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Impact of FTA on Philippine Industries: Analysis of Network Effects

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Abstract

Trade is an important component of the Philippine economy. Contemporary trade is shaped primarily by the evolution of Global Value Chains (GVCs), and this has a significant implication in integrating developing countries, such as the Philippines, into the global economy. An economy's inclusion into GVCs is affected by different factors, one of which is through a Free Trade Agreement (FTA). The impact of FTAs has long been studied in the Philippines, but the network effects of FTA trade shocks and its resulting impact to industry firm performance have not been explored as much. This study contributes to filling that gap by calculating the direct impact of trade agreements to the performance of various sectors. The results of the analysis show that FTA imports have a positive and significant direct effect on industry growth and labor productivity. The network effects, however, are not statistically significant for real Gross Value Added growth. On employment, the direct effect is negative and statistically significant, but the network effects would temper this effect because the upstream effect arising from customers is positive and statistically significant. The shock also has a positive and statistically significant direct effect on labor productivity, which implies that increasing imports increases labor productivity of Philippine sectors.

Keywords: *Trade, network effects, trade agreements, FTA, Philippines*

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List of Acronyms

AANZFTA	ASEAN-Australia-New Zealand FTA
ACFTA	ASEAN-China FTA
AFTA	ASEAN Free Trade Area
AHKFTA	ASEAN-Hong Kong, China FTA
AIFTA	ASEAN-India FTA
AJCEP	ASEAN-Japan Comprehensive Economic Partnership Agreement
AKFTA	ASEAN-Korea, Republic of FTA
ASEAN	Association of Southeast Asian Nations
ATIGA	ASEAN Trade in Goods Agreement
CARS	Comprehensive Automotive Resurgence Strategy
CMTA	Customs Modernization and Tariff Act
CPC	Central Product Classification
DTI	Department of Trade and Industry
EPA	Economic Partnership Agreement
FTA	Free Trade Agreement
GDP	Gross Domestic Product
GSP	Generalised Scheme of Preferences
GVA	Gross Value Added
GVC	Global Value Chain
HS	Harmonized System
i^3S	Inclusive Innovation Industrial Strategy
IDP	Industry Development Program
IO	Input-Output
IT-BPM	Information Technology and Business Process Management
LFS	Labor Force Survey
LPI	Logistics Performance Index
MFN	Most Favored Nation
MNC	Multi-National Corporations
MSME	Micro, Small, and Medium Enterprise
MTS	Multilateral Trading System

PEZA	Philippine Economic Zone Authority
PH-EFTA FTA	Philippines-European Free Trade Area FTA
PJEPA	Philippines-Japan Economic Partnership Agreement
PSA	Philippine Statistics Authority
PSIC	Philippine Standard Industry Classification
SME	Small and Medium Enterprise
TRP	Trade Reform Program
WITS	World Integrated Trade Solution
WTO	World Trade Organization

Impact of FTA on Philippine industries: Analysis of network effects

Francis Mark A. Quimba, Mark Anthony A. Barral, Maureen Ane D. Rosellon, and Sylwyn C. Calizo Jr.[1]

1. Introduction

The evolution of Global Value Chains (GVCs) significantly changed how global trade and industry worked. GVCs led to a fragmented production process where producers capitalized on comparative advantages across regional supply chains. This fragmentation allowed developing economies to participate in the production process, which eventually led to an economic growth backed by the creation of domestic jobs, foreign currency inflows, poverty reduction, and access to information. Sustaining this GVC-led economic growth will not only ensure that the economy continues to attract investments but will also push local firms to become globally more competitive (Duke CGGC 2016).

1.1 Objectives of the study

This study revisits the findings of a number of studies (Wignaraja et al. 2010; Aldaba et al. 2015; DTI 2015; Barral and Quimba 2019; Quimba, Rosellon, and Calizo 2020) on the impact of Free Trade Agreements (FTAs)[2] on the economy through the performance of domestic industries. It provides a different perspective by incorporating the network effects of increased trade to the impact of trade on industry firm performance. It also expands the study by Aldaba et al. (2015) by looking also at the agricultural sector.

By looking at the impact of trade agreements on industries and their value chains, this study is able to provide essential guidance to policymakers and implementers on how to maximize the increasing participation of the country in the global economy. Participation in the global economy, as a strategy of the Philippines, is expected to increase employment, promote inclusive growth, and diversify export markets.

1.2 Significance of the study

A number of studies (Wignaraja et al. 2010; Aldaba et al. 2015; DTI 2015; Barral and Quimba 2019; Quimba, Rosellon, and Calizo 2020) have been conducted on the importance of trade agreements to the country. For instance, Aldaba et al. (2015) surveyed around 100 firms and found that close to a third are FTA users. Most of these are medium-sized firms with total

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[2] The Philippines enforces a total of nine FTAs. Most of these are through the Association of Southeast Asian Nations (ASEAN), namely: ASEAN Free Trade Area (AFTA) and ASEAN Trade in Goods Agreement (ATIGA), ASEAN-China FTA (ACFTA), ASEAN-Japan Comprehensive Economic Partnership Agreement (AJCEP), ASEAN-Australia-New Zealand FTA (AANZFTA), ASEAN-India FTA (AIFTA), ASEAN-Korea, Republic of FTA (AKFTA), and ASEAN-Hong Kong, China FTA (AHKFTA). The other two FTAs are bilateral, namely: the Philippines-Japan Economic Partnership Agreement (PJEPA) and the Philippines-European Free Trade Association FTA (PH-EFTA FTA)

employment ranging from 50 to 300 workers. Their study finds that the lack of information and the use of other schemes, such as the Generalised Scheme of Preferences (GSP+) or incentives from the Philippine Economic Zone Authority (PEZA), are reasons affecting the use of FTAs.

Wignaraja et al. (2010) found that lower tariffs increased export sales are the most significant benefits of AFTA. However, respondent firms have also raised their concerns when facing cheaper imports and high costs of documentation in order to utilize the FTA. For example, Barral and Quimba (2019) used a synthetic control method to evaluate the impact of PJEPA on the performance of the Philippines' exports while Quimba, Rosellon, and Calizo (2020) analyzed the utilization rate of trade agreements and found room for improving the utilization of FTAs, particularly for PJEPA. Further, Quimba, Rosellon, and Calizo (2020) also found that the significantly lower tariffs provided by trade agreements increase utilization for the importation of all products in the Philippines.

According to a study commissioned by the Department of Trade and Industry (DTI 2015), 22.0 percent of all survey respondents were FTA users. A closer inspection further shows that 16.0 percent of Small and Medium Enterprises (SMEs) and 39.0 percent of large firms utilized FTAs. It was also found that AFTA and ATIGA were the most used FTAs, among respondents, followed by ACFTA and AJCEP

While the preceding studies have found varying rates of utilization, few have actually looked at the impact of FTAs to firm performance. This study contributes to this existing body of literature by incorporation the network effects of an influx of products through an FTA. The hypothesis is that the impact of a shock on the macro-economy would be bigger if we include the subsequent effects on other sectors or firms. This research utilizes the information provided by the Input-Output (IO) tables provided by the Philippine Statistics Authority (PSA) to incorporate the network effects to an influx of imported products from the Philippines' trade partners.

1.3 Limitations of the study

This study is limited by the availability of three types of data, namely: FTA utilization rates on imports at the product level (10-digit HS Code),[3] indicators on industry performance at the PSIC[4] level, availability of the PSA IO tables for the same industries that have growth rates at the PSIC level. Unfortunately, industry growth rates are available only at a highly aggregated level. Appendix 1 presents the industries with available growth rates. This study is also limited

[3] The Harmonised Commodity Description and Coding Systems (HS) is an international nomenclature for the classification of products introduced in 1988. For more on the HS system, see: https://unstats.un.org/unsd/tradekb/Knowledgebase/50018/Harmonized-Commodity-Description-and-Coding-Systems-HS

[4] The Philippine Standard Industrial Classification (PSIC) is a detailed classification of industries prevailing in the Philippines according to the kind of productive activities undertaken by establishments. For more on the PSIC system, see: https://psa.gov.ph/content/philippine-standard-industrial-classification-psic

by the concordance and alignment of the HS codes, ISIC[5], PSIC, and the PSCC.[6] For each conversion and alignment that the researchers have to conduct, a number of assumptions were made, which could result to measurement errors affecting the regression coefficients.

Further, the impact of trade agreements on a sector would not only be through the influx of imported products but also through exports (i.e., the expansion of markets). This study fails to incorporate exports to the model because it is not as diligently monitored as imports. Furthermore, this analysis is limited by the lack of firm level information on key imports and sources of these imports. While the PSA has information on imports, this is unrelated to the information on products.

The rest of this paper is organized as follows: Chapter 2 presents a background of the Philippine economy and related trade and industrial policies that were implemented during this period. Chapter 3 provides the methodology and data sources used for the evaluation of the role of FTAs. The estimation results will then be discussed in Chapter 4. Finally, the conclusion and policy recommendations are found in Chapter 5.

2. Philippine Trade and Industry

2.1 Background on Philippine industry

2.1.1 Value added

Aldaba (2013) has found that, since the 1980s, the share of services has been increasing from about 36.0 percent to 44.0 percent in 2000. From 2011-2018, industry share has been more than 55.0 percent (Table 1), increasing from 53.0 percent at the end of the century. Looking further at the data over time, Aldaba (2013) found that at the outset of the trade reforms, industry's share has been the largest at 40.5 percent, but this figure has declined between 1980 and 1985. Recent figures show that industry's share has been steady at about 33.0 percent.

The share of agriculture, hunting, forestry and fishing value added slightly dropped from 21.0 percent in 1980 to 19.0 percent in 2000 (Aldaba 2013). It has further declined over time with about 14.0 percent at the beginning of the millennium to only about an 8.0 percent share of value added from 2016-2018.

[5] The International Standard Industrial Classification of All Economic Activities (ISIC) is a standard classification of economic activities arranged so that entities can be classified according to the activity they carry out. For more on the ISIC, see: https://ilostat.ilo.org/resources/methods/classification-economic-activities/

[6] The Philippine Standard Commodity Classification (PSCC) is a detailed classification of all imported and exported commodities being used for tariff and statistical purposes. For more on the PSCC, see: https://psa.gov.ph/content/philippine-standard-commodity-classification-pscc

Table 1 Structure of the economy by major sector

	Industry	2001-05	2006-2010	2011-2015	2016-2018
1.	AGRI., HUNTING, FORESTRY AND FISHING	14	13	11	8
	a. Agriculture, hunting and forestry	11	10	9	7
	b. Fishing	2	3	2	1
2.	INDUSTRY SECTOR	33	32	33	34
	a. Mining & Quarrying	1	1	1	1
	b. Manufacturing	24	23	23	23
	c. Construction	5	5	6	6
	d. Electricity, Gas & Water Supply	4	4	3	3
3.	SERVICE SECTOR	53	55	57	58
	a. Transportation, Storage and Communication	7	8	8	7
	b. Trade and repair of motor vehicles, motorcycles, personal and household goods	16	17	17	17
	c. Financial Intermediation	5	6	7	7
	d. R. Estate, Renting & Business Activities	9	10	11	11
	e. Public Administration & Defense: Compulsory Social Security	5	4	4	4
	f. Other Services	10	10	10	10
	Gross Domestic Product	100	100	100	100

Source: PSA

Looking at the data from the 1950s, Aldaba (2013) has documented the performance of the industrial sector over time. She found that industrial growth has been sluggish since the 1980s. In the 1990s, the industry sector posted an average annual growth rate of 3.0 percent. The sector continued to by around 4.0 percent, on average, in the period 2001-2005 (Table 2).

Looking at more recent data, this paper finds that the sector grew faster in the succeeding years with an average annual growth rate of 7.0 percent in 2011-2015. For the period 2016-2018, the sector's average annual growth rate is also around 7.0 percent. Meanwhile, agriculture, hunting, forestry, and fishing had declining growth rates since 2000, which was driven mainly by negative growth rates in the fishing industry in 2011-2018, while the services sector has been growing the fastest since the turn of the century. It has grown at a consistent average rate of about 6.0 percent annually.

According to the data compiled by Aldaba (2013), the manufacturing sector has registered an average annual growth rate of 0.9 percent in the 1980s and 2.5 percent in the 1990s. From 2001-2005, the manufacturing sector grew at an average annual rate of 4.0 percent. It was in 2011-2018 when the sector grew significantly at around 7.0 percent annually, on average (Table 2).

Within the service sector, the transportation, communication, and storage as well as finance and private service sub-sectors, have registered continuously rising growth rates since the 1980s (Aldaba 2013) but this has slowed down after 2000 (Table 2). In 2016-2018, public administration (compulsory social security) posted the highest average growth rate of about 10.0 percent on average. Financial intermediation was next with an average growth of 8.0 percent. All the other sectors grew at an average of about 7.0 percent.

Table 2 Average annual growth rates by sector

	Industry	2001-05	2006-2010	2011-2015	2016-2018
1.	AGRI., HUNTING, FORESTRY AND FISHING	4	2	2	1
	a. Agriculture, hunting and forestry	3	2	2	2
	b. Fishing	6	4	-1	-2
2.	INDUSTRY SECTOR	4	5	7	7
	a. Mining & Quarrying	17	9	4	2
	b. Manufacturing	4	4	7	7
	c. Construction	0	11	7	11
	d. Electricity, Gas & Water Supply	4	5	4	6
3.	SERVICE SECTOR	6	6	6	7
	a. Transportation, Storage and Communication	10	4	6	5
	b. Trade and repair of motor vehicles, motorcycles, personal and household goods	6	5	6	7
	c. Financial Intermediation	7	8	8	8
	d. R. Estate, Renting & Business Activities	5	7	8	7
	e. Compulsory Social Security	3	4	3	10
	f. Other Services	4	6	6	7
	Gross Domestic Product	5	5	6	7

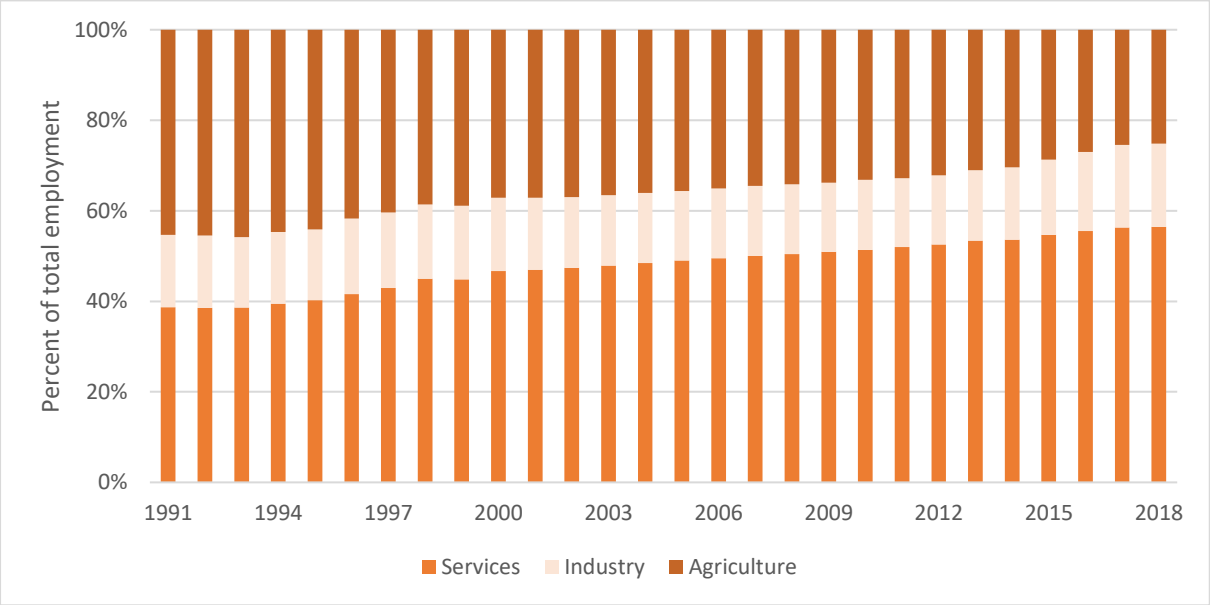
Source: PSA

2.1.2 Employment

In terms of employment contribution, the services sector has become the largest provider of employment in the most recent period (Figure 1). The share of the labor force employed in the sector consistently increased from around 32.0 percent in the mid-1970s to about 49.0 percent in 2000-2011. The share of industry to total employment has been almost stagnant at 15.0 percent from the mid-1970s to the most recent period under review.

Industry (e.g., manufacturing and construction, among others), has unsuccessfully created employment opportunities for new entrants to the labor force as well as those who move out of the agricultural sector. Its share dropped from 11.0 percent in the mid-1970s to 9.0 percent in 2000-2011. While the share of agriculture has been declining, the sector has remained an important source of employment. From 52.8 percent in the mid-1970s, the agriculture sector's share in total employment continuously declined in the succeeding decades and is around 36.0 percent from 2000-2011. The most recent figure shows that agriculture share of employment is around 27.0 percent (Figure 1).

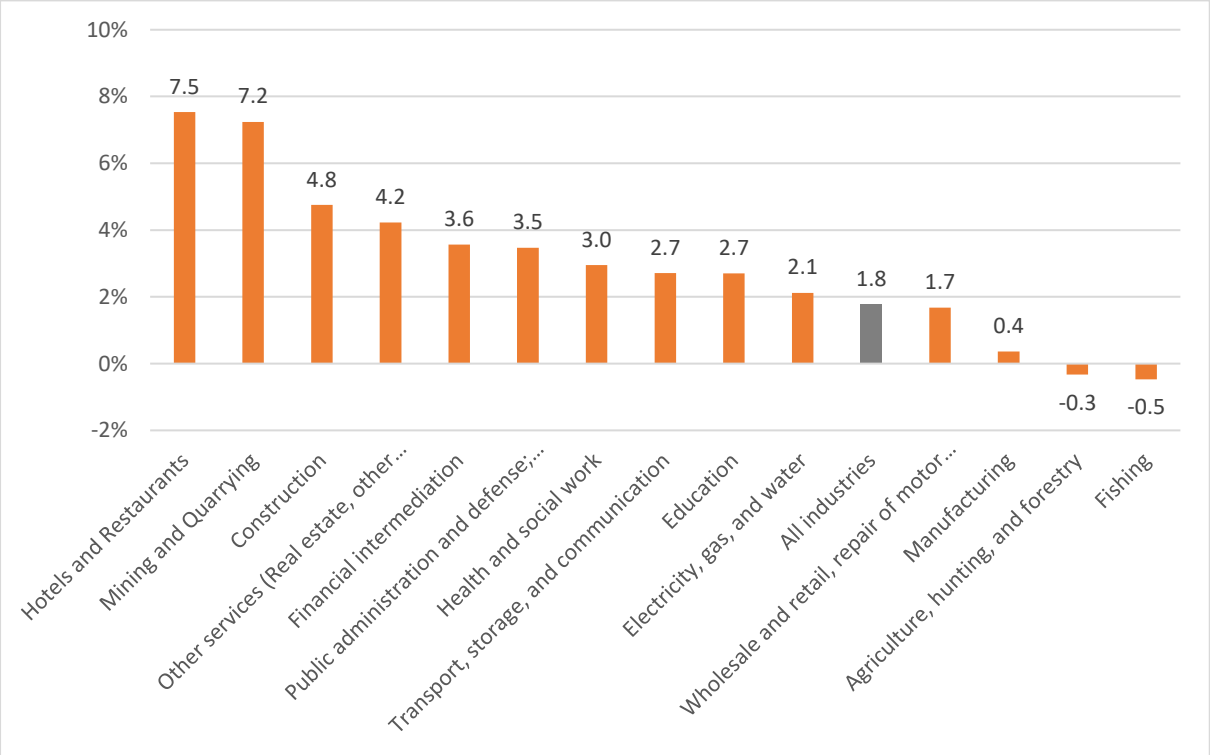
Figure 1 Employment by sector



Source: World Development Indicators

In terms of the expansion of sector employment, the average growth rate of manufacturing has been below 1.0 percent from 2005-2015 (Figure 2). The sub-sectors that have grown in terms of employment include mining and quarrying, it has the slowest growth after agriculture and fishing.

Figure 2 Average growth rates of major industries (2005-2015)



Source: Authors' calculations using data from PSA's Philippine Statistical Yearbooks

On average, total employment in the country grew by only 1.7 percent on average for this period. This is sluggish relative to the growth of the economy. The fastest growing sectors in terms of employment are hotel and restaurants, and mining and quarrying that have both grown beyond 7.0 percent, on average, in 2005-2015. Construction, other services, and financial intermediation complete the five fastest growing industries.

2.1.3 Productivity

One of the ways to measure productivity is through the calculation of total value added divided by total employment (i.e., value added per worker or labor productivity). Several studies (Balisacan and Hill 2003; Herrin and Pernia 2003; Llanto 2012; Aldaba 2013) have documented the trend in the productivity of labor across the different economic sectors since the mid-1970s. Aldaba (2013) finds that labor productivity is low and disparities across the three major sectors are wide. Industry had the highest labor productivity, which declined from the mid-1970s to the 1990s (Aldaba 2013), but showed some improvement in the current period although it still has not reached its highest average level registered in the mid-1970s. More recent figures support the finding that labor productivity is highest in industry followed by services (Table 3).

Table 3 5-year average labor productivity by sector, 1991-2018 (constant 2000 prices)

Sector	1991-1995	1996-2000	2001-2005	2006-2010	2011-2015 /1	2016-2018 /2
All Sectors	115,076	124,583	131,642	151,456	177,109	213,507
Agriculture, Forestry and Fishing	39,607	44,566	49,640	54,801	59,597	70,806
Industry	254,242	262,669	277,263	326,330	371,589	396,962
Services	145,026	143,754	146,283	166,161	188,511	218,637

Source: Authors' calculations using data from PSA

/1 For 2013-2016, values are based on the average of April, July, and October employment data, which excluded Leyte province

/2 For 2016, values are based on the average of January, April, July, and October employment data, which excluded Leyte province

The average labor productivity in the services sector has declined from the mid-1970s to the 1990s but improved in 2000-2010. In 2011-2015, the labor productivity in the services sector has grown as fast as the industry sector. The agriculture, fishery, and forestry sectors had the lowest level of labor productivity, which remained stagnant from the mid-1970s (Aldaba 2013) up to the 1990s although slight increases were experienced in the latest period.

In terms of labor productivity growth, Table 4 shows that, on the one hand, the agriculture sector is experiencing erratic movements in labor productivity growth with a sharp increase in 2016-2018 but less than one growth in 2001-2005. On the other hand, industry has consistently grown at 3.0 percent since 2006. Meanwhile, the services sector has also rapidly improved as it has grown at negative rates since 1991-2000 but has grown at a rate of 7.0 percent in 2016-2018.

Table 4 Growth rates of labor productivity, %

Sector	1991-1995	1996-2000	2001-2005	2006-2010	2011-2015 /1	2016-2018 /2
All Sectors	-0.7	1.2	1.3	2	4	8
Agriculture, Forestry and Fishing	-0.8	2.7	0.9	1	2	11
Industry	-1.7	1.2	1.1	3	3	2
Services	-0.8	-0.6	1.4	2	3	7

Source: Authors' calculations using data from PSA

/1 For 2013-2016, values are based on the average of April, July, and October employment data, which excluded Leyte province

/2 For 2016, values are based on the average of January, April, July, and October employment data, which excluded Leyte province

Factors that could affect labor productivity in the Philippines have been studied by Llanto (2012) and Herrin and Pernia (2003). Llanto (2012) found that foreign direct investments, educational attainment (i.e., capturing research and development), openness of the economy, and government expenditure in health and education are significant determinants of labor productivity. Macroeconomic stability is also a positive determinant of labor productivity as it leads to more investments and job creation. These results are consistent with the findings of Herrin and Pernia (2003) that identified three factors that affected the labor productivity from the mid-1970s to the 1990s. First, the limited investment in modern technology by the firms and the reluctance to implement international best practices in production and management. Second, the rapid population growth overwhelming the small expenditure and investment in human capital. Third, the relatively quick expansion of employment in low productivity services sector.

2.1.4 Forward and backward linkages

The Philippines is a relatively newcomer to GVCs compared to other countries in the Association of Southeast Asian Nations (ASEAN) region (Duke CGGC 2016). To address this concern, DTI has focused on creating a stable trade and industry environment. The policies and strategies of the DTI aim to contribute to increasing manufacturing growth through GVCs.

GVCs are defined as "the full range of activities that firms, workers, and supporting institutions around the world perform to bring a product from conception through production and end use (Duke CGGC 2016, p.2)." This entails the process of producing goods from raw materials to finished products carried out wherever the necessary skills and materials are available at competitive cost and quality.

It is important for developing countries, such as the Philippines, to effectively participate in GVCs because this helps to not only diversify the developing country's export basket but also to strengthen domestic industries, which then becomes a catalyst for inclusive economic growth. Gereffi and Fernandez-Stark (2011) even adds that a holistic view of industries, particularly through both a top-down and a bottom-up approach, is important, and this holistic view can be achieved by examining factors, such as labor, technology, standards, and regulations, among similar others. Gereffi et al. (2005), however, reminds that developing countries should not stop at just participating in GVCs but to continue further by moving into higher-value activities in the value chain - a movement that is known in the GVC literature as economic upgrading.

Aldaba (2008) looked at forward and backward linkages in analyzing how Philippine firms can increase participation of SMEs in GVCs. On the one hand, backward linkages arise when firms source raw materials and intermediate products or services from domestic companies. The creation of these backward linkages would increase the domestic value added of Multi-National Corporations (MNCs) and lead to significant contributions to the domestic economy. On the other hand, forward linkages are created when domestic-based companies sell goods or services to other Philippine-based companies.

In their analysis of the spillover effects of foreign direct investment, Aldaba and Aldaba (2010) used the 1988 and 1998 IO tables to calculate the horizontal forward and backward linkages among industries in the Philippines. They found that nine manufacturing sectors had values between 0.9 and 1.0, which signals that these sectors have strong horizontal linkages. These nine sectors include: (1) other dairy products; (2) hardboard and particle board; (3) stationers, artists, and office supplies; (4) petroleum refineries; (5) flat glass; (6) professional and scientific measuring and controlling equipment; (7) watches and clocks; (8) soaps and detergents; and, (9) fiber batting, padding, and upholstery fillings.

Aldaba and Aldaba (2010) also reported nine other sectors that had high horizontal linkages, namely: (1) milk processing; (2) butter and cheese manufacturing; (3) flavoring extracts; (4) carpets and rugs; (5) rubber tire and tube; (6) metal and wood working machinery; (7) parts and supplies for radio, television, and communication; (8) photographic and optical instruments; and, (9) rebuilding and major alteration of motor vehicles. Incidentally, these sectors also have a significant foreign presence.

In terms of backward and forward linkages, Aldaba and Aldaba (2010) found that textile spinning; weaving, texturizing and finishing; milk processing; and, basic industrial chemicals actually had strong backward linkages, while asphalt, lubricants, and miscellaneous products; products of petroleum and coal; butter and cheese manufacturing; ice cream and sherbets; carpets and rugs; rubber and tire manufacturing; and, pesticides and insecticides had strong forward linkages.

Corollary to the participation in GVCs is the quality of the country's international supply chain, which, in its simplest form, involves the transport of goods and services from a production facility in one country to a warehouse or distribution center in another country. This would therefore involve facilitating trade for a given country, which would include facilitating imports of parts and components and their movement to a production facility, as well as facilitation exports of the processed good from the production facility to the port (Patalinghug et al. 2015).

Recognizing that around 80.0 percent of international trade is involved with seaports, a country's participation in GVCs depends not only on the efficiency of the procedures associated with the movement of goods to-and-from the ports, whether by air or by sea, but also on how well those ports are connected to other countries. Using the World Bank's Logistics Performance Index (LPI)[7], Table 5 shows that the Philippines has done little to improve the state of its logistics. The Philippines' LPI score has decreased over time. From the

[7] The LPI is a perception index based on a survey of 1,000 logistics and trade-facilitation professionals around the globe. It is used to measure logistics efficiency across countries. Respondents evaluate eight markets on six core dimensions on a scale from 1 (worst) to 5 (best). The six core dimensions include: efficiency of the clearance process; quality of trade and transport infrastructure; ease of arranging competitively priced shipments; competence and quality of logistics services; ability to track and trace consignments; and, timeliness of shipments in reaching their destination. For more on the LPI, see: www.worldbank.org

baseline assessment, the Philippines' logistics has decreased in almost all dimensions. Only the quality of trade and transport infrastructure increased from the baseline figure.

Table 5 Philippine Logistics Performance Index, 2007-2018

Component	2007	2010	2012	2014	2016	2018
Overall LPI	2.69	3.14	3.02	3.00	2.86	2.90
Customs	2.64	2.67	2.63	3.00	2.61	2.53
Infrastructure	2.26	2.57	2.80	2.60	2.55	2.73
Timeliness	3.14	3.83	3.30	3.07	3.35	2.98
International Shipments	no data	3.40	2.97	3.33	3.01	3.29
Tracking and Tracing	no data	3.29	3.30	3.00	2.86	3.06
Logistics Competence and Quality	no data	no data	3.14	2.93	2.70	2.78

Source: World Bank

2.2 Philippine trade and industrial policy

Economic theory provides that trade liberalization can benefit the economy through three channels. First, the static gains arising from trade liberalization as resource allocation improves within and across industries. Trade reforms induce profound changes to the industry structure. For instance, resources used by different economic sectors can be reallocated among themselves or industries can undergo restructuring to some extent. Such a reallocation of resources or industrial restructuring can drive unprofitable businesses to contract and profitable businesses to grow (Aldaba and Cororaton 2002).

Second, trade liberalization can also bring about learning and innovation (i.e., technical change) that leads to improved productivity growth. These are considered as the dynamic gains that could be brought about by trade liberalization. Third, it is believed that imports can also compete with incumbent domestic industries and result to competitive effects.

The trade liberalization experience of the Philippines did not result in the expected growth in manufacturing and industry. The Philippines joined the World Trade Organization (WTO) in 1995 and committed to pursue trade liberalization and to integrate itself into the multilateral trading system (MTS) of the WTO. Also, the Philippines, in the 1980s to the 1990s, has a trade strategy characterized by the reduction of tariff and non-tariff barriers in the manufacturing and agricultural sectors (Table 6).

After 2010, the Philippines has been guided by a shift in perspective in industrialization policy as the previous decade has been characterized by jobless growth and high underemployment (Aldaba 2015). There is also a better appreciation on the role of innovation in improving the competitiveness of the sector to promote inclusive and sustainable growth. To address these factors, DTI launched the Industrial Development Program (IDP) in 2012, which has a vision of a globally competitive industrial sector with strong backward and forward linkages.

A decade into the 2000s, the government moved towards the Comprehensive National Industrial Strategy (CNIS)[8], which is a new industrial policy aimed at maximizing trade and investments, creating more quality jobs, and attaining sustainable and inclusive growth. From

[8] For more on the CNIS, see: http://industry.gov.ph/comprehensive-national-industrial-strategy/

2012, the government crafted programs and strategies for a comprehensive national industrial policy that builds innovative and globally-competitive industries and strong local and global linkages.

Table 6 Major trade and investment policies of the Philippines by decade

Period	Policy Regime	Policy Description
1950s-1970s	Import Substitution Phase Restrictive Investment Policy	-Protectionist measures such as high tariffs, import quotas, and other non-tariff barriers -Restricted foreign ownership to 40.0 percent in non-pioneer industries; 100.0 percent eligibility for foreign investment subject to Board of Investments' approval -Complicated investment incentive system
1980s-1990s	Unilateral trade Liberalization period Investment Liberalization Multilateral/Regional trade liberalization	-Trade Reform Program (TRP) I: reduced tariff range from 70.0-100.0 percent to 0.0-50.0 percent -TRP II: reduced tariff range to 3.0-30.0 percent -TRP III: further tariff changes towards a 5.0 percent uniform tariff -1987 Omnibus Investment Code (Board of Investments) -1991 Foreign Investment Act -Creation of PEZA (1995), Subic Bay Metropolitan Authority (1992), & Clark Development Corporation (1993) -GATT-WTO (1995) -AFTA-CEPT (1993)
2000s	Trade Facilitation Regionalism/Bilateralism through Free Trade Agreement	-Customs reforms (since mid-1990s) -Revised Kyoto Convention (2009) -National Single Window (2010) -ACFTA (2004); AKFTA (2006); AJCEP (2008); AANZFTA (2009); AIFTA (2009) -PJEPA (2006) -ASEAN+3, ASEAN+6 Talks
2010	Innovation-driven industrialization, trade and Investment policy GVC-focused industrial policy	-Comprehensive Automotive Resurgence Strategy (CARS) Program -Manufacturing roadmap -Philippine Inclusive Innovation Industrial Strategy (i^3S)

Source: Adopted from Aldaba (2013)

A strategic first step for the CNIS was the development of roadmaps to revive the manufacturing sector from its stagnant performance in the past two decades. The government, through DTI, and various industry associations collaborated on a project that generated over 30 roadmaps for various industries in manufacturing as well as agriculture and services.[9] For the manufacturing sector, the roadmaps fed into the Manufacturing Resurgence Program[10] whose main goal is to enhance competitiveness of domestic manufacturing industries to integrate them into higher value added regional and global value chains.

[9] Examples of these industries are aerospace, automotive, auto parts, biodiesel, ceramic tiles, chemicals, copper, e-vehicles, electronics, furniture, iron and steel, metal casting, motorcycle, natural health products, petrochemicals, plastics, paper, rubber, tool and die, cacao, carrageenan, condiments, processed fruit, meat and shrimp, information technology and business process management (IT-BPM), and housing. For more on these industries, see: http://industry.gov.ph/

[10] For more on the Manufacturing Resurgence Program, see: http://industry.gov.ph/manufacturing-resurgence-program/

A major program in line with the manufacturing resurgence objective is the Comprehensive Automotive Resurgence Strategy (CARS) Program launched in 2015. The program enhances the existing motor vehicle programs and ensures support for innovation, technology transfer, environmental protection, SME development, job creation, and deepening participation in regional and global value chains. It aims to "attract new investment, stimulate demand, and effectively implement industry regulations that will revitalize the Philippine automotive industry and develop the country as a regional automotive manufacturing hub (Executive Order No. 182 2015)" Under this program, the government provides time-bound and output/performance-based fiscal incentives for the manufacture of three models of four-wheeled motor vehicles.[11] To strengthen and deepen the supply chain network in the country, incentive eligibility covers new investment in the manufacture of parts and/or establishment of shared facilities for vehicles or parts. For example, Mitsubishi and Toyota are registered under the program with their participating models Mirage G4 and Vios, respectively.

Integrating the manufacturing resurgence program and the development plans for agriculture and services, the government has been implementing the Inclusive Innovation Industrial Strategy (i^3S) since 2017. The strategy is based on a comprehensive national industrial framework that strengthens domestic supply chains, deepens participation in GVCs, eliminates obstacles to investments, and recognizes the importance of innovation, competition, and productivity in fostering industry and economic growth. Innovation is given particular emphasis as a major driver of growth, especially as the fourth industrial revolution poses both challenges and opportunities for the industry and economy. The government also recognized the importance of developing human capital with technological and entrepreneurship skills to foster innovation and improve productivity (Aldaba 2017).

As part of innovation and modernization of trade policy, the government also passed in 2016 the Customs Modernization and Tariff Act (CMTA) of 2016 (RA10863)[12], which sought to modernize customs rules, expedite customs procedures, reduce opportunities for corruption, and improve customs service delivery. The law provides that all shipments are classified according to risk and the customs clearance times would depend on the risk classification of the cargo. For high risk consignments (about 50.0% of all consignments), clearance would be between one and two days, while moderate risk consignments require only about four hours for clearance.

The early reforms did not result in improvements in the manufacturing sector. In the 1980s to the early 2000s, manufacturing growth was slow, which grew by an average of 0.9 percent in the 1980s, 2.5 percent in the 1990s, and 3.5 percent in the early 2000s. Medalla (2002) provided an explanation for the lackluster performance: investments are only starting to be made in recent years. Also, the prolonged peso appreciation inhibited much of the potential growth from a more open economy. It is with this background that this study of the impact of Philippine trade agreements to Philippine economic sectors is made.

[11] Each model is expected to be produced not lower than 200,000 units. Participants of the program may be entitled to two types of fiscal support, namely: fixed investment support and production volume incentive. The program holds fiscal support amounting to PhP27.0 billion over six years.

[12] Republic Act 10863, or the Customs Modernization and Tariff Act, can be accessed here: https://www.officialgazette.gov.ph/2016/05/30/republic-act-no-10863/

3. Methodology

3.1 Sources of data

Imports data are taken from PSA for the years 2016-2018, disaggregated into different tariff schemes. The 2016 imports are classified using the 2004 PSCC, which is based on the HS 2002, while the 2017 and 2018 imports used the 2015 PSCC, which is based on the HS 2012. These data were matched against the MFN rates taken from the World Integrated Trade Solutions (WITS), which used the HS 2012 system. Given the difference in the systems used, the 2016 data were first converted to match the HS 2012.

The growth of the Gross Value Added (GVA) of the sectors were obtained from the Philippine Statistical Yearbook. The growth of employment and wages of the sectors were obtained from the October round of the Labor Force Survey (LFS).

Table 7 reveals the magnitude of the shock to the industries. The figures in the table can be interpreted as possible savings the industries have foregone by not importing under a trade agreement. Both the Industry and the Services sectors have the largest shock with about PhP2.5 billion and PhP2.4 billion in 2018, respectively. What is worrisome is the increasing magnitude of these shocks. For instance, the shock to Agriculture is just PhP1.5 million in 2016 but this has ballooned to PhP87.6 million in 2018. Other sectors also experienced increases in the magnitude of the shock.

Table 7 Direct impact to all sectors, Million Pesos (in 2000 prices)

Sector	2016	2017	2018
Agriculture	-1.461	-65.291	-87.588
Mining	-122.590	-150.327	-146.225
Industry	-1,631.532	-2,258.143	-2,544.584
Services	-1,627.668	-2,104.511	-2,404.751

Source: Authors' calculations

These shocks will be correlated with indicators of industry performance: growth in GVA, employment, wages and labor productivity. Table 8 presents the average growth rate of the key sectors of the Philippines. It shows that the Industry sector has been growing relatively fast in 2016 while the Agriculture sector has contracted. In 2017, the Services sector has grown the fastest while the Mining sector has grown the slowest although in 2018, it is the Mining sector that has grown the fastest while the Agriculture sector grew slowest at the rate of 1.7 percent.

Table 8 Average growth rate of Gross Value Added growth of industries (%)

Sector	2016	2017	2018
Agriculture	-1.87	5.20	1.68
Mining	8.45	4.33	8.02
Industry	10.64	8.61	4.60
Services	4.17	10.74	5.97

Source: Authors' calculations

In terms of employment, data shows that there has been an increase in the employment for the Industrial sector in 2016, further increasing by 23.0 percent in 2017 (Table 9). The Services sector has also increased rapidly in 2017 growing by around 37.0 percent, on average.

Meanwhile, both the Mining and the Agriculture sectors have contracted during the same period. Part of the reason for the decline may be due to the typhoons that have affected these sectors early in the year (NEDA 2017). In 2018, all the sectors experienced a decline in employment with the Mining sector contracting the most (35.8%).

Table 9 Average growth rate of employment (%)

Sector	2016	2017	2018
Agriculture	1.6	-12.6	-3.8
Mining	-1.8	-4.5	-35.8
Industry	5.8	23.0	-0.4
Services	-4.3	37.0	-6.3

Source: Authors' calculations from October round of LFS

Another indicator of growth of the various economic sectors of the country would be labor productivity, calculated as real GVA divided by total employment. The average labor productivity growth of the major sectors of the country are shown in Table 10. It shows that labor productivity is increasing the most in the Mining sector, which has grown by about 68.4 percent in 2018. In contrast, labor productivity has grown by around 10.0 percent in both Agriculture and Industry. Services sector labor productivity grew slowest in 2018 at only 6.0 percent.

Table 10. Average growth of labor productivity (%)

Sector	2016	2017	2018
Agriculture	-1.981	22.524	10.0223
Mining	0.938	5.429	68.440
Industry	11.745	-4.086	10.288
Services	21.764	-4.497	5.972

Source: Authors' calculations

It would be interesting to know how the industries have performed because of the presence of trade agreements that allowed the influx of imports at relatively lower tariff rates. The succeeding section presents the methodology that would calculate the relationship of these two indicators.

3.2 Econometric model

This paper adopts the relationship of FTA policy on growth of Philippine economic sectors through its impact on the production network. This study builds on the research of Acemoglu et al. (2015) that posits that a shock to a single sector could have a much larger impact on the macro-economy if it not only reduced the output of the firm but also those of others through which it is connected.

The relationship of sectoral performance to the trade shock is provided by the following equation:

$$\Delta ln\, Y_{it} = \delta_t + \psi \Delta ln\, Y_{i,t-1} + \beta^{own} Shock_{i.t-1} + \beta^{upstream} Upstream_{i,t-1} + \beta^{Downstream} Downstream_{i,t-1} + \epsilon_{i,t} \quad (1)$$

;where, $\Delta \ln Y$ is the industry performance indicator (growth of GVA, employment, wage and labor productivity;
$Shock$ is the direct impact of the FTA shock to the sector;
$Upstream$ is the indirect impact of the FTA shock to industry i as the upstream sector; and,
$Downstream$ is the indirect impact of the FTA shock to industry i as the downstream sector.

Equation 1 is shows that the explanatory variables used are the lagged values of the direct shock and the Upstream and Downstream shocks to address issues of contemporaneous measurement issues between the dependent variable and the explanatory variable. In addition, model 1 is estimated using panel fixed effects to control for omitted variable bias.

$Shocks$ are calculated as the difference between FTA imports at time *t-1* and the MFN imports at *t-1* at the previous year:

$$Shocks = Imports_{FTAt} - Imports_{MFNt} \quad (2)$$

This shock is the main variable as it relates an indicator of the FTA to the performance of the firms as aggregated into the industry performance. It can be interpreted as the savings of the industry due to the influx of imported goods under a trade arrangement as against importing under MFN tariff. Thus, a higher value of the shock implies a higher savings of the industry because the cost of the importation is lower. Negative values of the shock imply there is a reduction in the savings of the industry because the industry could have imported the MFN imports at FTA rates.

The shock variables are then magnified into two further impacts, namely: the downstream and upstream effects. The downstream and upstream effects are calculated using the following formula:

$$Downstream_{it} = \sum_j \left(input\%_{j \to i}^{2012} - 1_{j=i} \right) * shock_{jt} \quad (3)$$

$$Upstream_{it} = \sum_j \left(output\%_{i \to j}^{2012} - 1_{j=i} \right) * shock_{jt} \quad (4)$$

The study assumes that the direct shock to a certain industry is the difference in the value of imports under an Economic Partnership Agreement (EPA) with value of imports under MFN. Given this shock, the downstream and upstream effects to a given industry is calculated using the Leontief coefficients[13] (Equations 3 and 4). On the one hand, Equation 3 says that the shock to some industry *j* affects industry *i* because industry *i* is in the downstream of these industries while, on the other hand, Equation 4 says that the shock to an industry *j* will affect industry *i*

[13] The coefficients of industries are matched to the IO linkages using the 2012 IO table, which contains 65 industries. However, the 2012 IO table follows the classification of industries using the 1994 PSIC, which closely matches to ISIC 3.1. In order to match the import products that are already classified using the HS 2012 system, the codes must be converted to the Central Product Classification (CPC) 2.1, to ISIC 4.0, then to ISIC 3.1

because industry *i* is in the upstream of these industries. Acemoglu et al. (2015) describes downstream more succinctly as the impact to an industry arising from its suppliers while upstream as the impact arising from its customers.

Table 11 presents the average multiplier effect of a shock in a given sector. It shows that a one unit shock to industry *j* will affect be, on average, translated to about 0.6 units impact to industries in the Agriculture sector because the Agriculture sector is the supplier (upstream) of industry *j*. On the other hand, a one unit shock to industry *j* will translate to about 0.5 units of shock to the industries in the Agriculture sector because these industries in the Agriculture sector are customers of industry *j*.

Table 11 also reveals that the average upstream multiplier is relatively higher for all sectors except for industry where the downstream multiplier is higher. This means that a one-unit shock to industry *j* will be around 1.6 units of shock to sectors in the Industry sector because these sectors purchase their inputs from industry *j*. Meanwhile, a one-unit shock to industry *j* will only be 1.1 units of shock to sectors to the Industrial sector because the Industrial sector is the supplier to industry *j*. The upstream and downstream multipliers show that Industry is really affected by shocks to its suppliers more than shocks from its customers while the other sectors are affected by shocks to their customer industries.

Table 11. Average Upstream and Downstream multipliers by industry

Sector	**Upstream (Arising from customers)**	**Downstream (Arising from suppliers)**
Agriculture	0.60	0.54
Mining	1.06	1.05
Industry	1.12	1.63
Services	1.36	0.98

Source: Authors' calculations[14]

Examine the following illustration of the upstream and downstream multipliers. Consider the canned tuna manufacturing industry where the local tuna harvesting industry is the supplier of the canned tuna manufacturing industry that is in turn the supplier to the wholesale and retail sector of food products.

An FTA-shock of one unit would have a direct impact to all three industries: local tuna harvesting industry, canned tuna manufacturing industry, and wholesale and retail industry. However, there is the network effect on the canned tuna manufacturing industry such that the one-unit shock would be about 0.54 units as the shock is coming from the tuna harvesting industry (Agriculture row in Table 11, column Downstream), a supplier of the canned tuna manufacturing industry. In addition, the canned tuna manufacturing industry would be experiencing a 1.36-unit additional shock from the shock experienced by the wholesale and retail sector of food product (Services row in Table 11, column Upstream).

[14] See Appendix 2 for the Upstream and Downstream multipliers by industry.

4. Results and Discussion

Table 12 presents the results of the FTA shock. It shows that the influx of imports under trade agreements (for all schemes) has a statistically significant direct impact and such impact is positively associated with improvements in GVA growth and Labor productivity growth. However, the shock is negatively correlated with employment growth and it is not statistically significant with wage growth.

With regard to the network effects, the influx of imports under trade agreements of the customers of a given industry (upstream effect) is negatively associated with industry performance as measured by GVA growth but this is not statistically different from zero.

However, the downstream effect is positive. This means that, on average, industries are positively affected by the influx of imports under FTA shocks arising from their suppliers.

The impact to employment seems a little more puzzling as the direct impact of the FTA shock is negative. This means that when imports under FTA increases, the employment growth decreases. However, the results also point to an increase in the employment growth as caused by the shock arising from the customers.

Table 12 Impact of trade shocks on industry performance, all schemes

	(1)	(2)	(3)	(4)
VARIABLES	GVAGR_	EMPGR_	WAGGR_	PROD_
L.DIRSHOCK1EPA_	0.00736**	-0.01011***	0.00096	0.01821***
	(0.00301)	(0.00369)	(0.00794)	(0.00583)
L.UPSTREAM1EPA_	-0.00299	0.00523*	-0.00205	-0.00863**
	(0.00194)	(0.00261)	(0.00542)	(0.00411)
L.DOWNSTREAM1EPA_	0.00077	0.00102	-0.01038*	-0.00124
	(0.00215)	(0.00314)	(0.00570)	(0.00526)
2018.YEAR	0.77255	-6.97417	-10.70221	5.29929
	(3.80954)	(7.19670)	(11.32835)	(11.98506)
L.GVAGR_	-0.60995***			
	(0.04907)			
L.EMPGR_		-0.90678***		
		(0.03113)		
L.WAGGR_			-0.59074***	
			(0.11344)	
L.PROD_				-0.34599***
				(0.10899)
Constant	19.96536**	22.49513	-37.14122	7.36367
	(9.92632)	(14.51303)	(27.42717)	(24.06994)
Observations	112	105	102	105
R-squared	0.71362	0.93372	0.56459	0.45900
Number of NUMBER	56	53	52	53

Source: Authors' calculations
Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.10

Equation 1 was estimated for each of the trade agreements signed by the Philippines (see Appendix 3 to Appendix 9). The results are fairly similar to Table 12 where the direct shock is positively related to growth of the sectors but it is negatively correlated with employment growth. The estimation results also show that the direct shock is not a statistically significant determinant of wages growth but it is a positive and significant explanatory variable for labor productivity growth.

For brevity, Table 13 summarizes the impact of the direct shock, the downstream and upstream effects from the various regression estimates. On average, a one-unit increase in the shock (i.e., an increase in imports under FTA scheme by about PhP1.0 million with imports under MFN remain unchanged) translates to about 0.007-0.008 percentage points increase in growth rate of the economic sectors. The magnitude of the increase may be tempered by the impact upstream (impact from customers), which is negative (although not statistically significant). Similarly, the effect downstream is not statistically significant.

Looking at the impact to the labor situation of the country, the shocks coming from increased trade under an EPA may lead to a reduction in employment growth rate by about 0.009-0.010 percentage points. The impact is tempered by an increase brought about by the network effect arising from customers (about 0.005-0.006 percentage points) and also from suppliers by about 0.0009-0.0010 percentage points (although not statistically significant).

Table 13 Summary of the impact of trade shocks on GVA growth *by scheme*

	Shock(-t)	**Upstream effect(-t) (Arising from customers)**	**Downstream effect(-t) (Arising from suppliers)**
GVA			
All schemes	0.00736**	-0.00299	0.00077
AANZFTA	0.00841*	-0.00354	0.00084
ACFTA	0.00797**	-0.00308	0.00115
AFTA	0.00859**	-0.00357	0.00080
AIFTA	0.00726**	-0.00303	0.00075
AJCEP	0.00808**	-0.00309	0.00098
AKFTA	0.00713**	-0.00295	0.00076
PJEPA	0.00732**	-0.00299	0.00081
Employment			
All schemes	-0.01011***	0.00523*	0.00102
AANZFTA	-0.01092*	0.00563	0.00092
ACFTA	-0.01120**	0.00565*	0.00103
AFTA	-0.01159**	0.00601*	0.00114
AIFTA	-0.00992**	0.00522*	0.00093
AJCEP	-0.01141**	0.00562*	0.00116
AKFTA	-0.00971**	0.00506*	0.00090
PJEPA	-0.01011**	0.00526*	0.00095
Wage			
All schemes	0.00096	-0.00205	-0.01038*
AANZFTA	-0.00134	-0.00062	-0.01131*
ACFTA	0.00046	-0.00210	-0.01230*
AFTA	0.00066	-0.00196	-0.01141*
AIFTA	0.00082	-0.00188	-0.00991
AJCEP	-0.00028	-0.00152	-0.01175*
AKFTA	0.00054	-0.00168	-0.00981*
PJEPA	0.00091	-0.00199	-0.01026*

Labor productivity			
All schemes	0.01821***	-0.00863*	-0.00124
AANZFTA	0.02093**	-0.00994*	-0.00113
ACFTA	0.02018***	-0.00927*	-0.00110
AFTA	0.02122**	-0.01013*	-0.00146
AIFTA	0.01798***	-0.00871*	-0.00114
AJCEP	0.02067***	-0.00928*	-0.00140
AKFTA	0.01768***	-0.00846*	-0.00110
PJEPA	0.01819***	-0.00868**	-0.00117

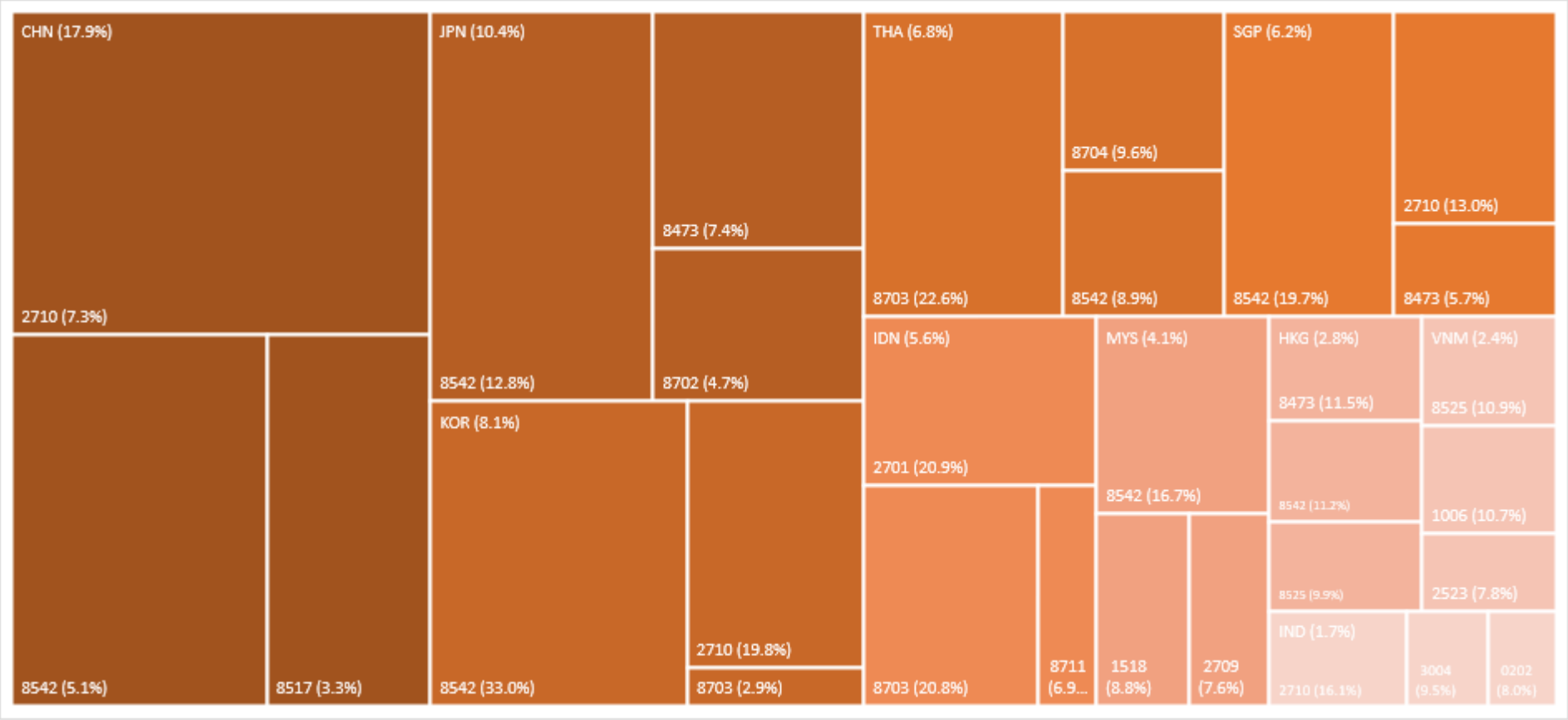
Source: Authors' calculations
*** p<0.01, ** p<0.05, * p<0.10

With regard to labor productivity, the results of the study show that higher FTA imports relative to MFN imports is associated with higher labor productivity. The magnitude of a one increase in the shock would be associated with around 0.017-0.020 percentage point increase in labor productivity.

The impact to GVA growth mirrors closely the import structure of the Philippines. Key imports from Japan and neighboring countries in ASEAN are electronic integrated circuits and micro-assemblies. These are also the same industries that have been tagged as having the largest Gross Domestic Product (GDP) multipliers, which is an indicator of linkages in the economy. This may provide a reason why AJCEP and AFTA are the trade agreements that have the largest estimated direct impact (Figure 3).

The results also provide a possible explanation for the perceived "jobless" growth that the Philippines is experiencing (Salvosa 2015; Mourdoukoutas 2019; Punongbayan 2019). The benefits from trade are translated as growth in output but it does not result in increase in employment. The economic sectors benefit from expanding their output due to the increase in imports but they are not hiring additional workers. Finally, the results show a positive and significant effect on labor productivity. This means that as businesses would increase the efficiency of their workforce because of the increase in imports from FTAs. However, the direct effect is tempered by the network effects (Upstream and Downstream), which are negative.

Figure 3 Top 3 import products by top 10 import source with an FTA to the Philippines, 2014-2018 (5-year average)



Source: Adopted from Quimba, Rosellon, and Calizo (2020)
Product Description: (0202) Meat of bovine animals, frozen; (1006) Rice; (1518) Animal or vegetable fats, oils, fractions, modified in any way; (2523) Portland cement, aluminous cement, slag cement, supersulphate cement and similar hydraulic cements; (2701) Coal; (2709) Petroleum oils and oils obtained from bituminous minerals, crude; (2710) Petroleum oils, oils from bituminous minerals, not crude; (3004) Medicaments; (8473) Machinery; (8517) Electrical apparatus for line- telephony or telegraphy; (8525) Transmission apparatus for radio- telephony, telegraphy, broadcasting or television; (8542) Electronic integrated circuits and microassemblies; (8702) Vehicles; (8703) Motor cars and other motor vehicles; (8704) Vehicles, for the transport of goods; (8711) Motorcycles and cycles

5. Conclusion and Policy Recommendations

5.1 Conclusion

Trade is an important component of the Philippine economy given that 2017 figures show that total imports and exports (size of trade) is about 72.0 percent of GDP. The Philippine Development Plan 2017-2022 (NEDA 2017) also identified trade as an integral component of the Philippine strategy for industrial development through the expansion of markets and increasing the linkages of domestic firms, particularly the Micro, Small, and Medium Enterprises (MSMEs) to GVCs. To this, the Philippines has pursued forming trade agreements with key partners in the region.

The Philippine trade agreements has allowed the Philippines to import majority of products from its partner countries at zero tariff rates (Table 14). Neighboring ASEAN partners have close to 100.0 percent of its exports to the Philippines at zero percent tariff. Japan, through the PJEPA, and Australia and New Zealand also have more than 95.0 percent of products subjected to zero tariffs. Despite this, utilization rates of FTAs (Table 15) have been very low for some of the country's key partners. Japan, India, and South Korea have below 50.0 percent utilization rate of FTAs. China performs a little better at 62.7 percent but this is still relatively lower than Thailand (73.4%), Indonesia (79.3%) and New Zealand (81.4%).

Table 14 Share of tariff lines with zero tariff rates to total tariff lines by FTA

	2016	2017	2018
AANZFTA	95.75	95.78	95.22
ACFTA	88.28	88.28	84.71
AFTA	5.13	99.23	99.30
AIFTA	5.05	5.04	12.96
AJCEP	70.78	72.43	91.92
AKFTA	90.15	90.01	86.91
PJEPA	74.34	75.86	95.01

Source: Adopted from Quimba, Rosellon, and Calizo (2020)
Note: Calculated for imports where the Most Favored Nation (MFN) tariff is greater than the tariff under the trade agreement

Table 15 Utilization rate of FTAs by FTA partner in 2018, %

	AANZFTA	ACFTA	AFTA	AIFTA	AJCEP	AKFTA	PJEPA	MFN
Australia	54.1	-	-	-	-	-	-	45.9
Brunei Darussalam	-	-	92.2	-	-	-	-	7.8
Cambodia	-	-	59.0	-	-	-	-	41.0
China	-	62.7	-	-	-	-	-	37.3
Indonesia	-	-	79.3	-	-	-	-	20.7
India	-	-	-	35.0	-	-	-	65.0
Japan	-	-	-	-	0.7	-	16.6	82.7
Korea, Republic of	-	-	-	-	-	31.2	-	68.8
Lao PDR	-	-	74.9	-	-	-	-	25.1
Myanmar	-	-	66.6	-	-	-	-	33.4
Malaysia	-	-	55.5	-	-	0.0	-	44.5
New Zealand	81.4	-	-	-	-	-	-	18.6
Singapore	-	0.1	25.6	-	0.0	-	-	74.3
Thailand	-	-	73.4	-	-	-	-	26.6
Viet Nam	0.2	0.2	60.3	-	-	-	-	39.2

Source: Adopted from Quimba, Rosellon, and Calizo (2020)
Note: Calculated for imports where the Most Favored Nation (MFN) tariff is greater than the tariff under the trade agreement

It is with this background that this study analyzed the impact of imports under lower tariff rates relative to Philippine economic sectors. Using Philippine imports data matched with data on industry performance, this study was able to calculate the direct impact of trade agreements to various sectors. It was also able to control for the network effects that would also indirectly affect the performance of different sectors of the country. The results of the analysis show that FTA imports have a positive and significant direct effect on industry growth and labor productivity. The network effects are not statistically significant for real GVA growth. In terms of impact on employment, the direct effect is negative and statistically significant. However, the network effects would temper this effect because the Upstream effect (effect from customers) is positive and significant.

The shock also has a positive and statistically significant direct effect on labor productivity, which implies that increasing imports increases labor productivity of Philippine sectors.

5.2 Policy recommendations

The results of the analysis show that imports under an FTA scheme (relative to MFN imports) have a positive and significant direct effect on industry growth and labor productivity. This provides evidence that the country is benefiting from trade agreements through improvements of industry output. The results also show that the Philippines is not benefitting from trade agreements through the increase in employment. Businesses seem to increase their output by increasing the labor productivity of their employees rather than increasing the number of workers.

The results of the analysis show that the linkages of the Philippines seem weak as reflected by the statistically insignificant relationship of the upstream and downstream effects with GVA. One way of increasing the connectivity of Philippine businesses and industries is to initiate Supplier development and linkage programs which would link domestic firms, especially SMEs, with foreign affiliates of MNCs. It is recommended that key government agencies related to trade and investment (e.g. DTI/BOI) facilitate the matching of firms as well as providing subcontracting and outsourcing advice to domestic firms.

The impact of trade agreements on industry performance is magnified by network effects. It is recommended that policies which support industries sourcing their inputs domestically be pursued. This would include policies that strengthen the supply chain and reduce the non-tariff related cost of importation (i.e., informal payments). The passage of the CMTA of 2016 and Ease of Doing Business Act of 2018 (RA11032)[15], is a good first step toward this end but there is a need to review whether the provisions of the law are being strictly implemented.

It is also recommended that trade policies ensure that businesses translate gains from cheaper imports to increasing production and employment. The negative relationship between the shock and employment reveal that businesses are hesitant to increase employment despite benefiting from importation at lower rates. It is therefore recommended that trade policies are supported by strong employment policies. In an interview, former NEDA Secretary General Ernesto Pernia mentioned that young Filipinos "*are underutilized because their skills are not being*

[15] Republic Act 11032, or the Ease of Doing Business and Efficient Government Services Delivery Act of 2018, can be accessed here: https://www.officialgazette.gov.ph/2018/05/28/republic-act-no-11032/

enhanced by education, training or employment. Government needs to strengthen its JobStart program, which provides assistance to young Filipinos in finding decent jobs (NEDA 2016)."

Businesses are hesitant to increase employment because these tend to become long-term investments which would include in-house training and skills development. Thus, government needs to increase the confidence of industries and companies in the growth prospects of the country for them to translate their gains from tariff-free imports to employment.

There is also the need to address the supply side issues of labor. To ensure that businesses would be able to find the appropriately skilled workers for employment, there may be a need for government to provide incentives to encourage universities and researchers to interact more closely with industry and thus, in the medium to long run develop the specialized skills and technological capabilities they need.

Finally, the results of the study are greatly dependent on the availability of data on imports at the firm level. PSA has already expressed matching the Foreign Trade Statistics with the Annual Survey of Philippine Business and Industry. It would be good to revisit the results of this study using that dataset.

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Appendix

Appendix 1 Growth rate of employed persons by industry group, 2005-2015

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
All industries	0.31	2.83	1.58	2.85	2.78	3.21	1.10	1.38	1.40	0.23
Agriculture, Hunting and Forestry	-0.73	0.86	2.53	-0.21	-0.88	3.00	-1.32	-2.17	-0.23	-4.15
Fishing	2.88	1.12	-1.25	2.47	0.46	-0.23	-2.21	-1.79	-0.73	-5.40
Mining and Quarrying	15.83	7.19	6.04	5.06	19.88	6.10	18.36	0.16	-4.34	-1.85
Manufacturing	-1.64	0.20	-4.35	-1.11	4.82	1.56	1.04	1.51	1.67	-0.10
Electricity, Gas and Water	14.29	5.47	-3.70	9.42	5.45	-1.53	0.82	3.78	-11.22	-1.60
Construction	-1.47	6.02	3.15	3.11	6.66	3.68	6.73	6.31	8.66	4.60
Wholesale and Retail, Repair of Motor Vehicles, Motorcycles & Personal Household Goods	-0.37	2.45	1.45	4.49	4.43	5.20	-7.24	3.52	2.01	0.89
Hotel and Restaurants	2.07	2.25	5.07	5.98	5.25	5.29	40.39	2.26	5.45	1.27
Transport, Storage and Communication	2.35	4.67	-0.35	3.45	1.63	1.90	6.49	4.19	-1.31	4.07
Financial Intermediation	-2.55	4.36	2.51	0.34	8.33	8.59	0.71	2.46	9.61	1.37
Public Administration & Defense, Compulsory Social Security	-0.74	4.44	8.06	4.36	5.60	1.42	4.52	0.38	-0.07	6.72
Education	1.63	3.60	3.48	6.21	3.38	1.98	0.07	2.14	2.34	2.21
Health & Social Work	-3.49	3.90	5.09	7.33	7.19	0.17	-3.13	7.13	2.45	2.85
Other services (Real estate, their community, private household, extra territorial)	4.68	8.69	1.15	8.75	4.30	3.87	4.79	2.42	1.47	2.18

Source: PSA

Appendix 2 Upstream and Downstream multipliers

Industry	Sector	UPSTREAM1EPA_2016	DOWNSTREAM1EPA_2016
Palay	Agriculture	1.48	0.56
Corn	Agriculture	0.85	0.50
Coconut	Agriculture	0.53	0.32
Sugarcane	Agriculture	0.13	0.60
Banana	Agriculture	0.23	0.39
Other crops	Agriculture	0.31	0.49
Livestock	Agriculture	0.58	0.85
Poultry	Agriculture	0.72	0.87
Agricultural activities and services	Agriculture	1.07	0.45
Forestry	Agriculture	0.03	0.25
Fishery	Agriculture	0.69	0.65
Gold mining	Mining	0.38	0.38
Other metallic mining, n.e.c	Mining	0.33	2.29
Other mining and quarrying, nec	Mining	2.48	0.47
Food manufactures	Industry	7.55	1.27
Beverage industries	Industry	0.38	1.29
Tobacco manufactures	Industry	0.11	1.25
Textile manufactures	Industry	0.66	1.47
Wearing apparel	Industry	0.26	1.35
Footwear and leather and leather products	Industry	0.01	1.33
Wood, bamboo, cane and rattan articles	Industry	0.18	1.57
Paper and paper products	Industry	1.39	2.28
Printing and reproduction of recorded media	Industry	0.37	1.88
Petroleum and other fuel products	Industry	4.07	1.41
Chemical and chemical products	Industry	2.20	3.18
Rubber and plastic products	Industry	0.48	1.86
Non-metallic mineral products	Industry	1.13	1.42
Basic metal industries	Industry	1.44	1.96
Fabricated metal products	Industry	0.49	1.83
Computer, Electronic and Optical products	Industry	1.52	1.41
Electrical equipment	Industry	0.28	1.74
Machinery and equipment except electrical	Industry	0.14	1.32
Transport equipment	Industry	0.57	1.86
Furniture and fixtures	Industry	0.08	1.22
Miscellaneous manufactures, nec	Industry	0.24	1.25
Electricity	Services	2.57	0.66
Steam	Services	0.09	0.71
Water	Services	0.22	0.65
Sewerage and waste water remediation activities	Services	0.02	1.37
Construction	Services	1.35	1.34

Wholesale and retail trade and Maintenance and repair of motor vehicles	Services	14.79	1.05
Land transport	Services	1.95	1.17
Water transport	Services	0.06	1.25
Air transport	Services	0.24	1.48
Warehousing and support activities for transportation	Services	0.98	1.14
Postal and courier activities	Services	0.01	1.15
Publishing and Information	Services	0.14	1.40
Communication	Services	0.60	0.76
Banking Institutions	Services	1.43	0.68
Non-bank Financial Intermediation	Services	2.47	0.63
Insurance and activities auxiliary to financial intermediation	Services	1.59	1.04
Real Estate Activities	Services	0.45	0.84
Ownership of Dwellings	Services	0.00	0.25
Professional, Scientific and Technical Activities	Services	0.64	0.97
Administrative and Support Service Activities	Services	0.77	0.86
Public Administration and Defense; Compulsory social security	Services	0.39	0.71
Accommodation and Food Service Activities	Services	0.93	1.37
Education	Services	0.81	0.38
Human Health and Social Work Activities	Services	0.19	0.98
Arts, Entertainment and Recreation	Services	0.38	1.26
Other Service Activities, nec	Services	2.19	1.25

Source: Authors' calculation

Appendix 3 Impact of trade shocks on industry performance, AFTA (Panel estimation with Fixed Effects)

	(1)	(2)	(3)	(4)
VARIABLES	GVAGR_	EMPGR_	WAGGR_	PROD_
L.DIRSHOCK1AFTA_	0.00859**	-0.01159**	0.00066	0.02122***
	(0.00351)	(0.00440)	(0.00965)	(0.00681)
L.UPSTREAM1AFTA_	-0.00357	0.00601*	-0.00196	-0.01013**
	(0.00224)	(0.00304)	(0.00635)	(0.00471)
L.DOWNSTREAM1AFTA_	0.00080	0.00114	-0.01141*	-0.00146
	(0.00239)	(0.00350)	(0.00638)	(0.00588)
2018.YEAR	0.72332	-7.00744	-10.51705	5.29654
	(3.81449)	(7.21236)	(11.41827)	(12.05109)
L.GVAGR_	-0.60859***			
	(0.04861)			
L.EMPGR_		-0.90668***		
		(0.03114)		
L.WAGGR_			-0.59117***	
			(0.11358)	
L.PROD_				-0.34531***
				(0.10849)
Constant	20.92592*	22.57283	-43.99800	7.58455
	(11.33827)	(16.73077)	(31.62859)	(27.92645)
Observations	112	105	102	105
R-squared	0.71459	0.93359	0.56415	0.45955
Number of NUMBER	56	53	52	53

Source: Authors' calculation
Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.10

Appendix 4 Impact of trade shocks on industry performance, AANZFTA (Panel estimation with Fixed Effects)

	(1)	(2)	(3)	(4)
VARIABLES	GVAGR_	EMPGR_	WAGGR_	PROD_
L.DIRSHOCK1AANZ_	0.00841*	-0.01092*	-0.00134	0.02093**
	(0.00433)	(0.00573)	(0.01076)	(0.00892)
L.UPSTREAM1AANZ_	-0.00354	0.00563	-0.00062	-0.00994*
	(0.00264)	(0.00379)	(0.00688)	(0.00588)
L.DOWNSTREAM1AANZ_	0.00084	0.00092	-0.01131*	-0.00113
	(0.00243)	(0.00343)	(0.00638)	(0.00579)
2018.YEAR	0.74384	-7.26863	-10.65001	5.82496
	(3.89244)	(7.20661)	(11.61904)	(12.10153)
L.GVAGR_	-0.60525***			
	(0.04963)			
L.EMPGR_		-0.90609***		
		(0.03134)		
L.WAGGR_			-0.59069***	
			(0.11320)	
L.PROD_				-0.34204***
				(0.10725)
Constant	22.67756	22.00305	-57.27111	9.56851
	(14.16866)	(20.41397)	(39.06848)	(34.26774)
Observations	112	105	102	105
R-squared	0.70380	0.93254	0.56538	0.45019
Number of NUMBER	56	53	52	53

Source: Authors' calculation
Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.10

Appendix 5 Impact of trade shocks on industry performance, ACFTA (Panel estimation with Fixed Effects)

	(1)	(2)	(3)	(4)
VARIABLES	GVAGR_	EMPGR_	WAGGR_	PROD_
L.DIRSHOCK1AC_	0.00797**	-0.01120**	0.00046	0.02018***
	(0.00370)	(0.00456)	(0.00934)	(0.00731)
L.UPSTREAM1AC_	-0.00308	0.00565*	-0.00210	-0.00927*
	(0.00231)	(0.00305)	(0.00628)	(0.00495)
L.DOWNSTREAM1AC_	0.00115	0.00103	-0.01230*	-0.00110
	(0.00259)	(0.00382)	(0.00693)	(0.00636)
2018.YEAR	1.09439	-7.25455	-10.47080	5.84598
	(3.77923)	(7.20586)	(11.38516)	(11.98635)
L.GVAGR_	-0.61145***			
	(0.04955)			
L.EMPGR_		-0.90645***		
		(0.03117)		
L.WAGGR_			-0.59029***	
			(0.11337)	
L.PROD_				-0.34547***
				(0.10923)
Constant	22.27793*	21.98444	-45.77712	9.15142
	(11.72576)	(17.34552)	(32.57732)	(28.69525)
Observations	112	105	102	105
R-squared	0.70664	0.93342	0.56439	0.45483
Number of NUMBER	56	53	52	53

Source: Authors' calculation
Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.10

Appendix 6 Impact of trade shocks on industry performance, AIFTA (Panel estimation with Fixed Effects)

	(1)	(2)	(3)	(4)
VARIABLES	GVAGR_	EMPGR_	WAGGR_	PROD_
L.DIRSHOCK1AI_	0.00726**	-0.00992**	0.00082	0.01798***
	(0.00305)	(0.00379)	(0.00804)	(0.00596)
L.UPSTREAM1AI_	-0.00303	0.00522*	-0.00188	-0.00871**
	(0.00197)	(0.00269)	(0.00547)	(0.00421)
L.DOWNSTREAM1AI_	0.00075	0.00093	-0.00991*	-0.00114
	(0.00206)	(0.00301)	(0.00547)	(0.00504)
2018.YEAR	0.79212	-7.04796	-10.63914	5.37536
	(3.81606)	(7.20078)	(11.36654)	(12.00742)
L.GVAGR_	-0.60946***			
	(0.04898)			
L.EMPGR_		-0.90665***		
		(0.03116)		
L.WAGGR_			-0.59101***	
			(0.11353)	
L.PROD_				-0.34546***
				(0.10870)
Constant	22.65886	22.84475	-55.94423	7.91723
	(13.61312)	(20.02013)	(37.63141)	(33.45393)
Observations	112	105	102	105
R-squared	0.71317	0.93362	0.56436	0.45866
Number of NUMBER	56	53	52	53

Source: Authors' calculation
Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.10

Appendix 7 Impact of trade shocks on industry performance, AJFTA (Panel estimation with Fixed Effects)

	(1)	(2)	(3)	(4)
VARIABLES	GVAGR_	EMPGR_	WAGGR_	PROD_
L.DIRSHOCK1AJ_	0.00808**	-0.01141**	-0.00028	0.02067***
	(0.00364)	(0.00444)	(0.00943)	(0.00714)
L.UPSTREAM1AJ_	-0.00309	0.00562*	-0.00152	-0.00928*
	(0.00220)	(0.00287)	(0.00602)	(0.00465)
L.DOWNSTREAM1AJ_	0.00098	0.00116	-0.01175*	-0.00140
	(0.00249)	(0.00370)	(0.00677)	(0.00613)
2018.YEAR	0.98284	-7.17799	-10.27380	5.65693
	(3.75902)	(7.19551)	(11.46201)	(11.96662)
L.GVAGR_	-0.60966***			
	(0.04902)			
L.EMPGR_		-0.90633***		
		(0.03125)		
L.WAGGR_			-0.59018***	
			(0.11328)	
L.PROD_				-0.34480***
				(0.10851)
Constant	22.48076*	22.23134	-48.24106	8.78802
	(12.19085)	(18.19913)	(34.57790)	(30.06423)
Observations	112	105	102	105
R-squared	0.70894	0.93368	0.56416	0.45926
Number of NUMBER	56	53	52	53

Source: Authors' calculation
Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.10

Appendix 8 Impact of trade shocks on industry performance, AKFTA (Panel estimation with Fixed Effects)

	(1)	(2)	(3)	(4)
VARIABLES	GVAGR_	EMPGR_	WAGGR_	PROD_
L.DIRSHOCK1AK_	0.00713**	-0.00971**	0.00054	0.01768***
	(0.00311)	(0.00389)	(0.00802)	(0.00613)
L.UPSTREAM1AK_	-0.00295	0.00506*	-0.00168	-0.00846*
	(0.00197)	(0.00271)	(0.00540)	(0.00425)
L.DOWNSTREAM1AK_	0.00076	0.00090	-0.00981*	-0.00110
	(0.00205)	(0.00298)	(0.00545)	(0.00499)
2018.YEAR	0.82210	-7.10873	-10.60465	5.48643
	(3.81537)	(7.19587)	(11.40011)	(11.99813)
L.GVAGR_	-0.60937***			
	(0.04915)			
L.EMPGR_		-0.90649***		
		(0.03121)		
L.WAGGR_			-0.59079***	
			(0.11347)	
L.PROD_				-0.34497***
				(0.10856)
Constant	22.77002	22.66612	-56.13007	8.24921
	(13.67932)	(20.08403)	(37.92516)	(33.52480)
Observations	112	105	102	105
R-squared	0.71172	0.93349	0.56436	0.45738
Number of NUMBER	56	53	52	53

Source: Authors' calculation
Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.10

Appendix 9 Impact of trade shocks on industry performance, PJEPA (Panel estimation with Fixed Effects)

	(1)	(2)	(3)	(4)
VARIABLES	GVAGR_	EMPGR_	WAGGR_	PROD_
L.DIRSHOCK1JP_	0.00732**	-0.01011**	0.00091	0.01819***
	(0.00310)	(0.00379)	(0.00796)	(0.00606)
L.UPSTREAM1JP_	-0.00299	0.00526*	-0.00199	-0.00868**
	(0.00198)	(0.00267)	(0.00545)	(0.00424)
L.DOWNSTREAM1JP_	0.00081	0.00095	-0.01026*	-0.00117
	(0.00213)	(0.00312)	(0.00568)	(0.00520)
2018.YEAR	0.85101	-7.08131	-10.58688	5.41199
	(3.79314)	(7.18877)	(11.34466)	(11.96120)
L.GVAGR_	-0.61033***			
	(0.04934)			
L.EMPGR_		-0.90658***		
		(0.03118)		
L.WAGGR_			-0.59093***	
			(0.11357)	
L.PROD_				-0.34569***
				(0.10890)
Constant	22.09041*	22.57523	-50.50934	7.96918
	(12.52358)	(18.45029)	(34.80711)	(30.65850)
Observations	112	105	102	105
R-squared	0.71237	0.93369	0.56426	0.45838
Number of NUMBER	56	53	52	53

Source: Authors' calculation
Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.10