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## Is hiring foreign worth it? Spillover from foreign firms' human capital and local firms' productivity

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**ADB Working Paper Series**

**IS HIRING FOREIGN WORTH IT?  
SPILLOVER FROM FOREIGN FIRMS'  
HUMAN CAPITAL AND LOCAL  
FIRMS' PRODUCTIVITY**

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**Abstract**

This study examines the effect of foreign direct investment (FDI) on local firms' productivity via human capital transfer from MNEs to local firms. Using the firm-level data for 2010–2015 from the Republic of Korea, we identify human capital spillovers using local firms' hired permanent foreign employees in an industry and region where MNEs and local firms operate. This identification is valid because permanent foreign workers hired by local firms tend to be visa holders from MNEs due to the Republic of Korea's visa regulations. We find that the industry and regional FDI positively affect local firms' productivity, particularly firms with higher growth in hiring skilled foreign employees. This human capital spillover from FDI is also more pronounced in high R&D-intensive industries. Our results are robust with various measures of skilled foreign employees hired by local firms, variations of specifications, and controlling for endogeneity issues. Our findings on positive FDI spillovers via human capital transfer to a local firm suggest that policymakers may relax unnecessary regulations for highly skilled foreign workers and provide a platform where a local firm's manager and skilled foreign employees find each other.

**Keywords:** FDI, firm productivity, human capital, foreign employees, technology spillover, knowledge spillover, visa status

**JEL Classification:** D24, F21, F23, J24, J63, O33

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## 1. INTRODUCTION

Through what channels do multinational enterprises (MNEs) affect purely domestic firms (hereafter, local firms), and how does foreign capital generate effective technology spillovers to local firms? There are diverse channels such as forward and backward linkages, human capital, competition and imitation, foreign capital ownership, etc. However, human capital has been considered an explicit and more direct source of knowledge spillover.<sup>1</sup> Previous research, such as that by Fosfuri et al. (2001), has argued that technological spillovers from foreign direct investment (FDI) can arise when a local firm later hires MNE workers. Keller and Yeaple (2009), using the share of foreign affiliate employment in total employment in industry, found that there are positive FDI spillovers from US MNEs to local firms, whereas Girma et al. (2015) showed negative spillovers to local firms from FDI firms, measured by the proportion of foreign firms in the region. However, due to data limitations, studies rarely directly capture human capital transferred from MNEs to local firms or gauge the extent to which knowledge spillover is driven by human capital separate from other confounding factors.

This study examines the effect of FDI on local firms' productivity via a transfer of skilled foreign workers from MNEs to local firms, using rich firm-level data for 2010–2015 from the Republic of Korea. Firstly, we attempt to identify the spillovers driven by human capital in an industry and region where MNEs and local firms have been competing by introducing permanent foreign employees hired by local firms. Due to Korean local firms' visa regulations and labor market environment, most local firms prefer to recruit skilled foreign employees with work visas who have work experience in MNEs in the local market than to recruit foreign workers from abroad. We find that industry and regional FDI, measured as the employment share of foreign MNEs to total employment in the industry and regional cluster, are positively associated with local firms' productivity, particularly for firms with higher growth in hiring skilled foreign employees (transferred human capital). We also show that this human capital transfer effect is more pronounced in R&D-intensive industries that require workers who are relatively more skilled. Our direct evidence on human capital transfer is robust to variations of specifications and controlling for endogeneity issues.

Fosfuri et al. (2001) and Glass and Saggi (2002) maintain that foreign technology can be transferred through human capital trained by MNEs.<sup>2</sup> However, prior studies have not directly captured spillovers from MNEs, and discussed the means of knowledge transfer between MNEs and local firms. A novel feature of this study is to introduce a valid proxy for human capital transfer from MNEs to local firms by focusing on foreign national permanent workers hired by local firms. According to the Republic of Korea's visa system and institutional background, we support that foreign permanent workers hired by local firms are likely to be transferred from MNEs.

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<sup>1</sup> Note that Saurav and Kuo (2020) provide a summary of previous studies on FDI and productivity and their detailed channels.

<sup>2</sup> They also suggest that foreign firms prevent their employees from moving to their local competitors and avert knowledge spillover by paying a wage premium.

This study also contributes to the literature on the presence of foreign employees as a channel for technology transfer (spillover) within a firm (i.e., Belderbos and Heijltjes 2005; Urata and Kawai 2000; Urata et al. 2006).<sup>3</sup> Urata et al. (2006), using data on Japanese MNEs, showed that while top management skill has been transferred at a limited number of affiliates, the task of labor management has been transferred at many affiliates by showing that host country's local staff (not Japanese staff) are in charge. Santacreu-Vasut and Teshima (2016) showed that MNEs experience a higher level of technology transfer when they belong to a technology-intensive industry and hire foreign employees. The authors also argue that institution quality, providing (dis)incentives for hiring foreign employees, is critical for MNEs' international expansion.<sup>4</sup> While these studies distinguish workers according to their nationality and consider foreign workers in terms of their technology (or knowledge) conveyance, they focus only on intra-firm knowledge transfer in MNEs via foreign workers.

Also closely related to our work is that by Markusen and Trofimenko (2009), which found that plants with skilled foreign employment have experienced increases in domestic workers' wages and labor productivity (value-added per worker).<sup>5</sup> In particular, whether a foreign employee acts as a channel for technology transfer and how foreign experts play an important active role in knowledge transfer has been discussed (e.g., Markusen and Trofimenko 2009; Santacreu-Vasut and Teshima 2016). More importantly, however, these studies pay attention to general foreigners, not those from MNEs. In this regard, based on the cultural and institutional environment for foreign workers, the current study successfully measures human capital transfer in an industry and region using skilled foreign workers hired by local firms.

The remainder of the paper is organized as follows. Section 2 discusses the theoretical background whereby FDI affects productivity via human capital transfer. Section 3 introduces the data set and formulates an empirical specification for FDI spillover. Section 4 presents the main empirical results. Concluding remarks follow in Section 5.

## 2. FDI AND MNEs' HUMAN CAPITAL TRANSFER

### 2.1 FDI and Productivity Debate

The debate is ongoing as to whether FDI significantly contributes to knowledge transfer to local firms. Many previous studies have found a positive effect of FDI on local firms' productivity; however, some have found mixed results or negative outcomes. Firstly, studies supporting the positive effects of FDI address knowledge spillover as one of the mechanisms for FDI positively affecting the productivity of locally-owned firms. According to Blomström and Kokko (1998), knowledge spillover can occur through backward linkage via the high standards required by MNEs, and forward linkage via

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<sup>3</sup> Urata and Kawai (2000) analyze technology transfer from Japanese parent firms to their overseas affiliates and examine the extent of the transfer. They find a positive correlation between the extent of technology transfer and the parent company's equity share only when the technologies involved are simple.

<sup>4</sup> If a host country has weak institutions, the role of foreign employees is critical because firms rely on technologies transferred by foreign employees. However, when demand for local input increases, the magnitude of reliance on foreign employees decreases. When the cost of foreign firms' disadvantages is reduced and a country improves its institutional structure, foreign employee reliance goes up again. Therefore, it shows a U-shaped pattern.

<sup>5</sup> Markusen and Trofimenko (2009) found that the hiring foreign experts increases the wages of skilled workers and value added per worker by about 11% in the post-expert period when controlling for plant fixed effects. In addition, when they used a number of observable plant characteristics, the results of rising wages and increasing value added per workers were similarly increased.

high-quality inputs.<sup>6</sup> A second mechanism is the demonstration effect, which could induce local players to adopt higher technology to deal with foreign competitors, given their exposure to the superior technology of the MNEs (Crespo and Fontoura 2007; Girma et al. 2001).<sup>7</sup>

Another set of contrasting studies has demonstrated a negative relationship between inward FDI and the productivity of local firms. Haddad and Harrison (1993) found that inward FDI at an industry level negatively impacted the productivity of manufacturing plants in Morocco. Aitken and Harrison (1999) demonstrated similar results using a sample of Venezuelan domestic firms, showing that competition driven by FDI crowds out benefits from FDI. Djankov and Hoekman (2000), using data from the Czech Republic for 1992–1996, found a significant positive effect of FDI on sales growth for the total sample of firms, but in local firms, spillovers hurt sales. This implies that while sales growth occurred for foreign-owned firms as a consequence of FDI, small and low-technology local firms failed to utilize FDI or absorb new knowledge.

Technology spillover via FDI in developing countries might not be substantial because local firms lack the necessary absorptive capacity.<sup>8</sup> Blomström and Kokko (1998), García et al. (2013), and Liu et al. (2009) pointed out that domestic firms become exposed to unfavorable competition when foreign firms enter the local market. Comprehensive research by Girma et al. (2015) considered both the direct and indirect (spillover) effects of FDI and confirmed the negative spillovers to Chinese domestic firms from a foreign presence. Indeed, if foreign firms steal market share from domestic firms, leaving the domestic firms to produce at lower levels, productivity spillovers will be limited. Foreign competitors are also better endowed with technical and managerial skills, allowing them to supply higher quality products and services at lower prices (Altomonte and Pennings 2009). In this regard, McGaughey et al. (2020) emphasized the role of ownership (controls vs. influence) in productivity spillover, finding that spillovers are greater for controlled foreign-owned firms (ownership share is greater than 50%) than for non-controlled firms (share is less than 10%). Among the controlled firms, productivity spillover is greatest for firms without specific foreign ownership at 10% or above. This implies that foreign control helps amplify spillovers, whereas the immediate influence on MNEs' affiliates by a specific foreign owner rather hampers horizontal spillover in the host country. In sum, FDI effects vary according to the channels in which spillovers materialize and depend on MNEs' and local firms' characteristics and capabilities.

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<sup>6</sup> Backward linkage of FDI occurs when local firms serve as suppliers of intermediate goods for foreign firms. Since the quality standards required by these foreign enterprises are higher than those in the domestic market (Salim and Bloch, 2014), domestic suppliers will be under pressure to upgrade the quality of their products by acquiring advanced technology for their production, resulting in the improvement of their productivity. Forward linkage of FDI arises when MNEs produce goods that are used as intermediate inputs by local firms. Local buyers will benefit from the high-quality inputs and improve their production, again resulting in higher productivity.

<sup>7</sup> Overall, MNEs are considered providers of advanced knowledge and new technology, while domestic firms can be effective recipients of FDI benefits that are expected to improve their productivity and make them more competent in the market. Hence, many governments, especially those from emerging countries, have made extensive efforts to attract FDI into their country.

<sup>8</sup> Konings (2001) found similar negative results using data for Romania, Bulgaria, and Poland during 1993–1997, suggesting that the crowding-out effect of competition driven by FDI superseded the positive impact of technology transfer. Kathuria (2000) showed that domestic Indian firms do not benefit from foreign entry.



## 2.2 Foreign Employees and Knowledge Transfer

Previous studies have examined the conditions whereby technology transfers are amplified or moderated.<sup>9</sup> Xu (2000) focused on the role of human capital at a country level, pointing out that US MNEs can generate technological spillovers only in countries with some level of development. Since they lack the minimum human capital threshold level, the least developed countries fail to take advantage of such transfers and spillovers. The importance of human capital transfer for local firms' productivity upgrades cannot be overemphasized.<sup>10</sup> However, it is difficult to measure human capital transfer from MNEs to local firms (at firm level) because data fail to trace individual workers' job turnover between MNEs and local firms.

Using foreign employment data, previous studies such as those by Santacreu-Vasut and Teshima (2016) and Urata et al. (2006) have attempted to verify the channel by which MNEs exert intra-firm knowledge transfer. Urata et al. (2006) examined the achievement of technology transfer rather than the costs expended for technology transfer to which earlier studies paid attention. Markusen and Trofimenko (2009) also focused on foreign experts hired by domestic firms and examined their influence on domestic workers. They found that domestic workers learn from foreign workers, increasing domestic workers' wages and value-added per worker (labor productivity). In this vein, a few studies have begun to point out that not only the elite foreigners but also ordinary returnees and foreign employees can facilitate firm (export) performance. A firm could effectively accumulate tacit knowledge and build overseas ties via foreign workers (Hu et al. 2019). For example, Morgan et al. (2021) argued that small- and medium-sized enterprises run by immigrants show superior financial performance when they export to their country of origin because they have home country knowledge, experience, skills, and connections. These studies provide an interesting approach, using foreign workers to capture knowledge transfer achieved by human capital inside a firm. However, the findings are limited to explaining FDI's spillover to local firms via human capital from MNEs.

## 2.3 Foreign Employment in the Republic of Korea

In the era of globalization, the Republic of Korea has been facing multicultural environments. However, the country, consisting of a single 'unmixed' race, has been considered a society with strong homogeneity and ethnic exclusionism. Of the total population in 2019, only 2.52 million (4.3%) were foreign residents. The share of skilled foreign workers is also low in many local firms. When gauging various Korean visa types, an E7 visa is considered eligible for permanent (skilled) foreigners, mostly hired by the manufacturing firms in our dataset (note that this study's Korean firm-level dataset distinguishes between permanent and temporary foreign workers). The E7

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<sup>9</sup> The resource-based view emphasizes firm-specific capabilities, and assets are the primary determinants of firm performance (Barney 1991; Hitt et al. 1997). Cohen and Levinthal (1990) introduced absorptive capacity as the ability to recognize the value of new external information, assimilate it, and apply it to commercial ends. This has been extensively incorporated in the international joint venture (IJV) and alliance research, since the success of collaboration depends on local partners' capacity to absorb the advanced knowledge (technological managerial and operation) contributed by MNEs. Thus, the capacity to learn and adapt is a significant indicator of knowledge acquisition from the foreign partner (Luo 2020; Urata et al. 2006). In addition, Lewin et al. (2020) emphasized that a firm's absorptive capacity represents a fundamental prerequisite for knowledge-seeking internationalization strategies that has attracted growing attention.

<sup>10</sup> Penrose (1959) emphasized that human capital is considered a pivotal organizational resource to make a critical decision. Personal communication channels may better support the transfer of tacit knowledge and valuable resources than low-cost virtual communication channels (Ozdemir et al. 2016).

defines an eligible foreign worker as “a person who plans to engage in a field designated by the Minister of Justice, the Republic of Korea, for the enhancement of national competitiveness by adopting foreign workers with professional knowledge/technology under a contract with public or private institutes in the Republic of Korea.”<sup>11</sup> Periods of stay for E7 visa holders are granted for up to three years, with a few exceptions. Criteria for a successful E7 application vary depending on the occupation, but usually a foreigner with a Bachelor’s degree with one year of working experience, a Master’s or doctoral degree, or more than five years of working experience can apply to acquire it. If foreign candidates graduate from a university in the Republic of Korea, they have to prove their professional specialty. Therefore, it is relatively challenging for an international student educated in the Republic of Korea without working experience to apply for the E7 visa. The E7 visa generally applies to skilled foreigners who are working for MNEs and dispatched to subsidiaries in the country.

Moreover, local Korean firms tend not to host a job market abroad due to the uniqueness of the Korean language and monocultural work environments. Thus, there is no direct channel for local firms to hire foreign workers abroad (only in the local market). Many permanent foreign workers in local firms can be considered foreigners who are trained and dispatched by foreign MNEs and are eligible to work in the Republic of Korea. In this regard, it is arguable that E7-compatible permanent foreign workers in local firms generally come from job turnover from the MNEs in the Republic of Korea.

Meanwhile, foreigners who currently reside with a working visa in the Republic of Korea were asked whether they prefer to extend their stay after terminating their visa period. In the 2013 survey, 66.6% of professional foreign employees, 60.6% of visiting employees, and 76.6% of non-professionals answered that they wanted to stay in the country. When we consider visa maturity—usually a maximum of three years—foreigners who entered the country in 2010 needed to extend their visas in 2013. This survey result sheds light on the fact that foreigners have a high chance of staying longer and moving to other local firms in the country. The same survey in 2015 showed similar results: 65.9% of professional working foreigners wanted to continue to stay and work in the country, implying that those foreigners extending their visa are likely to continue their work in MNEs or to be transferred to local firms. Thus, we argue that foreign permanent workers with proper visa status hired by local firms act as a knowledge transfer channel from MNEs to local firms.<sup>12</sup>

### 3. DATA AND METHODOLOGY

#### 3.1 Data

We use firm-level data from firms in the Republic of Korea collected by Statistics Korea via the Survey of Business Activities.<sup>13</sup> This dataset provides rich information on sales, export activity, employees, wages, material costs, foreign capital share, assets, and so forth since 2006. It is collected annually from all enterprises operating in the Republic of Korea with at least 50 regular workers and capital of 0.3 billion Korean won. This

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<sup>11</sup> Ministry of Justice, Republic of Korea. *Korea visa portal*. <https://www.visa.go.kr/>

<sup>12</sup> We exclude foreigners who pursue a permanent residency or Korean citizenship in examining the knowledge spillover effect because they should count as citizens of the Republic of Korea, not foreigners, once approved.

<sup>13</sup> Accessed on July 20, 2021.

paper explicitly studies the period 2010–2015 because those years give us detailed information related to firms' foreign employment such as the number of foreign employees in each task and sector. Statistics Korea stopped collecting information about foreign employees hired by individual firms to reduce the response burden on the firms in the survey from 2016. This firm-level data set represents the whole population of firms in the Republic of Korea and includes entire industries. Our study mainly focuses on Korean manufacturing firms. Manufacturing industries are classified into 24 types based on the Korea Standard Industrial Classification (KSIC) system. Regions include nine provinces (Gyeonggi, North Chungcheong, South Chungcheong, North Jeolla, South Jeolla, North Gyeongsang, South Gyeongsang, Gangwon, Jeju), six metropolitan cities, one special self-governing city (Sejong), and one special city (Seoul).

We also use the Workplace Panel Survey (WPS) conducted by the Korea Labor Institute as additional panel data. The WPS includes workplaces with 30 or more employees across the country; the surveys are conducted with 1,700 sample firms using a stratified sampling method and have various content such as workforce characteristics, financial performance, employment-related data such as employment status and assessment, work organization, and so on. Interestingly, the WPS has provided data about foreign employees who hold E7 visa status since 2015. The E7 visa is for foreign professionals employed in Korean firms that want to strengthen their competitiveness through a foreign specialist. This information is only eligible when the employment field of the firm and the expertise of foreigners are matched. In addition, E7 foreigners must have five years or more of work experience in that field or hold a Master's or Bachelor's degree with more than one year of experience.

### 3.2 Empirical Specifications and Measurements

We set up the following empirical specification for TFP and the role of human capital transfer in the effect of FDI on TFP for local firms.

$$TFP_{ijkt} = \beta_1 FDI_{jkt-1} + \beta_2 FDI_{jkt-1} \times Foreign\ Human\ Capital_{(i)jkt} + X_{ijkt-1} \cdot \gamma + \alpha_i + \alpha_k + \alpha_t + e_{ijkt} \quad (1)$$

where  $i$  indicates a firm,  $j$  denotes the industry to which the firm belongs,  $k$  is a region, and  $t$  is a time descriptor. The dependent variable is  $TFP_{ijkt}$ , a log of firm TFP.  $FDI_{jkt}$  is an FDI measure at industry and region level, which will be explained later. *Foreign Human Capital*<sub>(i)jkt</sub> is a new variable that captures human capital transfer using foreign employment hired by local firms. Our main variables are discussed more thoroughly below.  $X_{ijkt}$  is a set of firm-level controls that include the firm's R&D intensity (R&D/sales), export to sales, intermediate input import to costs, and employment (a proxy for firm size). Lastly, the Herfindahl index (HHI) is calculated as  $\sum_{k \in j} s_{kt}^2$ , where  $s_{kt}$  is the market share of firm  $k$  in industry  $j$  at time  $t$ . This is a proxy for the degree of industry concentration, capturing the level of domestic competition. We also include industry-, region-, and year-fixed effects. In addition, we use our right-hand side variables by lagging a year to reduce simultaneity and endogeneity issues.

Our definition of local firms follows McGaughey et al. (2020), using a 50% threshold of the foreign capital charge for controlled foreign firms based on the International Monetary Fund's FDI guidelines. However, most firms report either 0% foreign capital shares or greater than 50% shares. Firms whose foreign shares are between 0% and 50% constitute less than 1% of total firms.

## FDI and TFP

If foreign affiliates of MNEs generate positive externalities to local firms by the pooling of highly skilled technicians in an industry and region, we expect local firms' TFP to be correlated with measures of foreign presence in that industry and region. To measure FDI, we focus on human capital hired by foreign MNEs (Keller and Yeaple 2009). In particular, we allow more detailed dimensions of industry  $j$  and region  $k$  where MNEs and local firms interact.

$$FDI_{jkt} = \frac{\text{foreign affiliates' employment}_{jkt}}{\text{foreign affiliates' employment}_{jkt} + \text{domestic firm's employment}_{jkt}} \times 100$$

We also estimate firm-level TFP by industry. The various methods are used to estimate TFP by using the standard production function of each industry. A firm-level TFP demonstrates the efficiency of production of a firm, indicating the portion of the growth in output not explained by the growth of traditionally measured inputs such as labor and capital. For instance, even though firm A and firm B input similar levels of labor and capital, the final product may differ because of productivity differences. Prior literature understands those unobserved productivities as technology, knowledge, management strategies, regulation, or institutions. We use Wooldridge's (2009) method to estimate the TFP of Korean firms by each manufacturing industry.<sup>14</sup> Again, the focus of this study is the knowledge spillover effect of FDI on the growth of local firm's TFP.

## Measure for Human Capital Transfer

We create a human capital transfer variable (*Foreign Human Capital*) using information on employees' nationality. Growth of the foreign employment ratio in the local firm is calculated as a change in the ratio of permanent foreign employment to total employment over time. Unlike prior works, we interact this foreign employment variable of local firms with FDI and capture explicit knowledge spillover from foreign-owned firms to local firms. In addition, we construct one more moderator, a ratio of foreign employees who hold the E7 visa (measuring human capital transfer to local firms) to total employees in an industry and region. Note that we use only 2015 information for the E7 variable because the WPS data were initiated in 2015, so we use the E7 variable as its level. We then merge this with our main firm-level data by industry and region. Please see detailed explanations of our variables in Table 1.

<sup>14</sup> Production function by industry is calculated as follows:  $Y_{it} = \alpha + \beta L_{it} + \gamma K_{it} + v_{it} + e_{it}$ , where  $Y_{it}$  refers to the growth of value-added in firm  $i$  during the time period  $t$ ,  $L_{it}$  is the labor (employment) in the firm  $i$ , and  $K_{it}$  is firm  $i$ 's capital stock.  $v_{it}$  is the unobserved productivity component, and  $e_{it}$  is the error term. Levinsohn and Petrin (2003) proposed a firm's unobserved productivity by using intermediate inputs as a proxy:  $v_{it} = g(K_{it}, m_{it})$ ,  $m_{it}$  refers to the intermediate inputs. If a firm has positive  $v_{it}$ , there will be simultaneity issues when a firm increases input factors such as  $K_{it}$ . However,  $m_{it}$  is relatively independent from  $K_{it}$ , and we can use it as an instrumental variable.

**Table 1: List of Variables Used and Definitions**

Variable	Definition	Data source
Dependent variable		
TFP	Firm-level total factor productivity	Survey of Business Activities; Statistics Korea
Independent variables		
FDI	Foreign-owned affiliates' employees divided by total employment in industry and region	Survey of Business Activities; Statistics Korea
Moderators		
<i>Foreign human capital</i>		
D.Employment of foreigners in local firms	A change in the ratio of (permanent) foreigners hired by local firms to their total permanent employment	Survey of Business Activities; Statistics Korea
E7 visa holders of local firms	Foreigners who hold E7 visa hired by local firms in industry and region divided by total employees in industry and region	Workplace Panel Survey (WPS); Korea Labor Institute
D.Employment of foreigners in a research institute	A change in the ratio of foreign employment ratio in research institutes held by local firms	Survey of Business Activities; Statistics Korea
D.Employment of foreigners in HQ	A change in the ratio of foreign employment in headquarters to total	Survey of Business Activities; Statistics Korea
D.Employment of foreigners in branch	A change in the ratio of foreign employment in branches to total	Survey of Business Activities; Statistics Korea
Control variables		
R&D intensity	R&D expenditure divided by total sales	Survey of Business Activities; Statistics Korea
Export ratio	Annual total export divided by total sales	Survey of Business Activities; Statistics Korea
Intermediate import ratio	Firms' imported intermediate input divided by its total cost	Survey of Business Activities; Statistics Korea
Firm size	(log) Employment	Survey of Business Activities; Statistics Korea
Herfindahl index (HHI)	Degree of industry concentration capturing the level of competition	Survey of Business Activities; Statistics Korea
Instrumental variables		
Lagged industry real exchange rate (IRER)	Lagged industry real exchange rate in the Republic of Korea	Industry real exchange rate (IRER); Research Institute of Economy, Trade and Industry (RIETI)
Lagged volatility of IRER	Lagged volatility of industry real exchange rate in the Republic of Korea	Industry real exchange rate (IRER); Research Institute of Economy, Trade and Industry (RIETI)
Difference in IRER	A change in industry real exchange rate	Industry real exchange rate (IRER); Research Institute of Economy, Trade and Industry (RIETI)
Volatility of difference in IRER	Volatility of change in industry real exchange rate in the Republic of Korea	Industry real exchange rate (IRER); Research Institute of Economy, Trade and Industry (RIETI)

Note: "D." in moderators indicates a yearly change of the ratio.

Another critical issue is that a positive correlation between TFP and our measures of FDI would not be evidence of a causal effect. For example, in industries that attract FDI, productivity is growing relatively fast on average. This would lead to a positive correlation between FDI and productivity, which does not support the evidence for FDI spillovers. For the robustness of the results, we use foreign exchange rate as the instrumental variable for FDI (e.g., Blonigen 1997) to alleviate reverse causality problems. Specifically, a foreign exchange rate growth, its standard deviation, and its lagged values are used. Since we are using the interaction terms of FDI, we also interact our instruments for FDI with foreign human capital variable.

Before moving to our estimation results, we first present comparisons among variables in the descriptive statistics. Table 2 reports descriptive statistics and correlations of variables. We find negative relationships between TFP and some variables, including foreign-owned firms' employment ratio, an FDI proxy, and the employment of foreigners in local firms. In contrast, TFP and E7 visa holders show a positive relationship. Figure 1 also depicts how the employment of foreigners varies by broad industry classification in manufacturing sectors over the sample period. The rubber and plastic products industry has the highest share of foreign employees, followed by the textiles-related industry. Then, the motor vehicles, trailers, and semitrailers industries follow suit.

**Table 2: Descriptive Statistics and Correlations**

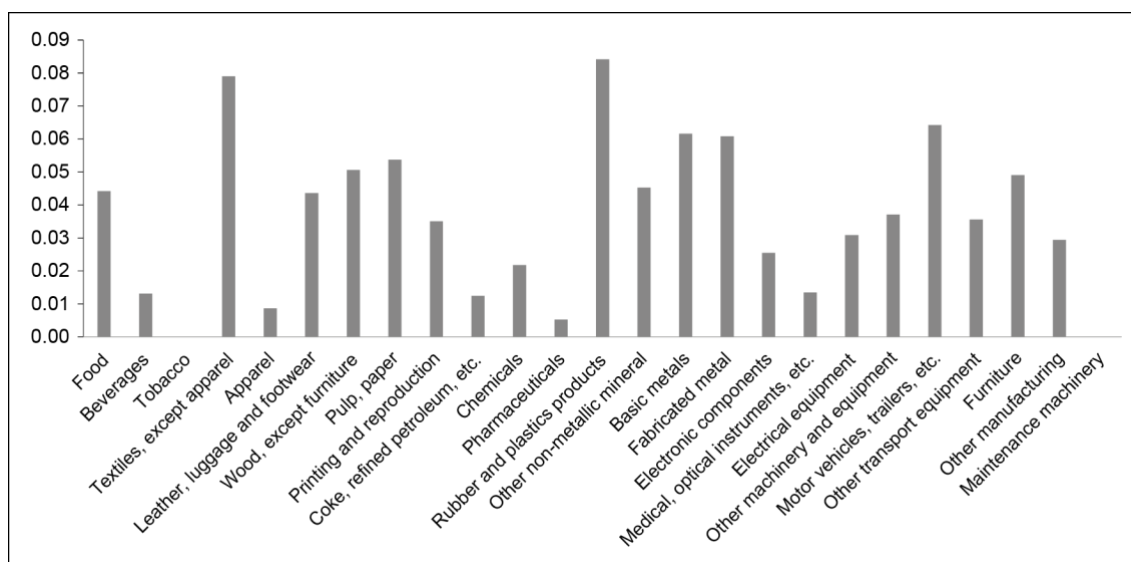
	Obs.	Mean	SD	1	2	3
(log) TFP	17,666	3.201	1.571	1		
2. FDI (%)	17,737	11.493	11.656	-0.1176*	1	
3. D.Employment of foreigner in local firms (%p)	17,737	0.166	5.985	-0.0091	-0.0028	1
4. E7 visa holder of local firms (%)	17,427	2.071	2.377	0.1071*	-0.0481*	0.0079
5. R&D intensity	15,786	0.018	0.054	-0.0556*	-0.0179*	-0.001
6. Export ratio	17,087	0.196	0.268	0.0098	0.0262*	0.0057
7. Intermediate import ratio	16,121	0.015	0.073	0.0401*	0.0378*	0.0023
8. Firm size	17,737	5.047	0.843	0.1098*	0.0246*	0.0142
9. Herfindahl index (HHI)	17,737	0.065	0.070	-0.1569*	0.0079	0.0061
	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>9</b>

(log) TFP						
2. FDI (%)						
3. D.Employment of foreigner in local firms (%p)						
4. E7 visa holder of local firms (%)	1					
5. R&D intensity	-0.0661*	1				
6. Export ratio	-0.0218*	0.0920*	1			
7. Intermediate import ratio	-0.0532*	-0.0076	0.1140*	1		
8. Firm size	-0.1021*	0.0107	0.1607*	0.1014*	1	
9. Herfindahl index (HHI)	-0.0823*	0.0648*	0.1201*	0.0369*	0.0613*	1

\* Significant at the 0.05 level.

**Figure 1: Foreign Employment Ratio by Manufacturing Industry**



## 4. EMPIRICAL RESULTS

We argue that FDI contributes to knowledge spillover via foreign employees, and hiring those foreigners from MNEs enhances local firms' productivity. We measure foreign affiliates' employment share in industry and region as a proxy for FDI (Keller and Yeaple 2009). Table 3 reports the main results with firm, region, and year fixed effects. In addition, we use clustered standard errors at firm level to ensure that our results are robust to heteroskedasticity. Finally, we use lagged variables on the right-hand side to consider time lags and address endogeneity.

**Table 3: Main Results**

Dependent Variable	log (TFP)			
		With Interaction Term	IV	IV (E7 Holder)
Model	(1)	(2)	(3)	(4)
Lagged FDI	0.0014 (0.0020) <i>0.506</i>	0.0013 (0.0020) <i>0.524</i>	0.0223 (0.0381) <i>0.558</i>	-0.1200 (0.1010) <i>0.235</i>
D. Employment of foreigners in local firms		-0.0031*** (0.0010) <i>0.003</i>	-0.0807* (0.0481) <i>0.093</i>	
Lagged FDI x D. Employment of foreigners in local firms		0.0001* (0.0001) <i>0.066</i>	0.0064* (0.0039) <i>0.095</i>	
E7 visa holders of local firm				-0.2453 (0.2100) <i>0.243</i>
Lagged FDI x E7 visa holders of local firm				0.0512* (0.0276) <i>0.064</i>
Lagged R&D intensity	0.2036 (0.3334) <i>0.542</i>	0.2025 (0.3336) <i>0.544</i>	0.2631 (0.3443) <i>0.445</i>	0.1585 (0.3826) <i>0.679</i>
Lagged export ratio	-0.0277 (0.0313) <i>0.376</i>	-0.0287 (0.0313) <i>0.359</i>	-0.0211 (0.0377) <i>0.575</i>	0.0073 (0.0689) <i>0.916</i>
Lagged intermediate import ratio	-0.0847 (0.1222) <i>0.489</i>	-0.0853 (0.1220) <i>0.484</i>	-0.1438 (0.1289) <i>0.265</i>	-0.2446 (0.1734) <i>0.159</i>
Lagged firm size	0.0136 (0.0369) <i>0.712</i>	0.0040 (0.0379) <i>0.915</i>	0.0348 (0.0451) <i>0.440</i>	-0.0540 (0.0585) <i>0.355</i>
Lagged HHI	1.0523*** (0.3499) <i>0.003</i>	1.0487*** (0.3497) <i>0.003</i>	0.4569 (0.3904) <i>0.242</i>	0.4320 (0.9917) <i>0.663</i>
Firm FE	Yes	Yes	Yes	Yes
Region FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Weak IV (p-val.)	-	-	0.00/0.36	0.14/0.20
Hansen over-id (p-val.)	-	-	0.0002	0.4913
Observations	13,104	13,104	13,021	12,777
Firm cluster observations	4,227	4,227	4,201	4,119
R-squared	0.932	0.932	-	-

Note: Clustered robust standard errors at firm level in parentheses. P-values are reported in italics below the standard errors.

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

Column (1) includes the main independent variable, FDI, and control variables. The estimated coefficient on industry and regional FDI is positive but insignificant ( $\beta=0.0014$ ,  $p=0.506$ ). In column (2), we add the interaction term of FDI and foreign human capital to test whether FDI can affect a firm's productivity when local firms hire foreigners who are usually transferred from MNEs. The estimated coefficient on FDI is still insignificant ( $\beta=0.0013$ ,  $p=0.524$ ). Furthermore, the coefficient on the measure of foreign human capital, changes in employment of foreigners in local firms, is negative and significant ( $\beta=-0.0031$ ,  $p=0.003$ ), implying that hiring foreign human capital itself incurs higher costs and can reduce productivity. However, hiring foreign human capital with industry and regional FDI can help enhance local firms' productivity. Interestingly, when we consider the interaction term of FDI and changes in employment of foreigners in local firms, we find a significant and positive coefficient ( $\beta=0.0001$ ,  $p=0.066$ ), suggesting that FDI in the industry and region has significant spillovers to local firms' TFP only when the local firms increase their hiring of foreign employees.

Meanwhile, even though we use lagged variables, we try an alternative model to avoid possible reverse causality because TFP and FDI can be correlated. Thus, we conduct instrument variable (IV) regression as a robustness check. For the IVs, we use the Korean industry real exchange rate (IRER), collected from the Research Institute of Economy, Trade, and Industry (RIETI). We use its level, volatility, and differences between year  $t$  and  $t-1$ . Column (3) shows the IV results that the interaction term of FDI and human capital transfer is positive and significant with a greater magnitude ( $\beta=0.0064$ ,  $p=0.095$ ) than the result in column (2), which supports our main argument.<sup>15</sup>

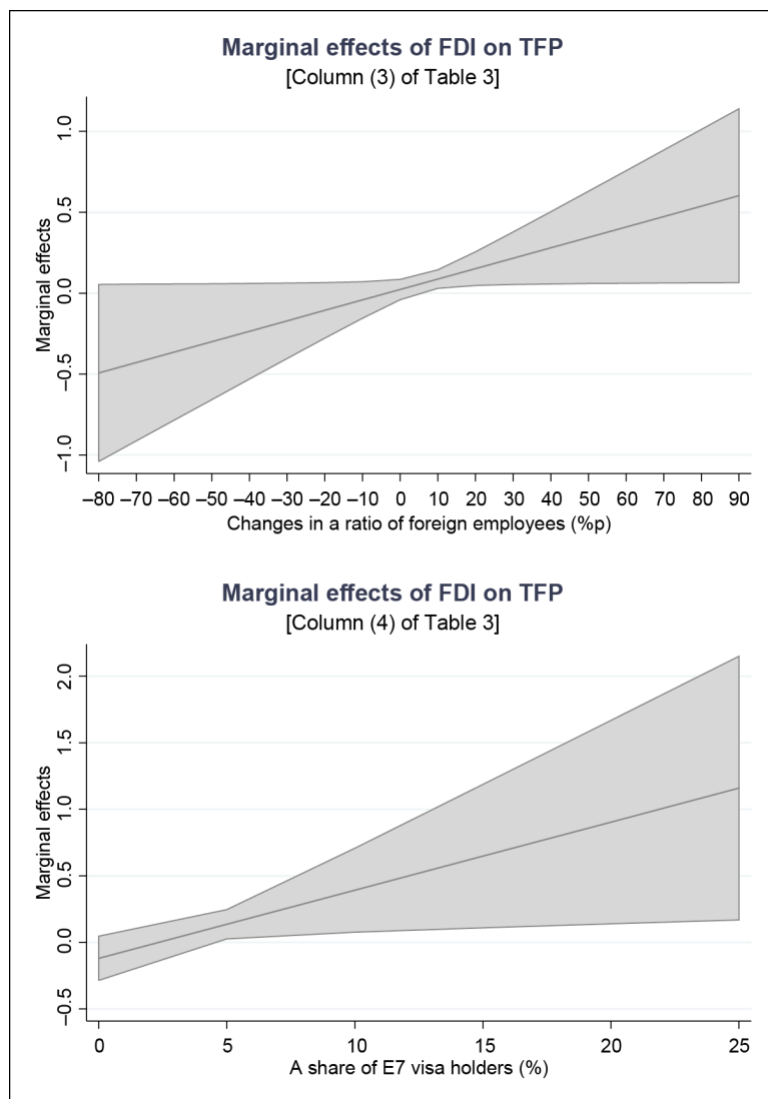
In column (4), another moderator, E7 visa-holding foreigners in local firms, has been included as an interaction term. The coefficient of the interaction term is significantly positive ( $\beta=0.0512$ ,  $p=0.064$ ). Thus, the result suggests that FDI in the industry and region has more significant spillover effects on local firms' TFP as a local firm hires more E7 visa holders from MNEs. IV specification also supports the validity of overidentifying restriction ( $p=0.4913$ ). Figure 2 describes the average marginal effects of the main regression in columns (3) and (4) with the 90% confidence interval. For the results in column (3), when change in the employment of foreigners in local firms is positive, the marginal effect of FDI on TFP is positive and significantly different from zero. The results using column (4) also show that when the share of E7 visa holders in the industry and region is greater than 5%, the marginal effect of FDI on TFP is also positive and significant.

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<sup>15</sup> We also report the weak IV test for FDI and its interaction term— $p$ -values of 0.00 and 0.36 (Sanderson and Windmeijer 2016)—indicating that instruments for FDI reject the null hypothesis that instruments are weak, while those for the FDI interaction term cannot reject the null. The over-id test rejects the null hypothesis that our IVs are valid.



**Figure 2: The Marginal Effect of FDI on TFP via Human Capital Transfer from MNEs to Local Firms**



Note: 90% confidential interval.

### 4.1 Robustness Check

Table 4 shows the results of more experiments to understand our main results in depth. Firstly, we repeat our main regression using sub-samples based on the level of R&D intensity. Our full sample is divided into two groups based on the industry mean of R&D intensity. We check whether industry R&D intensity brings any differences to the role of human capital transfer in the effect of FDI on TFP. Columns (1) and (2) of Table 4 present the results of regressions for high R&D and low R&D industries. In column (1), the results for firms in higher R&D intensity industries than the industrial average show that the interaction term of FDI and human capital transfer is positive and significant ( $\beta=0.0471$ ,  $p=0.024$ ). However, the other group with lower R&D intensity presents insignificant results ( $\beta=0.0085$ ,  $p=0.724$ ). This implies that local firms in higher R&D intensity industries can achieve higher productivity gains from human capital transfer driven by FDI. Thus, we confirm that R&D intensity, in addition to human capital transfer, can amplify the effect of FDI on local firms. This result also supports previous

studies claiming that firms' innovation via R&D and productivity presents a positive relationship (Belderbos et al. 2015; Ramadani et al. 2017).

**Table 4: Detailed Channels**

Dependent Variable	log (TFP)				
	R&D		Organization		
	High	Low	Research Institute	Headquarters	Local Branches
<b>Model</b>	<b>(1)</b>	<b>(2)</b>	<b>(3)</b>	<b>(4)</b>	<b>(5)</b>
Lagged FDI	-0.0848 (0.0619) <i>0.170</i>	0.0112 (0.0949) <i>0.906</i>	0.0034 (0.0022) <i>0.122</i>	0.0016 (0.0021) <i>0.444</i>	0.0022 (0.0022) <i>0.302</i>
E7 visa holders of local firm	-0.2232 (0.1969) <i>0.257</i>	0.0509 (0.1612) <i>0.752</i>			
Lagged FDI x E7 visa holders of local firm	0.0471** (0.0208) <i>0.024</i>	0.0085 (0.0241) <i>0.724</i>			
D. Employment of foreigners in organization			-0.0458 (0.0284) <i>0.107</i>	-0.0033*** (0.0011) <i>0.003</i>	0.0004 (0.0022) <i>0.860</i>
Lagged FDI x D. Employment of foreigners in local firms' organization			0.0036** (0.0015) <i>0.014</i>	0.0001* (0.0001) <i>0.050</i>	-0.0001 (0.0001) <i>0.415</i>
Lagged R&D intensity	0.1662 (0.4344) <i>0.702</i>	-0.7044 (1.2996) <i>0.588</i>	0.2282 (0.3708) <i>0.538</i>	0.2073 (0.3349) <i>0.536</i>	0.3872 (0.3719) <i>0.298</i>
Lagged export ratio	-0.0138 (0.0972) <i>0.887</i>	0.0153 (0.0585) <i>0.794</i>	-0.0074 (0.0309) <i>0.812</i>	-0.0192 (0.0304) <i>0.529</i>	-0.0211 (0.0322) <i>0.511</i>
Lagged intermediate import ratio	-0.1638 (0.3303) <i>0.620</i>	-0.0698 (0.1703) <i>0.682</i>	-0.1039 (0.1292) <i>0.421</i>	-0.0889 (0.1223) <i>0.467</i>	-0.1207 (0.1225) <i>0.325</i>
Lagged firm size	0.0249 (0.0886) <i>0.779</i>	0.0170 (0.0654) <i>0.795</i>	0.0352 (0.0394) <i>0.371</i>	0.0108 (0.0384) <i>0.778</i>	0.0328 (0.0388) <i>0.399</i>
Lagged HHI	0.0488 (1.5972) <i>0.976</i>	0.0694 (1.4161) <i>0.961</i>	1.5698*** (0.4190) <i>0.000</i>	1.1526*** (0.3639) <i>0.002</i>	1.3098*** (0.4128) <i>0.002</i>
Firm FE	Yes	Yes	Yes	Yes	Yes
Region FE	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
Weak IV (p-val.)	0.03/0.03	0.28/0.28	-	-	-
Hansen over-id (p-val.)	0.7778	0.1495	-	-	-
Observations	4,154	6,311	11,242	12,947	11,777
Firm cluster observations	1,564	2,290	4,004	4,215	4,044
R-squared	-	-	0.940	0.933	0.936

Note: Clustered robust standard errors at firm level in parentheses. P-values are reported in italics below the standard errors.

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

To measure the contribution of skilled foreign employees in local firms, we separate organization units in a local firm where human capital is actually employed into research institutes, headquarters, and branches. Column (3) shows the result when foreigners are hired by local firms in research institutes. The result reports that the coefficient on the interaction term of FDI and changes in the employment of foreigners in local firms' research institutes is significantly positive ( $\beta=0.0036$ ,  $p=0.014$ ). This suggests that if research institutes of local firms have more foreign employees transferred by MNEs (via FDI), the positive effect of FDI on local firms' productivity is more pronounced.

Moreover, a noticeable point from our study is that if we classify local firms into headquarters (HQ) and branches, the impact of FDI on local firms' TFP differs. Column (4) of Table 4 presents the results with foreign employees in HQ, confirming a positive and significant coefficient on the interaction term of FDI and changes in employment of foreigners in HQ ( $\beta=0.0001$ ,  $p=0.050$ ). Note that changes in foreign employment are significantly negative, implying that hiring foreigners incurs high costs, thereby putting downward pressure on productivity. But allowing for the FDI effect, the productivity upgrade driven by FDI is rather amplified by the employment of foreigners than offset by the cost of hiring foreigners. In contrast, column (5) shows that the interaction term of FDI and employment of foreigners in branches in a local firm does not present a significant coefficient. These results explain that firms' HQ usually operates the core business activities, so the impact of FDI and changes in foreign employment is more significant in HQ compared to local branches. Thus, we conclude that hiring foreign employees in HQ is more pivotal to enhancing the FDI spillover on local firms' productivity.

## 5. DISCUSSION AND CONCLUSION

This study examines the effect of FDI on local firms' productivity in industry and region via human capital transferred from foreign MNEs to local firms, especially foreign employees, considering the knowledge spillover channel to local firms. Thanks to Republic of Korea's specific visa regulation for skilled foreign employment and local firms' job market characteristics, we argue that skilled foreign employees tend to enter the Korean labor market through MNEs and later transfer to local firms. The main results support that industry- and region-specific FDI enhances local firms' TFP when local firms hire more foreigners from MNEs. In addition, we show that industry R&D intensity amplifies the positive FDI effects on local firms' TFP via foreign human capital.

This study gives some insights into policy implications and managerial practices. According to the survey regarding the labor shortage in the Republic of Korea,<sup>16</sup> managers of many local firms consider hiring foreigners to overcome their labor shortage or mismatch. This paper provides evidence that skilled foreign employees in the Republic of Korea are likely to be transferred by MNEs. Thus, if managers in a local firm can employ foreigners who have experience in foreign MNEs, these employees can contribute to knowledge spillover to the local firm in addition to resolving a labor shortage and mismatch problem. Local managers may search for E7 visa holders who want to extend their visas. Building an E7 holders' network would be beneficial for local managers to recruit skilled foreigners with work experience in the Republic of Korea.

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<sup>16</sup> Business labor force survey ([www.model.go.kr](http://www.model.go.kr)), Ministry of Employment and Labor.

Policymakers in countries facing a labor shortage but insufficient overseas recruiting systems like the Republic of Korea can actively resolve the lack of skilled employment and help boost local firms' performance. A more friendly system supporting skilled foreign employees who remain in a country will benefit both local firms and foreign workers. For example, when MNEs' skilled foreign workers apply for a visa extension in the host country, the host government can expedite the process and relax unnecessary restrictions. In addition, policymakers may construct a platform where a local firm posts job openings and foreigners access that information, or provide matching services between local firms and skilled foreign workers to enhance human capital transfer.

There are some limitations of the current study, as well as proposals for future research. While we examine the visa status of skilled foreign employees and their mobilization between MNEs and local firms, capturing human capital transfer, it is still difficult to trace job turnover at the individual worker levels. For example, domestic nationals trained by MNEs can be transferred to local firms, which brings about knowledge spillover. In addition, Hejazi et al. (2021) found that the learning effects from MNEs' superior performance are higher in services (28%) than in the goods-producing industries (8%). Therefore, scrutinizing different sectors, including service industries, will provide richer insights into how FDI's knowledge spillover via human capital affects local firms' productivity.

## REFERENCES

- Aitken, B. J., and Harrison, A. E. (1999). Do domestic firms benefit from direct foreign investment? Evidence from Venezuela. *American Economic Review*, 89(3), 605–618.
- Altomonte, C., and Pennings, E. (2009). Domestic plant productivity and incremental spillovers from foreign direct investment. *Journal of International Business Studies*, 40(7), 1131–1148.
- Barney, J. (1991). Competitive advantage. *Journal of Management*, 17(1), 99–120.
- Belderbos, R. A., and Heijltjes, M. G. (2005). The determinants of expatriate staffing by Japanese multinationals in Asia: Control, learning and vertical business groups. *Journal of International Business Studies*, 36(3), 341–354.
- Belderbos, R., Lokshin, B., and Sadowski, B. (2015). The returns to foreign R&D. *Journal of International Business Studies*, 46(4), 491–504.
- Blomström, M., and Kokko, A. (1998). Multinational corporations and spillovers. *Journal of Economic Surveys*, 12(3), 247.
- Blonigen, B. A. (1997). Firm-specific assets and the link between exchange rates and foreign direct investment. *The American Economic Review*, 87(3), 447–465.
- Cohen, W. M., and Levinthal, D. A. (1990). Absorptive capacity: A new perspective on learning and innovation. *Administrative Science Quarterly*, 35(1), 128–152.
- Crespo, N., and Fontoura, M. P. (2007). Determinant factors of FDI spillovers: What do we really know? *World Development*, 35(3), 410–425.
- Djankov, S., and Hoekman, B. (2000). Foreign investment and productivity growth in Czech enterprises. *The World Bank Economic Review*, 14(1), 49–64.
- Fosfuri, A., Motta, M., and Ronde, T. (2001). Foreign direct investment and spillovers through workers' mobility. *Journal of International Economics*, 53(1), 205–222.
- García, F., Jin, B., and Salomon, R. (2013). Does inward foreign direct investment improve the innovative performance of local firms? *Research Policy*, 42(1), 231–244.
- Girma, S., Gong, Y., Görg, H., and Lancheros, S. (2015). Estimating direct and indirect effects of foreign direct investment on firm productivity in the presence of interactions between firms. *Journal of International Economics*, 95(1), 157–169.
- Girma, S., Greenaway, D., and Wakelin, K. (2001). Who benefits from foreign direct investment in the UK? *Scottish Journal of Political Economy*, 48(2), 119–133.
- Glass, A. J., and Saggi, K. (2002). Multinational firms and technology transfer. *Scandinavian Journal of Economics*, 104(4), 495–513.
- Haddad, M., and Harrison, A. (1993). Are there positive spillovers from direct foreign investment? Evidence from panel data for Morocco. *Journal of Development Economics*, 42(1), 51–74.
- Hejazi, W., Tang, J., and Wang, W. (2021). Selection, learning, and productivity at the firm level: Evidence from Canadian outward FDI. *Journal of International Business Studies*, 52(2), 306–320.

- Hitt, M. A., Hoskisson, R. E., and Kim, H. (1997). International diversification: Effects on innovation and firm performance in product-diversified firms. *Academy of Management Journal*, 40(4), 767–798.
- Hu, X., Li, J., and Jin, Z. (2019). How ordinary returnees and foreigners drive firms' exports? *Review of International Business and Strategy*, 29(1).
- Kathuria, V. (2000). Productivity spillovers from technology transfer to Indian manufacturing firms. *Journal of International Development*, 12(3), 343–369.
- Keller, W., and Yeaple, S. R. (2009). Multinational enterprises, international trade, and productivity growth: Firm-level evidence from the United States. *The Review of Economics and Statistics*, 91(4), 821–831.
- Konings, J. (2001). The effects of foreign direct investment on domestic firms: Evidence from firm-level panel data in emerging economies. *Economics of Transition*, 9(3), 619–633.
- Lewin, A. Y., Massini, S., and Peeters, C. (2020). Absorptive capacity, socially enabling mechanisms, and the role of learning from trial and error experiments: A tribute to Dan Levinthal's contribution to international business research. *Journal of International Business Studies*, 51(9), 1568–1579.
- Levinsohn, J., and Petrin, A. (2003). Estimating production functions using inputs to control for unobservables. *The Review of Economic Studies*, 70(2), 317–341.
- Liu, X., Wang, C., and Wei, Y. (2009). Do local manufacturing firms benefit from transactional linkages with multinational enterprises in China? *Journal of International Business Studies*, 40(7), 1113–1130.
- Luo, Y. (2020). Adaptive learning in international business. *Journal of International Business Studies*, 51(9), 1547–1567.
- Markusen, J. R., and Trosimenko, N. (2009). Teaching locals new tricks: Foreign experts as a channel of knowledge transfers. *Journal of Development Economics*, 88(1), 120–131.
- McGaughey, S. L., Raimondos, P., and la Cour, L. (2020). Foreign influence, control, and indirect ownership: Implications for productivity spillovers. *Journal of International Business Studies*, 51(9), 1391–1412.
- Ministry of Employment and Labor, Republic of Korea. *Business labor force survey*, [www.model.go.kr](http://www.model.go.kr) Ministry of Justice, Republic of Korea. *Korea visa portal*. <https://www.visa.go.kr/>
- Morgan, H. M., Sui, S., and Malhotra, S. (2021). No place like home: The effect of exporting to the country of origin on the financial performance of immigrant-owned SMEs. *Journal of International Business Studies*, 52(3), 504–524.
- Ozdemir, S. Z., Moran, P., Zhong, X., and Bliemel, M. J. (2016). Reaching and acquiring valuable resources: The entrepreneur's use of brokerage, cohesion, and embeddedness. *Entrepreneurship Theory and Practice*, 40(1), 49–79.
- Penrose, E. (1959). *The theory of the growth of the firm*. New York.
- Ramadani, V., Abazi-Alili, H., Dana, L. P., Rexhepi, G., and Ibraimi, S. (2017). The impact of knowledge spillovers and innovation on firm-performance: Findings from the Balkan countries. *International Entrepreneurship and Management Journal*, 13(1), 299–325.

- Salim, R., and Bloch, H. (2014). Which firms benefit from foreign direct investment? Empirical evidence from Indonesian manufacturing. *Journal of Asian Economics*, 33, 16–29.
- Sanderson, E., and Windmeijer, F. (2016). A weak instrument F-test in linear IV models with multiple endogenous variables. *Journal of Econometrics*, 190(2), 212–221.
- Santacreu-Vasut, E., and Teshima, K. (2016). Foreign employees as channel for technology transfer: Evidence from MNC's subsidiaries in Mexico. *Journal of Development Economics*, 122, 92–112.
- Saurav, A., and Kuo, R. (2020). *The voice of foreign direct investment: Foreign investor policy preferences and experiences in developing countries*. World Bank.
- Urata, S., and Kawai, H. (2000). Intrafirm technology transfer by Japanese manufacturing firms in Asia. In I. Takatoshi and A. O. Krueger (Eds.), *The role of foreign direct investment in East Asian economic development* (pp. 49–77). National Bureau of Economic Research.
- Urata, S., Matsuura, T., and Wei, Y. (2006). *International intra-firm transfer of management technology by Japanese multinational corporations*. RIETI Tokyo.
- Wooldridge, J. M. (2009). On estimating firm-level production functions using proxy variables to control for unobservables. *Economics Letters*, 104(3), 112–114.
- Xu, B. (2000). Multinational enterprises, technology diffusion, and host country productivity growth. *Journal of Development Economics*, 62(2), 477–493.