ERIA Discussion Paper Series

No. 437

FDI Spillover Effects: Evidence from the Philippines

Rafaelita M. ALDABA

Undersecretary for the Competitiveness and Innovation Group of the Philippine Department of Trade and Industry (DTI)

Angel Derrickvhel QUEJADA[1]

August 2022

Abstract: *Using firm-level data in manufacturing, this chapter examines the impact of foreign direct investment (FDI) spillover effects on domestic firm performance. Through knowledge spillovers, FDI inflows affect the performance of domestic firms. Overall, there is some evidence to show that horizontal and forward spillovers from FDI have a significant positive impact on the performance of domestic firms. However, in terms of backward spillovers, the impact of FDI on the performance of domestic firms is negative and significant. The diffusion of backward spillover effects to domestic firms has remained limited due to the weak competitiveness of domestic firms and their inability to absorb the technology or knowledge being transferred.*

To strengthen the absorptive capacity and productivity of domestic firms, the chapter suggests a more comprehensive approach that would combine industrial policy to improve and develop domestic parts and supplier firms with measures to create an environment conducive to the creation and expansion of FDI backward spillovers. These include upgrading industry participation towards higher segments of global value chains, innovation, human resource development, upskilling and reskilling the workforce, and liberalising ecozone regulations affecting the transactions between multinational corporations and companies outside the economic zones.

Keywords: Foreign direct investment determinants, horizontal and vertical spillovers

[1] Department of Trade and Industry-Competitiveness and Innovation Group. The authors are grateful to the Philippine Statistics Authority for generating the manufacturing survey and census data used in the analysis. They also appreciate all the valuable comments and suggestions of Dr. Dionisius Narjoko, Senior Economist of the Economic Research Institute for ASEAN and East Asia (ERIA); Dr. Shandre Tangavelu, Associate Professor and Research Director, University of Adelaide; Dr. Shujiro Urata, Senior Research Advisor to the President of ERIA and Professor, Waseda University; and Dr. Doan Thi Thanh Ha, ERIA.

1. Background

In 2019, a recovery in both global foreign direct investment (FDI) inflows and outflows seemed to have started as inflows registered US$1.5 billion whilst outflows reached US$1.3 billion (UNESCAP, 2020). However, with the COVID-19 pandemic, global flows are expected to decline and remain low given the increasing uncertainties affecting the investment environment. Within Southeast Asia, inflows have been highly uneven, with Singapore recording the highest inward FDI of US$92.1 billion in 2019. Indonesia was in far second at US$23 billion, whilst Viet Nam posted US$16 billion. Malaysia followed at US$7.65 billion, the Philippines at around US$5 billion, Thailand at US$4 billion, and Cambodia at US$3.7 billion. To be able to recover and get back to their original growth trajectories, an influx of FDI flows would be crucial. The signing of the Regional Comprehensive Economic Partnership (RCEP) in November 2020 is seen as one bright spot amidst the pandemic. The RCEP is one of the largest trade and investment agreements that could boost FDI into the region.

Developing countries have been gearing up their investment promotion and incentive policies and programmes in their efforts to attract more FDI. FDI flows are beneficial because apart from bringing in new capital flows, foreign exchange, employment, and access to foreign markets, they are an important source of knowledge and technology transfer. Through FDI's spillover potential, there are productivity gains that could arise from the diffusion of knowledge and technology from foreign investors to domestic companies and workers (Farole and Winkler, 2019). This could contribute to the host country's long-run growth and development. Moreover, as global value chains (GVCs) and FDI are intricately intertwined, FDI could play a vital role in deepening the GVC participation of developing countries.

GVCs are usually commonly coordinated by multinational companies, with cross-border trade of inputs and outputs taking place within their networks of affiliates, contractual partners, and arm's-length suppliers, and multinational corporation (MNC)-coordinated GVCs account for 80% of global trade (UNCTAD, 2013). UNCTAD (2013) also highlights that countries with a greater presence of FDI relative to the size of their economies tend to have a higher level of

participation in GVCs and generate relatively more domestic value added from trade. Apart from having a direct impact on value added, jobs, and income, GVCs can also be an important avenue for developing countries to build productive capacity, including through technology dissemination and skill-building opportunities for industrial upgrading.

Prior to the 1990s, Philippine FDI policy was characterised by a highly restrictive and complicated regulatory and investment incentive system. As the country's market-oriented reforms deepened during the 1990s, the attitude and policy direction of the Philippines towards FDI changed considerably. A policy shift transpired as the government adopted more open and flexible policies towards FDI to achieve sustainable economic growth. But more importantly, the government recognised the need to expand exports and the potential economic contribution of FDI through the transfer of knowledge and experience.

Whilst the investment policy reforms and opening up of more sectors to foreign investors resulted in improvements in FDI inflows, overall, FDI inflows to the Philippines have been limited and lagged behind those of the country's neighbours in Southeast Asia. On average, FDI as a percentage of gross domestic product (GDP) during the period 2010–2019 reached only 1.5%. Compared with other countries, it has lagged significantly behind Cambodia, with an average of 12.5% during the same period, Viet Nam and the Lao PDR at 5.9%, Malaysia at 3.2%, and Indonesia at 1.9%.

The main objective of this study is to assess the spillover effects of FDI on domestic firms and industries. A clearer understanding of whether FDI inflows positively affect domestic firms through spillover effects will help in crafting better policies to attract FDI and pursue industrial upgrading in GVCs aligned with the country's industrial development goals and comparative advantage. The rest of the chapter is organised as follows: Section 2 traces the reforms in the country's FDI policies from the 1990s onwards. Section 3 examines FDI inflows and GVC participation using the Trade in Value Added (TiVA) database, whilst Section 4 presents the methodology and analysis of the results. The final section summarises the findings, policy implications, and recommendations to provide new directions to enable domestic companies to benefit from FDI spillovers.

2. FDI Policy Reforms from the 1990s to the Present

2.1. FDI liberalisation and investment incentive systems

From a highly restrictive and complicated regulatory and investment incentive system, the attitude and policy direction of the Philippines towards FDI changed considerably during the 1990s. Simultaneously with the implementation of trade liberalisation, privatisation, and economic deregulation, the government adopted more open and flexible FDI policies. The country accelerated the FDI liberalisation process through the legislation of Republic Act (RA) 7042, or the Foreign Investment Act (FIA), in June 1991. This allowed foreign equity participation up to 100% in all areas not specified in the Foreign Investment Negative List (FINL), which consists of three component lists: A, B, and C.

- List A: Consists of areas reserved for Filipino nationals by virtue of the Constitution or specific legislation like mass media, cooperatives, or small-scale mining.
- List B: Consists of areas reserved for Filipino nationals by virtue of defence, risk to health, morality, and the protection of small- and medium-scale industries.
- List C: Consists of areas in which there already exists an adequate number of establishments to serve the needs of the economy, and further foreign investments are no longer necessary.

In March 1996, RA 7042 was amended through the passing of RA 8179, which further liberalised foreign investments by allowing greater foreign participation in areas that were previously restricted. This abolished List C, which limited foreign ownership in ‘adequately served’ sectors. Currently, the FIA has two components Lists A and B covering sectors where foreign investment is restricted below 100%, those falling under the Constitution, or those with restrictions mandated under various laws.

The mid-1990s witnessed the liberalisation of the banking sector. The 1994 Foreign Bank Liberalization allowed the establishment of 10 new foreign banks in the Philippines. In 2000, the legislation of the General Banking Law (RA 8791) provided a 7-year window during which foreign banks may own up to 100% of one locally-incorporated commercial or thrift bank.

To develop international financial centre operations in the Philippines and facilitate the flow of international capital into the country, foreign banks have been allowed to establish offshore banking units (OBUs). OBUs are subject to virtually no exchange control on their offshore operations and are not subject to tax on income they source from outside the Philippines. Incentives have also been offered to multinationals that establish regional headquarters (RHQ) or a regional operating headquarters (ROHQ) in the Philippines.

In March 2000, the legislation of the Retail Trade Liberalization Act (RA 8762) allowed foreign investors to enter the retail business and have 100% ownership as long as they put up a minimum of US$7.5 million equity. A lower minimum capitalisation threshold ($250,000) is allowed for foreigners seeking full ownership of firms engaged in high-end or luxury products. RA 8762 also allowed foreign companies to engage in rice and corn trade.

Whilst substantial progress has been made in liberalising the country's FDI policy, there still remain significant barriers to FDI entry. The sectors where no foreign equity is allowed include mass media, the practice of professions, retail trade enterprises with paid-up capital of less than US$ 2.5 million, and other sectors. Exploration, development and utilisation of natural resources, land ownership, operation of public utilities, and private radio communications networks are some of the activities where foreign ownership is limited to 40%.

To encourage FDI inflows, the Philippines also pursued changes in its investment incentive schemes. In 1987, a new Omnibus Investments Code was legislated to simplify and consolidate previous investment laws and add two new measures: an income tax holiday for enterprises engaged in preferred areas of investment, and a labour expense allowance for tax deduction purposes. Under the new Omnibus Investments Code, foreign and domestic investors may avail of fiscal and non-fiscal incentives provided they invest in preferred areas of investment identified annually in the Investment Priorities Plan (IPP).

In the 1990s, several other laws containing investment incentive packages were legislated, the most important of which is RA 7227, known as the Bases Conversion and Development Act of 1992, and RA 7916, or the Special Economic Zone Act of 1995. RA 7227, or the Bases Conversion and Development Act of

1992, was enacted into law in March 1992 with the objective of accelerating the development of the former United States military bases into special economic zones. The Act created two administrative bodies, the Bases Conversion and Development Authority (BCDA) and the Subic Bay Metropolitan Authority (SBMA), tasked with adopting, preparing, and implementing a comprehensive development programme for the conversion of the Clark and Subic military reservations into special economic zones. In 1993, Executive Order No. 80 was issued establishing the Clark Development Corporation (CDC), as the implementing arm of the BCDA for the Clark Special Economic Zone.

In 1995, Republic Act (RA) 7916 was legislated to shift the focus away from government export processing zones (EPZs) towards private industrial zones. Focus also shifted from the traditional EPZ in which firms must be 100% export-oriented and engaged in recognised manufacturing activities towards industrial parks that allow all industries regardless of market orientation and a separate, fenced-in EPZ for wholly export-oriented firms. RA 7916 created the Philippine Economic Zone Authority (PEZA) to manage and operate government-owned zones and administer incentives to special economic zones (ecozones). RA 7916 allowed greater private sector participation in zone development and management through the provision of incentives for private zone developers and operators. Zone developers are allowed to supply utilities to tenants by treating them as indirect exporters.

The current incentive system that evolved is characterised by different investment regimes administered by various government bodies consisting of the Board of Investments, Philippine Economic Zone Authority, Subic Bay Metropolitan Authority, Clark Development Corporation, and other investment promotion agencies mandated by various laws to establish, maintain, and manage special economic or free port zones. Table 1 presents a comparison of the major incentives provided by the different investment incentive-giving bodies. BOI-registered enterprises are entitled to an income tax holiday (ITH) of up to 8 years, tax and duty free importation of spare parts, and tax credit on raw materials. After the lapse of the ITH, the regular corporate tax rate will apply to BOI enterprises. PEZA grants the most generous incentives, including an income tax holiday, a basic income tax rate of 5% of gross income, and tax- and duty-free importation of capital

equipment, spare parts, and raw material inputs. Except for the ITH, Clark and Subic enterprises enjoy the same incentives available to PEZA enterprises.

Table 1: Investment Incentive Schemes

	Investment Regime	BOI	PEZA	Subic and Clark
Incentives	Income	4–8 year ITH	4–8 year ITH	No ITH
	Others	After ITH, payment of the regular corporate tax rate of 35% of taxable income	After ITH, exemption from national and local taxes, in lieu of this special rate of 5% tax on gross income	5% tax on gross income in lieu of all local and national taxes
	Importation of raw materials and supplies	Tax credit	Tax and duty exemption	Tax and duty exemption
	Purchase of breeding stocks and genetic materials	Tax exemption within 10 years from registration	Tax and duty exemption	Tax and duty exemption
	Imported capital equipment, spare parts, materials and supplies	Tax and duty exemption on spare parts (duty- and tax-free importation of capital equipment expired in 1997)[a]	Tax and duty exemption	Tax and duty exemption

[a] Executive Order 313 (2004) restored these incentives.
Source: Aldaba and Aldaba (2011).

2.2. Foreign Direct Investment Flows: Structure and Trends

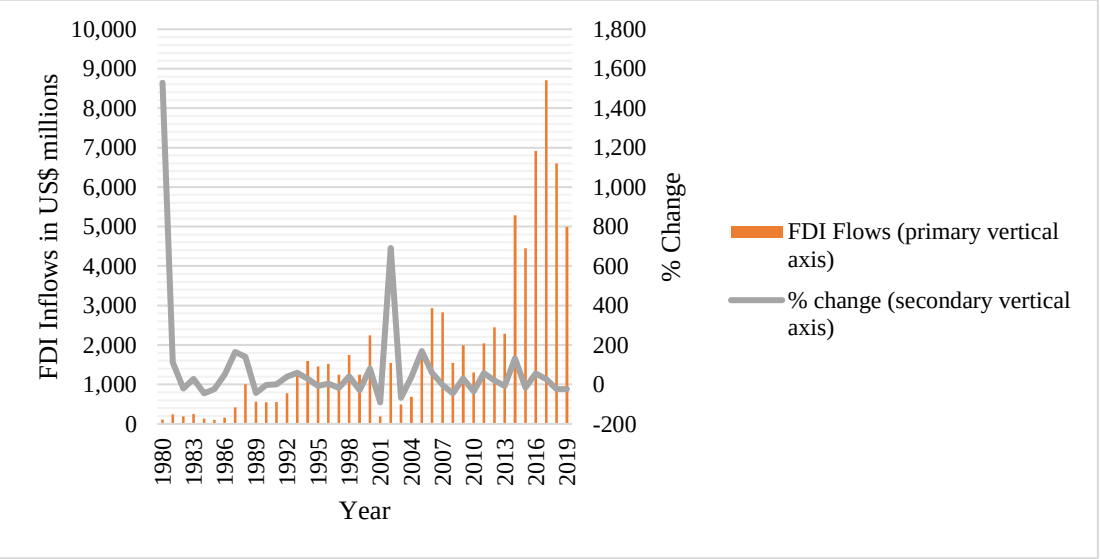
The 1990s witnessed considerable changes in the attitude and policy direction of the Philippines towards FDI. Recognising the need to expand exports and the potential contribution of FDI through the transfer of knowledge and experience, the government adopted more open and flexible FDI policies. This was implemented almost simultaneously with the trade reform programme along with privatisation and economic deregulation, which started in the 1980s.

The liberalisation efforts from the 1990s onwards have been accompanied by increases in FDI inflows, especially during the period 2000–2009, which registered an average annual change of 86%, although this slowed to an average of 18% during

the most recent years covering 2010–2019 (see Figure 1). The average annual change in FDI inflows was -97% in the 1970s and 189% in the 1980s.

In terms of the sectoral structure of FDI, Table 2 shows the distribution of FDI by major economic sector measured by the cumulative totals of FDI inflows for the most recent period of 2010–2019. Manufacturing has consistently dominated the bulk of FDI inflows with a share of 23.5% of cumulative FDI inflows from 2010 to 2014. This went up to 31.4% in the next period covering the years 2015–2019. Financial and insurance services accounted for a share of 13% during 2010–2014, which increased to 24% in the more recent years from 2015 to 2019. Real estate activities registered a share of 16% in the period 2010-2014, this declined to 9% in the 2015–2019 period. Arts, entertainment, and recreation posted a share of 7% which indicated a slight increase from its 6% during the period 2010–2014.

Figure 1: FDI Inward Flows, 1990–2019



Source: United Nations Conference on Trade and Development, UNCTADSTAT.

Table 2: Structure of FDI

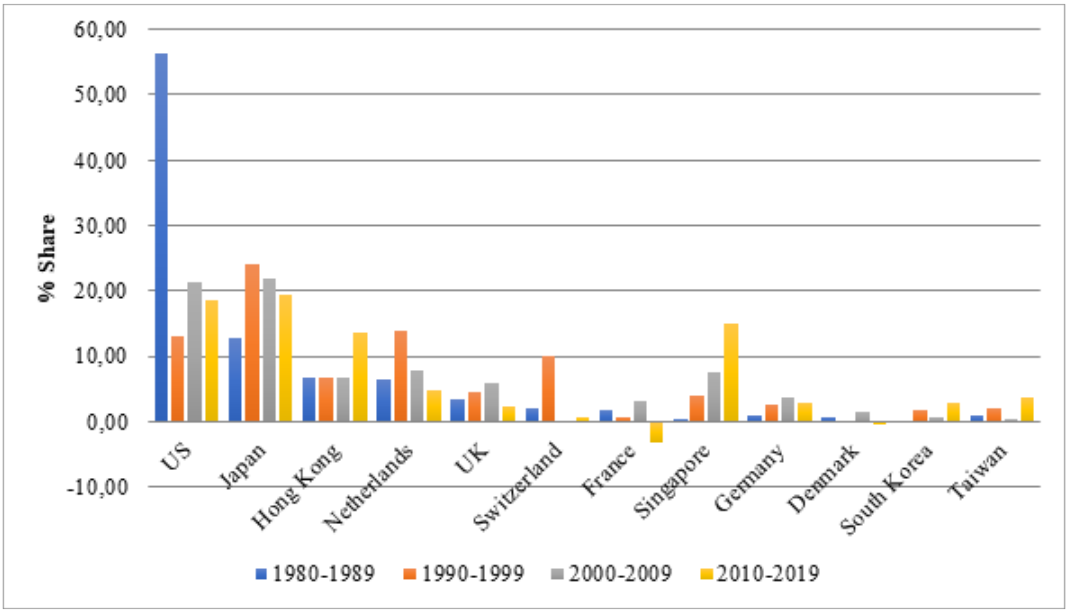
Industry	Cumulative Flows		% Distribution	
	2010–2014	2015–2019	2010–2014	2015–2019
Agriculture, forestry, and fishing	37.13	21.92	0.84	0.19
Mining and quarrying	278.61	112.67	6.29	0.97
Manufacturing	1,040.17	3,641.14	23.48	31.39
Electricity, gas, steam, and air conditioning supply	-137.22	1,844.73	-3.1	15.9
Water supply; sewerage, waste management and remediation activities	435.67	5.06	9.83	0.04
Construction	43.08	368.08	0.97	3.17
Wholesale and retail trade; repair of motor vehicles and motorcycles	387.57	145.53	8.75	1.25
Transportation and storage	220.22	169.07	4.97	1.46
Accommodation and food service activities	135.98	161.82	3.07	1.39
Information and communication	304.85	111.6	6.88	0.96
Financial and insurance activities	594.64	2,787.82	13.42	24.03
Real estate activities	705.24	1,032.61	15.92	8.9
Professional, scientific, and technical activities	28.08	63.3	0.63	0.55
Administrative and support service activities	70.2	126.88	1.58	1.09
Public administration and defence; compulsory social security	0.04	0	0	0
Education	1.94	5.56	0.04	0.05
Human health and social work activities	-0.06	93.65	0	0.81
Arts, entertainment, and recreation	279.79	814.46	6.31	7.02
Other service activities	1.39	-1.06	0.03	-0.01
Others not elsewhere classified	3.4	96.03	0.08	0.83
Equity other than reinvested earnings, net	4,430.70	11,600.87	100	100

Source: Bangko Sentral Ng Pilipinas.

Up until the 1980s, the United States (US) was the country's largest source of FDI inflows (see Figure 2). In the 1990s, its average share dropped from 56% in the 1980s to only 13%. In the next period 2000–2009, the share of the US increased to 21.5%, but this declined to 19% in the more recent period of 2010–2019. US dominance has been substantially diluted by the increasing presence of Japan, Switzerland, the Netherlands, the United Kingdom (UK), and Singapore. On

average, Japan's share increased from 13% in the 1980s to 24% in the 1990s, although this declined to 22% during the period 2000–2009 and to 19% in 2010–2019. Singapore's share went up from 4% in the 1990s to 15% during the years 2010–2019. Similarly, Hong Kong's share rose from around 7% in the 1980s to 14% in the most recent period.

Figure 2: FDI by Source Country



Source of basic data: Bangko Sentral ng Pilipinas.

Whilst the investment policy reforms and opening up of sectors to foreign investors resulted in improvements in FDI inflows to the country, overall, FDI inflows to the Philippines have been limited as the country's FDI performance has lagged behind its neighbours in Southeast Asia. Compared with FDI inflows to the Association of Southeast Asian Nations (ASEAN)-5 countries, Table 3 shows that the Philippines received the lowest level of FDI inflows, particularly from the 1990s onwards. In the 1980s, the Philippines and Indonesia received the same level of cumulative FDI of around US$3 billion, whilst Thailand registered a total of US$5 billion and Viet Nam US$56 million. In the 1990s, cumulative FDI inflows surged with a total of US$13 billion for Viet Nam and an average annual increase of 464% (see Table 4), US$22 billion for Indonesia, and US$32 billion for Thailand. Meanwhile, the Philippines posted a cumulative total amounting to US$12 billion in the same period and an average annual increase of 12% (see Table 4). Figure 3

shows that FDI as a percentage of GDP was also lowest in the Philippines with an average share of 1.5% in the most recent period 2010–2019 as compared to 21.5% in Singapore, 5.9% in Viet Nam, 3.2% in Malaysia, 1.9% in Indonesia, and 1.8% in Thailand.

Table 3: Cumulative FDI Inward Flows, 1970-2019 (US$ million)

	1970–1979	1980–1989	1990–1999	2000–2009	2010–2019
Brunei Darussalam	38	-12	3292	7292	4521
Cambodia	2	1	1244	4252	22867
Indonesia	4379	3261	21915	28293	177911
Lao PDR	2	4	548	1054	8322
Malaysia	3262	9647	48158	41988	99575
Myanmar	5	55	3601	4177	26289
Philippines	800	3178	11938	16294	45020
Singapore	3013	19068	89791	204249	671353
Thailand	798	5153	31839	61687	74008
Viet Nam	7	56	13378	35563	112107

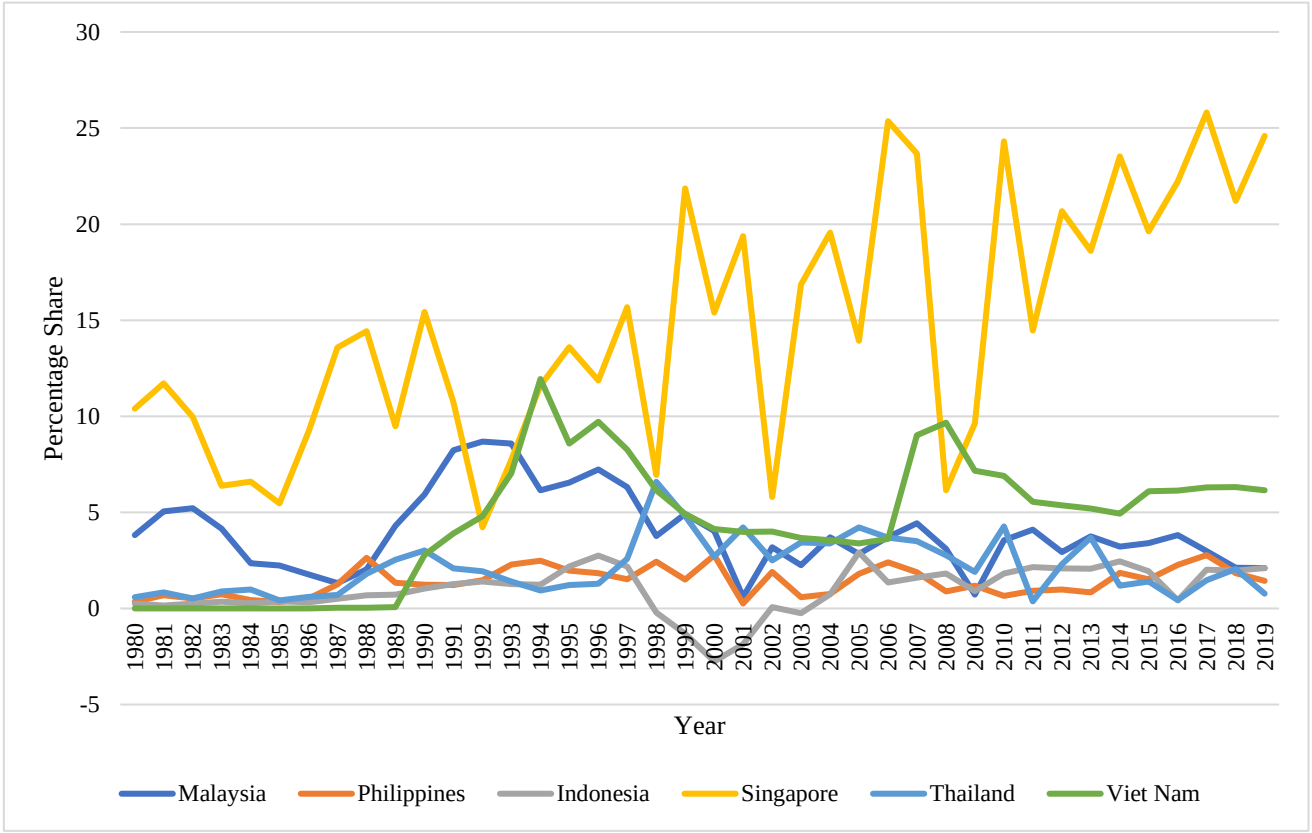
Source of basic data: UNCTAD FDI Data. Cumulative FDI Inward Flows refers to the sum of the annual FDI flows per period.

Table 4: Cumulative FDI Inward Flows (% change)

Average Annual % Change	1970–1979	1980–1989	1990–1999	2000–2009	2010–2019
Brunei Darussalam	-434	-470	980	28	-65
Cambodia	-341	-100	43	29	15
Indonesia	76	17	94	-59	57
Lao PDR	-197	0	51	84	21
Malaysia	35	21	16	44	52
Myanmar	616	-357	47	3786	2461
Philippines	-97	189	12	86	18
Singapore	39	18	45	26	28
Thailand	16	68	19	4	86
Viet Nam	-296	2387	464	27	8

Source of basic data: UNCTAD FDI Data. The percentage changes refer to the average of the annual percentage changes per period.

Figure 3: FDI Inflows as a Share of Gross Domestic Product in Selected ASEAN Countries, 1980–2019



Source: United Nations Conference on Trade and Development, UNCTADSTAT, and World Bank Indicators.

3. Global Value Chain Participation

The participation of developing countries in GVCs and global production networks can provide benefits, such as access to export markets and FDI, newer technology and greater attention to quality control, cost control, timely delivery, and human resources development. As Farole and Winkler (2019) highlighted, GVC presence opens up opportunities for developing countries to attract significant volumes of FDI and quickly establish a presence in new and often diversified sectors. Pietrobelli and Rabellotti (2011) indicated that for firms in developing countries, inclusion in GVCs not only provides new markets for their products but also plays an important role in providing access to knowledge and enhanced learning and innovation. In East Asia, the formation of regional production/distribution networks has enhanced regional manufacturing competitiveness and contributed to the rapid economic growth of countries in the region (Ando and Kimura, 2013).

The OECD's Trade in Value Added (TiVA) indicators are used to examine the participation of the Philippines in GVCs. Two sets of TiVA indicators are reviewed: (i) value added content of gross exports, which is divided into their domestic and foreign value added content, and (ii) the GVC participation index, which is used as an estimate of how much an economy is connected to GVCs for its foreign trade.

Table 5: Disaggregation of Philippine Gross Exports

(In US$ million)	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Gross Exports	29,103	45,089	46,085	51,291	46,663	61951	69,888	74,638	73955	79827	82030	80126
Domestic Value Added (DVA) Content of Exports	21,450	30,785	34,921	38,572	36,445	47167	53,453	56,827	58424	63573	63948	61387
Direct DVA	14,892	20,655	24,331	26,918	25,195	32534	36,928	39,430	40133	43664	44780	42534
Indirect DVA	6,547	10,097	10,569	11,630	11,226	14596	16,496	17,362	18260	19873	19119	18809
Reimported	10	33	21	25	24	37	30	35	31	36	48	44
Foreign Value Added	7,653	14,304	11,164	12,719	10,218	14784	16,435	17,811	15532	16253	18083	18966
(In percent)												
DVA Content of Exports	73.70	68.28	75.78	75.20	78.10	76.14	76.48	76.14	79.00	79.64	77.96	76.61
Direct DVA	51.17	45.81	52.80	52.48	53.99	52.52	52.84	52.83	54.27	54.70	54.59	53.08
Indirect DVA	22.50	22.39	22.93	22.67	24.06	23.56	23.60	23.26	24.69	24.90	23.31	23.47
Reimported	0.04	0.07	0.05	0.05	0.05	0.06	0.04	0.05	0.04	0.04	0.06	0.06
Foreign Value Added	26.30	31.72	24.22	24.80	21.90	23.86	23.52	23.86	21.00	20.36	22.04	23.67

Source: Trade in Value Added (TiVA) Indicators, OECD.Stat.

Table 5 presents the decomposition of gross exports[2] into domestic value added content, which is composed of three components – direct domestic value added, indirect domestic value added, and re-imported domestic value – and foreign value added. Philippine exports have higher domestic value added, representing around 77% of gross exports in 2016. The foreign value added of the country's exports accounts for the remaining 24%. On average, domestic value added increased from 74.5% in 2005–2010 to 77.6% in 2011–2016, whilst the foreign value added average share dropped from 25.5% to 22.4% during the same periods under review. Note, however, that foreign value added went up from 20% in 2014 to around 24% in 2016, which could indicate the entry of foreign investment in the country during these years.

[2] Direct domestic industry value-added content of gross exports reflects the direct contribution made by an industry in producing a good or service for export.
Indirect domestic content of gross exports originating from domestic intermediates reflects the indirect contribution of domestic supplier industries made through domestic (upstream) transactions.
Re-imported domestic value-added content of gross exports reflects the domestic value-added that was exported in goods and services used to produce the intermediate imports of goods and services used by the industry in question.
Foreign value-added content of gross export reflects the import content of exports, i.e. the foreign value-added coming from imports that are embodied in exports, broken down by country of origin.
Total domestic value-added content of exports = direct domestic industry value added content of gross exports + indirect domestic content of gross exports originating from domestic intermediates + re-imported domestic value added content of gross exports.

Table 6: Disaggregation of Gross Exports by Sector (%)

Gross Exports	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**
Agriculture, Forestry, Fishing	2	2	2	2	1	2	2	2	2	2	1
Mining and Quarrying	1	1	2	2	2	2	2	2	3	4	2
Manufacturing	64	67	59	60	57	60	56	56	55	55	54
Services	32	31	37	36	39	36	39	40	40	40	42
Domestic Value Added	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**
Agriculture, Forestry, Fishing	92	91	93	92	93	92	90	91	92	92	92
Mining and Quarrying	85	83	85	84	85	84	81	83	85	86	86
Manufacturing	67	60	68	68	71	69	69	68	71	72	69
Services	85	84	86	86	88	87	86	86	88	89	88
Foreign Value Added	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**
Agriculture, Forestry, Fishing	8	9	7	8	7	8	10	9	8	8	8
Mining and Quarrying	15	17	15	16	15	16	19	17	15	14	14
Manufacturing	33	40	32	32	29	31	31	32	29	28	31
Services	15	16	14	14	12	13	14	14	12	11	12

Source: Trade in Value Added (TiVA) Indicators, OECD.Stat.

Table 6 shows that gross exports are dominated by manufacturing, with an average share of 59% from 2005 to 2015. In 2005, manufacturing had a share of 64%, which declined to 54% in 2015. Services followed with an average share of 38%. As the manufacturing share decreased, the share of the services sector went up from 32% in 2005 to 42% in 2015. In terms of the domestic value-added content of manufacturing exports, this rose from 67% in 2005 to 69% in 2015. For services exports, the domestic value-added content followed the same trend, increasing from

85% in 2005 to 88% in 2015. The foreign value-added content of manufacturing exports declined from 33% in 2005 to 31% in 2015, although an increase was registered between 2014 and 2015 as foreign value content rose from 28% to 31%, respectively. The value-added content of services exports also dropped from 15% to 12% during the same years.

Table 7: Disaggregation of Manufacturing Gross Exports, Top Five Sub-sectors (%)

Gross Exports	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Food products, beverages, tobacco	8	5	7	8	7	10	11	7	8	8	6
Textile, wearing apparel, leather, and related products	11	8	8	6	5	4	4	4	4	4	4
Wood, paper products, printing	2	3	4	4	4	4	4	4	4	5	4
Chemicals, non-metallic mineral products	8	8	9	9	6	9	10	9	8	7	5
Basic metals, fabricated metal products	5	7	9	8	5	7	8	6	6	5	5
Computers, electronic and electrical equipment	47	56	47	49	54	47	43	52	52	52	55
Machinery and equipment, nec	3	2	3	2	2	3	2	3	3	3	3
Transport equipment	12	8	10	10	10	11	11	10	8	10	10
Other manufactur-ing, repair and installation of machinery and equipment	3	2	3	4	6	6	7	6	6	6	8

Domestic Value Added	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**
Food products, beverages, tobacco	91	90	93	91	92	91	89	90	91	91	91
Textile, wearing apparel, leather and related products	83	76	84	86	88	87	82	84	86	86	85
Wood, paper products, printing	78	74	82	81	83	81	75	78	81	80	79
Chemicals, non-metallic mineral products	69	63	65	62	72	68	60	67	68	69	71
Basic metals, fabricated metal products	76	69	77	78	78	73	72	76	76	78	79
Computers, electronic and electrical equipment	58	53	59	60	64	60	64	62	66	67	63
Machinery and equipment, nec	69	62	70	71	75	71	69	71	74	75	72
Transport equipment	65	57	70	69	72	68	65	66	69	69	66
Other manufactur-ing, repair and installation of machinery and equipment	74	69	75	76	79	76	75	77	79	79	76
Foreign Value Added	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**
Food products, beverages, tobacco	9	10	7	9	8	9	11	10	9	9	9
Textile, wearing apparel, leather, and related products	17	24	16	14	12	13	18	16	14	14	15
Wood, paper	22	26	18	19	17	19	25	22	19	20	21

products, printing											
Chemicals, non-metallic mineral products	31	37	35	38	28	32	40	33	32	31	29
Basic metals, fabricated metal products	24	31	23	22	22	27	28	24	24	22	21
Computers, electronic and electrical equipment	42	47	41	40	36	40	36	38	34	33	37
Machinery and equipment, nec	31	38	30	29	25	29	31	29	26	25	28
Transport equipment	35	43	30	31	28	32	35	34	31	31	34
Other manufactur-ing, repair and installation of machinery and equipment	26	31	25	24	21	24	25	23	21	21	24

Source: Trade in Value Added (TiVA) Indicators, OECD.Stat.

Table 7 shows that manufacturing gross exports consisted largely of computers, electronic, and electrical equipment, with an average share of 50% from 2010 to 2015. Its share went up from 47% in 2005 to around 55% in 2015. In far second is transport equipment, with an average share of 10%, followed by food products, beverages, and tobacco, and chemicals and non-metallic mineral products with about the same average share of 8% each during the same years. The domestic value added content of their exports is substantially higher than their foreign value added content, particularly in food products, beverages, and tobacco with only 9% foreign value added content and 15% in textile, wearing apparel, leather, and related products. The highest foreign value added content is in computers, electronic, and electrical equipment exports and transport equipment exports, which registered 37% and 34% foreign value added content in 2015, respectively. This relatively high foreign value-added content reflects the foreign investment and GVC participation of the Philippines in these subsectors.

From 2005 to 2015, services gross exports were dominated by distributive trade, transport, accommodation, and food services, with an average share of 57%, followed by other business services at 25% and information and communication at 13% (see Table 8). In terms of the foreign value-added content of their exports, this has been significantly lower than the domestic content value added, with information and communication exports registering 14% in 2015, and distributive trade, transport, accommodation, and food services exports posting a share of 13% during the same year.

Table 8: Disaggregation of Services Gross Exports, Top Sub-sectors (%)

Gross Exports	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**
Distributive trade, transport, accommodation and food services	69	62	64	60	54	57	54	51	55	53	52
Information and communication	14	11	11	12	13	11	12	21	11	12	10
Other business services	14	22	20	24	27	26	27	24	29	30	29
Domestic Value Added	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**
Distributive trade, transport, accommodation and food services	85	85	86	84	87	86	83	85	86	87	87
Information and communication	77	75	79	81	84	84	88	83	88	89	86
Other business services	88	83	88	89	89	89	89	90	91	91	90
Foreign Value Added	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**
Distributive trade, transport, accommodation and food services	15	15	14	16	13	14	17	15	14	13	13
Information and communication	23	25	21	19	16	16	12	17	12	11	14
Other business services	12	17	12	11	11	11	11	10	9	9	10

Source: Trade in Value Added (TiVA) Indicators, OECD.Stat.

Basically, a country participates in GVCs by importing foreign inputs to produce the goods and services that it exports (backward GVC participation) and by exporting domestically produced inputs to partners in charge of the downstream production stages (forward GVC participation).[3] To capture these linkages, the

[3] Backward participation in GVCs is the foreign value-added content of gross exports. It represents the value of imported intermediate goods and services that are embodied in a domestic industry's exports. The value added can come from any foreign industry upstream in the production chain. Forward participation in GVCs is the domestic value-added content of foreign gross exports. It captures the country's domestic value added embodied in the exports of the exporting country.

GVC participation index, which estimates how much a country connects to GVCs for its foreign trade, is applied. The index is composed of backward and forward linkages reflecting the upstream and downstream connections in GVCs. Backward GVC participation estimates the contribution to the total value of exports originating from foreign suppliers and represents the buyer perspective or sourcing side in GVCs where a country imports intermediates to produce its exports. Forward GVC participation captures the domestic value added contained in inputs sent to third countries for further processing and export through GVCs and represents the seller perspective or supply side in GVC participation (WTO TiVA and GVC Explanatory Notes).

Table 9: Global Value Chain Participation (%)

Country	GVC	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Philippines	Forward	20.1	22.4	23.1	24.0	22.2	23.0	22.5	21.5	23.0	22.8	22.4
	Backward	26.3	31.7	24.2	24.8	21.9	23.9	23.5	23.9	21.0	20.4	22.0
	Total	**46.4**	**54.1**	**47.3**	**48.8**	**44.1**	**46.9**	**46.0**	**45.4**	**44.0**	**43.2**	**44.4**
Singapore	Forward	20.9	19.4	20.6	19.1	18.8	20.6	19.3	19.1	19.6	20.5	20.9
	Backward	42.8	44.6	41.4	45.2	42.0	41.3	43.5	43.8	42.8	43.0	40.9
	Total	**63.7**	**64.0**	**62.0**	**64.3**	**60.9**	**61.9**	**62.8**	**62.8**	**62.4**	**63.5**	**61.9**
Thailand	Forward	15.4	15.6	16.0	15.0	14.4	14.9	14.1	13.9	13.5	13.6	13.8
	Backward	38.4	37.1	36.1	39.0	34.4	36.0	38.8	38.4	37.5	36.7	33.6
	Total	**53.8**	**52.7**	**52.2**	**54.1**	**48.8**	**50.9**	**52.9**	**52.3**	**51.0**	**50.4**	**47.3**
Viet Nam	Forward	14.5	13.8	14.0	13.8	13.5	12.5	12.7	12.4	12.3	11.9	11.1
	Backward	36.1	38.1	40.8	41.5	37.2	40.5	41.8	40.8	41.7	42.4	44.5
	Total	**50.6**	**51.8**	**54.8**	**55.3**	**50.7**	**53.0**	**54.5**	**53.3**	**54.0**	**54.4**	**55.6**
Malaysia	Forward	16.0	17.5	16.9	18.5	16.6	17.3	18.1	18.3	19.3	19.4	18.7
	Backward	45.0	43.4	44.1	40.3	39.8	40.6	39.4	38.1	37.2	36.6	36.9
	Total	**61.0**	**60.9**	**61.0**	**58.8**	**56.4**	**57.9**	**57.5**	**56.4**	**56.5**	**56.0**	**55.6**
Indonesia	Forward	24.6	27.5	27.5	27.9	25.8	27.9	30.3	28.4	27.5	26.4	24.1
	Backward	18.4	14.9	14.3	15.0	12.1	12.5	12.8	13.3	13.9	14.1	12.9
	Total	**43.0**	**42.4**	**41.8**	**42.8**	**37.9**	**40.4**	**43.1**	**41.7**	**41.4**	**40.5**	**37.1**

Source: Trade in Value Added (TiVA) Indicators, OECD.Stat.

Table 9 shows the level of integration of the Philippines and selected ASEAN countries in GVCs. For all the countries under review, a decline in GVC participation between 2005 and 2015 is observed except in Viet Nam's case. Philippine GVC participation indicated a slight increase from 43% in 2014 to 44% in 2015. In particular, its backward participation went up from 20.4% to 22%. This reflects the vertical efficiency-seeking FDI that the country is able to attract, especially in computers, electronic, and electrical equipment and transport equipment, which together accounted for 65% of manufacturing gross exports in 2015. Compared with its neighbours, the level of GVC participation of the Philippines (44%) is lower than Singapore (62%), Malaysia (56%), Viet Nam (56%), and Thailand (47%). In terms of the components of the Philippine GVC index, the forward and backward participation measures are roughly the same. In contrast, the GVC participation of Singapore, Malaysia, Viet Nam, and Thailand is largely driven by their relatively high levels of backward participation. In 2015, Philippine backward participation was 22%, whilst Singapore was 41%, Viet Nam 45%, Malaysia 37%, and Thailand 34%. The Philippines was higher than Indonesia, which posted the lowest backward participation at 13%.

Amongst the factors affecting the extent of a country's GVC participation and specialisation are the degree of trade openness, level of foreign investment, geography or proximity to neighbouring countries' markets, size or ability to source intermediates from domestic suppliers, and natural endowment of resources. Larger economies, those with significant mineral resources, and those that are relatively far from foreign markets and suppliers tend to have higher domestic value-added content in their imports than smaller countries. Countries that specialise in activities towards the beginning of value chains (upstream activities like mining and agriculture) and those that specialise in services will tend to have higher domestic value-added content in their exports. Meanwhile, relatively open and liberal trade regimes and high degrees of foreign investment generally have higher foreign content in their exports (OECD, TiVA Indicators 2018).

4. Analytical Framework and Empirical Results

4.1. FDI Spillover Effects: Understanding the Benefits from MNEs

Countries often attempt to attract FDI flows due to expectations that these would boost their economies and increase the productivity of local firms. FDI brings in not only finance but also knowledge transfers in the form of production expertise and managerial skills. As Findlay (1978) argued, FDI increases the rate of technological progress in a host country through a 'contagion' effect from the more advanced technology and management practices used by foreign firms. These knowledge effects are referred to as FDI externalities or spillovers. FDI externality or spillover is defined as an increase in the productivity and efficiency of domestic firms as a consequence of the presence of foreign firms in the domestic economy. This occurs when domestic firms are able to improve their productivity by copying some technology used by MNCs in the domestic market, and MNEs are not able to fully internalise the full value of these benefits (Blomstrom, Kokko, and Zejan, 2000). Spillovers also take place when a multinational affiliate demonstrates or helps prospective suppliers set up production facilities and provides technical assistance to improve products.

Lesher and Miroudot (2008) summarise five different channels through which spillovers are transmitted:

- Skills via labour mobility: workers gain new skills through explicit and implicit training provided by foreign firms. They take these skills with them when they later accept employment in domestic firms or start their own firms.
- Exports and infrastructure improvements: since MNCs engage in international trade, they lay the groundwork for domestic firms to benefit from distribution networks, logistic services, and infrastructure improvements. Domestic firms can also learn about the regulatory frameworks with which exporters must comply.
- Imitation: this takes the form of reverse engineering, where a domestic firm creates a similar product based on the design of a good or service that a foreign affiliate produces. Note that imitation is only successful if the domestic firm has the technical capacity and ability to source the necessary inputs to produce a similar product.

- Competition: the entry of foreign firms increases competition in the domestic market, forcing domestic firms to become more productive.
- Vertical linkages: Through backward and forward linkages, spillovers are transmitted in the domestic economy. As foreign firms set up vertical production networks, domestic firms are able to participate in their production chains. Since these suppliers must meet certain quality standards, they benefit from the experience and knowledge of the foreign firm.

A particularly significant channel for spillovers is through the following linkages between MNCs and their local suppliers and customers: horizontal, forward, and backward linkages:

- Horizontal linkages occur between MNCs and domestic producers within the same sector. A horizontal spillover can occur when local firms copy some technology used by multinational affiliates in the domestic market.
- Backward linkages represent connections between domestic firms and their multinational customers where domestic firms supply intermediate inputs to foreign firms. A backward spillover occurs when the MNC provides training and help in the management and organisation of domestic firm suppliers as well as technical assistance and information to help domestic firms become reliable suppliers of high-quality products that are delivered on time. Another backward spillover occurs when multinational affiliates assist local suppliers in finding additional customers, including their sister affiliates in other countries.
- Forward linkages are connections between a domestic firm and its multinational suppliers where domestic firms purchase intermediate inputs from foreign firms. A forward spillover occurs when a multinational affiliate provides training and other technical support to their customers.

Theory suggests that FDI does not only refer to the transfer of physical and financial assets of multinational companies to the economy but more importantly to the transfer of knowledge, technology, innovation, and skills from these to other firms in the domestic market. There is rich empirical work on FDI spillovers, however, the impact of FDI spillovers and linkages on domestic firms is not

generally clear. The evidence is still inconclusive on the presence of FDI spillovers and the channels by which they flow.

Alfaro et al. (2004) concluded that there is no overall consistent evidence of positive externalities from MNCs to domestic firms in the same sector in developing countries. Konings (2001) used firm-level panel data to examine the effects of FDI on the productivity performance of Bulgaria, Romania, and Poland. He found no evidence of positive spillovers to domestic firms on average, but rather, negative spillovers to domestic firms in Bulgaria and Romania and no spillovers to domestic firms in Poland. The results were explained by the early stages of transition that Bulgaria and Romania are in and where the increased competition from FDI dominates technological spillovers to domestic firms. Using firm-level panel data, Nguyen, Tran, Le and Trieu (2020) showed that in Viet Nam, horizontal and forward linkage spillovers have a negative impact on the productivity of domestic firms, whilst backward spillovers have a positive effect on local productivity even in the presence of a large technology gap. The authors emphasised the importance of human capital, financial development, and the technology gap for technology spillovers.

Studies such as Blomstrom (1986) and Kokko (1994) found econometric support for positive FDI spillovers for Mexico; Blomstrom, Kokko and Zejan (1994) for Uruguay; Blomstrom and Sjoholm (1999) for Indonesia; Djankov and Hoekman (2000) and Kinoshita (2001) for Czech enterprises; Li, Liu, and Parker (2001) for China; Javorcik (2004) for Lithuania; Takii (2005) for Indonesia; and Javorcik and Spatareanu (2008) and Javorcik and Spatareanu (2011) for Romania. Haddad and Harrison (1993) for Morocco; Aitken and Harrison (1999) for Venezuela; and Bosco (2001) for Hungary did not find any significant evidence of a positive relationship between the accumulation of FDI and economic growth. Using firm-level panel data, some studies found some evidence of negative effects of the presence of multinationals on domestic firms, such as Aitken and Harrison (1999) for Venezuela; Lopez-Cordova (2002) for Mexico; and Castellani and Zanfei (2002) for Spain. Backward linkages between local companies and their foreign partners significantly enhance the efficiency of firms, as seen in Lithuania

from 1996 to 2000 (Javorcik, 2004), in China from 1995 to 1999 (Liu, 2008), and in Indonesia (Blalock and Gertler, 2008).

Sinani and Meyer (2004) argue that the firm size, ownership structure, and trade orientation of local receivers of technologies matter to realise FDI spillovers in Estonia. Kathuria (2000) finds in Indian manufacturing that technology transfer spillovers only exist in scientific industries and are largely dependent on the efforts of local firms to invest in R&D. Acharya and Keller (2009) showed that compared to local R&D, technology transfers from frontier countries often have a higher impact on domestic productivity, particularly in high-tech industries, such as ICT, aircraft, pharmaceuticals, and chemicals amongst 17 OECD countries.

Technology gap studies highlight the importance of absorptive capacity and technology gap for technology spillovers. Glass and Saggi (1998) indicated that the larger the knowledge gap between the host and home countries, the lower the potential for technology transfer due to insufficient human resources and infrastructure. Findlay (1978) suggested that the greater the distance between two economies in terms of development, the greater the backlog of available opportunities to exploit in the less advanced economy and the greater the pressure for change and the more rapidly new technology is imitated or adopted (as cited in Rojec and Knell (2018)). Studies on the catch-up and absorptive capacity hypotheses, such as Blalock and Gertler (2009) and Wang and Blomstrom (1992) argue that the larger the gap, the more likely it is for FDI spillovers to happen since there will be more knowledge and technology available for local firms in the long run. However, Damijan et al. (2013) indicated that only firms with high- or medium-absorptive capacity levels could experience significant and positive horizontal spillovers. Their study suggests that a sufficient absorptive capacity of domestic firms in terms of human capital is a necessary condition for absorbing horizontal spillovers from foreign subsidiaries. Girma, Gorg, and Pisu (2008) showed that if the technology gap between recipient firms and multinational companies is too huge, the FDI spillovers in domestic firms would be less likely to happen. Using a manufacturing panel dataset for Greece, Dimelis (2005) concluded that a smaller technology gap would be more beneficial to domestic companies.

In terms of labour mobility spillovers, Gorg and Strobl (2005) finds that domestic firms in Ghana that are run by owners who worked for multinationals in the same industry immediately prior to opening up their own firm have higher productivity levels than other firms. Hamida and Khairallah (2017) argues that worker mobility spillovers in Switzerland only exist in high-technology manufacturing industries considering the initial level and absorptive capacity of the local firm's human capital, whilst no spillover effects were found in the services and construction industry. Demena and Murshed (2018) detects the presence of mobility spillovers for eight Sub-Saharan African countries.

In a comprehensive review of empirical studies on knowledge spillovers from FDI, Rojec and Knell (2018) highlighted the mixed results and the lack of evidence particularly from the results of firm-level panel data analysis along with the need to differentiate between vertical (inter-industry) and horizontal (intra-industry) spillovers and the importance of host country absorptive capacity for knowledge spillovers. The authors indicated that some of the reasons for the lack of evidence are, in many cases, that spillovers are absent because MNCs are efficient in preventing leakages; lack of consideration of firm heterogeneity in econometric models; and weak preconditions for spillovers in host countries.

Rojec and Knell (2018) concluded that horizontal spillovers are less likely to take place than vertical spillovers, as evidenced by the following studies which suggest positive vertical spillovers for host countries: Schoors and van der Tool (2001) in Hungary; Javorcik (2004) on positive backward FDI spillovers but no horizontal spillovers in Lithuania; Halpern and Murakozy (2006) on positive vertical and negative horizontal FDI spillovers in Hungary; Gorodnichenko et al. (2013) in transition countries; Blalock (2001) on positive productivity spillovers from FDI in upstream industries in Indonesia; Ha and Giroud (2010) on positive backward and forward R&D spillovers in the case of innovation-intensive foreign subsidiaries in the Republic of Korea; Jeon et al. (2013), Lin et al. (2009), and Du et al. (2011) on positive backward spillovers in China but no forward or horizontal spillovers; Kugler (2006) on FDI knowledge spillovers between but not within industries of the Colombian manufacturing sector; Barrios et al. (2009) on positive backward spillover effects in Ireland; and Reganati and Sica (2007) in the Italian

manufacturing sector. Using 1988 and 1998 cross-section data for the Philippines, Aldaba and Aldaba (2011) did not find evidence that productivity or employment spillovers take place between foreign and domestic firms through horizontal, forward, or backward linkages.

4.2. Analytical Framework

In calculating the FDI linkages, the following method developed by Javorcik (2004) is adopted. Horizontal linkages are calculated as the average percentage of foreign ownership in the sector weighted by each firm's contribution to sector output.

$$Horizontal_{jt} = \sum_i Foreign\ Ownership_{it} * \frac{Output_{it}}{\sum_i Output_{it}} \quad (1)$$

for all firms i in industry j.

Horizontal linkages are calculated using a dummy variable for foreign ownership that takes a value of one when foreign equity is greater than or equal to 10% and zero otherwise.

Backward linkages measure the potential backward spillover effects on a producer industry from foreign presence in the downstream sector and are calculated as the proportion of an industry's output of intermediate goods (consumed in the country) supplied to foreign-owned firms.

$$Backward_{jt} = \sum \delta_{jk} * Horizontal_{kt} \text{ if } k \neq j \quad (2)$$

where the backward coefficient, δ_{jk}, represents the proportion of sector j's output that is supplied to sector k (with foreign presence).

Forward linkages are proxies for the potential forward spillover effects from the foreign presence in a producer industry's suppliers. They are calculated as the proportion of a sector's intermediate consumption supplied by foreign firms.

$$Forward_{jt} = \sum \varphi_{jm} * Horizontal_{mt} \text{ if } m \neq j \quad (3)$$

where the forward coefficient φ_{jm} represents the proportion of inputs purchased by sector j from sector m (with foreign presence).

Following existing studies analysing FDI spillover effects from FDI, the following function is estimated:[4]

$$lnY_{ijt} = \beta_0 + \beta_K lnK_{ijt} + \beta_L lnL_{ijt} + \beta_1 Horizontal_{jt} + \beta_2 Backward_{jt} + \beta_3 Forward_{jt} + X'_{ijt}\beta_4 + Z'_{jt}\beta_5 + \varepsilon_{ijt} \quad (4)$$

where i indexes the firm, j indexes the industry, t indexes time, *Y* is the value added of a domestic firm, *K* is capital, *L* is labour, and β_K *and* β_L are the production elasticities of capital and labour, respectively, *Horizontal* is a measure of the presence of FDI in industry j, which is measured by the foreign firms' share of total output. A dummy variable for foreign ownership is used where foreign ownership is equal to one when foreign equity is greater than or equal to 10% and zero otherwise. *Backward* is a measure of the presence of FDI in downstream industries to which industry j supplies inputs. *Forward* is a measure of the presence of FDI in upstream industries from which industry j purchases inputs; *X* is a vector of the firm-level control variables that are assumed to affect productivity, such as R&D expenditures; and *Z* is a vector of industry-level control variables, such as the degree of market concentration. ε is an error term.

4.3. Data Description

The dataset consists of firm-level information from the Annual Survey of Establishments and Census of Philippine Business and Industry conducted by the Philippine Statistics Agency. The dataset covers 11 years spanning over a period of 17 years: 1996, 1997, 1998, 2000, 2001, 2003, 2005, 2006, 2008, 2009, and 2012. It contains firm-level information on revenues, employment, physical capital, and production costs and, for some years, information on exports and R&D expenditures are also included.

The firms are identified by unique establishment numbers that allowed the creation of a panel dataset. The dataset includes only firms with at least two observations and excludes all firms with only one observation. Firms with missing, zero, or negative values for any of the variables listed above were dropped as well

[4] See Murakami and Otsuka (2020).

as those firms with duplicates. The panel dataset is unbalanced and covers all firms with two or more overlapping years during the period 1996–2012 (with missing years in between). Table 10 provides the summary statistics for the variables used in the analysis of FDI determinants and the impact of FDI spillovers on domestic firms. The variables are defined as follows:

- *workers* are the total number of persons who are employed in the company.
- *capital* refers to the book value of the company's tangible fixed assets, including buildings, other structures, land improvements, land, furniture, transport, machinery and equipment.
- *materials* refer to the total cost of raw materials, supplies, and parts used in production the production of goods and industrial services.
- *VA* is the value added calculated as gross output less intermediate inputs.
- *xshare* is a ratio of the firm's total exports to total revenue.
- *RDsh* refers to R&D expenditures/total revenue, where R&D is defined as the amount spent on any systematic and creative work undertaken to increase the stock of knowledge and the use of the knowledge to devise new applications.
- *age* is the difference between year t and the year when the firm started its operations.
- *HHI* is the Herfindahl-Hirschman Index, which is the most common measure used to assess the concentration of the share of industry participants and is calculated using the following formula:
  $\sum_{i=1}^{n} ms_i{}^2$. Where ms is the market share of the i-th firm and n is the number of firms, i.e. it is the sum of the squared market shares of all firms in an industry. It ranges from a minimum of 1/n for n firms of equal size to a maximum of one when there is only one firm.
- *TFP* is the firm's total factor productivity defined as the residual of a Cobb-Douglas production function and estimated using the methodology of Levinsohn and Petrin (2003). In estimating the production function, data on value added and two factors of production, labour and capital, were used.

Fuel and electricity data were employed as proxies for productivity shocks.[5] Productivity growth signals technical progress and accumulation of human capital. Productivity increases also imply efficiency improvements due to the adoption of better techniques and increases in productive capacity of an industry that exceeds increases in the supply of factors of production.

- *Horlinks*, *Blinks*, and *Flinks* refer to horizontal linkages, backward linkages, and forward linkages, respectively. These were calculated using input-output tables from the Philippine Statistics Authority using equations (1), (2), and (3) along with the revenue and foreign equity data obtained from the Annual Survey of Establishments and Census of Philippine Business and Industry.[6]

[5] To address the simultaneity problem in input choice when estimating the production function by ordinary least squares (OLS), a semi-parametric estimator with an instrument to control for unobserved productivity shocks is applied. For this instrument, Olley and Pakes (1996) use investment, whilst Levinsohn and Petrin (2002) suggest the use of intermediate inputs.

[6] The forward and backward coefficients were calculated using the 1994, 2000, 2006, and 2012 input-output (I-O) tables. The 1994 I-O has 132 manufacturing sectors based on a 3-digit industry code; for 2000, there are 134 manufacturing sectors also based on a revised 3-digit industry code; 2006 has 129 manufacturing sectors based on a revised 3-digit industry code, whilst the 2012 IO has 39 manufacturing sectors based on a revised 2-digit industry code. The I-O codes across the different years were matched and harmonised with the manufacturing survey and census data based on a 5-digit industry code covering 356 sectors.

Table 10: Summary Statistics

	Obs	Mean	Std. Dev.	Min	Max
Workers	34,058	233.9791	615.3355	1	16,908
fixed assets	34,058	1.36e+08	8.77e+08	0.6211917	5.47e+10
materials	34,058	2.57e+08	2.18e+09	54.93351	1.20e+11
value added	34,058	2.18e+08	1.75e+09	463.2065	1.93e+11
TFP	34,058	10.81594	1.379122	1.146969	18.19347
age	31,267	17.577	16.87201	0	367
xshare	18,070	0.284547	0.422901	0	1.043
RDsh	18,857	0.001442	0.009814	0	0.6604167
HHI	34,061	0.271269	0.239527	0	1
Horlinks	34,061	0.386044	0.333406	0	1
Blinks	32,327	0.179410	0.175560	0	0.774297
Flinks	32,327	0.261833	0.512645	0	3.840737

Source: Authors' calculations.

4.4. Empirical Results and Analysis

Table 11 presents a summary of the characteristics of firms receiving FDI as compared to those that do not receive FDI. Firms with FDI have a higher productivity level in terms of total factor productivity and are more capital intensive (measured by K/L = capital/workers). Firms with FDI have higher export shares and are relatively younger in terms of years of operation. They are also mostly located inside economic zones.

Table 11: Characteristics of Firms with FDI

	Firms with FDI							Firms without FDI						
Year	**No. of Firms**	**TFP**	**Utilities Share**	**K/L in Pesos**	**Export Share**	**Age**	**% Inside Zone**	**No. of Firms**	**TFP**	**Utilities Share**	**K/L in Pesos**	**Export Share**	**Age**	**% Inside Zone**
1996	564	11.72	0.19	672,099	0.73	13	27	2,402	10.43	0.21	269,621	0.70	15	4
1997	574	11.80	0.17	770,097	0.74	14	28	2,424	10.45	0.20	268,255	0.71	16	4
1998	587	11.88	0.19	1,088,973	0.74	12	37	1,687	10.77	0.21	418,201	0.67	16	9
2000	338	11.80	0.13	138,711	0.66	14	40	815	10.80	0.16	38,860	0.48	17	9
2001	528	11.88	0.14	957,073	-	15	45	1,309	10.77	0.16	558,095	-	19	11
2003	584	11.86	0.12	1,181,992	-	15	54	1,228	10.76	0.14	614,775	-	20	12
2005	841	11.67	0.08	996,998	-	14	61	2,090	10.56	0.09	523,784	-	19	10
2006	1195	11.40	0.08	930,487	0.40	14	58	3,744	10.37	0.08	483,461	0.10	18	9
2008	1288	11.48	0.06	964,053	0.44	15	57	3,768	10.47	0.06	543,286	0.10	20	9
2009	1141	11.59	0.08	1,318,135	0.47	15	61	2,791	10.47	0.09	598,640	0.10	21	10
2012	811	11.98	0.07	1,386,729	0.73	20	64	1,618	10.70	0.06	907,747	0.57	25	11
	8451	11.68	0.10	1,008,587	0.53	15	52	23,876	10.54	0.12	486,338	0.18	19	8

Note: - = no data.
Source: Authors' calculations.

Table 12: Sectoral Distribution of Firms (%)

	Sectors	With FDI	Without FDI
1	Food products, beverages, tobacco products	11	25
2	Textiles, wearing apparel, tanning and dressing of leather, manufacture of luggage, handbags, footwear	17	15
3	Wood and products of wood, cork; furniture	3	8
4	Paper and paper products; publishing, printing, and reproduction of recorded media	4	10
5	Chemicals and chemical products	11	11
6	Coke, refined petroleum, other fuel products; rubber; other non-metallic mineral products	6	7
7	Basic metals, fabricated metal products, excl. machinery and equipment	9	9
8	Machinery and equipment, not elsewhere classified; office, accounting and computing machinery	7	5
9	Electrical machinery and apparatus not elsewhere classified; radio, tv, and communication equipment and apparatus; medical, precision, and optical instruments	21	5
10	Motor vehicles, trailers; other transport equipment	6	3
11	Recycling, other manufacturing, not elsewhere classified	4	3
	Total Number of Firms	8,451	23,876

Source: Data processing by the authors.

Table 12 shows that firms with FDI are mostly in electrical machinery and apparatus not elsewhere classified; radio, tv, and communication equipment and apparatus; medical, precision, and optical instruments (21% of all firms with FDI), followed by textiles, wearing apparel, tanning and dressing of leather, manufacture of luggage, handbags, and footwear (17%); chemicals and chemical products (11%) and food products, beverages, tobacco products (11%). Firms without FDI are mainly in food products, beverages, tobacco products (25%); textiles, wearing apparel, tanning and dressing of leather, manufacture of luggage, handbags, and footwear (15%) and chemicals and chemical products (11%).

To examine the effects of FDI spillovers, the following model is estimated using fixed effects regression:

$$\begin{aligned} lnY_{ijt} = {} & \beta_0 + \beta_K lncapital_{ijt} + \beta_m lnmaterials_{ijt} + \beta_L lnworkers_{ijt} + \beta_1 Horlinks_{jt} \\ & + \beta_2 Blinks_{jt} + \beta_3 Flinks_{jt} + \beta_4 xshare_{ijt} + \beta_5 RDshare_{ijt} + \beta_6 age_{ijt} \\ & + \beta_7 HHI_{jt} + \beta_5 Horlinks_{jt} \\ & * xshare_{ijt} + \beta_5 Horlinks_{jt} * HHI_{jt} + \beta_2 Blinks_{jt} * xshare_{ijt} \\ & + \beta_2 Blinks_{jt} * HHI_{jt} + \beta_3 Flinks_{jt} * xshare_{ijt} + \beta_3 Flinks_{jt} * HHI_{jt} \\ & + \varepsilon_{ijt} \end{aligned} \tag{5a}$$

where *i* indexes firms, *j* industry, and *t* year.

The explanatory variables are capital (*lncapital*), materials (*lnmaterials*), workers (*lnworkers*), horizontal linkages (*Horlinks*), backward linkages (*Blinks*), forward linkages (*Flinks*), export share (*xshare*), research and development (*RDshare*), age (*age*), market competition proxied by the Herfindahl-Hirschman Index (*HHI*), and interaction terms. The estimation is performed on the sample of domestic firms only.

Table 13 presents the results using value added as the dependent variable. Columns (A4) and (A5) show the results with the introduction of 1-year lagged variables for horizontal (*Horlinks_lag)*, backward (*Blinks_lag)*, and forward (*Flinks_lag*) spillovers. The base model shows that the coefficients on capital, materials, workers, export share, and age are all positive and highly significant. However, the coefficients on the horizontal and vertical effects are not statistically

significant. The results do not change with the addition of time and sector dummy variables. By controlling for the interaction effects of exports and competition (as measured by HHI) on the relationship between FDI spillovers and domestic firm productivity, the positive coefficient on forward spillovers from FDI to domestic firms turns statistically significant. However, whilst the coefficient on horizontal spillovers is positive, it is not statistically significant. The positive impact on domestic firm productivity is reinforced by strong competition as indicated by the negative coefficients on horizontal and forward spillovers interacted with HHI.

Table 13: FDI Spillover Effects on Domestic Firms

	Dependent Variable: Value Added				
	Without Lagged Variables			With Lagged Variables	
Variable	**Base Model (A1)**	**With Time and Sector Dummy Variables (A2)**	**With Interaction, Time, and Sector Dummy Variables (A3)**	**With Time and Sector Dummy Variables (A4)**	**With Interaction, Time, and Sector Dummy Variables (A5)**
lnworkers	0.3979601***	0.3924876***	0.3935115***	0.2858696	0.2803113
	(0.305095)	(0.0296881)	(0.0296645)	(0.0633421)***	(0.0633879)***
lnmaterials	0.2289181***	0.2318042***	0.2324065***	0.2199576	0.2245299
	(0.0161019)	(0.0161416)	(0.0161142)	(0.0325447)***	(0.0326816)***
lncapital	0.0609997***	0.0651303***	0.06447***	0.1021728	0.1008293
	(0.0080051)	(0.0084375)	(0.0084323)	(0.0308031)***	(0.03058)***
xshare	0.2638496***	0.243174***	0.2102772***	0.1826506	0.1872803
	(0.0570814)	(0.0572535)	(0.0755391	(0.1161674)	(0.1801892)
RDsh	2.820266	2.25408	2.174322	1.483443	1.594909
	(1.88563)	(1.549755)	(1.531919)	(3.227647)	(3.311607)
age	0.0139325**	0.0320694***	0.031469***	0.0146311	0.0147659
	(0.0055293)	(0.0122811)	(0.012392)	(0.0140794)	(0.0142533)
HHI	-0.0756168	-0.1259486	0.006868	0.0763825	0.3222721
	(0.0795776)	(0.0805899)	(0.101881)	(0.1651654)	(0.21494)
Horlinks	-0.0523739	-0.0931149	0.3502647	-0.036878	1.725741
	(0.1691554)	(0 .1732484)	(0.2538612)	(0.3591067)	(0.5712748)***
Blinks	-0.2353711	-0.1385164	-1.00408*	-0.1831809	-3.926655
	(0.3621282)	(0.3719605)	(0.5448585)	(0.8025987)	(1.295287)***

Flinks	0.0551897	0.064574	0.1821795**	0.037531	0.2185596
	(0.0529641)	0.0529241	(0.0826168)	(0.107896)	(0.1941036)
Horlinks*xshare			0.0389351		-0.0920369
			(0.324144)		(0.8851041)
Horlinks*HHI			-0.9619772**		-5.489809
			(0.4858206)		(1.200678)***
Blinks*xshare			0.152187		-0.4233374
			(0.6360889)		(2.112707)
Blinks*HHI			1.838608*		12.30991
			(1.095587)		(2.765329)***
Flinks*xshare			-0.0171926		0.2494541
			(0.1013591)		(0.2759069)
Flinks*HHI			-0.323635**		-0.6796644
			(0.1603412)		(0.4827007)
Horlinks_lag				-0.4563522	-1.002642
				(0.2883134)	(0.4534982)**
Blinks_lag				0.9754037	2.690914
				(0.6855802)	(1.120253)**
Flinks_lag				0.0104555	-0.1426073
				(0.0858891)	(0.1847057)
Horlinks_lag*xshare					-0.3318077
					(0.9263281)
Horlinks_lag*HHI					1.772404
					(0.9906265)*
Blinks_lag*xshare					0.9290413
					(2.266438)

Blinks_lag*HHI					-5.449701 (2.531781)**
Flinks_lag*xshare					-0.0877454 (0.2420314)
Flinks_lag*HHI					0.5316672 (0.4464621)
Constant	9.6612*** (0.2949861)	9.548431*** (0.4351344)	9.462133*** (0.4354323)	9.730612 (0.796955)***	10.02106 (0.847582)***
Number of Observations	10,553	10,553	10,553	4300	4300
	R-sq: within =0.198 between =0.810 overall =0.7634	R-sq: within = 0.206 between = 0.675 overall = 0.642	R-sq: within = 0.208 between = 0.675 overall = 0.643	R-sq: within =0.201 between =0.715 overall =0.707	R-sq: within = 0.216 between = 0.670 overall = 0.660
	F(10, 4753) =68.15 Prob > F = 0.0000	F(26,4753) = 29.41 Prob > F = 0.0000	F(32, 4753) = 24.44 Prob > F= 0.0000	F(23,3188) = 7.69 Prob > F = 0.0000	F(36,3188) = 7.13 Prob > F = 0.0000

Note: *** significant at 1%, ** significant at 5% and * significant at 10%. Numbers in parentheses are robust standard errors.
Source: Estimation by the authors.

For FDI backward spillover effects, the coefficient is negative and significant indicating weak transfer of technology to domestic firms. Foreign firms are not sourcing their inputs from domestic firms due to the latter's low absorptive capacity and inability to compete against more efficient foreign firms. This is further highlighted by the positive coefficient on the interaction between the backward spillover and the HHI, which indicates that with increases in competition reflected by a low HHI, FDI backward spillovers tend to lead to a negative effect on the performance of domestic firms. The presence of foreign firms may crowd out domestic firms that have low levels of competitiveness and limited capacity to assimilate and absorb knowledge and technology being transferred by foreign firms.

With lagged variables added to the base model, the coefficients on horizontal and vertical effects remained statistically insignificant. By controlling for the interaction effects of exports and competition, the coefficient on horizontal spillovers is positive and highly significant, indicating that through horizontal spillover effects, FDI inflows have a significant and positive impact on the performance of domestic firms. The positive impact on domestic firm performance is further reinforced by strong competition as indicated by the negative coefficient on horizontal spillovers interacted with the HHI. For forward spillovers, the coefficient is positive but not statistically significant. For backward linkages, the coefficient on backward spillovers remains negative and highly significant. This is further enhanced by the positive coefficient on the interaction between the backward spillover and the HHI.

Using total factor productivity as the dependent variable, Table 14 shows that for the base model, the same results are obtained, with the coefficients on horizontal, forward, and backward FDI spillovers remaining insignificant. With the addition of interaction variables, FDI, through horizontal and forward spillover effects, has a positive and significant impact on the productivity of domestic firms. Similar to the earlier results with value added as the dependent variable, FDI, through backward spillovers, has a negative effect on the productivity of domestic firms. The negative backward spillover from FDI to domestic firms may be attributed to the lack of absorptive capacity of domestic firms and the weak industry supply base in the country. Given the limited absorptive capacity, most

multinational companies bring in their own suppliers or rely on imported raw materials and intermediate parts and components for their operations. The results also show negative coefficients on horizontal and forward spillovers interacted with the competition indicator, HHI. With more competition, horizontal and forward spillovers from FDI positively affect the productivity of domestic firms. However, in terms of backward spillovers, the coefficient on the interaction of backward spillovers with the HHI is positive, indicating that intense competition (low HHI) reinforces the negative effect of backward spillovers on the productivity of domestic firms.

Adding lagged variables, the same results are generated for the base model (B4) as shown by the statistically insignificant coefficients on horizontal, forward, and backward FDI spillovers. With the addition of interaction variables (B5), FDI flows, through horizontal spillover effects, have a positive and highly significant impact on the productivity of domestic firms. Although for forward spillovers, whilst the coefficient is positive, it is no longer significant. For backward spillovers, the same results are obtained with a highly significant negative coefficient. This indicates that FDI, through backward spillovers, has negative effects on the performance of domestic firms. The results also show significant negative coefficients on horizontal and forward spillovers interacted with the HHI. With more competition, horizontal and forward spillovers from FDI positively affect the productivity of domestic firms. In terms of backward spillovers, the coefficient on the interaction of backward spillovers with the HHI is positive and highly significant, indicating that intense competition (low HHI) reinforces the negative effect of backward spillovers on the productivity of domestic firms.

Table 14: FDI Spillover Effects on Domestic Firms

Dependent Variable: Total Factor Productivity					
	Without Lagged Variables			With Lagged Variables	
Variable	**Base Model (B1)**	**With Time and Sector Dummy Variables (B2)**	**With Interaction, Time, and Sector Dummy Variables (B3)**	**With Time and Sector Dummy Variables (B4)**	**With Interaction, Time and Sector Dummy Variables (B5)**
lnworkers	-0.0472012 (0.0306938)	-0.0520491* (0.0295626)	-0.0511872* (0.029566)	-0.1580663 (0.0601884)***	-0.161009 (0.0603992)***
xshare	0.2870326 (0.0612854)***	0.2519418*** (0.0597917)	0.2111109*** (0.0777811)	0.2005612 (0.1220121)*	0.164762 (0.1883988)
RDsh	2.656089 (1.961813)	2.08377 (1.638119)	1.99904 (1.616507)	0.5518219 (3.422881)	0.6261509 (3.453997)
age	0.0156531 (0.005651)***	0.031816*** (0.0119821)	0.0313389*** (0.0120808)	0.0126895 (0.0152271)	0.0135994 (0.0155891)
HHI	-0.0887163 (0.08469)	-0.1349784* (0.0826498)	0.0024954 (0.1048614)	0.1235146 (0.1688662)	0.3914045 (0.2208785)*
Horlinks	-0.0297822 (0.1712534)	-0.0628467 (0.1722744)	0.44111* (0.2576095)	0.0349597 (0.3638202)	1.82788 (0.5677574)***
Blinks	-0.2993877 (0.3736685)	-0.2061832 (0.3710157)	-1.203691** (0.5574143)	-0.4788325 (0.8197568)	-4.41312 (1.305163)***
Flinks	0.0495057 (0.056253)	0.064012 (0.0541365)	0.1781054** (0.084212)	0.0565664 (0.112055)	0.2963236 (0.199504)
Horlinks*xshare			0.090964 (0.328563)		-0.1279087 (0.8758177)
Horlinks*HHI			-1.130977* (0.4770851)		-5.603896 (1.220895)***
Blinks*xshare			0.0789254		-0.3768846

			(0.6523497)		(2.113908)
Blinks*HHI			2.205136** (1.092881)		12.87425 (2.796391)***
Flinks*xshare			-0.0125269 (0.1141856)		0.2594252 (0.3016031)
Flinks*HHI			-0.3110002* (0.1674473)		-0.8534832 (0.5008986)*
Horlinks_lag				-0.4972714 (0.2922128)*	-1.101229 (0.4597558)**
Blinks_lag				1.184479 (0.6953308)*	3.059977 (1.154875)***
Flinks_lag				-0.0120104 (0.0875092)	-0.1716483 (0.1878153)
Horlinks_lag*xshare					-0.1208153 (0.9338754)
Horlinks_lag*HHI					1.867169 (0.9932048)*
Blinks_lag*xshare					0.6867453 (2.320173)
Blinks_lag*HHI					-5.855722 (2.566177)**
Flinks_lag*xshare					-0.0287935 (0.2707301)
Flinks_lag*HHI					0.5450724 (0.4576027)
Constant	10.37012 (0.1696787)***	10.79479*** (0.3725417)	10.69822*** (0.3727253)	11.06656 (0.5016094)***	11.66618 (0.6187766)***
Number of Observations	10,553	10,553	10,553	4,300	4,300

	R-sq: within = 0.008 between =0.003 overall = 0.006	R-sq: within =0.034 between=0.059 overall = 0.058	R-sq: within = 0.036 between=0.057 overall = 0.057	R-sq: within = 0.046 between =0.040 overall = 0.037	R-sq: within = 0.067 between = 0.065 overall = 0.057
	F(8, 4753) = 5.44 Prob > F = 0.0000	F(24, 4753)= 9.82 Prob > F = 0.0000	F(30,4753) = 8.49 Prob > F = 0.0000	F(21,3188) = 7.46 Prob > F = 0.0000	F(34,3188) = 13.05 Prob > F = 0.0000

Note ***significant at 1%, ** significant at 5% and * significant at 10%. Numbers in parentheses are robust standard errors.
Source: Estimation by the authors.

4.5. Domestic Tax and Duty Regulations affecting Ecozone and Non-ecozone Transactions

Most multinational companies in the Philippines are located in economic zones. These zones provide better infrastructure and more generous fiscal incentives, such as an income tax holiday, 5% special tax rate on gross income, exemptions from national and local taxes, duty and tax free importation of raw materials and capital equipment, and other fiscal and non-fiscal support, such as streamlined customs and business registration procedures along with liberal foreign exchange policies. However, physically and administratively, the zones are treated as isolated policed areas outside the customs territory.[7] Goods that are moved from the zones (which are considered free trade areas) to the non-free trade area in the country are treated as exports and are subject to customs taxes and strict regulations. Similarly, goods from the customs territory to be sold to the zones are treated as imports that are also subject to taxes and other regulations. Moreover, companies located in economic zone rules are required to export at least 70% of their production and limit domestic market sales to only 30% of total production.

Whilst the potential for integrating into the domestic economy has been present, especially given the low average tariff rates in the country, the economic zones' complex rules and regulations governing the operations of multinational companies located inside the zones and their business transactions with companies outside economic zones have prevented substantial FDI backward spillover effects from taking place. The administrative rules and regulations have also led to confusion on the value added tax treatment of transactions involving companies located inside the ecozone and their procurement of domestic goods from firms outside the ecozone.

Though a large number of electronics companies are concentrated in economic zones, the backward spillover linkages are limited and failed to positively affect the performance of domestic companies. With complex rules and regulations

[7] The 'customs territory' is defined as the national territory of the Philippines outside of the proclaimed boundaries of the ecozone, except those areas specifically declared by other laws and/or presidential proclamations to have the status of special economic zones and/or free ports. Restricted area: a specific area within the ecozone that has been classified and/or fenced-in as an export processing zone or free trade zone. (Republic Act 7916: Special Economic Zone Act Implementing Rules and Regulations)

on the domestic procurement of inputs, multinational companies operating inside the zones have very little incentive to source their inputs domestically. Given these differences in treating local and imported purchases, MNCs have become heavily dependent on imported inputs, resulting in weak backward linkages with the rest of the manufacturing companies operating outside economic zones.

For backward spillovers to take place, the existing linkages between firms must be deepened, and the absorptive capacity of domestic firms must be strengthened. To achieve this, the development of globally competitive and innovative domestic parts and suppliers would be crucial along with the alignment and simplification of rules and regulations on the domestic transactions of MNCs operating inside economic zones. To significantly increase spillovers and productivity, it is important to upgrade and move up towards higher segments of the value chain, such as the manufacturing of parts and components or by performing more complex activities, such as modular parts and sub-assemblies that are aligned with the country's comparative advantage. To realise this, the industry needs a strong base of manufacturers and suppliers of raw materials and intermediate parts and components. Strengthening firm-level productivity and competitiveness is crucial in attracting FDI flows as well as in transforming and deepening the country's GVC participation.

With increasing regional economic integration through the Regional Comprehensive Economic Partnership (RCEP), potential opportunities could arise from the growth of regional production networks and GVCs where domestic parts and supplier firms could act as subcontractors of outsourced parts and components. Links with regional production networks and GVCs offer possibilities for technology transfer and provide a promising route for domestic firms to access export markets. The need to strengthen domestic parts and suppliers and deepen their linkage with foreign affiliates are necessary conditions for the country to benefit from the expected FDI flows that could arise from deeper participation in regional production networks and GVCs.

To improve the competitiveness of domestic parts and suppliers and strengthen their linkages with foreign affiliates, the government needs to adopt a more comprehensive approach to address the most binding constraints preventing

the growth and development of the parts and components sector. This would combine industrial adjustment policy to improve and develop domestic parts and supplier firms and create an environment conducive to the creation and expansion of FDI spillovers as well as participation in higher segments of the industry value chain. Equally important is the need to review and simplify the various regulations affecting the operations of locators inside economic zones. Tariffs on most products have already been eliminated in the country through the various free trade agreements that the Philippines signed, such as the ASEAN Economic Community, ASEAN+1 FTAs, as well as the RCEP. Hence, the movement of goods to and from the zones must be facilitated through the removal of domestic restrictions in order for FDI flows and GVC participation to create significant positive spillovers on the performance of domestic firms. Domestically manufactured parts and components being used by exporters located inside economic zones must be treated the same as their imported counterparts, which could enter the country with zero duties and taxes.

5. Conclusions and Policy Recommendations

Since the 1990s, the Philippines has been implementing reforms to attract more global FDI flows and participate in the GVCs of multinational companies. Apart from trade liberalisation, investment policy changes were also carried out to open up more sectors to foreign investors. Investment promotion programmes, such as income tax holidays, duty- and tax-free importation of raw materials and capital equipment, income tax reduction after the income tax holiday for exporters, and the establishment of fenced-in economic zones, led to increases in FDI. However, FDI inflows to the Philippines have been limited as the country's FDI performance has lagged behind other countries in Southeast Asia. On average, FDI as a percentage of GDP moved slowly from 0.9% in the 1980s to 1.8% in the 1990s, declining to 1.4% during the period 2000–2009 and to 1.5% in 2010–2019. Viet Nam, whose FDI ratio to GDP started at less than 1% in the 1980s, performed strongly as it reached 5.9% in 2010–2019.

Based on the TiVA dataset, which disaggregates the country's gross exports, the country has been participating in the GVCs of MNCs, particularly in manufacturing. Philippine GVC participation indicated a slight increase from 43% in 2014 to 44% in 2015. In particular, the country's backward participation reflects the vertical efficiency-seeking FDI, especially in computers, electronic, and electrical equipment and transport equipment, which together accounted for 65% of manufacturing gross exports in 2015. Compared with its neighbours, the level of GVC participation of the Philippines (44%) is lower than Singapore (62%), Malaysia (56%), Viet Nam (56%), and Thailand (47%).

Using firm-level data on manufacturing, the study examined the impact of FDI flows through knowledge spillovers on the performance of domestic firms. The results indicated that FDI inflows affect the performance of domestic firms through spillover effects. Overall, there is some evidence to show that FDI inflows affect the performance of domestic firms through horizontal and forward spillover effects; however, in terms of backward spillover linkages, the impact of FDI on the performance of domestic firms is negative and significant. This result was consistently obtained in all models using value added and TFP as the dependent variables and even with the addition of lagged spillover variables. The presence of

foreign firms may have crowded out domestic firms with low levels of competitiveness and limited capacity to assimilate and absorb knowledge and technology being transferred by foreign firms.

The diffusion of backward spillover effects to domestic firms has remained limited, not only due to the weak competitiveness of domestic firms and inability to absorb the technology being transferred but also due to the existing complex administrative zone policies and regulations that serve as barriers to the creation of backward linkages. These domestic regulations have prevented the flow of spillover effects and the interaction between MNCs inside economic zones and domestic companies operating outside the zones. These imply the need to focus on strengthening the absorptive capacity and productivity of domestic firms along with the streamlining of ecozone regulations affecting the transactions between MNCs located inside zones and domestic companies outside the economic zones.

To deepen the firm linkages within the economy, the development of domestic parts and suppliers would be crucial. With the increasing regional economic integration through the RCEP, potential opportunities could arise from the growth of regional production networks and GVCs where domestic parts and supplier firms could act as subcontractors of outsourced parts and components. To improve the competitiveness of domestic parts and suppliers and strengthen their linkages with foreign affiliates, the government needs to adopt a more comprehensive approach that would combine industrial policy to improve and develop domestic parts and supplier firms with measures to build an environment that is conducive to the creation and expansion of FDI backward spillovers as well as upgrading participation towards higher segments of industry value chains. The following recommendations are proposed:

More flexible government regulations to link and integrate ecozone activities with the domestic economy

- Integrate economic zones into the domestic economy by relaxing the rules on the taxation of products bought from and sold to the domestic market. These should be liberalised given the country's free trade agreements that already eliminated or substantially reduced tariffs on most products.

- The ecozone rules requiring locators to export 70% of their production and limit domestic market sales to only 30% of total production should be reviewed towards the creation and expansion of linkages and more open trade between zone locators and domestic firms outside the zones.
- Allow the manufacturers of intermediate parts and components that supply to zone locators to import their raw materials, supplies, and capital equipment and, at the same time, treat the sale of their products to zone locators like imports that are allowed to enter the ecozones tax and duty free.

Build and develop a supply base of manufacturers of intermediate parts and components

- Promote human resource development, upskilling/reskilling of the workforce, training and capacity building, particularly on ICT. The government, in collaboration with academe and industry, must implement substantial reforms in all stages of education and a training system to raise the learning capabilities of firms and upgrade labour skills. Technical schools must reorient their curricula to serve industry needs and requirements and address specific skills needed by industries in view of new technologies arising from the Fourth Industrial Revolution (Industry 4.0). Government support must be provided to prepare workers for the jobs of the future and the development of more agile workers.
- Innovate and upgrade technology scale, design, and development skills and the technological capabilities of companies. Given the presence of lower-cost competitors in the region who possess stronger technological capabilities and well-developed supply chains, it is crucial for Philippine enterprises to innovate and move up the technology scale. Companies need to engage in and improve their design and development skills and technological capabilities. Industrial upgrading would necessitate a strong base of domestic knowledge. This would require the development of specialised skills and technological capabilities, particularly in electronics and auto parts, which comprise the bulk of the country's exports and GVC participation.

- Incentives could be crafted to encourage universities and researchers to interact closely with industries. Through public-private partnerships, research centres could be established to serve as venues for world-class professional training; advanced research, development and engineering, and new venture incubation. Learning from the experience of the Republic of Korea, Taiwan, and Singapore, the Philippines can set up central institutions to monitor and diffuse new technologies and provide cost-sharing technological services, especially to micro, small, and medium enterprises. These include services such as material testing, inspection, certification of quality, instrument calibration, establishment of repositories of technical information, patent registration, research and design, and technical training.
- Provide financial support to small and medium parts and components manufacturers through assistance in preparing accounting records, business advice, and simplification of loan documentation and tailor-fitting loans to match the borrower's cash flow. The wide implementation of the Central Credit Information Corporation is also expected to improve the overall availability of credit, particularly for SMEs; provide mechanisms to make credit more cost-effective; and reduce the excessive dependence on collateral to secure credit facilities. Training and capacity building programmes for SMEs to improve their financial literacy and management capacity would also be necessary.
- Implement productivity-enhancing and supplier development and linkage programmes to improve linkages between domestic firms, especially SMEs, with foreign affiliates of MNCs. To improve the competitiveness of domestic parts and suppliers and strengthen their linkages with foreign affiliates, the government needs to adopt a more comprehensive approach through an industrial policy to improve and develop domestic parts and supplier firms. The government needs to build an environment conducive to the creation and expansion of FDI-related spillovers as well as increase participation in higher segments of the industry value chain through programmes that facilitate the matching of firms as well as provide subcontracting and outsourcing advice to domestic firms.

Accelerate promotion efforts and creation of enabling environment to attract more FDI and deepen GVC participation

- Improve infrastructure, supply chain, and logistics to increase efficiency and reduce transaction costs. Creating an enabling environment for firms to realise their potential to grow is a crucial precondition for private sector investment (domestic or foreign). Good infrastructure and logistics that lower production costs and facilitate easy supply chain management, from the procurement of inputs to the export of outputs, are important for the operations of production networks. The government must continue to pursue policies and programmes to lower power and communication costs, provide sufficient port systems, reduce travel time, and offer travel and shipment options.
- Continue to improve the country's investment climate by focusing not only on the inadequate infrastructure system but also on strengthening institutions, streamlining and automating regulations towards a more efficient bureaucracy, and improving the ease of doing business in the country.

References

Aitken, B.J. and A.E. Harrison (1999), 'Do Domestic Firms Benefit from Direct Foreign Investments? Evidence from Venezuela', *American Economic Review*, 89, pp.605–18.

Acharya, R. and Wolfgang Keller (2009), 'Technology Transfer through Imports', *The Canadian Journal of Economics*, 42(4), pp.1411–48.

Aldaba, R. and F. Aldaba (2011), 'Linkages and Spillovers in Philippine Manufacturing: Does FDI Have Positive Effects?', Chapter 4 in C. Sussangkarn, Y.C. Park, and S.J. Kang (eds.), in *Foreign Direct Investments in Asia*. Taylor & Francis.

Alfaro, L., A. Rodríguez-Clare, G.H. Hanson, and C. Bravo-Ortega (2004), 'Multinationals and Linkages: An Empirical Investigation', *Economía*, 4(2), pp.113–69.

Ando, M. and F. Kimura (2013), 'What Are the Opportunities and Challenges for ASEAN?' *ERIA Discussion Paper Series* 2013-31. Jakarta: ERIA.

Barrios, S., H. Görg, and E. Strobl (2009), 'Spillovers through Backward Linkages from Multinationals: Measurement Matters', *IZA Discussion Paper* No. 4477. IZA.

Blalock, G. (2001), 'Technology from Foreign Direct Investment: Strategic Transfer through Supply Chains', mimeo. University of California, Berkeley.

Blalock, G. and P. Gertler (2009), 'How Firm Capabilities Affect Who Benefits from Foreign Technology', *Journal of Development Economics*, 90(2), pp.192–9.

Blomström, M. (1986), 'Foreign Investment and Productive Efficiency: The Case of Mexico', *The Journal of Industrial Economics*, pp.97–110.

Blomström, M., A. Kokko, and M. Zejan (1994), 'Host Country Competition, Labor Skills, and Technology Transfer by Multinationals', *Review of World Economics*, 130(3), pp.521–33.

Blomström M., A. Kokko, and M. Zejan (2000), 'Multinational Corporations and Spillovers', in M. Blomstrom, A. Kokko, and M. Zajan (eds.), *Foreign Direct Investment Firm and Host Country Strategies*. London: Palgrave Macmillan.

Blomström, M. and F. Sjöholm (1999), 'Technology Transfer and Spillovers: Does Local Participation with Multinationals Matter?', *European Economic Review*, 43(4-6), pp.915–23.

Bosco, M.G. (2001), 'Does FDI Contribute to Technological Spillovers and Growth? A Panel Data Analysis of Hungarian Firms', *Transnational Corporations,* 10(1), pp.43–68.

Castellani, D. and A. Zanfei (2003), 'Technology Gaps, Absorptive Capacity and the Impact of Inward Investments on Productivity of European Firms', *Economics of Innovation and New Technology*, 12, pp.555–76.

Damijan, J.P., M. Rojec, B. Majcen, and M. Knell (2013), 'Impact of Firm Heterogeneity on Direct and Spillover Effects of FDI: Micro Evidence from Ten Transition Countries', *Journal of Comparative Economics*, 41: 895–922.

Demena, B.A. and S.M. Murshed (2018), 'Transmission Channels Matter: Identifying Spillovers from FDI', *The Journal of International Trade & Economic Development*, 27(7), pp.701–28.

Dimelis, S. P. (2005), 'Spillovers from Foreign Direct Investment and Firm Growth: Technological, Financial and Market Structure Effects', *International Journal of the Economics of Business,* 12(1), pp.85–104.

Djankov, S. and B. Hoekman (2000), 'Foreign Investment and Productivity Growth in Czech Enterprises', *The World Bank Economic Review*, 14(1), pp.49–64.

Du, L., A. Harrison, and G. Jefferson (2011), 'Do Institutions Matter for FDI Spillovers?', *World Bank Policy Research Working Paper* No. WPS5757. Washington, DC: World Bank.

Farole, T. and D. Winkler (2019), *Making Foreign Direct Investment Work for Sub-Saharan Africa: Local Spillovers and Competitiveness.* Washington, DC: World Bank.

Findlay, R. (1978), 'Relative Backwardness, Direct Foreign Investment, and the Transfer of Technology: A Simple Dynamic Model', *Quarterly Journal of Economics*, 42.

Girma, S., H. Görg, and M. Pisu (2008), 'Exporting, Linkages and Productivity Spillovers from Foreign Direct Investment', *Canadian Journal of Economics*, 41(1), pp.320–40.

Glass, A. and K. Saggi (1998), 'International Technology Transfer and the Technology Gap', *Journal of Development Economics* 55, pp.369–98.

Görg, H. and E. Strobl (2005), 'Spillovers from Foreign Firms through Worker Mobility: An Empirical Investigation', *Scandinavian Journal of Economics*, 107(4), pp.693–709.

Gorodnichenko, Y., J. Svejnar, and K. Terrell (2013), 'When Does FDI Have Positive Spillovers? Evidence from 17 Transition Market Economies', *IZA Discussion Paper* No. 7824, IZA.

Ha, Y.J. and A. Giroud (2010), R&D Spillovers from Foreign Direct Investment (FDI): The Role of Firm-level Heterogeneity', in *Proceedings of the 36th EIBA Annual Conference*, 9–11 December. Porto.

Haddad, M. and A. Harrison (1993), 'Are There Positive Spillovers from Direct Foreign Investment?: Evidence from Panel Data for Morocco', *Journal of Development Economics*, 42(1), pp.51–74.

Halpern, L. and B. Murakozy (2006), 'Does Distance Matter in Spillover?', Hungarian Academy of Sciences, mimeo. Budapest: Institute of Economics, CEU Department of Economics.

Hamida, P.D.L.B. and R. Khairallah (2017), 'Are There Productivity Spillovers from Southern MNCs in the Swiss Service/Construction Industry?', *Journal of Contemporary Management*, 7(2), pp.57–70.

Javorcik, B.S. (2004), 'Does Foreign Direct Investment Increase the Productivity of Domestic Firms? In Search of Spillovers through Backward Linkages', *The American Economic Review*, 94(3).

Javorcik, B.S. and M. Spatareanu (2008), 'To Share or Not to Share: Does Local Participation Matter for Spillovers from Foreign Direct Investment?', *Journal of Development Economics*, 85(1-2), pp.194–217.

Javorcik, B.S. and M. Spatareanu (2011), 'Does It Matter Where You Come from? Vertical Spillovers from Foreign Direct Investment and the Origin of Investors', *Journal of Development Economics*, 96(1), pp.126–38.

Jeon, Y., B.I. Park, and P.N. Ghauri (2013), 'Foreign Direct Investment Spillover Effects in China: Are They Different across Industries with Different Technological Levels?', *China Economic Review*, 26, pp.105–17.

Kathuria, V. (2000), 'Productivity Spillovers from Technology Transfer to Indian Manufacturing Firms', *Journal of International Development*, 12(3), pp.343–69.

Kinoshita, Y. (2000), 'R&D and Technology Spillovers via FDI: Innovation and Absorptive Capacity', mimeo. Prague: CERGE-EI.

Kokko, A. (1994), 'Technology, Market Characteristics, and Spillovers', *Journal of Development Economics*, 43, pp.279–93.

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), pp.619–33.

Kugler, M. (2006), 'Spillovers from Foreign Direct Investment: Within or between Industries?', *Journal of Development Economics*, 80, pp.444–77.

Lesher, M. and S. Miroudot (2008), 'FDI Spillovers and Their Interrelationships with Trade', *OECD Trade Policy Working Paper* No. 80. Paris: OECD.

Levinsohn, J. and A. Petrin (2003), 'Estimating Production Functions Using Inputs to Control for Unobservables', *Review of Economic Studies*, 70(2), pp.317–41.

Li, X., X. Liu, and D. Parker (2001), 'Foreign Direct Investment and Productivity Spillovers in the Chinese Manufacturing Sector', *Economic Systems, 25*(4), pp.305–21.

Lin, P., Z. Liu, and Y. Zhang (2009), 'Do Chinese Domestic Firms Benefit from FDI Inflow? Evidence of Horizontal and Vertical Spillovers', *China Economic Review*, 20, pp.677–91.

Liu, Z. (2008), 'Foreign Direct Investment and Technology Spillovers: Theory and Evidence', *Journal of Development Economics*, 85, pp.176–93.

López-Córdova, J.E. (2002), 'NAFTA and Mexico's Manufacturing Productivity: An Empirical Investigation Using Micro-level Data'. Working Paper. Washington, DC: Inter-American Development Bank.

Murakami, Y. and K. Otsuka (2020), 'Governance, Information Spillovers, and Productivity of Local Firms: Toward an Integrated Approach to Foreign Direct Investment and Global Value Chains', *The Developing Economies*, 58(2), pp.134–74

Nguyen, P.V., K.T. Tran, N.T. Le, and H.D.X. Trieu (2020), 'Examining FDI Spillover Effects on Productivity Growth: Firm-Level Evidence From Viet Nam', *Journal of Economic Development*, 45(1), pp.97–121.

Olley, S. and A. Pakes (1996), 'The Dynamics of Productivity in the Telecommunications Equipment Industry.' *Econometrica*, 64(6), pp.245–76.

Pietrobelli, C. and R. Rabellotti (2011), 'Global Value Chains Meet Innovation Systems: Are There Learning Opportunities for Developing Countries?', *World Development*, 39(7), pp.1261–69.

Reganati, F. and E. Sica (2007), 'Horizontal and Vertical Spillovers from FDI: Evidence from Panel Data for the Italian Manufacturing Sector', *Journal of Business Economics and Management*, 8(4), pp.259–66.

Rojec, M. and M. Knell (2018), 'Why Is There a Lack of Evidence on Knowledge Spillovers from Foreign Direct Investment?', *Journal of Economic Surveys*, 32(3), pp.579–612.

Schoors, K. and B. van der Tol (2001), 'The Productivity Effect of Foreign Ownership on Domestic Firms in

Hungary' mimeo. Ghent, Belgium: Ghent University.

Sinani, E. and K.E. Meyer (2004), 'Spillovers of Technology Transfer from FDI: The Case of Estonia', *Journal of Comparative Economics*, 32(3), pp.1–22.

Takii, S. (2005), 'Productivity Spillovers and Characteristics of Foreign Multinational Plants in Indonesian Manufacturing 1990–1995', *Journal of Development Economics*, 76(2), pp.521–42.

United Nations Conference on Trade and Development (UNCTAD) (1996), *World Investment Report. Investment, Trade and International Policy Arrangements.* Switzerland.

UNCTAD (2013), *World Investment Report. Global Value Chains: Investment and Trade for Development*. Switzerland.

UNESCAP (2020), *Asia-Pacific Trade and Investment Trends 2020/2021*. *Foreign Direct Investment Trends and Outlook in Asia and the Pacific*. Online document. UNESCAP. https://www.unescap.org/our-work/trade-investment-innovation

Wang, Y. and M. Blomström (1992), 'Foreign Investment and Technology Transfer: A Simple Model', *European Economic Review*, 36, pp.137–55.

ERIA Discussion Paper Series

No.	Author(s)	Title	Year
2022-07 (No. 436)	Archanun KOHPAIBOON Juthathip JONGWANICH	Changes in Trade and Investment Policies in Thailand and the Implications for Medium-term Growth	August 2022
2022-06 (No. 435)	Mireya SOLIS	Heyday of Asian Regionalism? The Implications of the Regional Comprehensive Economic Partnership for the United States	August 2022
2022-05 (No. 434)	Zhang YUNLING	China and the Regional Comprehensive Economic Partnership: An Economic and Political Perspective	August 2022
2022-04 (No. 433)	Shiro ARMSTRONG	Australia's Interests in East Asia's Regional Comprehensive Economic Partnership	August 2022
2022-03 (No. 432)	Sasidaran GOPALAN, Ketan REDDY	What Determines Interfirm Trade Credit? Empirical Evidence from the ASEAN	June 2022
2022-02 (No. 431)	Masahito AMBASHI, Fusanori IWASAKI, and Keita OIKAWA	Prediction Errors of Macroeconomic Indicators and Economic Shocks for ASEAN Member States, 1990–2021	May 2022
2022-01 (No. 430)	Ikumo ISONO and Kazuhiro NARA	COVID-19, Telework Patterns Within a City, and Changes in Urban Structure – Preliminary Findings	April 2022
2021-62 (No. 429)	Linh BUI, Huyen HOANG, and Hang BUI	Entry Mode Choice and Performance of Foreign Direct Investment Firms in Emerging Economies: Micro-evidence from Viet Nam	March 2022
2021-61 (No. 428)	Fauziah ZEN and Michael REGAN	Projecting Infrastructure Needs and the Financing Mechanism: A Review of Estimations by ADB, McKinsey, and the OECD	March 2022
2021-60 (No. 427)	Astrid DITA and Sandy MAULANA	Implicit Subsidies for Infrastructure and Their Implications for Contingent Liabilities in Selected East Asian Countries	March 2022
2021-59 (No. 426)	Teguh Yudo WICAKSONO and Andre SIMANGUNSONG	Digital Technology Adoption and Indonesia's MSMEs during the COVID-19 Pandemic	March 2022
2021-58 (No. 425)	Mitsuyo ANDO, Fukunari KIMURA, and Kenta YAMANOUCHI	East Asian Production Networks Go Beyond the Gravity Prediction	March 2022
2021-57 (No. 424)	Tadashi ITO and Yukiko Umeno SATO	Chief Executive Officer Attributes and Trade	February 2022

ERIA discussion papers from the previous years can be found at:

http://www.eria.org/publications/category/discussion-papers