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Vulnerable to the virus: Globally-oriented manufacturing firms at risk from the spread of COVID-19

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Vulnerable to the Virus: Globally-Oriented Manufacturing Firms at Risk From the Spread of COVID-19

by

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Vulnerable to the Virus: Globally-Oriented Manufacturing Firms at Risk From the Spread of COVID-19*

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March 2020

Abstract: We use a unique Philippine firm-level database consisting of trade transactions data merged with firm surveys of manufacturing establishments covering the period from 2013 to 2019 to examine which exporting and importing firms are potentially vulnerable to the economic slowdown brought about by the spread of COVID-19. We find that the exposure of Philippine trade to the COVID-19 affected countries is substantial, accounting for more than half of the value of both exports and imports. Those that stand to lose the most are firms connected to the global value chains that simultaneously export and import. Around 370,000 workers from these firms are at risk.

While large firms are able to withstand, to some extent, the COVID-19 shock, SMEs do not have such capability. We find that the profile of these SMEs is substantially different than that of the larger firms in terms of product composition. These SMEs export food and food products which are highly perishable and more sensitive even to short-term vicissitudes in global demand. Given these, we estimate the subsidy needed to support both SMEs and large firms. For SMEs, we compute the subsidy to be Php9.4 billion pesos for 2020. The amount of subsidy increases to Php33.2 billion if large firms were also subsidized for their losses. Identifying the specific mechanism by which such subsidies will be provided to firms of various sizes (e.g. SMEs vs large) requires further study.

Keywords: COVID-19, Philippine Firms, Stimulus Package

JEL Code: O14, L11, H25

* This is a preliminary and evolving draft and may be subject to change in the future.

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1 Introduction

The COVID-19 disease, caused by a novel coronavirus that first appeared in Wuhan, China, is now spreading globally. Reported cases and fatalities have increased exponentially in a matter of weeks. As of this writing, the KIFF COVID-19 website tracker (<https://www.kff.org/global-health-policy/fact-sheet/coronavirus-tracker/>) has reported 181,493 cases in 159 countries resulting in 7,465 deaths.

The pandemic is projected to exact a huge economic toll on economies around the world. ADB (2020) estimates a global economic impact of \$77 billion to \$347 billion, or 0.1% to 0.4% of global GDP. As governments scramble to contain the spread of the disease, proposals have also been forwarded to stimulate their respective economies to avert a potential recession. In the Philippines, the spread of the disease is estimated to reduce GDP growth by a maximum of one percentage point, equivalent to potential losses amounting to Php187 billion.¹ As a response, House Bill (HB) 6606 has been filed to allocate Php108 billion (\$2 billion) to address the economic impact of COVID-19. Almost half of the amount (Php50 billion) proposed by HB 6606 is meant to support business, particularly micro, small, and medium enterprises.

The support for firms and businesses must be well-targeted, otherwise, the amount will be dissipated either by: (i) providing assistance to firms that already have the capacity to recover from the shock; or (ii) providing assistance to firms that are not directly affected by the slowdown in international markets (e.g. non-exporting or non-importing firms). However, even for domestic-oriented firms, any policy that may potentially slow down markets (e.g. the current lockdown in NCR) may affect their viability. Still, due to the limited amount of stimulus money, assistance must be well-targeted for these firms as well.

Targeting assistance to firms requires an intimate understanding of who these firms are, what market they serve, and how vulnerable they are to an external shock. In the Philippines, the impact of COVID-19 on firms in specific sectors is more apparent than the rest. For example, sectors such as tourism, retail, and services such as transport and food service are going to be affected by the immediate loss of customers as a lockdown will disrupt the movement of people. However, given data gaps, the economic impacts on the *globally-oriented manufacturing sector* (hereafter “GOMS”) are less clear and requires careful analysis. For the purposes of this paper, we define GOMS as manufacturing firms that export and/or import. Hence, domestically-oriented firms are not included in this study.

While not as substantial as our more trade-oriented Asian neighbors, export receipts are still a significant proportion of sales of Philippine manufacturing firms. Table 1 shows that export

¹ <https://business.inquirer.net/292155/neda-gdp-growth-may-fall-below-2020-target-if-covid-19-lingers>
(Accessed: March 19, 2020)

revenues from Philippine GOMS firms account for about 20% of production sales of the entire Manufacturing sector. Within sub-sectors of Manufacturing, the proportion of export receipts to sales is highest in (i) Computer, Electronic, and Optical Products (62%), (ii) Motor Vehicles (42 percent), and (iii) Electrical equipment (37%t).

Table 1. Average Share of Direct and Indirect Exports in Production Sales by Size (percent)

2-Digit PSIC	Description	Small	Medium	Large	Total
10	Food Products	8.22	18.33	15.67	10.92
11	Beverages	2.49	0.60	0.05	1.66
12	Tobacco products	10.66	34.34	24.86	23.85
13	Textiles	11.36	40.93	44.49	19.29
14	Wearing Apparel	13.83	44.48	61.84	32.82
15	Leather and Related Product	8.77	10.56	47.46	13.90
16	Wood, Cork, Bamboo, Rattan, Straw and Plaiting Materials	20.80	40.90	23.07	23.48
17	Paper and Paper Products	14.78	19.89	18.87	16.35
18	Printing and Reproduction of Recorded Media	1.81	3.56	7.63	2.41
19	Coke and Refined Petroleum Products	-	-	6.49	0.76
20	Chemical and Chemical Products	6.31	9.61	13.15	7.35
21	Pharmaceutical Products	4.13	32.46	9.29	11.18
22	Rubber and Plastic Products	13.30	28.36	30.30	19.78
23	Non-Metallic Mineral Products	7.45	12.88	19.34	9.80
24	Basic Metals	15.99	29.56	35.12	20.13
25	Fabricated Metal Products (except Machinery Equipment)	13.37	21.02	33.11	17.26
26	Computer, Electronic and Optical Products	47.58	48.39	75.87	62.08
27	Electrical Equipment	20.59	49.02	76.27	37.63
28	Machinery and Equipment, n.e.c.	17.82	28.65	68.30	24.69
29	Motor Vehicles, Trailers, and Semi-Trailers	14.69	61.96	65.72	42.10
30	Other Transport Equipment	18.29	20.00	44.28	24.17
31	Furniture	16.29	25.96	44.28	21.23
32	Other Manufacturing	20.43	61.21	74.93	30.89
33	Repair and Installation of Machinery and Equipment	10.11	-	39.84	13.08
C	Manufacturing	13.09	27.50	42.52	20.56

Source of data: PSA

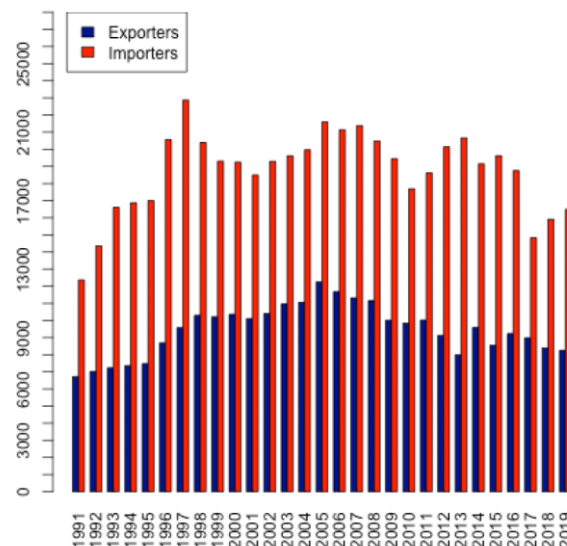
While manufacturing growth has been sluggish in the past 30 years, Philippine exports and imports have been growing steadily since the 2008 global financial crisis (Figure 1). However, Figure 2 shows a noticeable decline in both the number of importers and exporters since the mid-2000s, implying that increasing export and import earnings continue to be consolidated among a few—perhaps larger-sized—firms. With the threat of COVID-19, a large proportion of firms may completely exit from trade and therefore arrest the growth in exporting and importing activities gained in the past decade.

Figure 1. Philippine Exports and Imports, 1991-2019 (in constant 2000 prices)



Source: Philippine Statistics Authority Transactions Dataset

Figure 2. Total Number of Philippine Exporters and Importers, 1991-2019



Source: Philippine Statistics Authority Transactions Dataset

COVID-19 can exert pressure on GOMS firms through three channels. First, disruptions on the supply of intermediate inputs can affect the productivity of exporting firms (UNCTAD, 2020). For instance, if Philippine apparel exporters are reliant on imports of buttons and zippers from

China, then the interruption of Chinese production of these goods can slow down not only importers of these products but also the production of Philippine apparel exporters that use these products as inputs. A potential slowdown in China is worrisome, since 23 % of total import value in 2019 (\$24.5 billion out of \$107.3 billion) is accounted for by imports from China. Second, if the destination country experiences a lockdown which engenders a domestic recession, then demand for Philippine products will decrease and exports will weaken. The third channel involves a combination of the previous two channels: if a firm is exporting and importing at the same time (e.g. firms that are located in special economic zones) then a recession due to COVID-19 will be a double whammy—supply chains will disrupt their imports of raw materials or intermediate inputs *and* the recession will make them suffer the loss of export markets at the same time. According to the Philippine Economic Zone Authority (PEZA), these firms from special economic zones contribute 63% of the total commodity export and constituted 16% of the country's gross domestic product (GDP) (PEZA, 2019).

Examining which GOMS firms are susceptible to such a slowdown induced by COVID-19 is hard to do—at least in the Philippine setting—because of the nature of firm-level datasets available in the country. Traditional *survey-based* sources of firm-level information such as the Annual Survey of Philippine Business and Industry (ASPBI), do not have information on the markets served by globally-oriented Philippine manufacturing. Information on export and import transactions is available in the *administrative* dataset collected by the Bureau of Customs. However, the transactions dataset doesn't contain information on firm characteristics such as employment. The challenge, therefore, is to harness the strengths of both types of datasets by merging the information available from each.

We aim to fill this gap and take on this challenge by using a unique Philippine firm-level database consisting of trade transactions data merged with firm surveys of manufacturing establishments covering the period from 2013 till 2019. Our objective is to describe which exporting and importing manufacturing firms are potentially vulnerable to the economic slowdown brought about by the spread of COVID-19. In this paper, we examine firms that export or import from countries with the greatest number of detected cases.² These top COVID-19 affected countries are China, Italy, Iran, Republic of Korea, France, Spain, Germany, Japan, USA and Switzerland (henceforth, "COVID-19 countries"). These countries comprise nearly 95% of the 181,493 detected COVID-19 cases globally. We concentrate on these countries since the large number of COVID-19 cases increases the probability of containment actions such as lockdowns, travel bans, and other policies that could potentially slow down economic activity.

The paper is organized as follows. Section 2 describes in detail the nature of the new database and the methodology used in its development. In Section 3, we first examine the trends in the universe of *all* exporting and importing firms (not just in Manufacturing). We find that the exposure of Philippine trade to the top 10 COVID-19 affected countries is substantial,

² The source of COVID-19 information is <https://www.kff.org/global-health-policy/fact-sheet/coronavirus-tracker/> (Last accessed: March 18, 2019)

accounting for more than half of the value of both exports and imports. Those that stand to lose the most are firms connected to the global value chains that simultaneously export and import. Around 370,000 workers from these firms are at risk. While large firms are able to withstand, to some extent, a hopefully temporary shock like the COVID-19 (e.g. due to credit access), SMEs do not have such capability. We find that the profile of these SMEs is substantially different compared to the larger firms. These SMEs export food and food products which are highly perishable and more sensitive even to short-term vicissitudes in global demand. Given these, we estimate the amount of subsidies needed to support both SMEs and large firms. For GOMs SMEs, we compute the subsidy to be Php9.4 billion pesos for 2020. Section 4 summarizes the findings and concludes.

2. Data and Methodology

We use information from the matched universe of trade transactions of all Philippine firms from 2013 to 2019 with the Surveys/Censuses of Establishments from 2013 to 2016.³ The entire dataset consists of three parts, each with many cross-sectional observations: export transactions, import transactions, and establishment survey data. Each part has been merged separately then ultimately combined into a final dataset where some firms have matching information on historical trade transactions. The exports and imports (transactions) data consist of millions of trader-product-country-year combinations compiled by the Philippine Statistics Authority (PSA) from the administrative data of the Bureau of Customs (BOC).⁴ Each observation in this transactions dataset typically includes the trader and product codes, FOB value in US dollars, quantity and volume, insurance and freight costs, and country of destination/origin. Unit values, distance, trade margins, diversification measures, and aggregate trade indicators can be easily derived using these variables.

The last component of the matched dataset consists of manufacturing firm surveys. The firm survey data came from four Annual Survey of Philippine Business and Industry (ASPBI) conducted in 2013, 2014, 2015 and 2016. The matching of the transactions with the survey-based datasets are done with text and string-matching algorithms based on the comparison of relevant variables (i.e., names, address, TIN, and major goods produced/traded) in the trade and survey datasets. Nevertheless, manual inspection was still done for matches whose distance measures are above a certain threshold to verify if they are indeed different firms.

Tables 2 and 3 provide some basic description of the trade and survey data. Table 2 shows that throughout the four-year period spanning our dataset, a total of 24,591 firms were reported to have exported while 41,928 performed importing activities. These firms have exported a total of 9,136 different products to 250 countries. Over the same period, there were 12,331

³ The matching is done with the partnership of the Philippine Statistics Authority (PSA) Economic Sector Statistics Service (ESSS) under the supervision of Assistant National Statistician Grace del Prado. The activity is supported in partnership with the RESPOND project and the Philippine Competition Commission (PCC). This effort is a continuation of the project to merge the dataset from 1991-2012 as described in Balaoing (2017).

⁴ The BOC dataset is used to compute import and export values used to compute Gross Domestic Product (GDP) in the National Income Accounts released by the PSA.

different products imported from 246 different countries. We have used monthly transactions from January 2013 to December 2020 in most of our analysis, and this covers 10,685,961 export transactions and 17,683,569 import transactions over the period of our dataset.

Table 2. Basic description of the trade transactions data

	Exports			Imports		
	2013	2019	2013-2019	2013	2019	2013-2019
Observations	1,149,853	1,784,656	10,684,961	1,316,849	3,357,087	17,683,569
Traders	8,237	8,683	24,591	20,787	16,554	41,928
Products	5,354	5,079	9,136	9,805	8,784	12,331
Countries	222	228	250	188	193	246

Source of basic data: Philippine Statistics Authority

Note: Products counts are based on unique 10-digit PSCC 2004 codes.

Table 3. Basic description of the survey data

	2013	2016	2013-2016
Observations	5,673	5,418	22,392
Median age	15	17	16
Median employment	47	51	48
Median revenues from sales	28.17	33.08	29.88
Most represented industry	Food products	Food products	Food products
Most represented region	NCR	Calabarzon	NCR

Source of data: Philippine Statistics Authority

Note: Manufacturing only. Revenues are in million pesos, 2000 prices.

Table 3, which summarizes the survey data, shows there are a total of 22,392 observations from distinct manufacturing establishments in the dataset. The table shows that the coverage of the surveys has slightly decreased over time—from 5,673 in 2013 to 5,418 in 2016. The data also suggest that Philippine manufacturers are relatively young and small, with median age and employment size of 18 and 48, respectively. It is also interesting to note that the most represented sector in the data is the manufacture of food products while many of the firms remain concentrated in NCR, and until recently, in Calabarzon. These simple snapshots indicate that domestic manufacturing over the past years did not seem to have diversified well outside traditional production activities nor did it expand to regions outside Metro Manila and Southern Luzon.

3. Which Firms are at Risk from the Spread of COVID-19?

Firms internationally exposed are at the mercy of the vagaries of global demand. Hence, with the projected economic slowdown as a result of the COVID-19 diseases, Philippine importers and exporters are the most at risk. In the short-run, economies affected by the disease tend to impose restrictions on travel, both international and domestic, as well as price freezes on

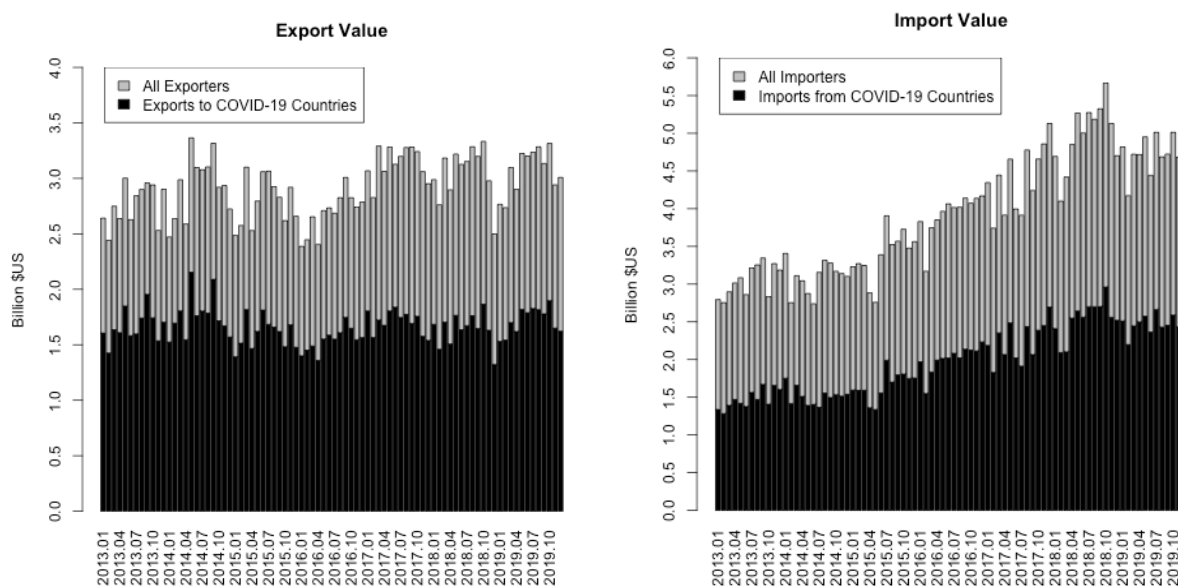
commodities. These affects trade activities that can have ripples across the whole global value chain.

The more cases detected in a country, the higher the probability that authorities impose these economic restrictions. Currently, Italy, South Korea and China are still on different lockdown stages that have heavily affected its tourism and manufacturing industries. In what follows, we examine exporters and importers that have transactions with COVID-19 countries.

Export and Import Values

In the following analysis, we used the PSA dataset of the universe of *all* export and import transactions per month from January 2013 to December 2019. This rich dataset allows us to nuance our analysis based on products, destinations and firms. In Figure 3, we see that the values of exports to and imports from the COVID-19 countries are substantial. For the entire year of 2019, receipts from exports to the COVID-19 countries totaled \$39.3 billion, which accounted for 55% of all export earnings (\$70.3 billion) in the year. This is also true for imports. This highlights the vulnerability of Philippine trade to any economic slowdown brought about by COVID-19, since more than half of exports and imports come from the countries most affected by the disease.

Figure 3. Export and Import Values, All Traders vs. Traders Transacting with the COVID-19 Countries (January 2013 to December 2019 in 2000 prices)

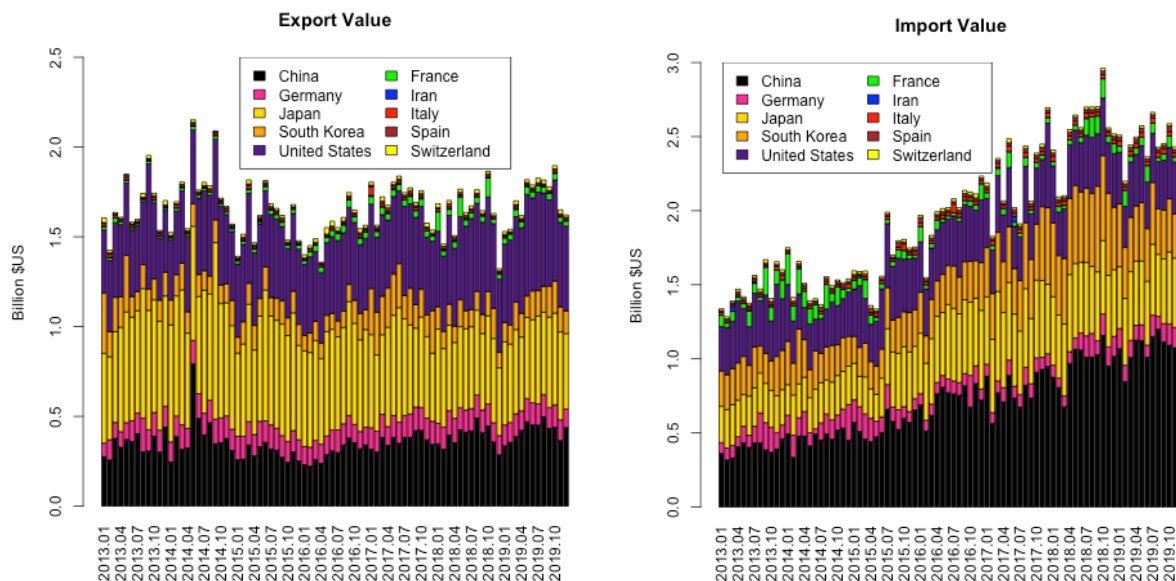


Source: Philippine Statistics Authority Transactions Dataset

Exports from COVID-19 countries earned \$39.3 billion in 2019. This constitutes 55% of total exports. The value of imports from COVID-19 countries in 2019 (\$56.4 billion) constitutes 53% of total import value (\$107.3 billion).

However, there is heterogeneity even within the COVID-19 countries. Most of exports and imports activities are covered by five countries: Japan, USA, China, South Korea and Germany (Figure 4). Any economic disruption or recession in these five countries will affect imports exports of globally-oriented firms through the different channels described earlier. A disruption in the supply chain brought about, for instance, by production cutbacks in China due to quarantine and lockdown of its workers, will affect our imports of intermediate inputs. If Japan and USA experience a recession and households there cut back on spending due to COVID-19, then our exports of goods will fall. In 2019, the value of exports to these five countries accounted for 54% of the value of all exports and 49.6% of all imports.

Figure 4. Export and Import Values of Traders Transacting with the Top COVID-19 Countries (January 2013 to December 2019 in 2000 prices)



Source: Philippine Statistics Authority Transactions Dataset

Among COVID-19 countries, Japan, USA, South Korea, China and Germany are the Philippines' largest markets for exports and also its largest source of imports.

In 2019, the value of exports to these five countries amounted to \$37.6 billion, which is 96% of the value of exports to COVID-19 countries and 54% of the value of all exports.

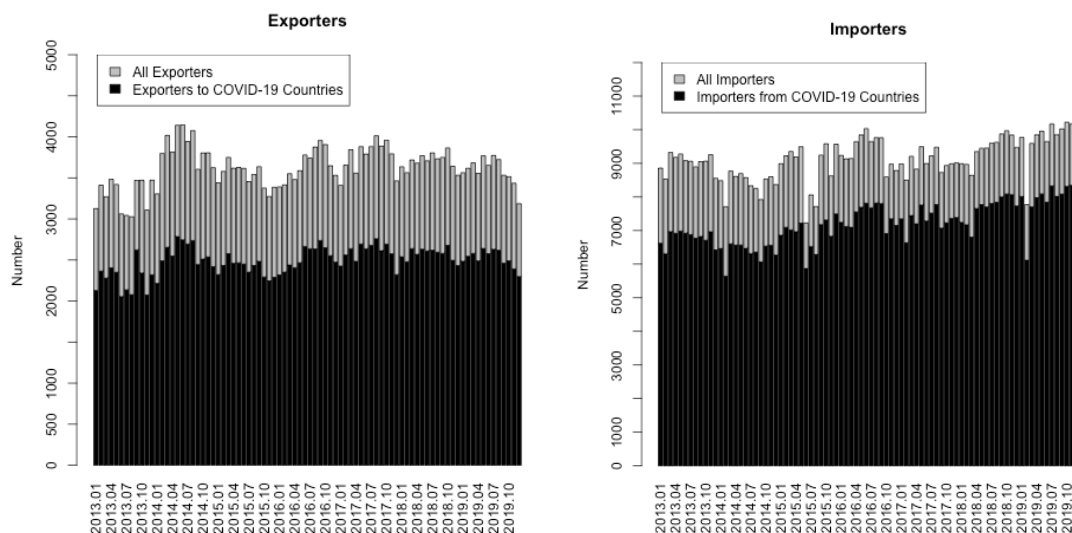
The value of imports to these five countries in 2019 amounted to \$53.32 billion, 94.5% of total value of imports from COVID-19 countries and 49.6% of the value of all imports.

Firms

Figure 5 shows the number of firms that transact with the top COVID-19 countries. As of December 2019, there are 2,298 exporters serving the COVID-19 countries, accounting for 72 percent of all exporting firms in the country. Figure 5 (Right panel) tells us that 7,799 firms imported from COVID-19 countries, which is 81 percent of all firms that imported in 2019. Out of the 2,298 firms exporting to the COVID-19 countries, 2,208 firms serve at least one of the big five markets (Japan, USA, South Korea, Germany and China). Out of the 7,799 firms importing from the COVID-19 countries, 7,512 firms import from at least one of the big five.

As of December 2019, 2,298 firms exported to and 7,799 firms imported from the COVID-19 countries. Most of these firms serve the big five markets, namely, Japan, USA, South Korea, Germany and China.

Figure 5. Number of Traders Transacting with the COVID-19 Countries (January 2013 to December 2019)



Source: Philippine Statistics Authority Transactions Dataset

We also find diversity between firms that who purely export, firms that purely import, and firms that both export and import. Table 4 shows that firms that simultaneously export and import account for 95% of export value (\$66.8 billion out of a total of \$70.3 billion), and 73% of import value (\$77.9 billion out of a total of \$107.3 billion) in 2019. The patterns are the similar for exporters/importers to COVID-19 countries: simultaneous exporters/importers account for 94% of export value (\$36.8 billion out of a total of \$39.3 billion) and 63% of import value (\$35.8 billion out of a total of \$56.4 billion). This suggests that the latter firms are the more dynamic exporters, presumably located in economic zones or are part of an established global value chain. These exporting and importing firms are the most vulnerable to both disruptions in the

supply chains where their imported inputs are sourced, as well as from the loss of markets for their exports.⁵

Table 4. Number of Firms and Value of Export/Imports in all Sectors, by Transaction Activity in 2019

	Economy-wide					
	No. of Firms	Share to Total (%)	Export Value	Share to Total (%)	Import Value	Share to Total (%)
Pure Exporter	4,748	22	3,490,351,596	5		–
Pure Importer	12,619	59			29,476,905,076	27
Exporter and Importer	3,935	18	66,835,252,197	95	77,897,837,487	73
Total	21,302	100	70,325,603,793	100	107,374,742,563	

	COVID-19 Countries					
	No. of Firms	Share to Total (%)	Export Value	Share to Total (%)	Import Value	Share to Total (%)
Pure Exporter	3,068	17	2,497,892,415	6		
Pure Importer	11,800	67			20,590,893,095	36
Exporter and Importer	2,742	16	36,803,194,911	94	35,836,251,292	64
Total	17,610	100	39,301,087,326	100	56,427,144,387	100

Source: Philippine Statistics Authority Transactions Dataset

Focusing on GOMS Manufacturing firms, Table 5 confirms that simultaneous exporters/importers are larger on average (i.e., they hire more workers on average) while the pure exporters/importers are mostly SMEs (i.e., firms that hire less than 200 people). Moreover, simultaneous exporters/importers earn more revenue and also pay workers more on average. This Table also shows that the fallout from COVID-19 will potentially affect 494,679 workers, 75 percent of which come from the large firms that simultaneously export and import.

Table 5. Characteristics of GOMS Firms by Activity Type (2016)

	No. of Firms	Average Employment	Number of Workers	Total Wage Bill	Total Firm Revenues
Pure Exporter	345	55.7	19,216	3,791,148,671	62,505,181,072
Pure Importer	1,473	70.5	103,855	26,648,765,342	782,746,524,636
Exporter and Importer	1,451	256	371,608	120,633,975,613	2,143,110,241,248
Total	3,269		494,679	151,073,889,626	2,988,361,946,956

Source: Philippine Statistics Authority Transactions Dataset for 2016 merged with the 2016 Annual Survey of Philippine Business and Industry (ASPBI)

Firms that simultaneously export and import account for 94% of export value and 64% of import value for all exports to and imports from COVID-19 countries. Focusing on Manufacturing, we see that these simultaneous exporters/importers are larger in terms of employment, pay their workers more, and earn more revenues on average.

The economic fallout from COVID-19 may potentially affect 494,679 workers from GOMS firms. 75% of those workers are hired by large firms that simultaneously export and import.

⁵ On the other hand, because of their size these dynamic firms are in a better position to withstand any economic shock.

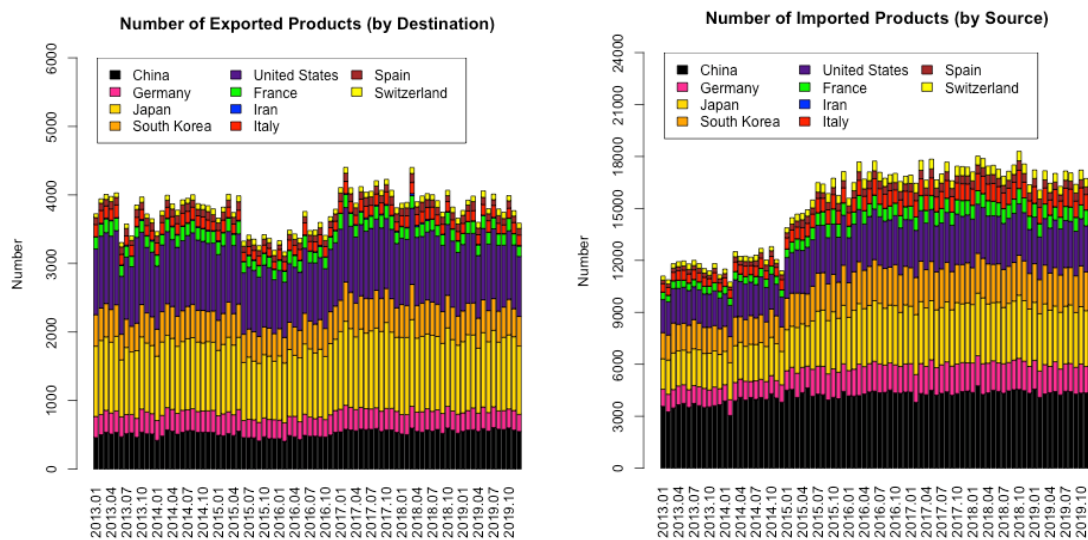
Products

The number of export products that are exposed to the potential slowdown in COVID-19 countries is likewise substantial—7,590 out of 9,136 unique products over the 2013-2019 period were exported to the COVID-19 countries. In December 2019, the country exported 995 different products to Japan and 876 products to the USA (Figure 6). While there are thousands of products exported to the different countries COVID-19 countries every month, only a handful of products capture a large chunk of export value. For instance, if we concentrate on the top 10 exports to the COVID-19 countries (Appendix Table 1), the total value of exports of these top products amount to \$21.9 billion in 2019—which is about 56% of our total exports to the COVID-19 countries (\$39.3 billion). Appendix Table 1 shows that the highest-earning export products to the COVID-19 countries involve manufactures that are typically components—e.g., electronics, semiconductors and other electronics/electrical parts. Even our top import products, as shown in Appendix Table 2, is geared towards inputs of manufactures and/or assembly of intermediate inputs (e.g., petroleum, oil, electronic parts, integrated circuits). These products are dependent on the global value chain, and any production cutback (resulting in import price increases) in the countries we import from will likely affect not only those in the importation business, but it will also affect the competitiveness of our export sector as well.

Over the 2013-2019 period, 7,590 out of 9,136 unique exported products are shipped to COVID-19 countries. However, there are only a handful of export products that are earning substantially, mostly from the manufacture of electronics, semiconductors and other electronic/electrical parts. Export of these manufactured products reached \$21.9 billion in 2019 (while exports to the COVID-19 countries in the same period totaled \$39.3 billion).

The top imported products are inputs for manufacturing or assembling intermediate goods most likely for exports to other countries.

Figure 6. Number of Products Exported to and Imported from COVID-19 Countries (January 2013 to December 2019)

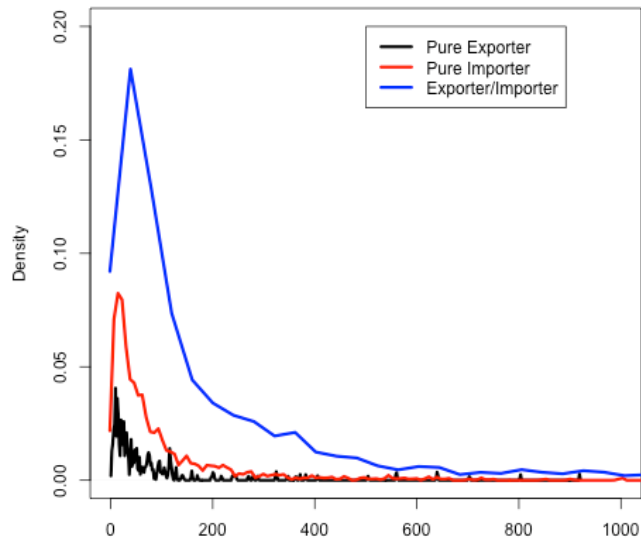


Source: Philippine Statistics Authority Transactions Dataset

It is evident from Appendix Table 1 that many of the top-valued exports are products of the Manufacturing Sector. In order to examine the characteristics of manufacturing firms exporting these products in more detail, we merge the transactions dataset for 2016 with the 2016 Annual Survey of Philippine Business and Industry (ASPBI) of the Manufacturing Sector. The information is shown in the last three columns of Appendix Table 1 where we describe the average employment size and assets of firms exporting these top products.⁶ What is evident is that exports of top products are engaged by relatively larger firms, hiring more than 200 people and with asset size in the billions. Manufacturing firms that import from the big five countries (Japan, USA, South Korea, China and Germany) are likewise large firms with average employment in the thousands and asset size in the billions. As we have seen from Table 5, these large firms are the firms that simultaneously export and import—firms that are connected to the global value chain. Figure 7 shows that a large proportion of firms that simultaneously export and import are large firms (i.e., hiring 200 or more employees) compared to firms that purely export and import, which are mostly SMEs (i.e., firms that hire less than 200 employees).

⁶ Some entries are missing for exports that came from non-manufacturing firms or products lines without firms interviewed in the ASPBI.

Figure 7. Kernel Densities of Employment of Pure Exporters, Pure Importers, and Exporters cum Importers Transacting with COVID-19 Countries



Source: Philippine Statistics Authority Transactions Dataset for 2016 merged with the 2016 Annual Survey of Philippine Business and Industry (ASPBI)

The firms that simultaneously export and import (e.g., those in special economic zones) are typically large. On average, they employ more than 200 people and have assets that are valued more than Php1 billion. Their top exported products are semiconductors, integrated circuits, electrical and electronic machinery while their top imported products are machine parts, integrated circuits and other mechanical parts

Once we concentrate on pure exporters/importers and their trade transactions, we find that their product spaces are different compared to that of larger firms. Table 6 shows that SME exports consist of a mix of manufactures of primary and food products (e.g. fruits and nuts, coconut oil, crustaceans) and intermediate inputs (e.g. integrated circuits). This suggests that these SMEs will be affected by COVID-19 due to a loss of export market (e.g. reduced spending for food products in COVID-19 countries) and/or a disruption in the global supply chain. Moreover, because food products are more perishable, these exporting SMEs may suffer even in the short-run due to temporary lockdowns.

Table 6. Product Space of Pure Exporters to the Top Five COVID-19 Countries**(a) China**

Description	Export Value
Nickel ores and concentrates Nickel ores and concentrates.	307,915,079
Bananas, including plantains, fresh or dried Bananas, including	115,061,474
Waste, parings and scrap of polymers of other plastics – – Ot	44,439,044
Other wood n.e.s., sawn or chipped lengthwise, sliced or peeled	19,894,398
Pineapples, fresh or dried – Pineapples Fresh	14,186,505
Eels (Anguilla spp.), live – – Eels (Anguilla spp.) – – Eels (Ang	13,139,100
Other office machines, n.e.s. – – Automatic teller machines –	12,937,142
Photosensitive semiconductor devices, including photovoltaic	10,343,410
Crabs, other than frozen – – – Live – – – Live	8,286,727
Other fruits, nuts and other edible parts of plants, otherwise p	7,560,717

(b) Korea

Description	Export Value
Petroleum oils and oils obtained from bituminous minerals, cru	27,042,162
Oil-cake and other solid residues, whether or not ground or in	9,490,105
Bananas, including plantains, fresh or dried Bananas, including	7,602,140
Copper waster and scrap Copper waste and scrap. Other	3,778,482
Recovered waste and scrap: of other paper or paperboard, incl	3,744,183
Ferrous waste and scrap, n.e.s. – – Other – – Other	3,354,063
Guavas, Mangoes and mangosteens, fresh or dried – Guavas,	3,179,169
Pineapples, fresh or dried – Pineapples Fresh	3,163,900
Other mollusks (whether in shell or not), n.e.s., frozen, dried, s	3,118,511
Other mollusks (whether in shell or not), n.e.s., frozen, dried, s	2,669,860

(c) Germany

Description	Export Value
Activated carbon – Activated carbon Coconut-shell based	16,603,369
Othe cameras, n.e.s – – – Other – – – Other	8,876,266
Other office machines, n.e.s. – – Automatic teller machines –	6,614,458
Parts and accessories of the machines of heading No. 84.72 –	5,686,483
Parts and accessories for cameras – – – Other, for cameras of	5,269,716
Other fruits, nuts and other edible parts of plants, otherwise p	3,811,075
Mounted optical elements, n.e.s. – – Other – – Other	2,566,358
Mounted optical elements, n.e.s. – – Lenses and prisms for lig	1,989,455
Parts and accessories of photocopying apparatus incorporatin	1,790,113
Parts and accessories for the photographic flashlight apparatus	1,762,190

(d) Japan

Description	Export Value
Photosensitive semiconductor devices, including photovoltaic	32,454,860
Bananas, including plantains, fresh or dried Bananas, including	21,308,270
Nickel ores and concentrates Nickel ores and concentrates.	13,178,053
Other articles of bedding and similar furnishings, n.e.s. – – Fo	11,159,094
Parts and accessories for cameras – – – Other, for cameras of	8,671,371
Other articles of leather or of composition leather – Other –	8,223,082
Maize (sweet corn) and other vegetables, fresh or chilled – Ot	6,951,050
Shrimps and prawns, frozen – – Shrimps and prawns – – Shr	6,683,323
Pineapples, fresh or dried – Pineapples Fresh	6,059,595
Abaca fiber, raw – – Raw JK	4,544,053

(e) USA

Description	Export Value
Photosensitive semiconductor devices, including photovoltaic	191,161,990
Cane sugar, raw, not containing added flavouring or colouring	84,237,748
Crab, prepared or preserved – Crab Other	28,474,790
Other office machines, n.e.s. – – Automatic teller machines –	20,461,811
Women's or girls' briefs and panties, of cotton, knitted or croc	18,273,385
Coconut (copra) oil, crude – – Crude oil Other	18,028,800
Coconut (copra) oil and its fractions thereof, whether or not re	13,651,092
Articles for Christmas festivities – – Other – – Other	11,535,425
Other fruits, nuts and other edible parts of plants, otherwise p	10,636,492
Frames and mountings for spectacles, goggles or the like, of o	9,432,936

Source: Philippine Statistics Authority Transactions Dataset for 2016 merged with the 2016 Annual Survey of Philippine Business and Industry (ASPBI)

Table 7 shows the product space of SME firms that purely import by country of origin. We see that most of these SME imports are manufactured intermediate inputs or mechanical parts. Hence these small firms will be potentially affected by disruptions in the global supply chain.

The composition of exports and imports of SMEs that purely export/import are different from the larger firms. SME exports to COVID-19 countries are mostly food and food products (e.g. exporters of bananas, copra, pineapples, nuts and crustaceans) and intermediate inputs (e.g. semiconductors, mechanical parts). This makes SME exporters susceptible to both a loss of export market and/or a disruption in the global supply chain.

Imports from SMEs, on the other hand, consists of mostly manufactured intermediate inputs or mechanical parts (e.g. semiconductors, machine parts, motor vehicle parts).

Table 7. Product Space of Top SME Imports from the COVID-19 Countries**(a) China**

Description	Import Value
Bars and rods of other alloy steel, not further worked than hot-	189,279,709
Semi-finished products of iron or non-alloy steel, containing b	137,382,653
Bars and rods, hot-rolled, in irregularly wound coils, of other a	127,406,170
Apples, fresh – Apples – Apples	122,942,761
Glazed ceramic mosaic cubes and the like, whether or not on a	115,199,561
Flat-rolled products of iron or non-alloy steel, otherwise plate	83,772,392
Petroleum oils and oils obtained from bituminous minerals, oth	72,386,856
Glazed ceramic mosaic cubes and the like, whether or not on a	64,041,411
Photosensitive semiconductor devices, including photovoltaic	63,168,488
Flat-rolled products of iron or non-alloy steel, painted, varnish	52,811,669

(b) South Korea

Description	Import Value
Other objective lenses, mounted – – Other – – Other	33,179,593
Petroleum oils and oils obtained from bituminous minerals, oth	25,037,170
Other electric conductors, for a voltage not exceeding 80 V, no	22,846,387
Mechanical shovels, excavators and shovel loaders, with a 360	17,261,291
Wire, of refined copper, n.e.s. – – Other Plated or coated with	15,226,777
Light petroleum oils and preparations thereof – – – Motor spi	14,885,530
Parts and accessories of the machines of heading No. 84.71 –	12,344,236
H sections, of iron or non-alloy steel, not further worked than	12,291,147
Bars, rods and profiles, of refined copper – – Bars and rods o	9,864,324
Mixed alkylbenzenes and mixed alkylnaphthalenes, oth	9,368,195

(c) Germany

Description	Import Value
Other edible offal of swine, frozen – – Other – – Other	29,922,615
Other meat of swine, frozen – – Other b. Out-Quota	11,694,865
Other engines and motors, n.e.s. – Other Other	10,350,703
Pig fat, free of lean meat, and poultry fat, not rendered or other	8,111,302
Other continuous-action elevators and conveyors, for goods c	7,143,224
Other meat of swine, frozen – – Other a. In-Quota	6,906,591
Flours, meals and pellets, of meat or meat offal; greaves – Flo	6,235,551
Kraftliner, uncoated, unbleached, in rolls or sheets – – Unblea	3,669,335
Other Medicaments (excluding goods of heading No.30.02, 30	2,965,917
Other turbines of an output exceeding 40 MW – – – Ste	2,527,004

(d) Japan

Description	Import Value
Cruise ships, excursion boats and similar vessels principally d	29,760,144
Other turbines of an output exceeding 40 MW – – – Steam tur	20,891,290
Other self-propelled mechanical shovels, excavators and shov	16,855,947
Other parts & accessories, n.e.s., of motor vehicles of groups 7	10,759,496
Felt tipped and other porous-tipped pens and markers – Felt	10,743,220
Ammonium sulphate – – Ammonium sulphate – – Ammonium	10,148,519
Other overhead travelling cranes, transporter cranes, gantry c	9,632,857
Components, parts and accessories imported from one or mor	8,442,561
Petroleum oils and oils obtained from bituminous minerals, oth	8,151,045
Motor vehicles, g.v.w. exceeding 5 tonnes but not exceeding 2	6,909,241

(e) USA

Description	Import Value
Oil-cake and other solid residues, whether or not groun	327,729,489
Other wheat and meslin – – – Other – – – Other	139,661,779
Grapes, fresh – Fresh – Fresh	25,237,383
Other preparations not elsewhere specified or included – – –	25,088,305
Meat of bovine animals, boneless, frozen – Boneless – Bonele	21,035,734
Cuts and offals of fowls of the species Gallus domesticus, froz	21,029,023
Other wheat and meslin – – – Other Used as feed	19,155,912
Other edible offal of swine, frozen – – Other – – Other	17,501,177
Soya beans, whether or not broken – Other – Other	15,207,801
Cuts and offals of fowls of the species Gallus domesticus, froz	14,296,566
Kraftliner, uncoated, unbleached, in rolls or sheets – – Unblea	13,876,897

Source: Philippine Statistics Authority Transactions Dataset for 2016 merged with the 2016 Annual Survey of Philippine Business and Industry (ASPBI)

Amount of stimulus for GOMS firms

Given the facts of the previous sections, there is an urgent need to assist the importers and exporters in the manufacturing sector, whether MSMEs or large, to stem the effect of COVID-19. Table 8 shows our estimated subsidy. We estimate that total firm revenue from purely exporting SMEs that export to COVID-19 countries will total Php 69.4 billion in 2020. Assuming that the Philippine government subsidizes 12% of firm revenues (as profit) for a month, then we estimate the subsidy to amount to Php 693 million. Total revenue from purely importing SMEs that import COVID-19 countries is estimated to be Php 782 billion, therefore the subsidy is computed at Php 8.7 billion. Total revenues from firms that simultaneously export and import amount to Php2.1 trillion. If we subsidize these firms as we have subsidized the purely

exporting/importing SMEs, the subsidy should equal Php23.8 billion.⁷ The subsidies to GOMS firms will therefore total Php33.2 billion and this covers all types of manufacturing firms, not just SMEs.

Table 8. Computation of Firm Subsidies

	Total Firm Revenues	Revenues in a Month	Adjustmet for Inflation	Profit
Pure Exporter	62,505,181,072	5,208,765,089.33	5,781,729,249.16	693,807,509.90
Pure Importer	782,746,524,636	65,228,877,053.00	72,404,053,528.83	8,688,486,423.46
Exporter and Importer	2,143,110,241,248	178,592,520,104.00	198,237,697,315.44	23,788,523,677.85
Total				33,170,817,611.21

Note: We use information from the merged 2016 Transactions/ASPBI Manufacturing datasets. Figures were adjusted to inflation using CPI. We assume 12% of revenue as profit.

Assuming that the Philippine government subsidizes 12% of firm revenues (as profit) for a month, then we estimate the subsidy to be Php 33.2 billion, with breakdown as follows:

- Purely exporting MSMEs: 693M
- Purely importing MSMEs: 8.7B
- Large firms that simultaneously export AND import: 23.8 B

The stimulus package may involve a combination of measures. The literature mentions, among others, tax deferrals, loan repayment holidays, loan restructuring, loans or credit guarantees by the state, wage/payroll subsidies, providing employment maintenance funds, and reducing tariffs and other trade barriers (Baldwin and di Mauro, 2020). These instruments should be fine-tuned to the nature of the firms targeted for assistance. For instance, SMEs may need employment maintenance funds or wage subsidies.⁸ For larger firms, tax deferrals or debt/loan restructuring may be more salient.

⁷ (Php 2,143 billion/12 months) x 0.12 x 1.11 (inflation adjustment from 2016 to 2020)

⁸ We note that HB 6606 provides for a separate fund for displaced workers amounting to 15B. Based on rough estimates, providing displaced workers in GOMs an amount equivalent to minimum wages for a month can be financed through this proposed 15B fund.

Policy Toolkit to Help Firms and Businesses

We have estimated that Php 33.2 billion is needed to assist Philippine GOMS firms to help them cope with the economic fallout from the COVID-19 crisis. Below are some of the policy measures, among others, that can be adopted in any combination. Some of the countries currently implementing these measures are in parentheses:

- Loan and credit guarantee to ensure credit availability to firms (Canada, Thailand)
- Temporary wage/payroll subsidy to prevent layoffs (New Zealand)
- Deferment of income tax payments without penalties or interest (Canada)
- Special credit window/facility for business through the banking system (India)
- Loan repayment holidays/loan restructuring from government financial institutions and private banks (UK)
- Provide employment maintenance where the government partially covers the cost to pay workers allowances from leave of absences. (South Korea)
- Reduce tariffs to reduce the cost of imported inputs

4. Concluding Remarks

The COVID-19 pandemic is the largest public health challenge in nearly a century. Large economies are expected to slow down, and the effect could ripple to developing countries like the Philippines through the trade channel. This is the reason why countries are scrambling to come up with various stimulus programs to avert a recession. In the Philippines, as with other countries, the stimulus programs aim to support businesses, especially those who are most vulnerable to economic shocks.

In this paper, we have described which firms will stand to lose when large economies affected by COVID-19 start to slow down. In our paper, we find that in 2019, exports from COVID-19 countries constitute 55% of total Philippine export value. At the same time, imports from COVID-19 countries constitute 53% of total import value.

We also find that 17,610 out of 21,352 (82%) importing and exporting firms in 2019 are transacting with COVID-19 countries and therefore will be at risk from any disruption in supply chains or economic slowdown. Of the 17,610 firms, 3,068 are purely importing, 11,800 are purely exporting, and 2,742 are simultaneously exporting and importing. We find that the exports to and imports from the COVID-19 countries with the highest value are mostly products that serve as intermediate inputs (e.g. electronics, electronic components). We also find that the firms responsible for trading these high-value products are those that are connected to the global value chain, that is, firms that simultaneously export and import. As opposed to firms that exclusively export and exclusively import, these exporting and importing firms are relatively larger—with average employment in the thousands and asset size in the billions. Firms that purely export or purely import are small and medium enterprises with average employment less than 100. We estimate that 494,679 workers are at risk from the COVID-19 fallout, with 75 percent of those workers coming from large firms that simultaneously export and import.

Unlike large GOMS firms that simultaneously export and import, the exports of GOMS SMEs that purely export/import are mostly concentrated on primary food products and intermediate goods. Thus, the nature by which an economic slowdown in COVID-19 countries affects these two types of firms will propagate through different channels. For SMEs, it is possible that a lockdown on COVID-19 countries will affect these firms even in the short run. Compounding the problem is that these SMEs may not have the capability of large firms, e.g., access to credit, to withstand an economic shock such as that engendered by COVID-19.

In order to assist firms that are potentially affected by COVID-19, we compute the required subsidy to be Php33.2 billion for 2020. This amount is broken down into Php9.4 billion for globally-oriented SMEs and Php23.8 billion for large firms that simultaneously export and import. Policy measures may include a combination of tax deferrals, loan repayment holidays, loan restructuring, loans or credit guarantees by the state, wage/payroll subsidies, providing employment maintenance funds, and tariff reductions. We recommend for future study the specific mechanism by which such subsidies will be provided to firms of various sizes (e.g. SMEs vs large).

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Appendix Table 1. Product Space of Exports to the COVID-19 Countries

(a) China

Description	Export Value	Average Filipino Share	Average Employment	Average Asset Size
Digital monolithic integrated circuits - - - Wafers and discs, electrical	1,388,085,256		20,611	2,262,646,553
Semiconductor devices manufactured from materials on consignment	1,296,294,776	23	1,443	6,592,544,784
Storage units - - Hard disk drives - - Hard disk drives	967,666,487			
Bananas, including plantains, fresh or dried Bananas, including plantains	650,781,654			
Cathodes and sections of cathodes, of refined copper - - Cathodes	643,712,202	69	973	21,062,502,487
Nickel ores and concentrates Nickel ores and concentrates. Ores	557,777,250	85	128	309,257,589
Other coal, whether or not pulverised, but not agglomerated - - Other	437,963,000			
Electrical and electronic machinery, equipment and parts manufactured	221,261,621	52	4,788	1,811,295,441
Other fixed capacitors, n.e.s. - - Other Other	184,817,029		605	397,519,394
Input or output units, whether or not containing storage units in the	152,658,415	0	4,075	4,725,261,510

(b) Italy

Description	Export Value	Average Filipino Share	Average Employment	Average Asset Size
Coconut (copra) oil, crude - - Crude oil Other	15,632,526	100	26	70,837,554
Articles of other precious metal and parts thereof, of silver, whether	14,273,006	100	13	8,071,540
Men's or boys' shirts, of cotton, not knitted or crocheted - Of cotton	13,034,864			
Articles of a kind normally carried in the pocket or in the handbag, w	11,481,600			
Handbags, whether or not with shoulder strap, including those with	9,816,266			
New pneumatic tyres, of rubber, of a kind used on motor cars (includ	8,846,980	10	1,779	11,134,534,345
Other office machines, n.e.s. - - Automatic teller machines - - Au	8,115,321	1	703	252,969,076
Other articles of fur skin - - Sport bags - - Sport bags	7,876,300			
Watches manufactured from materials on consignment basis - - W	7,397,244			
Tunas, skipjack and bonito (Sarda spp.), whole or pieces, but not mir	7,139,871	100	183	662,127,675

(c) Iran

Description	Export Value	Average Filipino Share	Average Employment	Average Asset Size
Bananas, including plantains, fresh or dried Bananas, including plantains	58,415,331			
Pineapples, fresh or dried - Pineapples Fresh	7,739,984			
Coconut (copra) oil and its fractions thereof, whether or not refined,	680,890	100	289	375,952,699
Carageenan, seaweeds and other algae, n.e.s. - - - Carageenan S	519,941			
Animal or vegetable fats and oils and their fractions, boiled, oxidized	486,807			
Coated electrodes of base metal, for electric arc-welding - - - Other	253,761	100	26	5,068,064
Glycerol, crude; glycerol waters and glycerol lyes - Crude glycerol	209,940			
Other wires, electrode and similar products & parts, of base metal of	192,758			
Watches manufactured from materials on consignment basis - - W	160,666			
Coconut (copra) oil and its fractions thereof, whether or not refined,	134,064			

(d) Republic of Korea

Description	Export Value	Average Filipino Share	Average Employment	Average Asset Size
Electrical and electronic machinery, equipment and parts manufactured	602,226,814	22	8,183	2,416,735,782
Semiconductor devices manufactured from materials on consignment	564,414,923	23	1,208	5,960,870,965
Digital monolithic integrated circuits - - - Wafers and discs, electrical	339,180,447			
Bananas, including plantains, fresh or dried Bananas, including plantains	259,084,610			
Cathodes and sections of cathodes, of refined copper - - Cathodes	99,890,355	69	973	21,062,502,487
Ignition wiring sets and other wiring sets of a kind used in vehicles,	81,936,077		4,726	400,245,968
Cigarettes containing tobacco - - Other - - Other	72,813,029	60	1,272	15,697,788,000
Parts and accessories of instruments and apparatus of heading No. 9	57,046,948			
Petroleum oils and oils obtained from bituminous minerals, crude	53,086,491			
Pineapples, fresh or dried - Pineapples Fresh	41,598,602			

(e) France

Description	Export Value	Average Filipino Share	Average Employment	Average Asset Size
Digital monolithic integrated circuits - - - Wafers and discs, electrical	208,574,990			
Parts of machinery, plant or laboratory equipments, whether or not	166,738,826			
Other parts of aeroplanes or helicopters - - Parts of telecommunic	100,980,564	42	1,041	2,891,024,303
Input or output units, whether or not containing storage units in the	30,644,019	0	4,075	4,725,261,510
Spectacle lenses of other materials - Spectacle lenses of other ma	29,249,375	0	677	579,548,329
Static converters (e.g. rectifiers) - - - UPS - - - UPS	25,449,210	0	1,926	1,628,664,363
Other parts and accessories suitable for use solely of principally with	17,620,505			
Semiconductor devices manufactured from materials on consignme	13,117,660	80	1,169	5,750,347,955
Aircrafts parts, temporarily imported or exported - Aircraft parts	11,008,351	30		12,180,848
Electrical and electronic machinery, equipment and parts manufactu	9,759,989	86	1,264	946,998,520

(f) Spain

Description	Export Value	Average Filipino Share	Average Employment	Average Asset Size
Coconut (copra) oil, crude - - Crude oil Other	32,702,722	100	58	39,344,416
Pineapples, otherwise prepared or preserved, whether or not containi	14,515,482	100	79	4,643,560
Yellowfin tunas (Thunnus albacares), (excluding livers and roes), fro	13,600,661			
Carageenan, seaweeds and other algae, n.e.s. - - - Carageenan S	10,555,532			
Dodecan-1-ol (lauryl alcohol), hexadecan-1-ol (cetyl alcohol) and oct	8,672,820		70	4,521,780,806
Other surface-active agents, n.e.s. - - - Other washing preparation	8,413,503		70	4,521,780,806
Carageenan, seaweeds and other algae, n.e.s. - - - Carageenan C	6,317,680	100	102	124,176,716
Parts and accessories of the machines of heading No. 84.72 - - - Pa	6,102,205	1	703	252,969,076
Tunas, skipjack and bonito (Sarda spp.), whole or pieces, but not mir	6,059,545	100	635	188,800,126
Input or output units, whether or not containing storage units in the	5,904,119	0	4,075	4,725,261,510

(g) Germany

Description	Export Value	Average Filipino Share	Average Employment	Average Asset Size
Digital monolithic integrated circuits - - - Wafers and discs, electri	754,881,887			
Semiconductor devices manufactured from materials on consignme	308,955,546	33	1,136	4,921,445,202
Storage units - - Hard disk drives - - Hard disk drives	192,978,986			
Input or output units, whether or not containing storage units in the	127,271,386	0	4,075	4,725,261,510
Tunas, skipjack and bonito (Sarda spp.), whole or pieces, but not mir	88,607,521	100	515	271,025,628
Electrical and electronic machinery, equipment and parts manufactu	88,432,760	76	1,387	1,216,219,764
Input or output units, whether or not containing storage units in the	62,048,991			
Transistors, other than photosensitive transistors, with a dissipation	62,029,155		96	32,647,483
Input or output units, whether or not containing storage units in the	60,690,837	0	4,075	4,725,261,510
Video projectors - - Other Other	49,316,654			

(h) Japan

Description	Export Value	Average Filipino Share	Average Employment	Average Asset Size
Ignition wiring sets and other wiring sets of a kind used in vehicles,	1,090,479,907	50	5,072	1,173,501,425
Digital monolithic integrated circuits - - - Wafers and discs, electri	1,088,702,292		20,611	2,262,646,553
Bananas, including plantains, fresh or dried Bananas, including pla	713,874,976			
Other vessels for the transport of goods and other vessels for the tra	451,970,847	20	389	6,955,565,109
Radio navigational aid apparatus - - - Other - - - Other	411,815,550		343	136,930,463
Nickel oxide sinters and other intermediate products of nickel metal	392,720,469			
Semiconductor devices manufactured from materials on consignme	203,813,882	38	2,819	5,430,649,058
Other builders' joinery and carpentry of wood, n.e.s. - - Other - -	193,744,358	2	3,747	3,150,082,867
Copper ores and concentrates Copper ores and concentrates. Cor	179,130,898			
Electrical and electronic machinery, equipment and parts manufactu	178,704,729	18	2,978	1,200,143,649

(i) United States

Description	Export Value	Average Filipino Share	Average Employment	Average Asset Size
Semiconductor devices manufactured from materials on consignment	1,624,252,777	39	924	2,460,430,442
Digital monolithic integrated circuits - - - Wafers and discs, electronic	881,502,059		1,252	283,739,260
Ignition wiring sets and other wiring sets of a kind used in vehicles,	570,578,261	50	6,219	1,110,868,731
Storage units - - Hard disk drives - - Hard disk drives	543,555,026		1,047	2,914,885,627
Static converters (e.g. rectifiers) - - - UPS - - - UPS	380,984,895	0	1,872	1,527,798,598
Other parts of aeroplanes or helicopters - - Parts of telecommunication	337,794,713	25	930	2,560,460,598
Transmission apparatus incorporating reception apparatus - - Other	266,274,466		2,333	284,296,339
Electrical and electronic machinery, equipment and parts manufactured	247,550,949	69	1,295	1,030,001,160
Static converters (e.g. rectifiers) - - Other - - Other	196,044,784	35	1,132	282,766,632
Printed circuits - Other - Other	194,383,614	34	493	457,543,969

(j) Switzerland

Description	Export Value	Average Filipino Share	Average Employment	Average Asset Size
Other unwrought gold, non-monetary - - - In lumps, ingots or cast	157,789,374			
Other semi-manufactured forms, non-monetary - - - In rods, bars,	146,563,234			
Base metals or silver, clad with gold	31,766,301			
Other semi-manufactured forms, non-monetary - - - In rods, bars,	13,605,588			
Electrical and electronic machinery, equipment and parts manufactured	13,101,331	80	1,228	1,166,115,917
Digital monolithic integrated circuits - - - Wafers and discs, electronic	11,556,525			
Static converters (e.g. rectifiers) - - Other - - Other	5,846,102	26	664	211,971,219
Aircraft parts, replacements and goods returned to the country where	4,438,500			
Input or output units, whether or not containing storage units in the	3,344,393	0	4,075	4,725,261,510
Yellowfin tunas (Thunnus albacares), (excluding livers and roes), fresh	2,793,080			

Note: Products, export values, and the number of firms are obtained from the Transactions Dataset. Firm characteristics like asset size and employment are obtained by matching the 2016 ASPBI with the firms in the 2016 Transactions dataset. Some product lines are blank since there may not be information on these product lines for these countries in 2016, or that firms have not been surveyed in the ASPBI.

Appendix Table 2. Product Space of Imports from the COVID-19 Countries

(a) China

Description	Import Value	Average Filipino Share	Average Employment	Average Asset Size
Petroleum oils and oils obtained from bituminous minerals, other than crude	2,062,766,754	51	43	7,471,303,859
Other materials, accessories and supplies imported on consignment basis	1,497,144,348	60	1,324	2,274,122,820
Parts and accessories of the machines of heading No. 84.71 - - Other	639,979,700	31	1,414	1,867,157,004
Light petroleum oils and preparations thereof - - - Aviation spirit - - - Other	562,840,179			
Other electrical apparatus for line telephony or line telegraphy - - - Other	416,166,744			
Gas or smoke analysis apparatus - - Electrically operated - - Electric	287,172,201	100	137	54,997,352
Digital monolithic integrated circuits - - - Wafers and discs, electrical	266,213,067	9	793	2,149,727,890
Glazed ceramic mosaic cubes and the like, whether or not on a backing	246,679,342	91	2,382	2,223,213,156
Flat-rolled products of iron or non-alloy steel, otherwise plated or coated	202,920,398	94	64	518,284,907
Other structures (excluding prefabricated buildings of heading No. 94.01)	199,863,922	59	1,882	1,153,730,056

(b) Italy

Description	Import Value	Average Filipino Share	Average Employment	Average Asset Size
Other electric conductors, for a voltage exceeding 1,000 V - - - Other	143,684,197			
Flours, meals and pellets, of meat or meat offal; greaves - Flours, meals	70,525,958	100	53	174,131,510
Other digital monolithic integrated circuits, n.e.s. - - - Wafers and discs	50,568,290	87	1,223	5,154,650,470
Digital monolithic integrated circuits - - - Wafers and discs, electrical	38,301,483	60	1,281	6,392,772,380
Materials, accessories and supplies imported on consignment basis	20,336,246	94	527	394,764,285
Grain splits, including sides, of other bovine or equine animals - - Other	17,990,910	92	5,405	90,505,105
Other Medicaments (excluding goods of heading No.30.02, 30.05 or 30.06)	17,886,908			
Other materials, accessories and supplies imported on consignment basis	15,089,499	93	742	706,485,559
Electric heating resistors - - Other - - Other	10,792,975	69	821	9,840,123,804
Other boring or sinking machinery, self-propelled - - Self-propelled	10,414,293	99	2,120	3,482,188,852

(c) Iran

Description	Import Value	Average Filipino Share	Average Employment	Average Asset Size
Bitumen and asphalt, natural, asphaltites and asphaltic rocks - Other	769,340			
Other articles of asphalt or of similar material - Other - Other	323,473			
Static converters (e.g. rectifiers) - - Other - - Other	143,619			
Other acyclic amides (including acyclic carbamates) and their derivatives	132,500			
Urea, whether or not in aqueous solution - Urea, whether or not in solution	128,500			
Articles of asphalt or of similar material (for example, petroleum bitumen)	105,583			
Grapes, dried - Dried - Dried	68,620			
Other structures (excluding prefabricated buildings of heading No. 94.01)	61,418			
Petroleum bitumen - Petroleum bitumen - Petroleum bitumen	51,708			
Medicaments containing other antibiotics, consisting of mixed or uncombined	38,080			

(d) Republic of Korea

Description	Import Value	Average Filipino Share	Average Employment	Average Asset Size
Materials, accessories and supplies imported on consignment basis	1,667,417,401	50	1,381	1,810,653,446
Other materials, accessories and supplies imported on consignment basis	836,479,758	66	983	3,518,418,002
Light petroleum oils and preparations thereof - - - Motor spirit, refined	554,687,147	60	14	52,416,789
Petroleum oils and oils obtained from bituminous minerals, other than crude	553,781,940	60	14	52,416,789
Petroleum oils and oils obtained from bituminous minerals, crude - Crude	423,883,975	32	100	22,309,078,000
Digital monolithic integrated circuits - - - Wafers and discs, electrical	371,776,557	14	1,022	4,118,394,798
Light petroleum oils and preparations thereof - - - Other motor spirit	216,049,468			
Light petroleum oils and preparations thereof - - - Aviation spirit - - - Other	183,532,652			
Other digital monolithic integrated circuits, n.e.s. - - - Wafers and discs	127,540,993	14	1,055	4,328,085,606
Ceramic dielectric fixed capacitors, multilayer - - Ceramic dielectric	106,809,022	1	1,959	11,721,934,270

(e) France

Description	Import Value	Average Filipino Share	Average Employment	Average Asset Size
Aeroplanes and other aircraft, of an unladen weight exceeding 15,000 kg	416,406,265			
Other parts of aeroplanes or helicopters - - Parts of telecommunications equipment	101,828,088	41	766	2,119,329,196
Spark-ignition reciprocating or rotary internal combustion piston engines	98,347,258			
Other Medicaments (excluding goods of heading No.30.02, 30.05 or 30.06)	75,884,365			
Bridges and bridge-sections, of iron or steel - - Prefabricated modular bridges	52,041,772			
Parts suitable for use solely or principally with the aircraft engines - - Turbopropellers	32,328,749			
Digital monolithic integrated circuits - - Wafers and discs, electronic	25,237,240		1,282	5,617,354,412
Other materials, accessories and supplies imported on consignment basis	21,718,239	94	515	450,416,992
Other edible offal of swine, frozen - - Other - - Other	17,030,088			
Artificial guts (sausage casings) of hardened protein or of cellulosic	16,699,097			

(f) Spain

Description	Import Value	Average Filipino Share	Average Employment	Average Asset Size
Spirits obtained by distilling grape wine or grape marc - - Brandy and other spirits	66,964,969	100	264	2,430,024,535
Other edible offal of swine, frozen - - Other - - Other	64,888,990			
Mixtures of odoriferous substances and mixtures (including alcoholic beverages)	58,363,017			
Aeroplanes and other aircraft, of an unladen weight exceeding 2,000 kg	30,870,443			
Other munitions of war and parts thereof - Other Other	23,336,110			
Artificial guts (sausage casings) of hardened protein or of cellulosic	19,564,688	100	1,231	1,701,185,055
Pig fat, free of lean meat, and poultry fat, not rendered	18,762,931			
Spark-ignition reciprocating or rotary internal combustion piston engines	13,000,000			
Other Medicaments (excluding goods of heading No.30.02, 30.05 or 30.06)	12,903,614			
Vaccines for veterinary medicine - Vaccines for veterinary medicine	10,501,008			

(g) Germany

Description	Import Value	Average Filipino Share	Average Employment	Average Asset Size
Aeroplanes and other aircraft, of an unladen weight exceeding 15,000 kg	420,107,256			
Materials, accessories and supplies imported on consignment basis	280,684,196	35	956	1,181,067,779
Other parts of aeroplanes or helicopters - - Parts of telecommunications equipment	268,352,740	46	472	1,573,901,173
Other Medicaments (excluding goods of heading No.30.02, 30.05 or 30.06)	119,654,044			
Spark-ignition reciprocating or rotary internal combustion piston engines	81,500,000	60	10	1,553,001
Other materials, accessories and supplies imported on consignment basis	80,942,553	57	1,080	1,404,535,186
Brewery machinery - - Having maximum capacity not exceeding 300 hl	41,536,575			
Other digital monolithic integrated circuits, n.e.s. - - Wafers and discs	41,487,791	30	763	1,858,634,688
Other edible offal of swine, frozen - - Other - - Other	36,922,491			
Helicopters of an unladen weight exceeding 2,000 kg - - Of an unladen weight not exceeding 2,000 kg	23,456,874			

(h) Japan

Description	Import Value	Average Filipino Share	Average Employment	Average Asset Size
Motor vehicles for the transport of ten or more persons, including taxicabs	512,453,074	60	1,076	3,820,092,559
Materials, accessories and supplies imported on consignment basis	506,364,237	18	8,198	1,769,506,140
Digital monolithic integrated circuits - - Wafers and discs, electronic	483,649,724	11	2,205	5,318,736,271
Parts and accessories of the machines of heading No. 84.71 - - Other	394,779,549	9	1,407	1,677,241,142
Other digital monolithic integrated circuits, n.e.s. - - Wafers and discs	310,569,920	25	2,532	6,488,210,760
Other materials, accessories and supplies imported on consignment basis	230,430,466	51	3,257	1,326,136,485
Indicator panels incorporating liquid crystal devices (LCD) or light emitting diodes	181,168,140	7	592	846,171,603
Other parts & accessories, n.e.s., of motor vehicles of groups 722, 731, 732, 733	142,329,137	15	1,326	831,989,763
Materials, accessories and supplies imported on consignment basis	121,627,523	82	3,772	1,186,818,970
Parts of the goods of subheading 8479.89.10, 8479.49.20 and other	120,440,905	21	2,697	1,388,646,552

(i) USA

Description	Import Value	Average Filipino Share	Average Employment	Average Asset Size
Other digital monolithic integrated circuits, n.e.s. - - - Wafers and	920,937,998	25	762	1,128,113,741
Materials, accessories and supplies imported on consignment basis	779,794,488	51	923	1,693,854,665
Oil-cake and other solid residues, whether or not gro	698,936,638			
Other wheat and meslin - - - Other - - - Other	669,795,193	100	107	831,080,439
Other parts of aeroplanes or helicopters - - Parts of telecommun	301,391,752	47	872	2,471,866,679
Other materials, accessories and supplies imported on consignment	239,284,673	71	1,140	2,112,707,761
Digital monolithic integrated circuits - - - Wafers and discs, electri	147,556,058	10	565	2,347,642,051
Milk and cream, in powder, granules or other solid forms, of a fat co	141,137,530			
Ethyl alcohol and other spirits, denatured, of any strength - - - Oth	107,367,673	34	94	20,660,436,429
Parts and accessories of the machines of heading No. 84.71 - - Oth	86,037,725	14	710	1,254,391,462

(j) Switzerland

Description	Import Value	Average Filipino Share	Average Employment	Average Asset Size
Other Medicaments (excluding goods of heading No.30.02, 30.05 or	32,128,050			
Wrist-watches, whether or not incorporating a stop-watch facility, w	22,268,666			
Wrist-watches, whether or not incorporating a stop-watch facility, w	19,892,723			
Other Medicaments (excluding goods of heading No.30.02, 30.05 or	19,576,869			
Other materials, accessories and supplies imported on consignment	14,196,317	42	1,075	1,093,076,716
Wrist-watches, electrically operated, whether or not incorporating a	13,718,000	100	4	806,076
Semi-finished products of iron or non-alloy steel, containing by weig	13,639,969			
Parts of diodes, transistors and similar semiconductor devices, etc. d	11,089,020			
Medicament containing adrenal cortical hormones - - - Other - -	6,538,415			
Other digital monolithic integrated circuits, n.e.s. - - - Wafers and	6,292,536		1,282	5,617,354,412

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