging markets in the sample are also keeping pace in terms of productivity with German MNEs in the machinery and equipment manufacturing sectors and management consultancy activities. Only in one of four sectors – chemicals manufacturing – does their productivity lag indigenous firms. Noteworthy is that AMNEs in the sample show a similar picture, with clear productive advantages in some divisions and disadvantages in others.

Thus, the expectation of an overall weak position of EMNEs compared with a presumably strong position of AMNEs in advanced markets is not supported by the empirical data in the case of Germany.

The estimation of direct spillover effects from economic activities of foreign companies to German local companies and German MNEs has revealed statistically significant effects only in one of four considered sectors, namely wholesale trade. German local companies enjoy positive externalities spilling over from both EMNEs and AMNEs whereas in the case of AMNEs the magnitude of the effect is more pronounced. Regarding German MNEs, positive spillover effects are observable only in the case of AMNEs. The EMNEs in the same sector produce no significant externalities to indigenous host country MNEs.

In all other sectors no positive and significant spillover effects have been detected, revealing that advantages in productivity of foreign companies do not automatically mean the existence of a positive influence on the productivity of domestic firms.

The obtained results do not demonstrate issues related to the origins of productivity advantages. High productivity of EMNEs can possibly be explained by competitive or technological advantages and also using a "cherry–picking" strategy. In the first case, foreign companies that enter host country market bring positive changes to local economical environment, not least through the spillovers. In the second case EMNEs pursue aggressive acquisition strategy aiming at "sector champions" in the host country. Foreign acquisitions of companies with high productivity are automatically reflected in comparatively lower productivity of purely indigenous companies and might be potentially disadvantageous for other companies in the sector. In considering this idea, Mattes (2010) provides some additional food for thought. He has investigated the changes in productivity over time after the takeover of local firms by foreign investors. The author was unable to detect any significant changes. Identification of spillover effects is more complicated for several reasons. The effects are not obvious and cannot be measured directly. The externalities from foreign companies obviously produce no immediate effect and there is no adequate answer to the question of what period of time is sufficient for spillovers to be revealed through changes in productivity of host country companies. Besides that, the externalities cannot always be directly derived from productivity changes of other companies in the sector. For instance the technological advances in other sectors of the economy could influence productivity of host companies through vertical spillovers. All these effects are not easy to consider and to measure.

Considering the results as a whole, the influence of EMNEs on host country economy in case of advanced host countries can be interpreted as ambiguous. The emerging country companies operating abroad are by far not productivity laggards, but reveal heterogeneity, as in the case of AMNEs. In some sectors they can influence the indigenous firms positively and not in others. Is seems reasonable to put the question of whether the indigenous firms that enjoy positive productivity externalities belong to priority sectors of the host economy, or if a negative influence in other sectors is potentially more harmful to the FDI receiving economy.

The obtained results might have the following implication for the FDI policies of advanced countries. The results indicate that it is probably unreasonable to advocate and support the FDI in an advanced economy by any means regardless of the current situation in a specific industrial sector. At the same time, a prudent political approach requires distance from the idea that arises lately in the media to set limits for FDI depending on the investing company's country of origin. Obviously, such limitations could be easily overcome through investments via tax havens. Besides that, the long–term consequences of the investments cannot be reliably predicted. In the advanced countries such as Germany, in which the productivity level of the domestic companies is comparable to or exceeds that of foreign firms, the political incentives should be turned to support the indigenous investments in fixed assets and technology to attract foreign capital.

8 Conclusions, limitations and suggestion for further research

Consideration of the recent trend in the intense growth of FDI flows from emerging countries targeting advanced countries raises a legitimate question about the influence of EMNEs activities on the host countries' economies. The academic literature has extensively investigated the different aspects of EMNEs strategies, motivation and operation modes but has yet to fully consider the question of consequences of their activities for the economies of advanced host countries.

The influence of EMNEs activities on host countries can be exerted at both the macro– and micro–levels. At the micro level, it is possible to assess the effects from the FDI activities by foreign companies in host countries from the point of view of their influence on productivity of indigenous companies. This is a complex question that cannot be answered easily. One possible way to approach the influence of EMNEs on host country firms is an evaluation of their impact through the prism of productivity spillovers.

According to theoretical explanations of rapid internationalization of EMNEs, the emerging country companies are predominantly aiming at technological catching-up and augmenting their capabilities through their establishments in advanced markets. Thus, it is reasonable to suppose that they are lagging behind advanced country companies in terms of productivity. Building upon this idea, it is presumed that EMNE subsidiaries are not able to create any positive externalities to advanced host country companies. The academic literature has yet to provide any convincing evidence about the existence and magnitude of spillovers from EMNEs to the companies in advanced countries. To date, there have been limited studies on this topic.

This thesis is aimed to contribute to research in this field addressing the question of the existence of positive impact from economic activities of EMNE subsidiaries in developed markets on indigenous companies through productivity spillovers. The analysis has been conducted using Germany as a good example of an advanced country that possesses the necessary conditions at the macro and micro levels for the occurrence of positive spillover effects to the benefit of indigenous companies. In order to provide an answer to the research question at the first step, the analysis concentrated on the existence of significant productivity advantages of EMNEs in Germany over local companies in order to assess the potential for spillover effects. The spillovers have been estimated at the second step. For

the purposes of comparison, AMNEs in Germany were used a reference group, as they have a longer history of operations in this country and according to the studies can at least in part indicate other motives for their activity.

The empirical analysis has been conducted using firm level panel data for the period 2007 to 2015 in four industrial sectors in Germany: manufacturer of chemical products, manufacturer of machinery and equipment, wholesale trade and head office activities.

The econometric investigation has been conducted with the the concept of total factor productivity as a residual from the Cobb–Douglas production function. The analysis of productivity advantages through an estimation of an average TFP in each sector for foreign and domestic companies has shown that EMNEs, despite expectations, are by no means falling behind AMNEs, German MNEs and German local companies. Still, the pattern of productive advantages that indicates the potential and direction of possible spillovers is rather heterogenous. Similar to AMNEs, the EMNEs show productivity advantages over host country firms in some of the considered divisions, but lag behind the indigenous establishments in others.

The empirical estimation of direct spillover effects within each of four industrial divisions has shown that EMNEs operating in Germany despite the predictions, produce positive spillover effects in the wholesale trade sector and according to expectations shows no evidence of positive externalities in other sectors.

The results obtained for the purposes of comparison for AMNE subsidiaries reveal a similar pattern – the positive influence on host country companies in some sectors and no significant direct spillovers in others. The results suggest that FDI's overall impact by EMNEs in developed countries is ambiguous and cannot be clearly judged as harmful or beneficial to the host country economy regardless of the industrial sector.

These findings contribute to recent discussion in the academic literature and media about the possible consequences of intense FDI inflows from emerging markets to advanced economies. Obtained results may provide additional justification for carefully considered policy regulation with the sectoral approach toward incoming FDI, bearing in mind domestic social interests and developmental priorities. However, the investigation into the question about the outcomes of EMNE operations in advanced countries is still in its initial phase and more thorough research in this field is absolutely essential to provide sound

recommendations.

This work has the following limitations that result from its assumptions, underlying data and estimation strategy. First, the research focuses on horizontal intra–industry spillover effects, neglecting the influence of forward and backward linkages between the firms resulting in vertical spillovers. The inter–industry spillover effects have also not been considered. Second, for the purposes of estimation it was assumed that AMNEs and EMNEs operating in Germany are both homogeneous groups with similar characteristics that determine the likelihood of spillovers to local companies. Besides that, some foreign companies originating in tax haven countries have completely been omitted from consideration, as it would be difficult to identify the nationality of FDI capital. This might have led to the underestimation of the influence of EMNEs, as the economic literature indicates that a significant share of investments from emerging economies comes to Germany through holding companies situated in Belgium, the Netherlands and Luxembourg (Jost, 2013). Third, the empirical investigation of spillovers has neglected the possible influence of the entry mode of FDI and ownership structure as well as embededness of EMNEs into the local technological and productive environment.

Another group of limitations is connected to the data and sampling method used for the analysis. The limitations of the Amadeus database can de derived from the discussion of similar databases *FAME* by Eberhardt and Helmers (2010) and *ORBIS* by Kalemli–Ozcan et al. (2015). The main concern is that the data cannot serve as a sound reflection of a country`s universe of firms and thus is not ideal for an estimation of the Cobb–Douglas production function. Moreover, a large share of small and medium firms has been excluded from the sample to facilitate the estimation by means of econometric software. In addition, used data refers to a period with comparably low Chinese investments. Since 2011, the annual investment level as well as the number of acquisitions by Chinese investors has risen substantially (Hanemann and Huotari, 2015). Thus, spillovers from EMNEs might be underestimated as they are not immediate effects that require a time lag to reveal their full magnitude.

The third group comprises estimation methodology limitations. This work assumed that only companies with higher productivity can have some positive influence on firms with lower productivity and not vice versa, neglecting the potential existence of mutual

productivity spillovers between companies with similar productivity levels (see e.g. Franco and Kozovska, 2008). Moreover, it has been assumed that spillovers are possible between foreign MNEs and German companies. The learning effects that arise within the foreign sector between the MNEs has not been considered. The four divisions have been chosen by the highest number of EMNEs in order to compare spillovers from EMNEs and AMNEs, excluding other divisions in which the pattern of spillovers might be different. The production function has been estimated for the chosen sample of four divisions as a whole, which comprises heterogenous divisions of services and manufacturing. This might have led to biased estimates of parameters and subsequently to a distorted estimation of TFP.

Indicated limitations open vast possibilities for further research in this field. I believe that more careful and detailed research is needed in order to analyze the impact of EMNE subsidiaries in advanced host economies. It could deepen the understanding of spillover effects produced by EMNEs from several perspectives. First, future research should investigate the connection of spillovers via motivation and mode of entry of EMNEs in advanced countries. Second, the existence of reverse spillover effects that run from domestic companies to EMNE subsidiaries should be studied. Third, the possibility of mutual productivity externalities and technological spillovers between the companies with similar productivity levels must be investigated. Finally, further research should address the question of the meaning of positive and negative externalities from foreign activities from the point of view of the priorities of development policy and requirements of a host country's national security.

Appendix A

Selected review of the academic literature dedicated to internationalization of EMNEs in advanced countries

Topic of the study	Selected studies	Main findings
Preconditions of FDI		
Firm–level factors - firm size - firm type and ownership - resources and capabilities - network ties - export intensity - international experience - managerial influence	Ge (2011)	Factors for successful establishment of Chinese MNEs in Germany include: business contact with company before takeover, inter–supplementarity between parent company and subsidiary, local management, open–mindedness of both managements, clear strategic control system.
	Kalasin et al. (2014)	EMNEs can intentionally change their organizational path choosing the one that suits better to advanced market conditions, by listing their stock on advanced financial markets or reconfiguration of their activities
	Amendolagine et al. (2015)	The study associates the international business strategies of Chinese and Indian MNEs in Europe and following firm characteristics: mode of entry, destination, motivation and number of deals in the country
Industry–level factors - structure - sector - policy - competition	Goldstein et al. (2006)	Comparative case study on three OEM in "white goods" industry from emerging countries, who pursued global growth through accelerated internationalization into advanced countries combined with strategic and organizational innovation.
	Lu et al. (2011)	The industry dynamics has following impact on motives of Chinese outward FDI: the high level of industry R&D intensity motivates strategic asset–seeking OFDI, the high level of domestic industry competition induces market–seeking OFDI
	Amighini and Franco (2013)	Chinese automotive outward FDI is mostly driven by the market size of host economies at the same targeting non high–income countries. Macroeconomic stability and efficient labour markets act as attraction factors.
Transaction–specific factors - motivation - importance of the project - high vs low–profile investments	Makino et al. (2002)	EMNEs are likely to invest into advanced countries when they have strategic asset–seeking and market–seeking motives.
	Deng (2007)	Chinese MNEs investing in advanced economies are motivated primarily by the quest for strategic resources and capabilities. Underlying rationales for such asset–seeking FDI are strategic needs.
	Di Minin et al. (2012)	Chinese R&D units in Europe evolve often from a strategy of pure technology exploration, over fusion of foreign technologies with R&D activities back home, into one of technology exploitation in foreign locations.
Institutional context - home country institutional factors /role of government - host country institutional factors - cultural and other informal institutional components	Lu et al. (2011)	Supportive government policies are important motivators for both strategic asset–seeking and market–seeking outward FDI of Chinese companies.
	Schüler–Zhou and Schüler (2013)	Chinese migrants living in Germany and Chinese diaspora networks are important platforms for Chinese FDI in Germany.

Topic of the study	Selected studies	Main findings
	Lu et al. (2014)	For Chinese firms the home government support and well–developed host country institutions reduce the importance of prior entry experience and significantly increase the likelihood of FDI entry into a host country.
	Wu and Chen (2014)	Better–developed home country institutional environment promotes EMNEs expansion to foreign markets more advanced than the home country. High degree of government ownership weakens the positive effect of home country's institutional development on EMNEs' propensity to expansion to more advanced markets.
Investment strategies and processes		
Firm strategies - catch–up strategies - strategic intent and fit - mode of entry	Liu and Li (2002)	Case study on Haier company which used setting up of research centers and strategical technological alliances with AMNEs to overcome its initial disadvantages.
	Bertoni et al. (2008)	Acquisitions by BRICs MNEs in advanced markets are predominantly explained by exploitation strategy and search for new markets, and to a lesser degree by exploration strategy and finding of new assets.
	Zhang and Filippov (2009)	Internationalization of Chinese MNEs in Europe through strategic alliances and M&As in comparison to the traditional forms of outward FDI provides following benefits for learning and absorption of skills and technology or tacit and codified knowledge.
	Klossek et al. (2012)	Chinese MNEs operating in Germany use diverse strategies to mitigate the liability of foreignness, which depend partly on their entry mode.
	Amendolagine et al. (2015)	Greenfield investments are usually preferred by the large–sized EMNEs entering Europe. High aspiration for innovation is linked with a high probability to enter with an acquisition and with technological asset–seeking investments.
	Anderson and Sutherland, (2015)	Acquisitions of Chinese MNEs in the United States are the primary mode of strategic asset seeking.
Subsidiary role and control - knowledge transfer - knowledge dissemination - interfere networks - corporate subsidiary governance	Borini et al. (2012)	Reverse transfer of innovation in Brazilian MNEs depends on the strategic orientation of the foreign subsidiary's R&D function, communication between the parent and its subsidiaries, the entrepreneurial orientation of the company, the subsidiary's age.
	Giuliani et al. (2013)	EMNEs and AMNEs pursue different strategies for accessing local knowledge and for transferring it within the company. EMNEs contribute to the creation of firm–level advantages through reverse knowledge transfer.
	Awate et al. (2015)	Within EMNEs the headquarters accesses knowledge from R&D subsidiaries in advanced economies for innovation catch–up.
	Nair et al. (2015)	Subsidiary level competencies and capabilities play a vital role in persuading the parent EMNEs to initiate the reverse knowledge transfer.

Topic of the study	Selected studies	Main findings
	Hensmans and Liu (2018)	EMNEs have to access higher innovation capabilities from their autonomously operating advanced economy subsidiaries.
Organizational design and structure - expatriate management - multinational team management - employee training abroad	Zhong et al. (2015)	Review and discussion of the existing literature on expatriate management in Chinese MNEs when conducting outward FDI.
	Kong and Wu (2016)	Investigation of factors that influence the expatriate effectiveness of managers of Chinese MNEs in foreign countries
Host country relationships - CSR - environmental role - corporate political activity	Fiaschi et al. (2015)	BRIC firms use certain CSR policies in an instrumental way to enter advanced countries.
	Hong and Kim (2017)	CSR activities may be used as instrument for helping EMNEs secure access to human resources in advanced countries.
Outcomes of investment		
Economic/financial performance – profitability - market share - value creation - subsidiary survival	Driffield and Temouri (2014)	The productivity firms from of non–OECD and BRIC–countries in Germany is predominantly explained by the cash flow and not the intangible factors. EMNEs sourcing technology are able to contribute positively to German productivity only if the investments generate a substantial cash flow.
	Sanfilippo (2015)	Productivity of EMNEs' affiliates in Western Europe is significantly lower as compared to their counterparts from developed countries and domestic MNEs. The gap between EMNEs' affiliates and others is significantly larger in more sophisticated industries.
	Liu et al. (2016)	For Chinese MNEs the domestic learning through collaboration with foreign firms at home, and host market learning, positively contribute to subsidiary performance.
	Han et al. (2018)	Chinese MNEs' subsidiary performance is positively related to the degree of home–country government non–financial policy support, but not financial support.
Goal activement - knowledge absorption and accumulation - capability building - firm innovation - brand creation	Goldstein (2008)	Case study of internationalization and brand creation on the example of the Tata Group (India).
	Awate et al. (2012)	EMNEs are catching up with AMNEs in high technology industries in terms of output capabilities, but still lag in terms of innovation capabilities.
	Godinho and Ferreira (2013)	Case study of intellectual property rights strategy on two leading Chinese firms, analyzing how they are moving to global leadership in the telecom equipment market.
Competitiveness - Impact on global business environment - impact on industries - impact on home and host countries	Liu et al. (2015)	Taiwanese outward FDI to high–wage countries has a favorable impact on domestic employment, production and investment.
	Anderson et al. (2015)	After the acquisitions of advanced market companies by Chinese MNEs their domestic patents number rises significantly whereas patent performance abroad remains without changes. A plausible explanation might be the acquisition of codified assets for the purposes of imitation.

Topic of the study	Selected studies	Main findings
	Knoerich (2017)	Access to assets and advantages abroad through outward FDI by emerging economies can yield financial, intangible capability and tangible capacity returns, which might generate macroeconomic gains and mitigate problems of economic development.
	Zhou et al. (2018)	Chineese domestic innovation performance (DIP) is positively related to OFDI in developed countries while it is negatively related to OFDI in transitional and emerging markets.

Source: own review of academic literature based on organizational framework developed by Deng (2012)

Appendix B

Classification of the countries of origin in the sample

Advanced countries	Emerging countries	Tax havens
Australia	Brazil	Bermuda
Austria	China	Cayman Islands
Belgium	Colombia	Curaçao
Bulgaria	India	Cyprus
Canada	Libya	Gibraltar
Danemark	Mexico	Hong Kong
Finland	Oman	Liechtenstein
France	Russian Federation	Luxembourg
Great Britain	South Korea	Malaysia
Greece	Taiwan	Singapore
Ireland	Turkey	Virgin Islands
Israel	Ukraine	
Italy	United Arab Emirates	
Japan		
Netherlands		
Norway		
Poland		
Slovenia		
South Africa		
Spain		
Sweden		
Switzerland		
United States of America		

Source: FATS Recommendations Manual (Eurostat, 2012) ; World Economic Situation and Prospects 2016.

Appendix C

Distribution of companies across the NACE Rev. 2 industry classification divisions at the two–digit level

NACE 2	EMNE	AMNE	Tax Havens	German MNEs	Domestic companies	Total
01	0	5	0	4	199	208
02	0	0	0	0	3	3
03	0	2	0	0	0	2
05	0	1	0	0	1	2
06	0	4	0	1	0	5
07	0	0	0	0	2	2
08	1	5	0	3	45	54
09	0	1	1	1	1	4
10	0	42	7	19	193	261
11	1	7	0	7	54	69
12	0	3	1	0	0	4
13	1	10	1	8	40	60
14	1	3	0	10	20	34
15	1	2	1	5	7	16
16	0	8	2	7	88	105
17	2	34	2	8	54	100
18	0	6	0	2	68	76
19	3	4	1	4	8	20
20	5	89	11	36	103	244
21	0	26	2	24	38	90
22	3	75	4	37	166	285
23	2	37	2	26	110	177
24	3	32	8	16	81	140
25	1	91	13	69	481	655
26	3	117	6	66	175	367
27	3	67	1	50	156	277
28	14	186	12	133	453	798
29	0	35	2	22	49	108
30	0	19	0	7	25	51
31	0	6	0	8	43	57
32	0	43	2	25	84	154
33	2	10	1	4	36	53
35	1	21	3	20	474	519
36	0	2	0	2	46	50
37	0	3	0	0	14	17
38	1	10	1	3	135	150
39	0	1	0	0	5	6
41	0	14	0	6	266	286
42	0	4	0	6	130	140
43	1	26	1	14	467	509
45	5	52	4	5	446	512
46	26	512	43	156	1025	1762

NACE 2	EMNE	AMNE	Tax Havens	German MNEs	Domestic companies	Total
47	1	50	6	25	577	659
49	0	33	1	12	302	348
50	3	6	1	5	12	27
51	0	1	0	3	2	6
52	3	46	8	27	226	310
53	0	3	0	1	6	10
55	0	30	7	6	57	100
56	1	3	1	0	26	31
58	0	9	2	9	60	80
59	1	10	0	3	18	32
60	0	2	0	3	13	18
61	2	8	2	3	25	40
62	0	106	2	70	226	404
63	0	10	0	6	15	31
64	3	24	1	36	60	124
66	0	8	1	10	43	62
68	0	16	1	19	393	429
69	0	3	0	2	37	42
70	18	166	10	301	493	988
71	2	60	4	49	249	364
72	1	42	3	15	62	123
73	0	19	0	6	41	66
74	2	17	1	14	43	77
75	0	0	0	1	1	2
77	1	23	1	4	40	69
78	0	12	0	4	35	51
79	1	9	0	7	15	32
80	0	0	0	2	11	13
81	0	4	0	2	63	69
82	0	46	5	25	163	239
84	0	0	0	2	30	32
85	0	3	0	0	96	99
86	0	16	0	3	572	591
87	0	2	0	1	275	278
88	0	1	0	0	102	103
90	0	1	0	2	33	36
91	0	0	1	0	16	17
92	0	3	0	1	27	31
93	0	5	0	0	52	57
94	0	0	0	1	32	33
95	0	8	0	0	9	17
96	0	29	1	4	101	135
Total	119	2449	191	1498	10450	14707

Appendix D

Country of origin and number of the companies across the four selected divisions of the sample

Manufacture of chemicals and chemical products (20)			Manufacture of machinery and equipment (28)			Wholesale trade (46)			Activities of head offices; management consultancy activities (70)		
Country of origin	Number of companies	Percent	Country of origin	Number of companies	Percent	Country of origin	Number of companies	Percent	Country of origin	Number of companies	Percent
DE	139	56,97	DE	586	73,43	DE	1181	67,03	DE	794	80,36
US	35	14,34	US	50	6,27	US	145	8,23	US	40	4,05
CH	11	4,51	CH	31	3,88	JP	89	5,05	CH	28	2,83
BE	7	2,87	GB	21	2,63	CH	45	2,55	GB	16	1,62
GB	7	2,87	JP	19	2,38	NL	41	2,33	FR	15	1,52
NL	7	2,87	CN	10	1,25	GB	34	1,93	AT	12	1,21
FR	5	2,05	NL	10	1,25	FR	32	1,82	NL	12	1,21
JP	5	2,05	FR	8	1,00	IT	29	1,65	SE	11	1,11
LU	4	1,64	IT	8	1,00	LU	27	1,53	JP	10	1,01
AT	3	1,23	LU	8	1,00	AT	20	1,14	CN	9	0,91
IT	3	1,23	SE	8	1,00	DK	14	0,79	BE	5	0,51
NO	3	1,23	AT	7	0,88	SE	14	0,79	IT	5	0,51
AE	2	0,82	DK	5	0,63	BE	9	0,51	IE	4	0,40
AU	2	0,82	FI	4	0,50	IE	9	0,51	DK	3	0,30
CO	2	0,82	IE	4	0,50	KR	9	0,51	IN	3	0,30
KY	2	0,82	NO	4	0,50	CN	8	0,45	LI	3	0,30
VG	2	0,82	BE	3	0,38	FI	8	0,45	LU	3	0,30
BM	1	0,41	CA	2	0,25	CA	7	0,40	BM	2	0,20
CY	1	0,41	BG	1	0,13	ES	7	0,40	RU	2	0,20
MY	1	0,41	CW	1	0,13	HK	4	0,23	AE	1	0,10
SE	1	0,41	ES	1	0,13	NO	4	0,23	CA	1	0,10
UA	1	0,41	GI	1	0,13	KY	3	0,17	ES	1	0,10
			KR	1	0,13	TW	3	0,17	FI	1	0,10
			KY	1	0,13	LI	2	0,11	HK	1	0,10
			LI	1	0,13	AU	1	0,06	IL	1	0,10
			OM	1	0,13	BM	1	0,06	KR	1	0,10
			RU	1	0,13	BR	1	0,06	NO	1	0,10
			ZA	1	0,13	BZ	1	0,06	TR	1	0,10
						CW	1	0,06	TW	1	0,10
						CY	1	0,06	VG	1	0,10
						GR	1	0,06			
						IL	1	0,06			
						IN	1	0,06			
						LY	1	0,06			
						MX	1	0,06			
						MY	1	0,06			
						PL	1	0,06			
						RU	1	0,06			
						SG	1	0,06			
						SI	1	0,06			
						VG	1	0,06			
						ZA	1	0,06			
Total	244	100,00	Total	798	100,00	Total	1762	100,00	Total	988	100,00

Appendix E

Producer price index and consumer price index for Germany, 2007–2015

Year	Producer price indices for industrial products (2010=100)		Consumer price index, overall (2010=100)
	Manufacture of chemicals and chemical products (20)	Manufacture of machinery and equipment (28)	
2007	94,9	95,0	96,1
2008	99,7	97,2	98,6
2009	96,5	99,4	98,9
2010	100,0	100,0	100,0
2011	108,0	101,9	102,1
2012	111,2	103,9	104,1
2013	109,5	105,4	105,7
2014	108,0	106,5	106,6
2015	104,3	107,5	106,9

Source: Statistisches Bundesamt (Destatis), 2017

Reference list

Abraham, F., Konings, J., Slootmaekers, V., 2010. FDI spillovers in the Chinese manufacturing sector. *Economics of Transition* 18, 143–182. https://doi.org/10.1111/j.1468-0351.2009.00370.x

Alfaro, L., Rodríguez-Clare, A., Hanson, G.H., Bravo-Ortega, C., 2004. Multinationals and Linkages: An Empirical Investigation. *Economía* 4, 113–169. http://www.jstor.org/stable/20065460

Amendolagine, V., Cozza, C., Rabellotti, R., 2015. Chinese and Indian multinationals: A firm-level analysis of their investments in Europe. *Global Economic Review* 44, 452–469. https://doi.org/10.1080/1226508X.2015.1099235

Amighini, A., Rabellotti, R., Sanfilippo, M., 2010. Outward FDI from Developing Country MNEs as a Channel for Technological Catch-Up. *Seoul Journal of Economics* 23, 239-261.

Amighini, A., Cozza, C., Giuliani, E., Rabellotti, R., Scalera, V., 2013. *Technology-Driven FDI: A Survey of the Literature*. Lund University, CIRCLE-Center for Innovation, Research and Competences in the Learning Economy.

Amighini, A., Cozza, C., Giuliani, E., Rabellotti, R., Scalera, V.G., 2015. Multinational enterprises from emerging economies: what theories suggest, what evidence shows. A literature review. *Economia e Politica Industriale* 42, 343–370. https://doi.org/10.1007/s40812-015-0011-8

Amighini, A.A., Franco, C., 2013. A sector perspective on Chinese outward FDI: The automotive case. *China Economic Review* 27, 148–161. https://doi.org/10.1016/j.chieco.2013.09.002

Anderson, J., Sutherland, D., 2015. Entry mode and emerging market MNEs: An analysis of Chinese greenfield and acquisition FDI in the United States. *Research in International Business and Finance* 35, 88–103. https://doi.org/10.1016/j.ribaf.2015.03.008

Anderson, J., Sutherland, D., Severe, S., 2015. An event study of home and host country patent generation in Chinese MNEs undertaking strategic asset acquisitions in developed markets. *International Business Review* 24, 758–771. https://doi.org/10.1016/j.ibusrev.2015.01.007

Arnold, J.M., 2005. *Productivity estimation at the plant level: A practical guide*. Unpublished manuscript. [Online]. Available from: http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.563.6425&rep=rep1&type=pdf [Accessed 10 March 2018].

Awate, S., Larsen, M.M., Mudambi, R., 2015. Accessing vs sourcing knowledge: A comparative study of R&D internationalization between emerging and advanced economy firms. *Journal of International Business Studies* 46, 63–86. https://doi.org/10.1057/jibs.2014.46

Bertoni, F., Elia, S., Rabbiosi, L., 2008. Drivers of acquisitions from BRICs to advanced countries: firm-level evidence, in: *Conference on Emerging Multinationals: Outward FDI from Emerging and Developing Economies*, Copenhagen Business School, Copenhagen, Denmark.

Blomström, M., Kokko, A., 1998. Multinational Corporations and Spillovers. *Journal of Economic Surveys* 12, 247–277. https://doi.org/10.1111/1467-6419.00056

Blomström, M., Kokko, A., Globerman, S., 2001. The determinants of host country spillovers from foreign direct investment: a review and synthesis of the literature, in: *Inward Investment Technological Change and Growth*. Palgrave Macmillan, London, 34–65. https://doi.org/10.1057/9780230598447_2

Borini, F.M., de Miranda Oliveira Jr, M., Silveira, F.F., de Oliveira Concer, R., 2012. The reverse transfer of innovation of foreign subsidiaries of Brazilian multinationals. *European Management Journal* 30, 219–231. https://doi.org/10.1016/j.emj.2012.03.012

Cantwell, J., Dunning, J.H., Lundan, S.M., 2010. An evolutionary approach to understanding international business activity: The co-evolution of MNEs and the institutional environment. *Journal of International Business Studies* 41, 567–586. https://doi.org/10.1057/jibs.2009.95

Cantwell, J., Narula, R., 2001. The Eclectic Paradigm in the Global Economy. *International Journal of the Economics of Business* 8, 155–172. https://doi.org/10.1080/13571510110051504

Caves, R.E., 1974. Multinational Firms, Competition, and Productivity in Host-Country Markets. *Economica* 41, 176–193. https://doi.org/10.2307/2553765

Chen, V.Z., Li, J., Shapiro, D.M., 2012. International reverse spillover effects on parent firms: Evidences from emerging-market MNEs in developed markets. *European Management Journal* 30, 204–218. https://doi.org/10.1016/j.emj.2012.03.005

Cogman, D., Jaslowitzer, P., Rapp, M.S., 2015. Why emerging-market companies acquire abroad [Online]. *McKinsey & Company*, July 2015. Available from: https://www.mckinsey.com/business-functions/strategy-and-corporate-finance/our-insights/why-emerging-market-companies-acquire-abroad [Accessed 22 June 2018]

Corden, W.M., 1967. Monopoly, Tariffs and Subsidies. *Economica* 34, 50. https://doi.org/10.2307/2552513

Cornell University, INSEAD, and WIPO, 2017: *The Global Innovation Index 2017: Innovation Feeding the World*. Ithaca, Fontainebleau, and Geneva. Available from: https://www.globalinnovationindex.org/gii-2017-report [Accessed 10 June 2018]

Crespo, N., Fontoura, M.P., 2005. *Determinant Factors of FDI Spillovers – What Do We Really Know?* Working Paper No. 06. Working Papers Department of Economics. ISEG - Lisbon School of Economics and Management, Department of Economics, Universidade de Lisboa.

Damgaard, J., 2011. *Productivity Spillovers from FDI: Ownership Structures, Domestic Firm Characteristics, and FDI Characteristics*. Working Paper No. 72, Danmarks Nationalbank Working Papers.

Deng, P., 2007. Investing for strategic resources and its rationale: The case of outward FDI from Chinese companies. *Business Horizons* 50, 71–81. https://doi.org/10.1016/j.bushor.2006.07.001

Deng, P., 2012. The Internationalization of Chinese Firms: A Critical Review and Future Research. *International Journal of Management Reviews* 14. 10.1111/j.1468-2370.2011.00323.x

Deutsche Bundesbank, 2016. *Bestandserhebung über Direktinvestitionen*.

Die Welt, 2011. GM blockiert Saab-Rettung aus Angst vor China: US-Autokonzern [Online]. Die Welt, 08 November 2011. Available from: https://www.welt.de/wirtschaft/article13704047/ [Accessed 10 September 2018]

Di Minin, A., Zhang, J., Gammeltoft, P., 2012. Chinese foreign direct investment in R&D in Europe: A new model of R&D internationalization? *European Management Journal*, 30, 189–203. https://doi.org/10.1016/j.emj.2012.03.004

Driffield, N., Love, J.H., 2005. Who gains from whom? Spillovers, competition and technology sourcing in the foreign-owned sector of uk manufacturing. *Scottish Journal of Political Economy* 52, 663–686.

Driffield, N., Love, J.H., 2003. Foreign direct investment, technology sourcing and reverse spillovers. *The Manchester School* 71, 659–672. https://doi.org/10.1046/j.1467-9957.2003.00372.x

Driffield, N.L., Love, J.H., 2006. Does the motivation for foreign direct investment affect productivity spillovers to the domestic sector? *Applied Economics Quarterly Volume* 52, 3–28.

Driffield, N., Love, J.H., 2007. Linking FDI motivation and host economy productivity effects: conceptual and empirical analysis. *Journal of International Business Studies* 38, 460–473. https://www.jstor.org/stable/4540434

Driffield, N., Love, J.H., Yang, Y., 2014. Technology sourcing and reverse productivity spillovers in the multinational enterprise: global or regional phenomenon? *British Journal of Management* 25, S24–S41. https://doi.org/10.1111/1467-8551.12009

Driffield, N., Temouri, Y., 2014. Inward investment and the drivers of post recession recovery in Germany. *Jahrbücher für Nationalökonomie und Statistik* 234, 775–799.

Dunning, J.H., 2015. Reappraising the Eclectic Paradigm in an Age of Alliance Capitalism, in: Cantwell, J. (Ed.), *The Eclectic Paradigm: A Framework for Synthesizing and Comparing Theories of International Business from Different Disciplines or Perspectives*. Palgrave Macmillan UK, London, pp. 111–142. https://doi.org/10.1007/978-1-137-54471-1_5

Dunning, J.H., 1977. Trade, Location of Economic Activity and the MNE: A Search for an Eclectic Approach, in: Ohlin, B., Hesselborn, P.-O., Wijkman, P.M. (Eds.), *The International Allocation of Economic Activity*. Palgrave Macmillan UK, London, 395–418. https://doi.org/10.1007/978-1-349-03196-2_38

Dunning, J.H., 1980. Toward an Eclectic Theory of International Production: Some Empirical Tests. *Journal of International Business Studies* 11, 9–31. https://doi.org/10.1057/palgrave.jibs.8490593

Dunning, J.H., 1988. The Eclectic Paradigm of International Production: A Restatement and Some Possible Extensions. *Journal of International Business Studies* 19, 1–31. https://doi.org/10.1057/palgrave.jibs.8490372

Dunning, J.H., 1995. Reappraising the Eclectic Paradigm in an Age of Alliance Capitalism. *Journal of International Business Studies* 26, 461–491. https://doi.org/10.1057/palgrave.jibs.8490183

Dunning, J.H., Lundan, S.M., 2008. Institutions and the OLI paradigm of the multinational enterprise. *Asia Pacific Journal of Management* 25, 573–593. https://doi.org/10.1007/s10490-007-9074-z

Eberhardt, M., Helmers, C., 2010. *Untested Assumptions and Data Slicing: A Critical Review of Firm-Level Production Function Estimators*. Economics Series Working Paper No. 513. University of Oxford, Department of Economics.

Eden, L., Dai, L., 2010. Rethinking the O in Dunning's OLI/Eclectic Paradigm. *Multinational Business Review* 18, 13–34. https://doi.org/10.1108/1525383X201000008

Fiaschi, D., Giuliani, E., Nieri, F., 2015. *BRIC Companies Seeking Legitimacy Through Corporate Social Responsibility*. SSRN Scholarly Paper No. ID 2559110. Social Science Research Network, Rochester, NY. http://dx.doi.org/10.2139/ssrn.2559110

Flatten, T.C., Engelen, A., Zahra, S.A., Brettel, M., 2011. A measure of absorptive capacity: Scale development and validation. *European Management Journal* 29, 98–116. https://doi.org/10.1016/j.emj.2010.11.002

Focus Online, 2011. Saab: Das endgültige Aus [Online]. *Focus Online*, 19 Dezember 2011. Available from: https://www.focus.de/finanzen/finanz-news/saab-das-endgueltige-aus-_aid_695712 [Accessed 10 September 2018]

Eurostat, 2012. *Foreign Affiliates Statistics (FATS): recommendations manual*. Publications Office, Luxembourg.

Fosfuri, A., Motta, M., 1999. Multinationals without Advantages. *Scandinavian Journal of Economics* 101, 617–630. https://doi.org/10.1111/1467-9442.00176

Franco, C., Kozovska, K., 2008. Mutual Productivity Spillovers and Clusters in Eastern Europe: Some Empirical Evidence. *SSRN Electronic Journal*. https://doi.org/10.2139/ssrn.1317334

García-Vega, M., Hofmann, P., Kneller, R., 2011. *International Technology Transfer from above and below*. Paper presented at the ETSG Conference, 8-10 September, Copenhagen.

Ge, S., 2012. *Chinese Companies in Germany: Internationalization Strategies, Management Models and industrial Relations* (Dissertation). Technische Universität München.

Girma, S., 2005. Absorptive capacity and productivity spillovers from FDI: a threshold regression analysis. *Oxford bulletin of Economics and Statistics* 67, 281–306. https://EconPapers.repec.org/RePEc:bla:obuest:v:67:y:2005:i:3:p:281-306.

Giuliani, E., Gorgoni, S., Guenther, C., Rabellotti, R., 2013. Emerging-market MNEs investing in Europe. A typology of subsidiary global–local connections. *International Business Review*. https://doi.org/10.1016/j.ibusrev.2013.06.002

Globerman, S., 1979. Foreign Direct Investment and "Spillover" Efficiency Benefits in Canadian Manufacturing Industries. *The Canadian Journal of Economics / Revue canadienne d'Economique* 12, 42–56. https://doi.org/10.2307/134570

Godinho, M.M., Ferreira, V., 2013. *Two emerging innovative dragons: An analysis of the IPR strategy of China's Huawei and ZTE*. Technology Management in the IT-Driven Services (PICMET), 2013 Proceedings of PICMET'13: IEEE, 1044–1057.

Goldstein, A., 2008. Emerging economies' transnational corporations: The case of Tata. *Transnational Corporations* 17, 85–108.

Goldstein, A., Bonaglia, F., Mathews, J., 2006. Accelerated internationalization by emerging multinationals: the case of white goods. *Journal of International Business Studies* 42, 369–383.

Görg, H., Strobl, E., 2001. Multinational Companies and Productivity Spillovers: A Meta-Analysis. *The Economic Journal* 111, F723–F739. https://doi.org/10.1111/1468-0297.00669

Griffith, R., 1999. *Productivity and foreign ownership in the UK car industry*. Working Paper Series. https://doi.org/10.1920/wp.ifs.1999.9911

Griffith, R., Harrison, R., Van Reenen, J., 2006. How Special Is the Special Relationship? Using the Impact of U.S. R&D Spillovers on U.K. Firms as a Test of Technology Sourcing. *The American Economic Review* 96, 1859–1875.

Griliches, Z., 1998. The search for R&D Spillovers, in: *R&D and Productivity: The Econometric Evidence*. A National Bureau of Economic Research Monograph. University of Chicago Press, Chicago, 251–268.

Hamida, L.B., Khairallah, R., 2016. Southern MNCs in Switzerland and regional productivity spillovers in services/construction industry. *International Journal of Business and Emerging Markets* 8, 340. https://doi.org/10.1504/IJBEM.2016.077583

Han, X., Liu, X., Xia, T., Gao, L., 2018. Home-country government support, interstate relations and the subsidiary performance of emerging market multinational enterprises. *Journal of Business Research* 93, 160-172. https://doi.org/10.1016/j.jbusres.2018.04.021

Hanemann, T., Huotari, M., 2015. *Chinese FDI in Europe and Germany: Preparing for a New Era of Chinese Capital* [Online]. A Report by the Mercator Institute for China Studies and Rhodium Group. https://rhg.com/wp-content/uploads/2015/06/ChineseFDI_Europe_Full.pdf [Accessed 10 July 2017]

Harms, P., Méon, P.-G., 2017. Good and useless FDI: The growth effects of greenfield investment and mergers and acquisitions. *Review of International Economics* 26, 37–59. https://doi.org/10.1111/roie.12302

Hensmans, M., Liu, G., 2018. How Do the Normativity of Headquarters and the Knowledge Autonomy of Subsidiaries Co-Evolve? Capability-Upgrading Processes of Chinese Subsidiaries in Belgium. *Management International Review* 58, 85–119. https://doi.org/10.1007/s11575-017-0333-z

Hong, G., Kim, E., 2017. Overcoming country-of-origin image constraints on hiring: the moderating role of CSR. *Asian Business & Management* 16, 253–271. https://doi.org/10.1057/s41291-017-0023-5

Hu, A.G.Z., Jefferson, G.H., 2002. FDI Impact and Spillover: Evidence from China's Electronic and Textile Industries. *The World Economy* 25, 1063–1076. https://doi.org/10.1111/1467-9701.00481

Hubert, F., Pain, N., 2002. *Fiscal Incentives, European Integration and the Location of Foreign Direct Investment*. The Manchester School 70, 336–363. https://doi.org/10.1111/1467-9957.00306

Javorcik, B.S., 2004. Does Foreign Direct Investment Increase the Productivity of Domestic Firms? In Search of Spillovers Through Backward Linkages. *American Economic Review* 94, 605–627. https://doi.org/10.1257/0002828041464605

Javorcik, B.S., Spatareanu, M., 2011. Does it matter where you come from? Vertical spillovers from foreign direct investment and the origin of investors. *Journal of Development Economics* 96, 126–138. https://doi.org/10.1016/j.jdeveco.2010.05.008

Johanson, J., Vahlne, J.-E., 1977. The Internationalization Process of the Firm: A Model of Knowledge Development and Increasing Foreign Market Commitments. *Journal of International Business Studies* 8, 23–32. https://doi.org/10.1057/palgrave.jibs.8490676

Jost, T., 2013. *Inward FDI in Germany and its policy context*, 2012. Columbia FDI Profiles. https://doi.org/10.7916/d8qr55ht

Jungbluth, C., 2016. *Challenge and opportunity: Chinese direct investment in Germany: GED study*. Gütersloh: Bertelsmann Stiftung.

Ikenson, D., 2018. The Economic Bedrock Of Foreign Direct Investment [Online]. *Forbes*, October 17, 2018. Available from: https://www.forbes.com/sites/danikenson/2018/10/17/the-economic-bedrock-of-foreign-direct-investment/ [Accessed 10 November 2018]

Kalasin, K., Dussauge, P., Rivera-Santos, M., 2014. The Expansion of Emerging Economy Firms into Advanced Markets: The Influence of Intentional Path-Breaking Change. *Global Strategy Journal* 4, 75–103. https://doi.org/10.1111/j.2042-5805.2014.1076.x

Kalemli-Ozcan, S., Srensen, B.E., Villegas-Sanchez, C., Volosovych, V., Yesiltas, S., 2015. How to Construct Nationally Representative Firm Level Data from the ORBIS Global Database. *SSRN Electronic Journal*. https://doi.org/10.2139/ssrn.2660191

Karpaty, P., Lundberg, L., 2004. *Foreign direct investment and productivity spillovers in Swedish manufacturing*. FIEF.

Klossek, A., Linke, B.M., Nippa, M., 2012. Chinese enterprises in Germany: Establishment modes and strategies to mitigate the liability of foreignness. *Journal of World Business, Focus on China Special Section* 47, 35–44. https://doi.org/10.1016/j.jwb.2010.10.018

Knoerich, J., 2017. How does outward foreign direct investment contribute to economic development in less advanced home countries? *Oxford Development Studies* 45, 443–459. https://doi.org/10.1080/13600818.2017.1283009

Kong, X., Wu, J., 2016. *Expatriate management of Emerging Market Multinational Enterprises: Influence of informal institutional environment on expatriate effectiveness with the case of Chinese MNEs*. [Master's Thesis]. Available from: http://urn.kb.se/resolve?urn=urn:nbn:se:uu:diva-301160. [Accessed 29 September 2018].

Kugler, M., 2006. Spillovers from foreign direct investment: Within or between industries? *Journal of Development Economics* 80, 444–477. https://doi.org/10.1016/j.jdeveco.2005.03.002

Lee, J., Mansfield, E., 1996. Intellectual Property Protection and U.S. Foreign Direct Investment. *The Review of Economics and Statistics*, 78(2), 181-186. https://www.jstor.org/stable/2109919

Liu, H., Li, K., 2002. Strategic Implications of Emerging Chinese Multinationals: The Haier case study. *European Management Journal* 20, 699–706. https://doi.org/10.1016/S0263-2373(02)00119-6

Liu, W.-H., Tsai, P.-L., Tsay, C.-L., 2015. Domestic impacts of outward FDI in Taiwan: Evidence from panel data of manufacturing firms. *International Review of Economics & Finance* 39, 469–484. https://doi.org/10.1016/j.iref.2015.07.011

Liu, X., Gao, L., Lu, J., Lioliou, E., 2016. Does learning at home and from abroad boost the foreign subsidiary performance of emerging economy multinational enterprises? *International Business Review* 25, 141–151. https://doi.org/10.1016/j.ibusrev.2014.10.012

Lu, J., Liu, X., Wang, H., 2011. Motives for Outward FDI of Chinese Private Firms Firm Resources, Industry Dynamics, and Government Policies. *Management and Organization Revie*w 7, 223–248. https://doi.org/10.1111/j.1740-8784.2010.00184.x

Lu, J., Liu, X., Wright, M., Filatotchev, I., 2014. International experience and FDI location choices of Chinese firms: The moderating effects of home country government support and host country institutions. *Journal of International Business Studies* 45, 428–449. https://doi.org/10.1057/jibs.2013.68

Luo, Y., Tung, R.L., 2007. International expansion of emerging market enterprises: A springboard perspective. *Journal of International Business Studies* 38, 481–498. https://doi.org/10.1057/palgrave.jibs.8400275

Luo, Y., Tung, R.L., 2018. A general theory of springboard MNEs. *Journal of International Business Studies* 49, 129–152. https://doi.org/10.1057/s41267-017-0114-8

MacDougall, G.D.A., 1960. The benefits and costs of private investment from abroad: A theoretical approach. *Economic Record* 36, 13–35. https://doi.org/10.1111/j.1475-4932.1960.tb00491.x

Madhok, A., Keyhani, M., 2012. Acquisitions as entrepreneurship: asymmetries, opportunities, and the internationalization of multinationals from emerging economies. *Global Strategy Journal* 2, 26–40. https://doi.org/10.1002/gsj.1023

Makino, S., Lau, C.-M., Yeh, R.-S., 2002. Asset-Exploitation Versus Asset-Seeking: Implications for Location Choice of Foreign Direct Investment from Newly Industrialized Economies. *Journal of International Business Studies* 33, 403–421. https://doi.org/10.1057/palgrave.jibs.8491024

Mathews, J.A., 2002. *Dragon Multinational: A New Model for Global Growth*. Oxford University Press.

Mathews, J.A., 2006. Dragon multinationals: New players in 21st century globalization. *Asia Pacific Journal of Management* 23, 5–27. https://doi.org/10.1007/s10490-006-6113-0

Mathews, J.A., 2017. Dragon multinationals powered by linkage, leverage and learning: A review and development. *Asia Pacific Journal of Management* 34, 769–775. https://doi.org/10.1007/s10490-017-9543-y

Mattes, A., 2010. *International M&A: Evidence on effects of foreign takeovers*. Working Paper No. 60. IAW-Diskussionspapiere.

Meyer, K.E., Sinani, E., 2009. When and where does foreign direct investment generate positive spillovers? A meta-analysis. *Journal of International Business Studies* 40, 1075–1094. https://doi.org/10.1057/jibs.2008.111

Mollisi, V., Rovigatti, G., 2017. *Theory and Practice of TFP Estimation: The Control Function Approach Using Stata*. SSRN Scholarly Paper No. ID 2916753. Social Science Research Network, Rochester, NY. https://EconPapers.repec.org/RePEc:rtv:ceisrp:399

Montobbio, F., Sterzi, V., 2011. Inventing together: Exploring the nature of international knowledge spillovers in Latin America, in: *Catching up, Spillovers and Innovation Networks in a Schumpeterian Perspective*. Springer, 81–117.

Murakami, Y., 2007. Technology spillover from foreign-owned firms in Japanese manufacturing industry. *Journal of Asian Economics* 18, 284–293. https://doi.org/10.1016/j.asieco.2007.02.002

Nair, S.R., Demirbag, M., Mellahi, K., 2015. Reverse Knowledge Transfer from Overseas Acquisitions: A Survey of Indian MNEs. *Management International Review* 55, 277–301. https://doi.org/10.1007/s11575-015-0242-y

Narula, R., 2006. Globalization, new ecologies, new zoologies, and the purported death of the eclectic paradigm. *Asia Pacific Journal of Management* 23, 143–151.

Pittiglio, R., Reganati, F., Sica, E., 2016. Vertical spillovers from multinational enterprises: Does technological gap matter? *Panoeconomicus* 63, 313–323. https://doi.org/10.2298/PAN1603313P

Ramamurti, R., 2012. What is really different about emerging market multinationals? *Global Strategy Journal* 2, 41–47. https://doi.org/10.1002/gsj.1025

Reganati, F., Sica, E., 2007. Horizontal and Vertical Spillovers from FDI: Evidence from Panel Data for the Italian Manufacturing Sector. *Journal of Business Economics and Management* 8, 259–266.

Reganati, F., Sica, E., 2005. *Do domestic firms benefit from the presence of MNEs? The case of the Italian manufacturing sector.* No. 23, Quaderni DSEMS. Dipartimento di Scienze Economiche, Matematiche e Statistiche, Universita' di Foggia.

Resmini, L., Nicolini, M., 2007. *Productivity spillovers and multinational enterprises: in search of a spatial dimension*. Papers DYNREG10, Economic and Social Research Institute (ESRI).

Roodman, D., 2006. How to do Xtabond2: An Introduction to Difference and System GMM in Stata [Online]. *SSRN Electronic Journal*. Available from: https://doi.org/10.2139/ssrn.982943 [Accessed 12 September 2016]

Ruane, F., Ugur, A., 2005. Foreign direct investment and productivity spillovers in Irish manufacturing industry: evidence from plant level panel data. *International Journal of the Economics of Business* 12, 53–66. https://doi.org/10.1080/1357151042000323139

Rugman, A., 2009. Theoretical aspects of MNEs from emerging economies. In: R. Ramamurti and J.V. Singh, eds., *Emerging Multinationals in Emerging Markets*. Cambridge: Cambridge University Press, 42–63. https://doi.org/10.1017/CBO9780511576485.003

Sanfilippo, M., 2015. FDI from emerging markets and the productivity gap—An analysis on affiliates of BRICS EMNEs in Europe. *International Business Review* 24, 665–676. https://doi.org/10.1016/j.ibusrev.2014.11.005

Shiraishi, T., 2018. Europe pushes back as Chinese investment spree continues [Online]. *Nikkei Asian Review*, September 30, 2018. Available from: https://asia.nikkei.com/Business/Business-Deals/ [Accessed 12 October 2018]

Schüler-Zhou, Y., Schüller, M., 2013. An empirical study of Chinese subsidiaries' decision-making autonomy in Germany. *Asian Business & Management* 12, 321–350. https://doi.org/10.1057/abm.2013.1

Siotis, G., 1999. Foreign Direct Investment Strategies and Firms' Capabilities. *Journal of Economics & Management Strategy* 8, 251–270. https://doi.org/10.1111/j.1430-9134.1999.00251.x

Solow, R.M., 1956. A contribution to the theory of economic growth. *The quarterly journal of economics* 70, 65–94.

Temouri, Y., Driffield, N.L., Higón, D.A., 2008. Analysis of productivity differences among foreign and domestic firms: evidence from Germany. *Review of World Economics* 144, 32–54. https://doi.org/10.1007/s10290-008-0136-1

The Economist, 2011. Role reversal: Emerging-market firms are increasingly buying up rich-world ones [Online]. *The Economist*, September 24, 2011. Available from: https://www.economist.com/special-report/2011/09/24/role-reversal [Accessed 10 September 2018]

The Economist, 2018. Europeans fret that Chinese investment is a security risk [Online]. *The Economist*, 22 March 2018. Available from: https://www.economist.com/finance-and-economics/2018/03/22/ [Accessed 11 May 2018]

Tülüce, N.S., Doğan, İ., 2014. The Impact of Foreign Direct Investments on SMEs' Development. *Procedia - Social and Behavioral Sciences* 150, 107–115. https://doi.org/10.1016/j.sbspro.2014.09.012

UNCTAD, 2016. *World Investment Report 2016: Investor nationality: policy challenges*. United Nations, NewYork; Geneva.

UNCTAD, 2017. *World Investment Report 2017: Investment and the Digital Economy*. United Nations, NewYork; Geneva.

Van Pottelsberghe de la Porterie, B., Lichtenberg, F., 2001. Does Foreign Direct Investment Transfer Technology across Borders? *The Review of Economics and Statistics* 83, 490–497. https://EconPapers.repec.org/RePEc:tpr:restat:v:83:y:2001:i:3:p:490-497

Von Zedtwitz, M., 2005. International R&D strategies of TNCs from developing countries: the case of China, in: *Globalization of R&D and Developing Countries: Proceedings of the Expert Meeting, Geneva, 24-26 January 2005*. United Nations, New York; Geneva, 117–140.

Wei, Y., Liu, X., Wang, C., 2006. Trade Orientation and Mutual Productivity Spillovers between Foreign and Local Firms in China. *Journal of Asia Business Studies* 1, 46–53. https://doi.org/10.1108/15587890680001304

Wei, Y., Liu, X., Wang, C., 2008. Mutual productivity spillovers between foreign and local firms in China. *Cambridge Journal of Economics* 32, 609–631. https://doi.org/10.1093/cje/bem037

Williamson, P., 2015. The competitive advantages of emerging market multinationals: A re-assessment. *Critical perspectives on international business* 11, 216–235. https://doi.org/10.1108/cpoib-02-2014-0008

Woolsey, B., 2017. Takeover Turbulence: Robot maker Kuka feels the squeeze [Online]. *Handelsblatt*, December 17, 2017. Available from: https://www.handelsblatt.com/today/companies/ [Accessed 3 August 2018]

World Economic Forum, 2018. *Global Competitiveness Report 2017-2018* [Online]. Available from: https://widgets.weforum.org/global-competitiveness-report-2017/ [Accessed 15 Juni 2018]

World Economic Situation and Prospects 2016. United Nations Publications, New York.

Wu, J., Chen, X., 2014. Home country institutional environments and foreign expansion of emerging market firms. *International Business Review* 23, 862–872. https://doi.org/10.1016/j.ibusrev.2014.01.004

Yilmaz, G., Bengtson, A., Hadjikhani, A., 2015. Internationalization of Firms from New Emerging Markets in other New Emerging Markets: Opportunity Development of a Turkish Firm in Romania. *Procedia - Social and Behavioral Sciences* 195, 982–992. https://doi.org/10.1016/j.sbspro.2015.06.480

Zhang, Y., Filippov, S., 2009. *Internationalization of Chinese firms in Europe*. United Nations Univ., Maastricht Economic and social Research and training centre on Innovation and Technic.

Zhong, Y., Zhu, C.J., Zhang, M.M., 2015. The management of Chinese MNEs' expatriates: The current status and future research agenda. *Journal of Global Mobility: The Home of Expatriate Management Research* 3, 289–302. https://doi.org/10.1108/JGM-12-2014-0053

Zhou, C., Hong, J., Wu, Y., Marinova, D., 2018. Outward foreign direct investment and domestic innovation performance: evidence from China. *Technology Analysis & Strategic Management*, 1–15. https://doi.org/10.1080/09537325.2018.1485890

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