

The Impacts of Lockdown Policies on International Trade in the Philippines

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Abstract

The Philippines was among the most infected countries in East Asia at the onset of the COVID-19 outbreak. This study analyzes how international trade on various margins was affected by the country's own lockdown policies and those of trading partners. Using a monthly series of product-by-country data for the period from January 2019 to December 2020 and an event study design, the paper shows that domestic lockdown measures did not affect international trade but external lockdowns affected both exports and imports. The introduction of lockdown measures by trading partners affected imports more than exports, leading to 7 and 56 percent monthly average drops in export and import values, respectively. Restrictions on internal movements and international travel controls in partner countries were responsible for the drop in exports. The

slump in imports was because of workplace closure, stay-at-home requirements, restrictions on internal movement, and international travel controls by trading partners of the Philippines. Intermediate goods were the key driver of the drop in imports following foreign lockdowns, reflecting supply disruptions in backward global value chain participation. At the same time, exports of intermediate goods were more resilient to the lockdown policies. Finally, both exports and imports were more affected at the extensive margin than the intensive margin, as lockdown measures hindered interactions among people, in turn reducing the potential of businesses to create new relationships and launch new products in foreign markets. Overall, diversified and geographically dispersed suppliers can help countries adjust better to future disruptions.

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The Impacts of Lockdown Policies on International Trade in the Philippines*

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1 Introduction

Most governments imposed measures restricting the mobility of people and the operation of certain sectors, referred to as lockdowns, to avert the spread of Coronavirus (COVID-19) and mitigate its impact from early 2020. These measures have upended economic order worldwide: the global economy shrank by 3.2% in 2020 while the gross domestic product (GDP) of advanced economies contracted by 4.6% in 2020 (IMF, 2021). International trade was also affected. The volume and value of merchandise trade in the world declined by 5.3% and 7.6%, respectively, in 2020 (WTO, 2021). Empirical evidence on the effect of the pandemic on international trade is still nascent, mainly covering developed economies and primarily descriptive.

This study builds on this debate by investigating the impact of lockdowns on the international trade of the Philippines. We conduct an event-study analysis on monthly 10-digit Harmonized System (HS) level bilateral import and export trade ranging from January 2019 to December 2020. The lockdown indicator is a dummy variable signaling the month when the Philippines and its trading partners imposed one of these policies: workplace closure, closure of public transport, stay at home requirements, restrictions on internal movement, and international travel controls.

The Philippines makes for an important case in this regard. The country is among the top traders in East Asia (Thorbecke and Pai, 2015) and it was one of the most affected nations by the virus in the region. It accounted for 31% of total East Asian COVID-19 cases by the end of December 2020, making it the second most infected country in the region after Indonesia. The first case of COVID-19 was discovered on January 30, 2020.¹ The number of infected people was 3 by the end of February 2020 but it spiraled from mid-March where the cumulative number of infected people rose from 111 on March 14, 2020, to 2,084 by March 31, 2020. The Philippines had about 8,500 COVID-19 cases by the end of April and more than 37,500 infections by the end of June 2020. The number of infections was

¹See [Figure A1](#).

more than 160,000 by mid-August 2020, making the Philippines the hardest hit country in terms of COVID-19 cases in East Asia. The Philippines maintained the top rank in terms of COVID-19 cases in East Asia up to mid-October when it was surpassed by Indonesia. The number of infections in the Philippines was 474,064 as of December 31, 2020. The first death arising from COVID-19 in the Philippines occurred on February 2, 2020. Thereafter, COVID-19 related fatalities increased rapidly: 88 by the end of March 2020, 568 by the end of April 2020, and 9,244 by the end of December 2020.²

In response to this, total exports of goods and services in the Philippines experienced the largest decline in four decades in 2020, declining by nearly 50%, while imports contracted by over 65% by April 2020. The combined drop in exports of goods and services was larger than in the Asian financial crisis in 1998 (-14.7%) and the global financial crisis in 2008-2009 (-11.8%). The drop in both goods and services was unlike previous episodes where services exports proved more resilient. In addition, the output gap (difference between actual output and potential output) in the Philippines in 2020 was negative and by far exceeded that of the 2008-2009 global financial crisis and nearby countries of China, Vietnam, Indonesia, Thailand, and Malaysia (Islamaj et al., 2021).

Our results reveal that domestic lockdown policies did not affect international trade in the Philippines, instead exports and imports plunged due to external lockdowns. Exports of the Philippines to countries that imposed lockdowns dropped by a monthly average of 7% and 13% in terms of value and quantity, respectively, reflecting a drop in foreign demand. The Philippines' imports from countries that imposed lockdowns shrunk by a monthly average of 56% for values and 78% for quantities, indicating a drop in domestic demand and supply-side disruptions on imported inputs. The extensive margin (number of products) was the key driver of the collapse in exports and imports. The Philippines' top-ten trading partners (mainly China, Japan and the United States) and intermediate goods (especially Consumer Electronics, and Machinery transport equipment), were the key drivers of the drop in imports.

²See [Figure A2](#) which shows that the number of COVID-19 deaths in the Philippines rose consistently and the country was second, after Indonesia, in terms of COVID-19 fatalities in East Asia in 2020.

Conversely, exports to top-ten partners and of intermediate goods were more resilient to foreign lockdowns. Overall, the lockdown had a larger effect on imports than exports.

Since lockdowns affected entire countries and regions, domestic production or regionally based supply chains would not have prevented the disruption to production systems. However, when hit by a supply shock, relying more on imported inputs with diverse set of source countries can provide a buffer compared to relying primarily on domestic inputs (Hayakawa and Mukunoki, 2021a; Espitia et al., 2021). GVCs through extensive supply chain networks with geographically dispersed suppliers can help countries adjust better and contribute to speedy recovery and possible resilience to future shocks.

Articles providing evidence of the impact of COVID-19 on international trade have been on the increase. They have so far examined the effect of the virus on global value chains (Javorcik, 2020; Vidya and Prabheesh, 2020; Egger and Zhu, 2021; Castañeda-Navarrete et al., 2020; Espitia et al., 2021; Che et al., 2021; Hayakawa and Mukunoki, 2021a), trade policies (Baldwin and Evenett, 2020; Evenett, 2020; Mendoza, 2021), export and import flows (Maliszewska et al., 2020; Büchel et al., 2020; Zhao et al., 2021; Minondo, 2021; Hayakawa and Mukunoki, 2021b; Rose et al., 2021) and COVID-19 lockdown measures (Majune, 2020; Hayakawa and Mukunoki, 2021c; Pei et al., 2021). These studies employ various approaches in their analysis (descriptive statistics, regression model, gravity model, computable general equilibrium model, difference-in-differences, propensity score matching, logistic regression and event-study methodology). Monthly data is prevalent among papers except for Majune (2020) who applied weekly-level data.

Majune (2020) is closely related to our work because it employed an event-study methodology in the analysis. The study found that COVID-19 had an asymmetric effect on Kenya's international trade.³ We closely follow Majune (2020) with a focus on the Philippines and in turn make three contributions to this literature.

³Exports increased by an average of 13% while imports dropped by an average of 23% between July 1, 2019, and June 30, 2020. The fall in imports was triggered by the disruption in sea cargo trade with countries that imposed lockdown controls. In an updated version of the paper, Majune and Addisu (2021) find that lockdowns imposed by Kenya also boosted the country's exports and dampened imports.

First, we add to the literature on COVID-19 in the Philippines, as this is to our knowledge, the first comprehensive analysis on the effects of lockdown policies on trade in the country.⁴ Studies reveal that unemployment (Bertulfo, 2020), the welfare of remittance-dependent households (Yamada et al., 2021; Murakami et al., 2021), food security (Erokhin and Gao, 2020), and general economic performance (Yu et al., 2020) have been disrupted by COVID-19. However, empirical evidence from an international trade perspective is missing, yet it is crucial for an economy such as the Philippines.

Second, our paper incorporates trade margins and survival into the analysis to demonstrate how lockdowns impacted existing and new trade relationships, and the overall sustainability of exports and imports during the pandemic. Evidence of this kind of analysis can be traced back to the 2008-2009 global financial crisis (Bricongne et al., 2012; Manova et al., 2015; Douch et al., 2021), Asian financial crisis (Bernard et al., 2009) and Argentine crisis of 2001–2002 (Gopinath and Neiman, 2014), yet it is likely to be pertinent to the export and import strategy of the Philippines after the pandemic.⁵

Finally, the inclusion of imports in our analysis is also important as less attention has been devoted to them by empirical papers regardless of their significant contribution to inputs of manufacturing sectors of developing countries such as the Philippines (Serti and Tomasi, 2014; Wagner, 2016).

The rest of this paper is organized as follows. Section 2 briefly describes our data while section 3 presents some stylized facts for international trade in the Philippines (2019-2020). The methodology is described in section 4 and empirical results are discussed in section 5. Section 6 concludes our study.

⁴Mendoza (2021) has studied the effect COVID-19, proxied by stringency and spread, in East Asia and a case study of the Philippines. Nonetheless, the study does not focus on lockdowns as we do and does not cover aspects such as trade margins that are done in this study.

⁵Pei et al. (2021) have assessed how lockdowns affected the intensive and extensive margins of exports in China but they neither covered imports nor export survival as covered in the current study.

2 Data

2.1 Lockdown data

Lockdown is a binary variable where one indicates the month the following measures were imposed by trading partners of the Philippines: workplace closure, the closure of public transport, stay at home requirements, restrictions on internal movement, and international travel controls. This definition of lockdowns has been adopted from Majune (2020). Data for these indicators is from the Oxford COVID-19 Government Response Tracker (Hale et al., 2020).

To explain the pattern of lockdown measures, we display the trend of the lockdown Stringency Index for the Philippines and neighboring countries (Thailand, Malaysia, China, Indonesia, and Vietnam) between January 1, 2020, and December 31, 2020, in Figure 1. The index is constructed by re-scaling the maximum ordinal values of nine indicators (one health measure and eight closures and containment policies) to range between 0 and 100. The scores are then averaged to get a composite index for over 180 countries. A score of 0 indicates no restrictions while 100 signals severe implementation of lockdown policies in a country (Hale et al., 2020).

The first lockdown measure in the Philippines was on January 31, 2020, when arrivals of people from some regions were banned. This was followed by the closure of the border, workplaces, public transport, and imposition of stay-at-home requirements and restrictions on internal movement on March 15, 2020, as reflected by a sudden jump in the index, from 34 to 75. The index was 100 on March 22, 2020, indicating maximum implementation of all containment measures. However, it dropped significantly, on May 29, 2020, when workplace and public transport closure, stay at home requirements and restrictions on internal movement were temporarily suspended. The easing of international travel controls started on July 7, 2020. The Philippines had the joint least index with Vietnam by the end of 2020, indicating a significant lax of most containment measures.

Among the neighboring countries, Indonesia was the first to impose lockdown measures (January 18) followed by China (January 23), Vietnam (January 25), Malaysia (January 30), and Thailand (March 6). Of these countries, only China started by implementing three internal measures concurrently: restraint of internal movements, imposition of stay-at-home requirements, and closure of public transport. It also had the strictest lockdown policies in the world for most of the first quarter of 2020 (Islamaj et al., 2021). Other countries started with international travel controls and progressively introduced domestic measures. Malaysia's stringency index was the lowest, of all neighbors of the Philippines, before November 2020 because of the delay in closing public transport. China had the highest stringency index, followed by Malaysia, Indonesia, Thailand, and Vietnam, respectively, by the end of 2020.

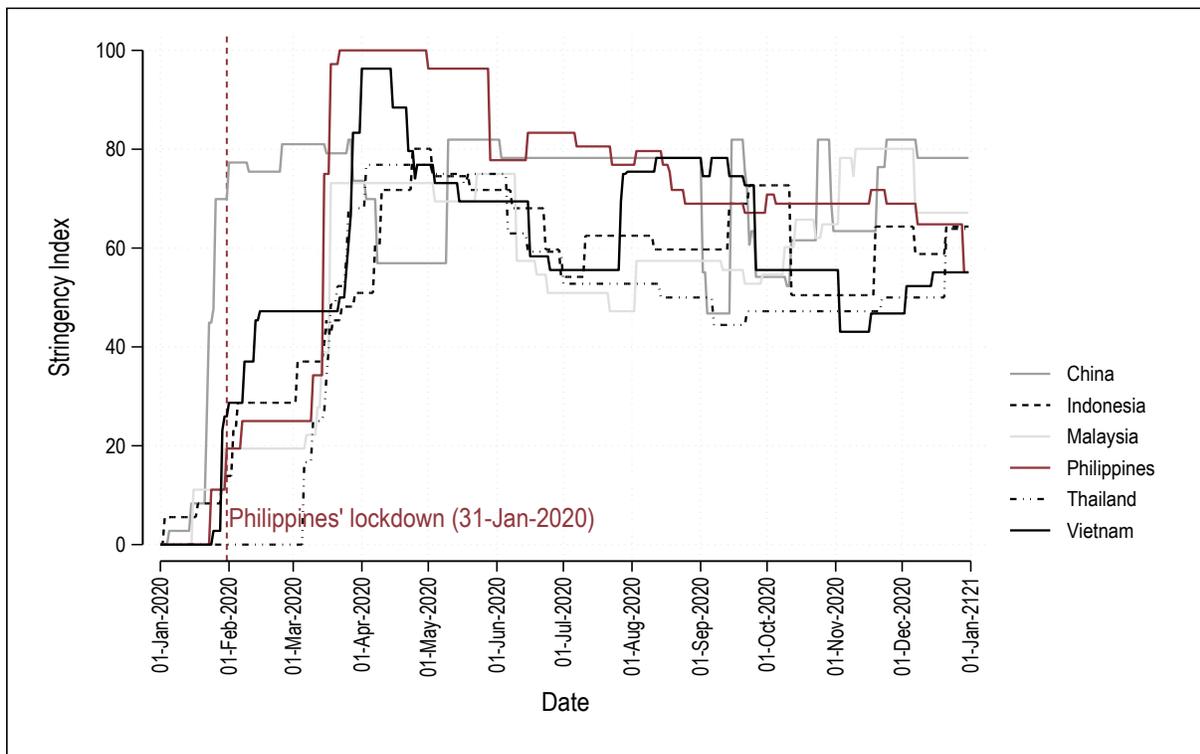


Figure 1: COVID-19 Stringency Index of the Philippines and nearby countries in 2020

Source: Author's compilation using data from Hale et al. (2020)

2.2 Trade data

Our export and import data is a monthly product-country data series obtained from the Philippine Statistics Authority (PSA). The data ranges from January 2019 to December 2020. Products are classified at 10-digit Harmonized System (HS) level.

[Table 1](#) displays descriptive statistics for our trade data. The average monthly product-country of destination exports from the Philippines between January 2019 and December 2020 was US\$ 553,417. The average monthly product-country of origin imports to the Philippines was US\$ 232,370 over the same period. Whereas the average monthly exports exceeded imports, reflecting a surplus trade balance, the Philippines has perennially had a trade imbalance. Thus, our surplus could indicate a massive drop in imports than exports during the lockdown period.

[Table 1](#) also shows that the average lockdown dummy for both exports and imports was 43%. Statistics of the level of stringency are also presented in [Table 1](#). It is a binary variable that is constructed from the aforementioned government stringency index which ranges from 0 to 100. Following Majune (2020), a country is classified as having high stringent measures if its average score is greater than the median (53 in our case) and vice versa for a low stringent country. We find that over half of the Philippines' trading partners had strict lockdown policies with export destinations being slightly sterner than importing countries.

Table 1: Descriptive Statistics

Variable	Obs.	Mean	Std. Dev.	Min	Max
Export trade					
Export value	243,526	553,417	5,570,730	25	458,000,000
Lockdown dummy	243,526	0.43	0.50	0	1
Stringency index	243,526	0.53	0.50	0	1
Import trade					
Import value	848,983	232,370	2,402,721	25	294,000,000
lockdown	848,983	0.43	0.50	0	1
Stringency index	848,983	0.50	0.50	0	1

Source: Authors' compilation using PSA data

3 Stylized facts on trade flows, dynamics and survival

3.1 Trends and composition of trade

[Figure 2](#) compares the trend of cumulative exports and imports in billion US\$ in 2019 and 2020 for the Philippines. Values for 2019 are included for purposes of bench-marking with those of 2020. Banning of international arrivals by the Philippines in late January 2020 is labeled as mild lockdown while the imposition of the remaining containment measures by mid-March 2020 is labeled as severe lockdown. We also present the period when lockdown measures were first relaxed, in late May 2020.

[Figure 2](#) reveals that the volume of exports in January and February 2020 slightly exceeded those of the same period in 2019. This implies that the mild lockdown did not have an immediate impact on exports. Export values for 2020 started to drift from those of 2019 in the third month. By the time all lockdown policies were applied, cumulative exports for 2020 were about US\$ 3.6 billion less than the 2019 value. This divergence persisted to the eighth month when values for the two countries started to shrink, though mildly. The value of cumulative exports in December 2019 surpassed that of December 2020 by over US\$ 7 billion.

[Figure 2](#) also shows that the value of imports in 2020 trailed that of 2019 for all months. The gap was about US\$ 0.3 billion in January but widened to US\$ 1.2 billion in February when a mild lockdown was imposed. The gap widened to US\$ 3.7 billion in March when all containment measures were in place. Unlike exports, the drift in import values for 2019 and 2020 expanded throughout the year. The difference in import values between the two years was approximately US\$ 26 billion in December. This is three times that of exports, for the same period, and suggests that the COVID-19 pandemic had a severer effect on imports than exports.

We now assess how the lockdown affected international trade in the Philippines by products ([Table 2](#)) and partners ([Figure 3](#)). [Table 2](#) presents the share of products in terms

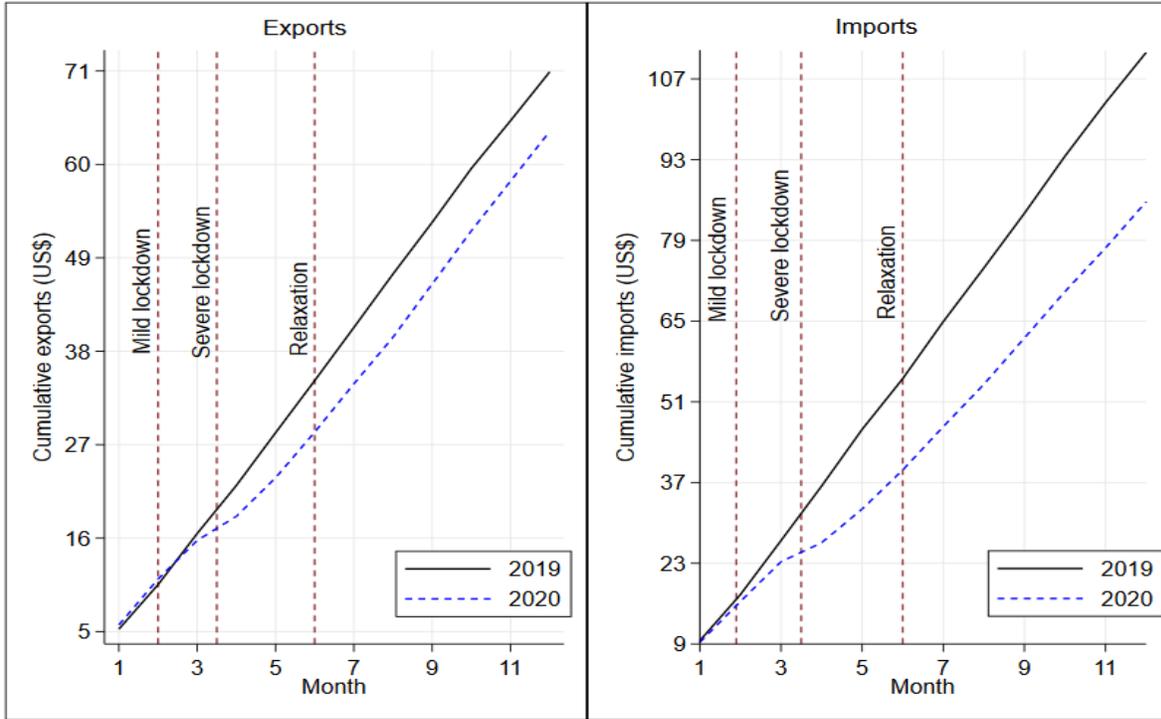


Figure 2: Cumulative exports and imports in 2019 and 2020

Note: Mild lockdown indicates the month when few restrictions were in place in the Philippines. Severe lockdown is the month when all measures were imposed. Relaxation is the first month when some lockdown measures were lifted

Source: Authors' compilation using PSA data

of values of exports and imports before and after trading partners of the Philippines imposed lockdown measures. It also displays the percentage point difference in exports and imports per product when lockdowns were introduced. We prioritize Components/Devices, Electronic Data Processing, Consumer Electronics, Ignition Wiring Sets, and Machinery and Transport Equipment because of their nature of being intermediate goods⁶ and thus vital in the Global Value Chain (GVC) trade. Intermediate goods boost trade (Hummels et al., 2001; Taglioni and Baldwin, 2014) and are more sensitive to geographic barriers (Hyun, 2018), such as lockdowns in our case than final goods. The Philippines like most East Asian countries is deeply integrated into GVC trade (Antràs, 2020; Mendoza, 2021). Therefore, assessing the reaction of the above-mentioned products to the lockdown offers insights into the impact of

⁶Refer to Hummels et al. (2001), Yi (2003) and Johnson and Noguera (2012) for definition.

COVID-19 on GVCs in the Philippines. All non-intermediate goods are classified as Other Products.⁷

Table 2 reveals that roughly 60% of exports in the Philippines were intermediate goods before and during the lockdown. This indicates that the Philippines largely participates in GVC trade through forward linkages.⁸ Components/Devices were the Philippines' highest exports before and during the lockdown (over 41%). They were followed by Electronic Data Processing, Machinery and Transport Equipment, Ignition wiring sets, and Consumer Electronics respectively.

The highest share of imports was within the category of Other Products before and under the lockdown,⁹ suggesting low backward GVC participation by the Philippines.¹⁰ Machinery and Transport Equipment dominated intermediate imports albeit with a significant drop during the lockdown. The column on difference indicates that exports of most products contracted upon imposition of lockdowns apart from Components/Devices and Consumer Electronics. Components/Devices exports increased by 2.6 percentage points while exports of Consumer Electronics rose by 0.18 percentage points. Exports of Other Products had the greatest decline (1.44 percentage points) when lockdowns were introduced. The share of imports for most products increased during the lockdown except Consumer Electronics (0.13 percentage points), and Machinery and Transport Equipment (4.61 percentage points). Components/Devices imports increased by 2.63 percentage points during the lockdown. It was also the only product whose total trade (exports and imports) increased during the lockdown.

China; Japan; the United States; Hong Kong SAR, China; the Republic of Korea; Singapore; Thailand; Indonesia; Taiwan, China; and Malaysia were the top ten export and

⁷Table A1 displays shares of top five Other Products and pre and during the lockdown in the Philippines.

⁸Forward GVC participation means a country mainly exports intermediate commodities that are used in other countries' exports. Backward linkages is when a country's exports are mainly composed of imported intermediate inputs. Latest data from OECD TiVA confirms relatively higher forward GVC participation of the Philippines.

⁹Specifically other manufactures, special transactions, chemicals, processed food and beverages and petroleum products as per Table A1.

¹⁰Latest data from OECD TiVA confirms relatively low backward GVC participation of the Philippines.

Table 2: Philippine’s export and import shares pre and during the lockdown

Product	Exports (% shares)		Imports (% shares)		Difference	
	Pre-lockdown	Lockdown	Pre-lockdown	Lockdown	Exports	Imports
Components/Devices	41.80	44.40	8.12	10.75	2.60	2.63
Electronic Data Processing	9.37	8.68	3.47	4.60	-0.69	1.12
Consumer Electronics	1.19	1.37	1.14	1.01	0.18	-0.13
Ignition wiring	3.30	2.94	0.07	0.07	-0.36	0.00
Machinery & Transport Equipment	3.76	3.47	15.73	11.12	-0.29	-4.61
Other Products	40.58	39.14	71.47	72.45	-1.44	0.98

Note: Lockdown represents months trading partners of the Philippines imposed restrictions

Source: Authors’ compilation using PSA data

import trade partners of the Philippines before and after the lockdown. Approximately 79% of exports from the Philippines were to these countries before the lockdown. The share rose to 82% after the lockdown. As for imports, these countries made up to 77% and 80% of imports by the Philippines before and after the introduction of the lockdown, respectively. The dominance of East Asian countries in the list of top trading partners suggests that international trade in the Philippines is mostly regional.

Of these countries, we observe from the upper right quadrant of [Figure 3](#) that the share of total trade (imports and exports) with China; Hong Kong SAR, China; Indonesia; Japan; and Singapore increased after the lockdown. Since these countries are neighbors of the Philippines, we infer that geographical connectivity factors of the gravity model (like distance, contiguity, and language) shaped the international trade of the Philippines during the pandemic. Malaysia and Taiwan, China are in the top left quadrant, indicating that the share of imports from them increased during the pandemic but that of exports dropped. The United States, Republic of Korea, and Thailand are in the left bottom quadrant implying that their export and import trade with the Philippines simultaneously contracted after the lockdown. The Rest of the World (RoW) is located in this quadrant and could be the reason for the drop in both import and export trade as shown in [Figure 2](#).

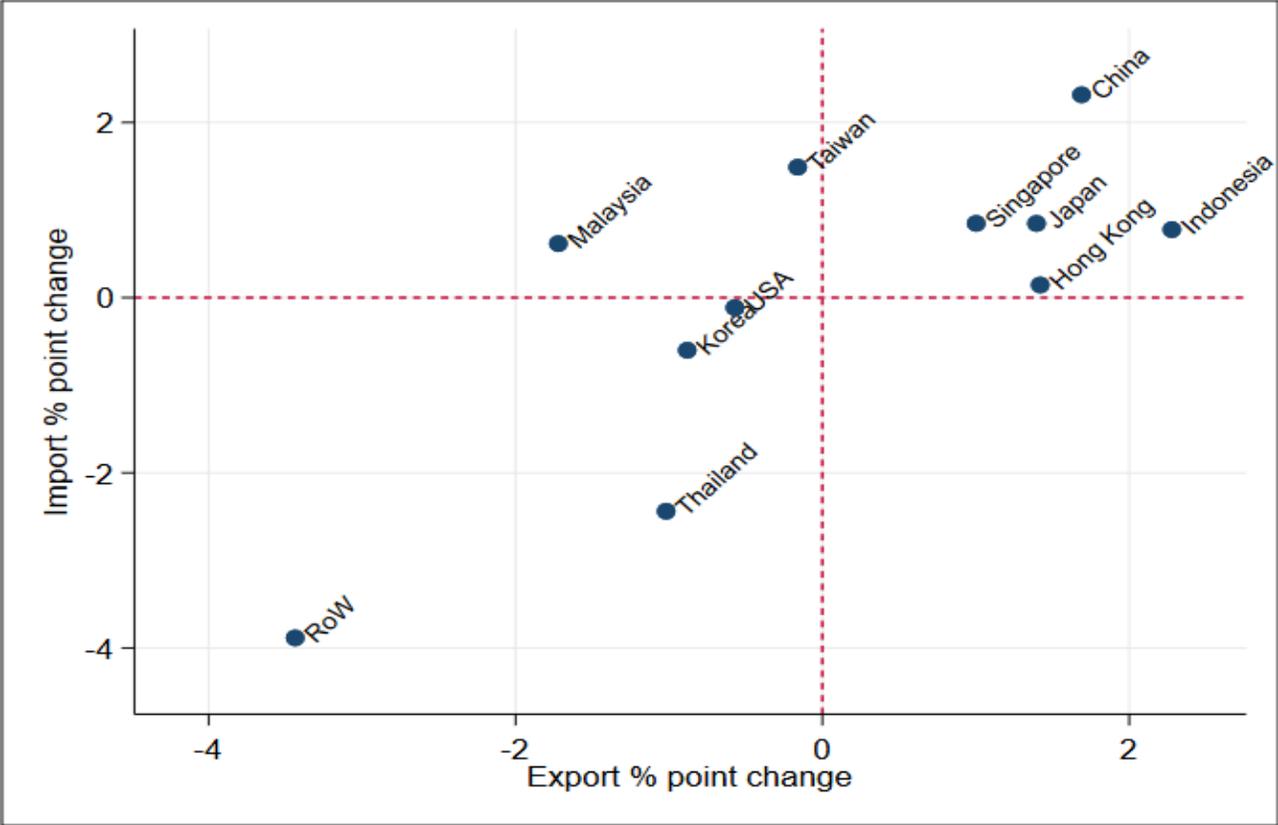


Figure 3: Philippine’s percentage point change in exports and imports by top-10 trading partners before and under the lockdown

Note: RoW (Rest of the World) includes non top-ten countries in terms of the volume of total trade (exports and imports) countries before and under the lockdown

Source: Authors’ compilation using PSA data

3.2 Trade dynamics

This section describes the trade dynamics of imports and exports by the Philippines before and after the lockdown was imposed. Trade dynamics is described through trade margins and trade survival. Trade margins are channels of tracking variations (value and volume) in trade flows, often decomposed into extensive and intensive. The extensive margin captures changes in trade arising from the number of products and markets while the intensive margin tracks changes in the export flow of existing trade ties (Besedeš and Prusa, 2011). Trade survival is the likelihood that a trade relationship stays active for a specific period. It is closely related to the intensive margin. However, the intensive margin evaluates the performance (value and quantity) of existing trade relationships at two points in time while trade survival measures

the probability of these relationships remaining active in the intervening period (Besedeš and Prusa, 2011).

Table 3 displays results of the overall export and import growth rates alongside growth by products, partners, and the intensive margin between February 2019 and December 2020. The month-by-month variation in the number of products and partners represents the extensive margin while the intensive margin represents the growth of continuous trade relationships (those that were active from February 2019 to December 2020). The lockdown is a binary indicator where one represents the months the lockdown was active in the Philippines (January-December 2020) and zero for the months before the lockdown (January-December 2019).

The second and sixth columns of Table 3 indicate that the growth of exports and imports in the Philippines was modest before the lockdown. It ranged from 15% to -11% for exports and 17% to -6% for imports. The reaction to the lockdown was instant, as the growth of both imports and exports contracted within the first three months of the lockdown. The effect was massive in April 2020 when both imports and exports grew by -52% and -38% respectively. Relaxation of the lockdown measures in May 2020 (see Figure 2) had an immediate effect on the growth of exports and imports. Exports grew by 60% in May while imports increased by 78% in the same month. The growth rate of imports and exports largely remained positive for most of the subsequent months, though with a low magnitude.

Table 3 also shows that the magnitude of variation in the number of products exported (column 4) often surpassed that of export partners (column 3) before and during the lockdown. This implies that the effect of the product extensive margin was stronger than the destination extensive margin, during the pandemic when exports are considered in the Philippines. Month-by-month variation in the number of products and partners was below 10% in the pre-lockdown period. However, the greatest impact of the lockdown was in April 2020 where the number of export products and partners reduced by 22% and 32% respectively. Relaxation of the lockdown in May 2020 had an instant effect as both the number of

products and partners increased by 38% and 19% respectively. Nonetheless, their variation was less than 10% after July 2020.

Columns 7 and 8 indicate that the variation in the number of trading partners had a larger influence on import growth than the number of products before the lockdown. However, the magnitude of variation in the number of products was larger than that of the number of partners in the first six months of the lockdown. Therefore, the variation in imports during this period was largely caused by product churning and entry. More importers left the Philippines' market compared to product churning and switching from October 2020.

The fifth and ninth columns of [Table 3](#) show the month-by-month growth of the intensive margin.¹¹ There was more contraction in the first four months of the lockdown for both exports and imports. Meaning that most existing trade relationships collapsed during the early periods of the lockdown. The growth in intensive margin for exports and imports was 60% and 57%, respectively, upon the relaxation of lockdown policies in May 2020 but the trend fluctuated thereafter albeit with a low magnitude. A deeper understanding of the intensive margin is demonstrated through survival analysis in [Figure 4](#), [Figure 5](#), and [Table 4](#).

[Figure 4](#) displays Kaplan–Meier (KM) export survival plots for export trade in the Philippines. The first quadrant shows the level of export survival at overall (product-destination-month), destination-month, and product-month levels for the 24 months of our study. We find that 37% of the Philippines' overall exports survived beyond the first month of trading and less than 10% survived past the seventh month. The survival rate was less than 7% for the period of the lockdown (from the thirteenth month). About two-thirds of exports survived beyond the first month of trading when the destination-month level is considered. Half of them survived beyond the second month and less than 30% throughout the

¹¹On average, 95% and 90% of variations in export and import values between February 2019 and December 2020 in the Philippines were from the intensive margin. The dominance of the intensive margin on trade growth is common among developing countries (Besedeš and Prusa, 2011).

Table 3: Philippines' Export, Import and Intensive Margin growth rates (February 2019-December 2020)

Month	Exports (%)				Imports (%)			
	Val	#Part	#Prod	IM	Val	#Part	#Prod	IM
Pre-lockdown								
2019m2	-1.14	7.14	1.01	-	-16.61	-4.26	-5.35	-
2019m3	15.30	0.00	4.86	14.66	17.42	5.93	4.68	22.78
2019m4	-6.26	-5.00	-9.18	-3.55	0.85	-4.90	-1.24	0.58
2019m5	9.73	0.58	8.09	7.00	4.23	6.62	0.40	4.18
2019m6	-0.82	1.74	-3.16	0.17	-10.76	-7.59	-1.64	-10.36
2019m7	1.54	2.86	5.80	2.06	12.51	3.73	1.93	12.80
2019m8	0.93	-2.78	-7.12	2.02	-5.86	-4.32	1.31	-7.49
2019m9	-3.54	2.29	7.21	-3.80	1.93	2.26	-2.42	2.02
2019m10	4.36	0.56	1.83	2.40	4.43	-3.68	1.71	2.68
2019m11	-11.45	-0.56	-4.77	-9.88	-6.36	9.16	-2.37	-3.41
2019m12	2.28	-1.68	-7.84	0.93	-6.14	-9.79	-2.42	-8.35
Lockdown								
2020m1	0.67	-4.55	5.13	-0.18	6.66	3.10	2.99	6.03
2020m2	-6.72	-5.36	-2.97	-6.46	-24.00	0.75	-13.01	-23.97
2020m3	-15.84	0.00	-8.63	-17.36	-2.12	-4.48	1.18	-0.32
2020m4	-37.59	-22.01	-31.83	-37.47	-52.53	-12.50	-18.63	-52.72
2020m5	60.10	18.55	38.16	59.54	78.35	17.86	19.42	56.76
2020m6	18.65	3.40	11.93	22.25	15.56	0.76	7.80	26.72
2020m7	5.43	5.92	3.31	7.24	11.54	4.51	2.51	14.63
2020m8	-3.18	1.86	-1.77	-2.92	-2.79	0.72	-2.25	-1.19
2020m9	13.72	7.93	6.52	13.16	9.69	2.86	2.43	9.91
2020m10	0.34	-1.13	3.82	-1.16	0.12	-4.17	0.46	0.82
2020m11	-6.68	-4.57	-3.84	-4.87	-5.84	-1.45	-1.03	-5.28
2020m12	0.01	-1.80	2.14	0.18	5.54	-1.47	1.12	2.00

Note: Val=Value, #Part=Number of partners, #Prod=Number of products and IM=Intensive Margin

Source: Authors' compilation using PSA data

lockdown period (after the twelfth month). The survival rate after the first month of trading was 47% when product-month spells are considered. A third of these relationships were active after the second month and less than 13% of them were active during the lockdown period.

Next, we explore the effect of the lockdown on export survival at each level. As defined earlier, the lockdown corresponds to the period when the lockdown was active in the Philippines (January-December 2020) and the months before the lockdown (January-December 2019). The graph on the top-right quadrant shows that overall export survival

under the lockdown was often slightly higher than the pre-lockdown level except for the third and fourth months when the lockdown was severe (see Figure 2). The graph on the bottom-left quadrant suggests that export survival by destination was highly affected by the lockdown. The gap in survival between the lockdown and pre-lockdown periods in the first two months was small but it widened after the lockdown became severe. The graph in the bottom-right quadrant reveals that the effect of the lockdown on export survival of products was mild except for the third and fourth months when the pre-lockdown survival rate marginally exceeded the lockdown rate. In summary, the effect of the lockdown on the survival of exports from the Philippines differed substantially across levels of analysis (overall, product and destination). The effect was more pronounced at the destination than overall and product levels, suggesting a surge in market exits during the lockdown.

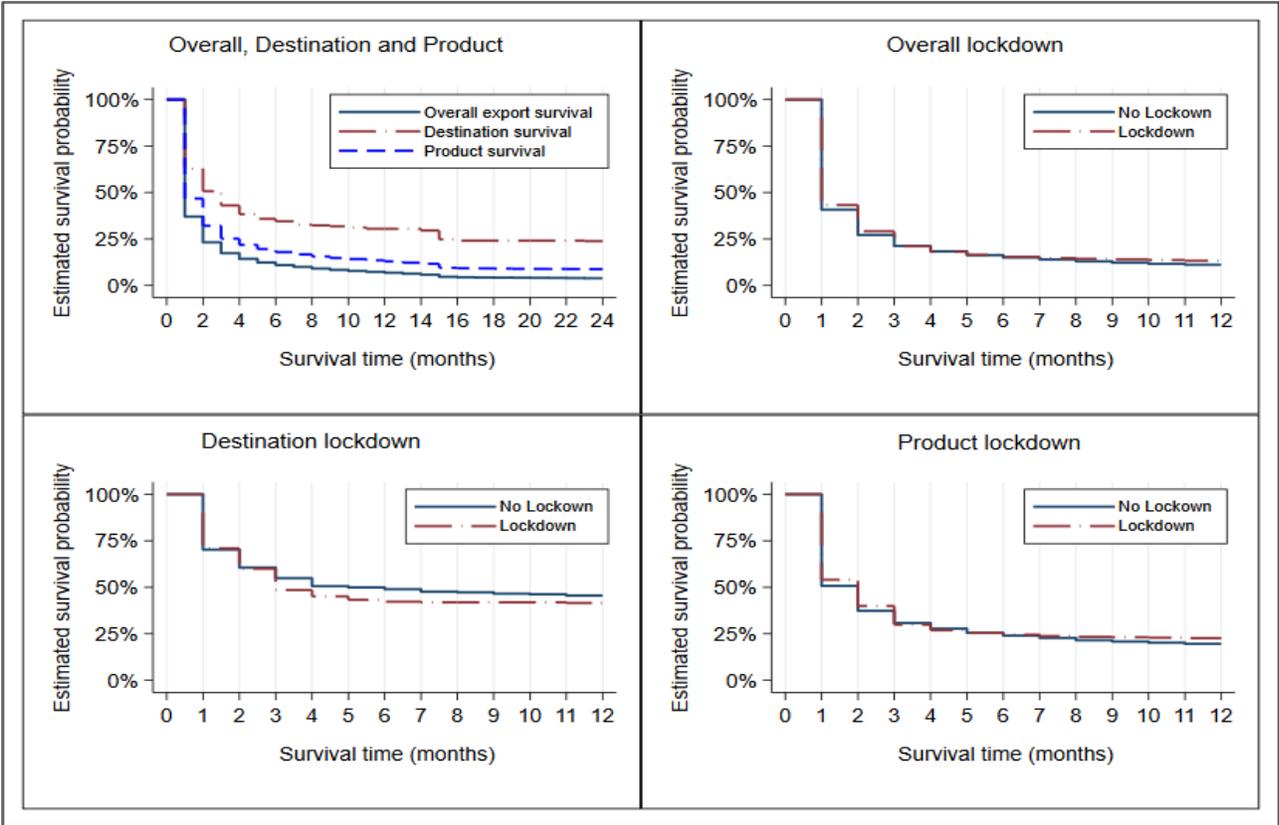


Figure 4: Philippine’s export survival before and under the lockdown
 Source: Authors’ compilation using PSA data

We replicate our results for imports in Figure 5. The upper-left quadrant shows that

survival of overall imports (product-destination-month) was lowest among the categories of analysis. About 40% of imports survived beyond the first month of trading and less than 7% of them survived beyond the twelfth month when the lockdown was imposed. The first-month survival rate for products and destinations was 60% and 53% respectively. However, survival of imports by destinations surpassed that of products after the twelfth month. This implies that the rate of product churning was higher than the market exit during the lockdown period in the Philippines.

The top-right graph displays overall import survival before and during the lockdown. Similar to exports, import survival under the lockdown exceeded the pre-lockdown level in the first two months. However, import survival under the lockdown temporarily trailed the pre-lockdown level between the third and the seventh month. Import survival by destination and products during the lockdown period was slightly below the pre-lockdown level as per the lower-left and lower-right panels respectively. This indicates that some importers exited the Philippines' market during the pandemic. Also, the importation of some products into the Philippines stopped during the pandemic.

[Table 4](#) reports results of export and import survival across products (intermediate and Other Products) and destinations (top ten and RoW) in the Philippines during the lockdown. We show survival rates after the first, sixth, and twelfth months of trading for each category. The mean and median duration of trading is also displayed.

The second and third columns of [Table 4](#) show that more than half of intermediate and Other Products survived after the first month of exporting. The survival of Other Products was higher than that of intermediate products by 4%. However, they lost this advantage by the mid and end of the year. The mean duration of exporting intermediate goods from the Philippines was 3.2 months while that of Other Products was slightly less, 3.1 months. Both sets of products had a median survival period of 1 month. Columns 4 and 5 show that the survival rate of exports from the Philippines to the top ten destinations was higher than that of the rest of the world for the entire period of the lockdown. Therefore, the low survival

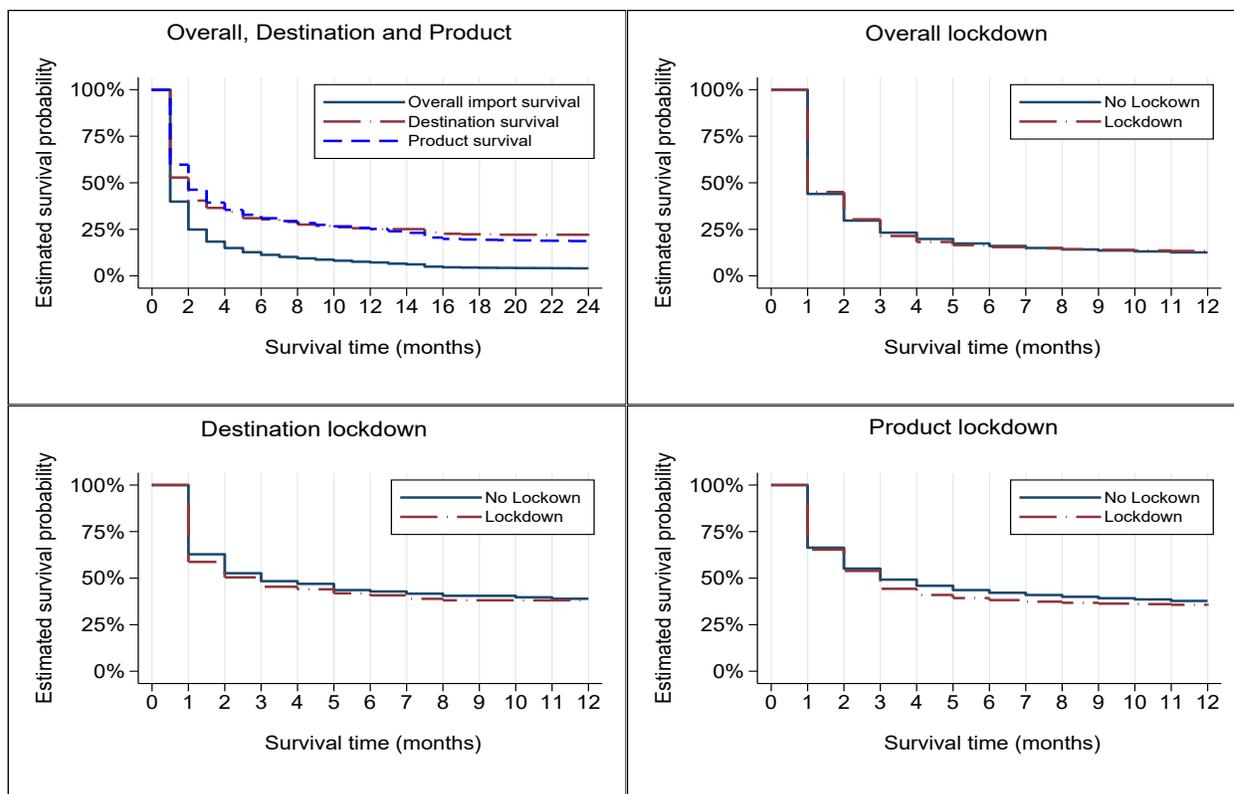


Figure 5: Philippine’s import survival before and under the lockdown

Source: Authors’ compilation using PSA data

rate across destinations, as observed in Figure 4, originated from the rest of the world. The mean survival period of exports to the top ten destinations of exports was 0.6 months higher than to the rest of the world during the lockdown.

The second part of Table 4 shows results for imports. Columns 2 and 3 indicate no major difference in survival rates of intermediate and Other Products. Roughly two-thirds of these goods survived beyond the first month of trading. The survival rates in the 6th and 12th months were 39% and 37% respectively. The mean and median duration of importing these products was around 4.5 months while the median period was 2 months. The last two columns show that the survival rate of imports from the top ten was 10% higher than that of the rest of the world for the entire period of the lockdown. The mean difference between the two categories of countries was 1 month.

Table 4: Philippine’s export and import survival by products and destination during the lockdown

Category	Exports			
	Product		Destination	
Survival dynamics	Intermediate	Other Products	Top ten	RoW
1 st month	51%	55%	47%	40%
6 th month	25%	24%	19%	12%
12 th month	24%	22%	17%	10%
Mean (months)	3.2	3.1	2.6	2
Median (months)	1	1	1	1
Imports				
1 st month	64%	65%	51%	38%
6 th month	39%	39%	20%	10%
12 th month	37%	37%	18%	8%
Mean (months)	4.4	4.5	2.8	1.8
Median (months)	2	2	1	1

Note: RoW is the rest of the world.

Source: Authors’ compilation using PSA data

4 Methodology

An event-study approach is employed to establish the effect of COVID-19 lockdown policies on international trade in the Philippines. This approach is preferred over impact-evaluation estimators such as the difference-in-differences (DiD) and Propensity Score Matching (PSM). DiD and PSM compare the outcome before and after a treatment has been imposed on a control and treatment group. Given that all countries in our sample imposed lockdowns, we do not have a non-treated control group (Majune and Addisu, 2021). Another advantage of the event-study approach is that it addresses concerns of lockdown anticipation. Since East Asia was the first epicenter of COVID-19, most countries started imposing restrictions earlier than the rest of the world (see Figure 1) which could have triggered the reaction of exporters and importers in the Philippines in anticipation of the imposition of lockdowns in partner countries. The event-study also enables us to observe the reaction of international trade to lockdown policies at high frequency (months) which often changed depending on the spread/wave of the virus in a country. The event-study model is specified as follows:

$$\ln(Y_{ipt}) = \alpha_t + \alpha_{it} + \alpha_{ig} + \sum_{j=-12}^{-2} \beta_j 1\{tdiff_g = j\} + \sum_{j=0}^{11} \beta_j 1\{tdiff_g = j\} + \gamma_{ipt} + \epsilon_{ipt} \quad (1)$$

where the dependent variable, Y_{ipt} , is a natural logarithm of bilateral export and import trade (values) between the Philippines (p) and its trading partners (g) across products (i) and time in months (t). Seasonality patterns are controlled for by month-time fixed effects (α_t) and product-month fixed effects (α_{pt}). α_t captures any secular variation in exports and imports during a month while α_{pt} controls for seasonality and inventory stocking patterns associated with high frequency data such as monthly (Bricongne et al., 2012). α_{ig} is the product-partner fixed effects that captures any product and partner characteristics that are correlated with lockdowns and trade flows. β_j is the coefficient indicating the magnitude of the effect of the lockdown on an export or import trade outcome j months before and after it was implemented. $tdiff_g$ is the number of months until and after the lockdown was imposed in a partner country. The period $j = -1$ is a month prior to the lockdown. It is used as the reference category when interpreting coefficients for other periods.

All periods $j < -1$ are utilized as leads to show the anticipatory effect of the lockdown after the start of the pandemic. Countries imposed lockdowns at different times in our sample following the first case of the virus in China. Hence, there is a possibility of anticipatory effects and failure to account for these effects can understate the effect of the lockdown policies (Majune, 2020). All periods $j > -1$ are considered as lags. Since the maximum period of our data is 24 months, we allow our leads to run up to 12 months¹² while our maximum lag period is 11 months since the earliest lockdown event for trading partners of the Philippines was in January 2020. γ_{ipt} is included to control for the effect of domestic lockdowns on the performance of trade. It contains dummies for the months the lockdown was active in the Philippines and zero for the months the lockdown was absent. ϵ_{ipt} is the

¹²2.8% of trading partners did not impose lockdowns for a period of more than 12 months. We bin these observations to our maximum lead period of 12 months.

error term.

Coefficients of monthly dummies before and after lockdown policies were imposed by trading partners of the Philippines from [Equation 1](#) are plotted in [section 5](#). The coefficients are interpreted as percentage changes having been transformed into elasticities.¹³ We present results for aggregate trade, product categories, and trade partners. Later, we conduct three sets of robustness checks. We start by establishing the effect of domestic lockdowns on import and export trade of the Philippines. Next, we test the effect of different measures of restrictions in partner countries on exports and imports of the Philippines. Lastly, we check for product-level differences by analyzing the effect of external lockdowns on imports and exports of similar commodities with similar trading partners.

5 Empirical Results

5.1 Results for aggregate trade

This section reports the results of the event-study model in [Equation 1](#) for total monthly export and import trade in the Philippines. In general, the average monthly drop for exports by value and quantity during the lockdown was 7% and 13% respectively as shown in [Figure 6](#).

The upper panel of [Figure 6a](#) displays coefficient plots of export values for the Philippines. We find that export values dropped immediately lockdowns were imposed. They contracted by 9% a month into the lockdown and consistently fell up to the third month when they started to recover. Coefficients of export values attained pre-lockdown levels by the eleventh month although they were statistically insignificant past the fifth month. Borrowing from [Figure 1](#), this could mean that the Philippines' exports positively reacted to the initial efforts by trading partners to relax lockdown measures but the irregularity in suspending these policies mildly affected export trade by values. Coefficients of exports by

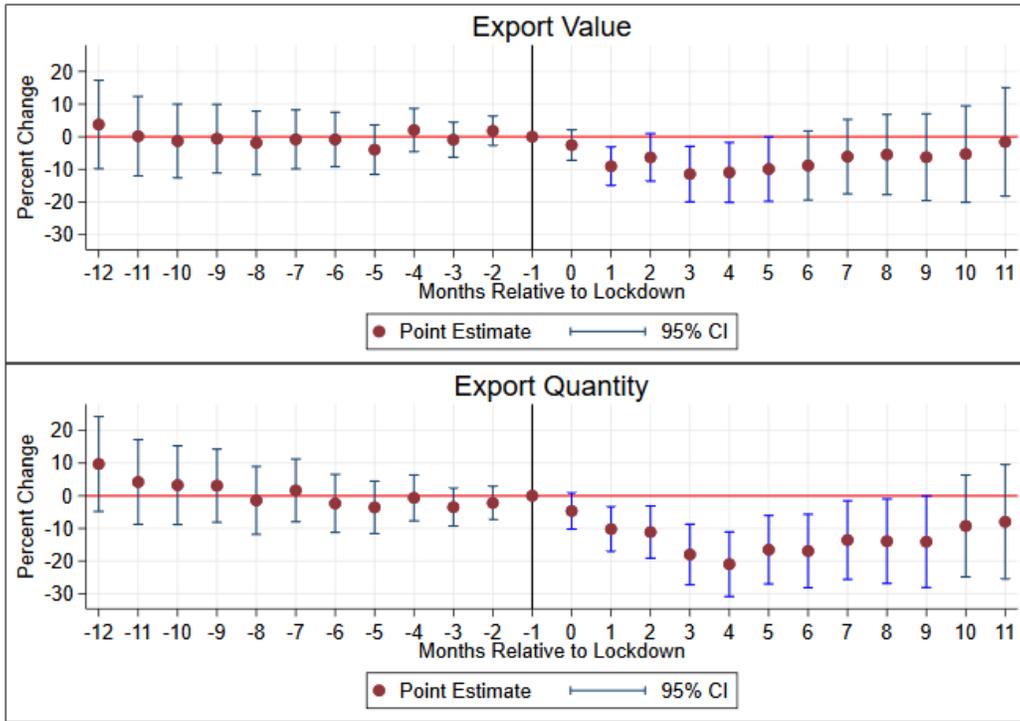
¹³Coefficients β_j were transformed into elasticities as follows $\beta_j=(\exp \beta_j-1)*100$. Refer to Ullah et al. (2021) and Clarke and Tapia-Schythe (2021) for a guide on conducting event-study analysis in Stata.

quantity in the Philippines were larger than those of export values as shown in the lower panel of [Figure 6a](#).

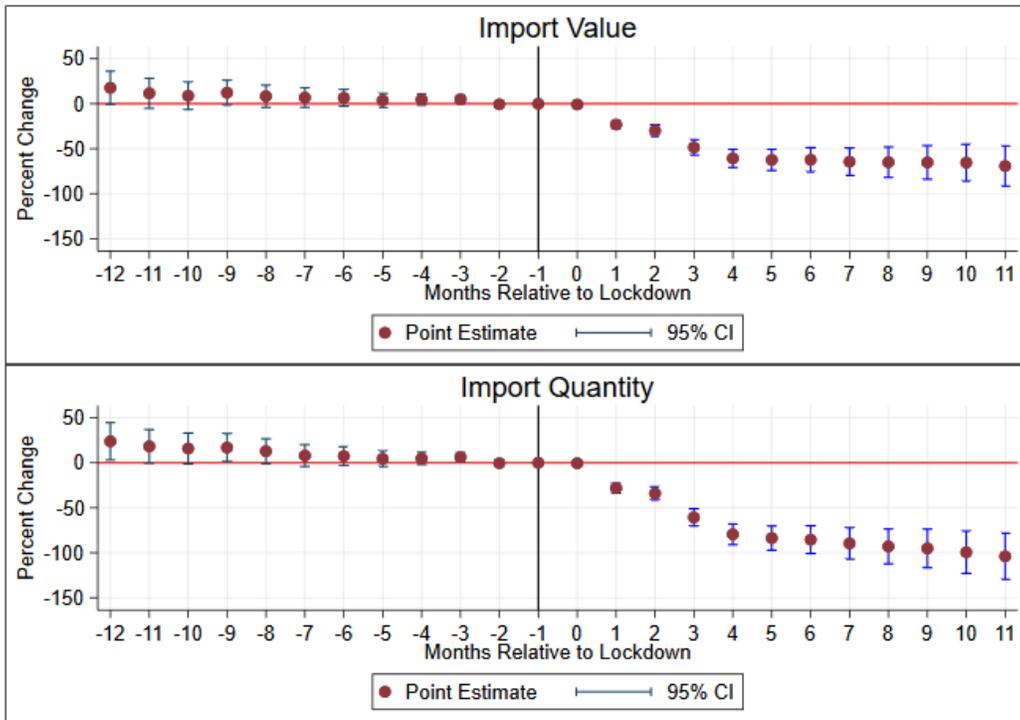
Export quantities fell by 10% in the first month of the lockdown and then shrunk by 11% in the second month, 18% in the third month, and 21% in the fourth month. They started to recover from the fifth month but did not attain pre-lockdown levels. Unlike export values, coefficients of exports quantities were larger and remained statistically significant up to the ninth month.

This could have three implications. First, the rise in export values and a modest increase in quantities might have been influenced by the volatility in the exchange rate that impacted commodity prices during the pandemic (Iyke, [2020](#); Feng et al., [2021](#)). Second, this signals a lag in export quantities in responding to changes in commodity prices. Third, the sensitivity of export quantities to lockdown measures months into their operation could signify adjustments to modes of transportation, especially from sea to air. Most airlines converted passenger planes to cargo to increase exports during the lockdown (Majune, [2020](#)). However, the capacity of air cargo is lower than that of sea cargo, causing export quantities to drop.

[Figure 6b](#) displays the impact of lockdowns on import values and quantities of the Philippines. The upper panel shows that import values dropped by 23% a month into the lockdown. The slump was persistent to the eleventh month when imports fell by 69%. Import quantities exhibited a negative growth for all the months lockdowns were active as shown in the lower panel of [Figure 6b](#). Starting with a 28% drop in the first month of lockdowns, import quantities dropped by 34% in the second month and consistently contracted to over 90% after the seventh month. Although both import values and quantities were by far below their pre-lockdown levels, the average monthly fall in quantities (78%) was greater than that of values (56%). Majune ([2020](#)) also found that the average weekly fall in import quantities (35%) exceeded the drop in import values (23.4%) in Kenya. Büchel et al. ([2020](#)), Du and Shepotylo ([2021](#)) and Minondo ([2021](#)) also find that import values declined in Switzerland,



(a) Export values and Quantities



(b) Import values and Quantities

Figure 6: Effects of lockdown policies on Philippines' Aggregate Trade

Note: Blue spike means a coefficient is significant

United Kingdom, and Spain ,respectively, during the lockdown.

In general, results from the event-study model suggests that imports were more affected by lockdowns than exports. This is in line with our conclusions in section 2.2 (summary statistics) and section 3.1 (trends) which suggests that demand-side shocks had a larger effect than supply-side shocks. Demand-side shocks stem from the strict implementation of lockdown policies which lowers the level of economic activity leading to a surge in unemployment and the collapse of businesses thereby reducing demand for imports (Hayakawa and Mukunoki, 2021a). We did not find evidence of anticipatory effects on exports as the coefficients for lead monthly periods were small and statistically insignificant. Conversely, we observed anticipatory effects for imports a few months to the lockdown. This could be attributed to the proximity of the Philippines to China where the virus originated. Next, we discuss event-study results for exports and imports by countries and products.

5.2 Results by products

[Figure A3](#) displays coefficients of the impact of the lockdown on exports and imports of intermediate goods. We do not find evidence that lockdowns had an effect on exports values of intermediate goods, as all the coefficients for the period the external lockdown was active are statistically insignificant (see the upper panel of [Figure A3](#)). This confirms our results in [Table 2](#) where Other Products had the largest drop in exports relative to intermediate products when lockdown measures were imposed. This results also implies that the forward linkages of GVC export trade of the Philippines was relatively resilient to foreign lockdowns.

Further analysis in [Figure 7](#) shows that the lockdown did not have a statistically significant effect on exports of Components, Electronic Data Processing and Ignition wiring sets. Exports of Consumer Electronics declined by 78% in the third month of the lockdown. This was followed by a 58% decline in the fourth month and 63% drop in the sixth month. Exports of machinery transport equipment improved, particularly after the second month of the lockdown, by a monthly average of 64%. This implies that machinery transport equipment

were the most demanded intermediate product from the Philippines during the pandemic.

The lockdown reduced exports of Other Products (non-intermediate goods), particularly between the first and eighth months where the coefficients are statistically significant. The monthly average drop of these exports from the first to the eighth month is 12%. Given that Other Products had the longest spell of export contractions of all commodities, we confirm our initial inference that this category of products was more affected by the lockdown than intermediate goods.

As for imports, we find that the effect of lockdown measures on imports of intermediate goods was instant as shown in the bottom panel of [Figure A3](#). These commodities dropped by 22% after the first month of lockdowns and consistently decelerated up to 62% in the fourth month followed by a slight improvement from the fifth month. We do not observe any anticipatory effects for intermediate goods. The results generally suggest that the fall in imports in the Philippines can be traced back to low backward GVC transactions which plunged by 18% according to Mendoza ([2021](#)). The Philippines' local supply system was disrupted during the pandemic causing low demand for imported products (Mendoza, [2021](#)).

[Figure A4](#) displays event-study plots for imports of categories of intermediate goods. We find no evidence that the lockdown affected Components, Ignition wiring sets and Electronic Data Processing imports. Imports of Consumer Electronics dropped by 59% in the first month of the lockdown and later shrunk by a monthly average of 175% between the third and ninth month. Machinery transport equipment imports declined by a monthly average of 74% for the entire period the lockdown was active in the Philippines. Imports of Other Products were reduced by an average of 57% during the lockdown period. Overall, the drop in Consumer Electronics, Machinery transport equipment and Other Products implies that these products are highly income elastic such that a negative shock on the earnings of households significantly diminishes their demand.¹⁴

¹⁴COVID-19 has led to mass unemployment collapse of businesses which reduces aggregate demand of households (Baldwin and Evenett, [2020](#)).

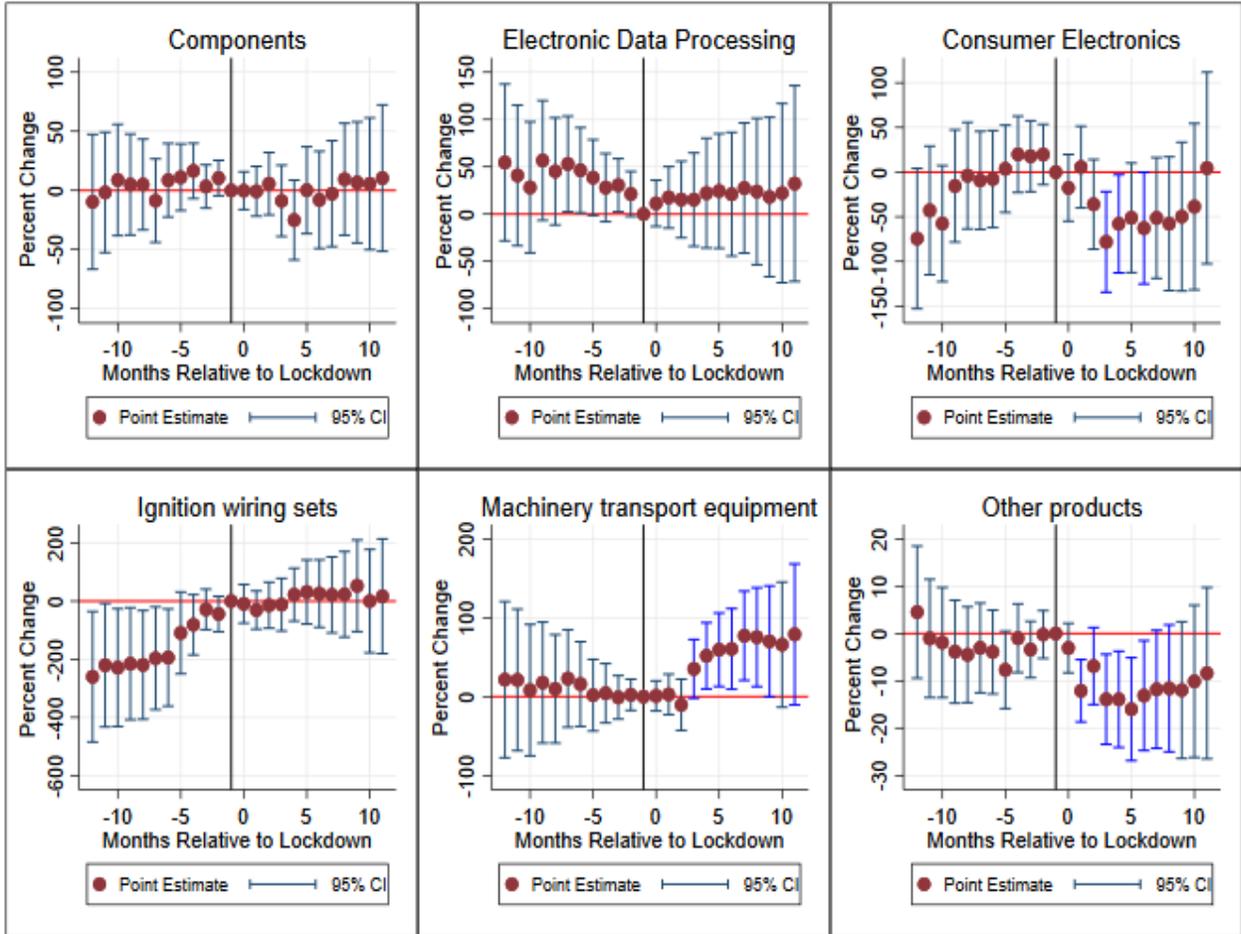


Figure 7: Effects of lockdown policies on the Philippines' export values by products

5.3 Results by trading partners

To further investigate the effect of lockdown policies on international trade, we estimated the event-study model for the top ten export and import trade partners and countries which imposed stringent COVID-19 measures. As earlier indicated, the top ten were responsible for at least 77% of overall international trade from the Philippines between 2019 and 2020. Hence, their reaction to COVID-19 is likely to have a significant effect on export and import trade of the Philippines. In this regard, we created a dummy variable with one being either China; Japan; the United States; Hong Kong SAR, China; the Republic of Korea; Singapore; Thailand; Indonesia; Taiwan, China; and Malaysia and zero otherwise. Similar to Majune

(2020), we also assessed the differential effect of applying lockdown policies among countries by distinguishing between those that were highly stringent and less stringent. From section 2.2, this is a dummy variable where one reflects high stringency (average > median government stringency index) and vice versa for a less strict country.

Figure A5 displays coefficient plots for event-study dummies with the top ten countries relative to the rest of the world. The upper panel shows that exports to the top ten only significantly declined in the first month of the lockdown. This implies that the drop in export flows (see Figure 6a), upon imposition of the lockdown, was influenced by non-top ten countries.

Country-specific analysis in Table 5 reveals that the lockdown significantly increased exports to China for most months. This could have been caused by the rise in foreign demand in China between the second and fourth quarters of 2020 (Islamaj et al., 2021). Exports to Hong Kong SAR, China, also increased and were statistically significant for the months the lockdown was active. Exports to the United States reduced in the first three months of the lockdown where the coefficients are statistically significant. They improved afterwards but they were statistically significant in the sixth month. We find no evidence of the effect of the lockdown on exports to Hong Kong SAR, China. Exports to the rest of the world declined, particularly between the fourth and eighth months where the coefficients were statistically significant.

Evidence from the lower panel of Figure A5 indicates that the imposition of lockdowns in the top ten significantly reduced their imports to the Philippines (-60% on average). Further analysis in Table A2 indicates that this drop was majorly influenced by the collapse in imports from China, Japan and the United States whose coefficients were negative and statistically significant for the entire period of the lockdown. Imports from Hong Kong SAR, China, also contracted under the lockdown and they were only statistically insignificant in the fourth, fifth and tenth months. Imports from the rest of the world improved within the first three months of the lockdown but later shrunk by a monthly average of 7%.

Table 5: Effects of lockdown policies on export trade by top five countries and RoW

Lockdown event dummies	China	Japan	United States	Korea, Rep.	Hong Kong SAR, China	RoW
Lead12	0.011 (10.861)	6.244 (7.238)	-6.067 (7.625)	-4.810 (9.467)	13.687 (11.002)	-1.990 (3.776)
Lead11	3.305 (10.491)	4.053 (7.120)	3.228 (8.066)	-0.556 (10.429)	9.660 (11.913)	-7.069* (3.628)
Lead10	22.921** (10.046)	-3.603 (6.975)	-7.901 (8.038)	5.803 (10.254)	16.350 (11.067)	-7.573** (3.546)
Lead9	27.264*** (10.253)	-9.594 (6.977)	-4.660 (8.016)	-6.764 (9.636)	14.152 (10.599)	-4.356 (3.527)
Lead8	23.908** (10.072)	-2.984 (6.703)	-7.901 (8.300)	-12.818 (10.078)	25.235** (10.211)	-6.604* (3.447)
Lead7	6.726 (10.323)	-11.770* (7.155)	4.585 (8.006)	1.094 (9.766)	28.949*** (10.557)	-4.151 (3.430)
Lead6	19.629** (9.712)	-8.496 (6.892)	2.963 (8.005)	5.549 (10.697)	26.804*** (10.351)	-5.731* (3.363)
Lead5	8.854 (10.372)	-16.307** (7.562)	6.169 (7.969)	-18.419* (9.668)	9.361 (11.180)	-5.256 (3.349)
Lead4	5.868 (9.599)	0.696 (6.313)	8.447 (7.388)	-14.616 (9.811)	22.778** (11.228)	-0.945 (3.159)
Lead3	15.406 (9.431)	3.448 (6.534)	-15.641** (7.747)	-9.503 (10.088)	7.185 (10.267)	-2.641 (2.955)
Lead2	5.363 (9.629)	-4.110 (6.385)	6.964 (7.511)	-9.391 (10.436)	5.941 (10.291)	1.212 (2.674)
Lag0	20.379** (9.708)	-11.787* (6.448)	7.968 (7.185)	-8.380 (9.989)	15.821* (9.583)	-0.547 (2.701)
Lag1	5.532 (9.838)	-6.044 (6.493)	-17.884** (7.723)	-3.669 (10.343)	-7.039 (10.578)	-2.021 (2.872)
Lag2	16.871* (9.963)	3.991 (6.488)	-30.158*** (10.118)	15.774 (12.004)	24.899** (10.333)	-2.337 (3.101)
Lag3	39.518*** (11.105)	-31.328*** (8.020)	-17.434** (8.177)	-1.363 (10.303)	34.881*** (12.073)	-5.424 (3.482)
Lag4	30.573*** (10.262)	-12.690* (6.836)	-0.081 (7.682)	-4.594 (10.183)	34.324*** (11.360)	-11.050*** (3.383)
Lag5	31.672*** (9.873)	-10.453 (6.398)	10.458 (7.971)	-1.919 (10.095)	39.619*** (10.555)	-13.096*** (3.334)
Lag6	25.663*** (9.883)	-7.116 (6.350)	15.596** (7.845)	-5.223 (10.710)	23.411** (10.797)	-13.033*** (3.344)
Lag7	11.720 (10.454)	-1.641 (6.099)	6.088 (8.153)	-9.043 (10.761)	13.489 (10.862)	-7.017** (3.392)
Lag8	3.465 (9.874)	5.099 (6.426)	8.964 (7.661)	-5.253 (10.163)	20.297* (10.886)	-8.091** (3.483)
Lag9	17.586* (10.250)	-6.622 (6.713)	-1.016 (8.091)	-13.557 (11.118)	22.018* (11.474)	-6.562* (3.506)
Lag10	21.672** (9.994)	-13.441* (6.923)	2.010 (8.259)	-12.301 (10.442)	22.353** (10.985)	-5.328 (3.998)
Lag11	31.481*** (9.786)	-13.012* (6.819)	- (-)	- (-)	27.380** (10.891)	-2.574 (4.550)
Constant	983.951*** (1.969)	983.141*** (2.022)	984.613*** (2.026)	984.149*** (1.955)	983.360*** (1.966)	985.420*** (3.223)
Observations	237,016	237,016	237,016	237,016	237,016	237,016
Number of pair_id	42,619	42,619	42,619	42,619	42,619	42,619
R-squared	0.012	0.012	0.012	0.011	0.012	0.011

Note: RoW is the Rest of the World. Estimation was conducted on the monthly trade data using a fixed effects estimator that accounts for cross-country-product heterogeneities.

Robust standard errors are reported in parentheses. Asterisk indicate the level of significance, *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Figure A6 reveals that imports were more affected by strict lockdown measures than exports. Exports to countries that had stringent COVID-19 policies fell by an average of around 12% between the first and third months of the lockdown where the coefficients are statistically significant. This result is contrary to Kenya where lockdowns reduced exports

to countries with strict measures (Majune, 2020). The lower panel of [Figure A6](#) shows that imports from countries with strict lockdown policies significantly fell for the entire period of the lockdown. Imports fell by 51% in the first month. This is more than double the drop in the first month of total imports (23%) as displayed in the top panel of [Figure 6b](#). The drop was massive between the second and third months and third and fourth months but eased afterwards. Majune (2020) found that Kenya’s imports from countries that applied strict lockdown controls increased by an average of 24%.

5.4 Results by trade margins

This section presents event-study results of the effect of the lockdown on trade margins. Following Besedeš and Prusa (2011), we define the extensive margins as the total number of products traded (exported or imported) with a specific trade partner in a particular month. The intensive margin is the average sales per product by month and trading partner. Both the intensive and extensive margins are analyzed in their natural log form. As before, the lockdown is a binary variable where one indicates the month when a lockdown was imposed by Philippines’ trading partner and zero otherwise.

[Figure A7a](#) indicates that the extensive margin of exports was more affected by the lockdown compared to the intensive margin of exports. The average effect of the lockdown on export extensive margin was -4.6% and 7.6% for export intensive margin. This result implies that the extensive margin played a bigger role in reducing the growth of exports than the intensive margin during the pandemic. In contrast, the intensive margin was responsible for variations in exports during the global financial crisis of 2008 (Bricongne et al., 2012; Douch et al., 2021).

Thus, the pandemic resulted in more product churning and exit while increasing average sales per product in existing markets. Containment measures such as social distancing, that hinder interactions among people, might have reduced the potential of businesses to create new relationships and launch new products in foreign markets. Supply shocks could also have

played a role in the exit of new firms and products as the closure and slow clearance of goods at the border points decreased the rate of cross-border supply. The production of exportables could also have been affected by measures such as the closure of workplaces and curfews which affected firm productivity in the Philippines during the pandemic. Exports from the Philippines could also have been affected by demand shocks in destination markets.¹⁵

Table A3 and Table A4 present event-study results for extensive and intensive margins of exports by products respectively. Table A3 reveals that the fall in the extensive margin was because of the collapse of the extensive margin of exports of components and Other Products. The extensive margin of Electronic Data Processing exports was positive but with sporadic periods of statistical significance. They grew by 5% and 6% in the fourth and fifth months and later, from the ninth to the eleventh month, by over 8%. This suggests that the introduction of new Electronic Data Processing products in markets was evident during the pandemic. Consumer Electronics only reduced in the second month of the lockdown. We find no evidence of the impact of the lockdown on the extensive margin of Ignition wiring and Machinery and Transport Equipment exports.

The intensive margin of exports in Table A4 was boosted by Other Products which grew by a monthly average of 8% during the lockdown. The intensive margin of Components decreased by 5% in the first month of the lockdown and later rose by 6% in the second month but the coefficients are statistically insignificant for the remainder of the period. The intensive margin of Electronic Data Processing exports improved by an average of 13.5% between the second and fifth month when the coefficients are statistically significant. The effect of the lockdown on the intensive margin of Consumer Electronics was only evident in the first month where it dropped by 11%. The intensive margin of Ignition wiring exports was mainly affected in the first month and tenth month of the lockdown. The lockdown's effect on the intensive margin of Machinery and Transport Equipment exports was positive but sporadic across months.

¹⁵Refer to Hayakawa and Mukunoki (2021a) and Hayakawa and Mukunoki (2021b) for explanation of the channels through which COVID-19 has affected international trade.

The import extensive margin also contracted while the intensive margin improved as per [Figure A7b](#). Again indicating that businesses struggled to create new trade relationships and introduce new products into the Philippines during the pandemic. The average growth in the extensive margin and intensive margin for imports was -3.9% and 16% respectively.

[Table A5](#) shows that the decline in import extensive margin was a result of a drop in the extensive margin of Components, Ignition wiring and Other Products. The import extensive margin of Components contracted for the entire period of the lockdown by a monthly average of 15%. The import extensive margin of Ignition wiring products declined by a monthly average of 18% in the first six months of the lockdown and by a monthly average of 31% after the seventh month. The import extensive margin of Other Products dropped in the first two months of the lockdown by an average of 7%. It later declined by 3% in the fourth and fifth months and consistently declined from the eight to the eleventh month by an average of 5.7%. The lockdown only effected extensive margin Electronic Data Processing, Consumer Electronics, and Machinery and Transport Equipment imports in the first two months.

The import intensive margin was boosted by intermediate goods (except Electronic Data Processing) and Other Products during the lockdown (see [Table A6](#)). The import intensive margin of all products declined in the first month of the lockdown but later improved at different intervals. For instance, Components improved by a monthly average of 44% after the fourth month of the lockdown. Consumer Electronics grew by an average of 68% from the sixth to the eleventh month of the lockdown while Ignition wiring, and Machinery and Transport Equipment grew by an average of 52% and 33%, respectively, after the first month of the lockdown. The intensive margin of Other Products shrunk by 6% in the first month of the lockdown but later grew by about 4% in the second month and 26% between the sixth and eleventh month. In general, the lockdown improved the intensive margin but reduced the extensive margin for both exports and imports in the Philippines.

5.5 Robustness checks

Extra analysis is conducted in this section to verify our results. First, we establish the effect of the lockdown imposed by the Philippines on its bilateral trade. The lockdown measures by the Philippines (see discussion in [section 2.1](#)) have the potential of disrupting imports through a slump in domestic demand and exports through reduced production of export commodities by firms. For this analysis, we define a lockdown as a binary variable with one indicating months when the Philippines strictly imposed restrictions (from March 2020) and zero otherwise. Therefore, the number of months until and after the lockdown was imposed is uniform across observations.¹⁶ The maximum period of lags, in this case, is 9 months (April-December 2020) and 14 months for the lead period (January 2019-February 2020). Month-time fixed effects, partner-month fixed effects and product-month fixed effects are included to control for potential endogeneity.

[Table 6](#) presents event-study coefficients for exports and imports by value and quantity. The second column reveals that the value of exports from the Philippines dropped when the domestic lockdown was active. The magnitude of the coefficients is higher than that of the baseline results in [Figure 6a](#). The quantity of exports declined after three months of the lockdown (from July 2020) as per the third column. However, all coefficients in columns 2 and 3 are statistically insignificant, implying that domestic lockdown measures did not affect exports from the Philippines. The fourth and fifth columns show that the impact of the domestic lockdown on imports was negative but statistically insignificant. Therefore, domestic lockdown measures by the Philippines did not affect its international trade.

Nonetheless, these results are sensitive to the type of fixed effects that are used. [Table A8](#) displays event-study coefficients for the domestic lockdown with only the month-time fixed effects (without product-month and product-partner fixed effects). We find that domestic lockdowns did not have a statistically significant effect on exports but both import values and quantities declined by a monthly average of about 361%. Since these coefficients

¹⁶This is defined as $tdiff_p$ similar to $tdiff_g$ in [Equation 1](#).

are larger than those of the baseline model (Figure 6b), they imply that domestic lockdown policies had a higher effect on the drop in imports than external policies.

The second robustness check entails testing the effect of different measures of restrictiveness in partner countries on exports and imports of the Philippines. We assume that different measures adequately capture the severity of the impact of the lockdown restrictions on trade flows as opposed to a composite indicator. To do this, we test the effect of workplace closure, stay-at-home requirements, restrictions on internal movement, and international travel controls on bilateral export and import values of the Philippines.¹⁷ We assess the average effect of lockdown indicators for all the months that they were active (overall) and at intervals of 1-3 months, 4-6 months, 7-9 months and 10-11 months. This gives a glimpse of their effects over time.

About 36% of trading partners of the Philippines imposed policies on workplace closure. About 32% of them imposed stay-at-home requirements, and restrictions on internal movement. Close to 42% of partners instituted controls on international travel. The upper panel of Table A7 indicates that closure of workplaces, restrictions on internal movement, and international travel controls had adverse effects on exports, in general. The average monthly effect was highest for restrictions on internal movement (-5%), and international travel controls (-4.7%). The overall effect from the stay-at-home requirement was positive (4.5%). However, it was negative and significant in the first month. The negative effect of workplace closure on exports was only severe in the first three months. Also, it was only statistically significant in the first two months. The adverse effects of restrictions on internal movements, and international travel controls were active throughout the lockdown period. The coefficient of internal movements was statistically significant in the first three months and the ninth and tenth months. Coefficients for international travels were significant in the third and fourth months of the lockdown.

The lower panel of Table A7 shows that all the lockdown indicators reduced import

¹⁷Each indicator is a dummy variable for the months that they were active in a partner country.

Table 6: Effects of PH lockdown policies on its export and import trade

Lockdown event dummies	Export value	Export quantity	Import value	Import quantity
Lead14	-17.175 (62.466)	68.871 (72.963)	-387.447*** (138.960)	-362.702** (141.047)
Lead13	-16.577 (50.014)	55.537 (57.619)	-407.726*** (124.583)	-388.132*** (128.420)
Lead12	-10.657 (50.179)	41.271 (56.845)	-325.559*** (115.160)	-288.970** (118.536)
Lead11	3.653 (42.900)	75.148 (53.652)	-310.940*** (112.382)	-295.110** (117.824)
Lead10	-2.288 (40.875)	52.657 (47.299)	-303.603*** (95.906)	-259.155*** (100.382)
Lead9	-19.585 (39.438)	46.125 (46.206)	-260.634*** (88.876)	-252.310*** (96.657)
Lead8	35.136 (35.200)	65.661 (44.911)	-221.388*** (83.145)	-174.882** (85.772)
Lead7	-28.043 (35.546)	6.475 (46.027)	-272.991*** (76.487)	-242.466*** (79.867)
Lead6	0.130 (32.454)	47.862 (41.584)	-183.414*** (68.329)	-150.583** (68.519)
Lead5	1.055 (31.349)	25.113 (38.952)	-186.607*** (68.282)	-191.841*** (68.691)
Lead4	-30.587 (27.575)	25.887 (36.311)	-149.440*** (48.381)	-109.007** (48.336)
Lead3	-12.207 (25.091)	2.765 (29.793)	-26.218 (41.885)	-50.175 (42.205)
Lead2	-2.229 (31.652)	9.785 (50.305)	-56.942* (32.347)	-20.457 (34.474)
Lag0	-9.357 (56.128)	17.588 (62.262)	-79.845 (77.656)	-105.788 (81.106)
Lag1	-21.245 (50.554)	11.347 (62.033)	-27.555 (77.704)	-61.241 (74.505)
Lag2	-22.359 (48.822)	-2.877 (52.224)	-32.622 (66.657)	-60.719 (67.755)
Lag3	-17.406 (44.439)	5.252 (54.473)	-19.429 (59.706)	-41.418 (59.326)
Lag4	-39.523 (41.074)	-46.982 (48.523)	-5.294 (54.306)	-68.011 (55.190)
Lag5	-2.393 (41.051)	-6.701 (47.574)	-13.549 (45.666)	-38.502 (46.742)
Lag6	-17.121 (32.130)	-3.925 (42.357)	-32.666 (33.183)	-50.086 (36.617)
Lag7	-5.367 (28.022)	6.524 (38.684)	-29.424 (37.709)	-46.100 (36.186)
Lag8	-41.028 (32.638)	-27.619 (41.821)	- -	- -
Lag9	- -	- -	-9.744 (31.496)	-20.598 (27.281)
Constant	918.692*** (78.346)	549.824*** (87.163)	1266.384*** (153.775)	892.179*** (154.173)
Observations	243526	243526	848983	848983
Number of pair id	44792	44792	120298	120298
R-squared	0.011	0.020	0.017	0.027

Note: Estimation was conducted on the monthly trade data using a fixed effects estimator that accounts for cross-country-product heterogeneities. Robust standard errors are reported in parentheses. Asterisk indicate the level of significance, *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

values. Closure of workplaces had the highest monthly overall effect (-28%) followed by stay-at-home requirements (-19%), restrictions on internal movement (-17%), and international travel controls (-11%). The effects of workplace closure, stay-at-home requirements and restrictions on internal movements were severe in the first nine months while that of international travel controls was severe after the third month. The coefficients of these indicators were largely significant across the period they were active.

Lastly, we perform extra analysis to establish whether product-level differences exist when trading with the same partner. It has been shown in [Figure 7](#) and [Figure A4](#) that the effect of external lockdowns was varied for related export and import products. We check for product-level differences for trade in Components, Electronic Data Processing, and Machinery and Transport Equipment between the Philippines and China ([Table A9](#)), and the United States ([Table A10](#)). China is preferred being the largest trading partner of the Philippines while the United States is the only non-East Asian top-ten trading partner of the Philippines.

[Table A9](#) reveals that product differences exist when trading with China. Despite being statistically significant for only the first month of the lockdown, exports of Electronic Data Processing to China increased while the imports slumped. The difference in the direction of the lockdown's effect is more pronounced in Machinery and Transport Equipment products. Their imports collapsed while exports increased. Furthermore, imports were statistically significant for more months than exports. Exports and imports of all products declined for most months that the lockdown was active when trade with the United States is considered in [Table A10](#). However, imports were statistically significant for most months compared to exports.

6 Conclusion

This study sought to analyze the effect of COVID-19 lockdown policies on export and import trade in the Philippines. We applied an event-study analysis on a monthly-product-country data series ranging from January 2019 to December 2020.

We found that both exports and imports dropped upon imposition of the lockdown by trading partners of the Philippines. We find no evidence that the domestic lockdown (i.e., by the Philippines) affected exports and imports of the Philippines. Restrictions on internal movements and international travel controls in partner countries were responsible for the drop in exports. The slump in imports was because of workplace closure, stay-at-home requirements, restrictions on internal movement, and international travel controls in trading partners of the Philippines.

Further analysis revealed that lockdowns in the Philippines' smaller trade partners were key in driving the decline in exports to those countries while larger trading partners (top ten partners) were responsible for the fall in imports. In addition, the drop in exports can be attributed to the slump in Other Products (non-intermediate products), while intermediate goods (particularly Consumer Electronics, Machinery transport equipment) and Other Products were responsible for the decline in imports. Therefore, export GVC trade was robust to the lockdown while backward GVC trade declined during the pandemic. Finally, both exports and imports were more affected at the extensive margin than the intensive margin when the lockdown was imposed. This indicates that lockdown measures hindered interactions among people, in turn reducing the potential of businesses to create new relationships and launch new products in foreign markets.

Since lockdowns affected entire countries and regions, domestic production or regionally based supply chains would not have prevented the disruption to production systems. GVCs through extensive supply chain networks with diversified and geographically dispersed suppliers can help countries adjust better and contribute to speedy recovery and possible resilience to future shocks.

References

- Antràs, P. (2020). Conceptual aspects of global value chains. *The World Bank Economic Review*, 34(3), 551–574. <https://doi.org/10.1093/wber/lhaa006>
- Baldwin, R., & Evenett, S. (2020). *Covid-19 and trade policy: Why turning inward won't work*. Centre for Economic Policy Research (CEPR). <https://voxeu.org/content/covid-19-and-trade-policy-why-turning-inward-won-t-work>
- Bernard, A. B., Jensen, J. B., Redding, S. J., & Schott, P. K. (2009). The margins of us trade. *American Economic Review*, 99(2), 487–93.
- Bertulfo, D. J. (2020). *Covid-19 labour market impact in the philippines: Assessment and national policy responses*. ILO Country Office for the Philippines, Manila, Philippines. <https://www.voced.edu.au/content/ngv:89581>
- Besedeš, T., & Prusa, T. J. (2011). The role of extensive and intensive margins and export growth. *Journal of development economics*, 96(2), 371–379. <https://doi.org/10.1016/j.jdeveco.2010.08.013>
- Bricongne, J.-C., Fontagné, L., Gaulier, G., Taglioni, D., & Vicard, V. (2012). Firms and the global crisis: French exports in the turmoil. *Journal of international Economics*, 87(1), 134–146. <https://doi.org/10.1016/j.jinteco.2011.07.002>
- Büchel, K., Legge, S., Pochon, V., & Wegmüller, P. (2020). Swiss trade during the covid-19 pandemic: An early appraisal. *Swiss journal of economics and statistics*, 156(22), 1–15. <https://doi.org/10.1186/s41937-020-00069-3>
- Castañeda-Navarrete, J., Hauge, J., & López-Gómez, C. (2020). Covid-19's impacts on global value chains, as seen in the apparel industry. *Development Policy Review*. <https://doi.org/10.1111/dpr.12539>
- Che, Y., Liu, W., Zhang, Y., & Zhao, L. (2021). China's exports during the global covid-19 pandemic. *Frontiers of Economics in China*, 15(4), 541–574. <https://doi.org/10.3868/s060-011-020-0023-7>

- Clarke, D., & Tapia-Schythe, K. (2021). Implementing the panel event study. *The Stata Journal*, 21(4), 853–884. <https://doi.org/10.1177/1536867X211063144>
- Douch, M., Edwards, T. H., Van Hove, J., & Kren, J. (2021). The great trade collapse and the determinants of uk export margins: A cohort-and firm-level matching approach. *The World Economy*, 44(10), 2838–2857.
- Du, J., & Shepotylo, O. (2021). Uk trade in the time of covid-19: A review. *The World Economy*.
- Egger, P. H., & Zhu, J. (2021). How covid-19 travels in-and outside of value chains and then affects the stock market: Evidence from china. *The World Economy*. <https://doi.org/10.1111/twec.13134>
- Erokhin, V., & Gao, T. (2020). Impacts of covid-19 on trade and economic aspects of food security: Evidence from 45 developing countries. *International journal of environmental research and public health*, 17(16), 5775. <https://doi.org/10.3390/ijerph17165775>
- Espitia, A., Mattoo, A., Rocha, N., Ruta, M., & Winkler, D. (2021). Pandemic trade: Covid-19, remote work and global value chains. *The World Economy*. <https://doi.org/10.1111/twec.13117>
- Evenett, S. J. (2020). Sicken thy neighbour: The initial trade policy response to covid-19. *The World Economy*, 43(4), 828–839. <https://doi.org/10.1111/twec.12954>
- Feng, G.-F., Yang, H.-C., Gong, Q., & Chang, C.-P. (2021). What is the exchange rate volatility response to covid-19 and government interventions? *Economic Analysis and Policy*, 69, 705–719. <https://doi.org/10.1016/j.eap.2021.01.018>
- Gopinath, G., & Neiman, B. (2014). Trade adjustment and productivity in large crises. *American Economic Review*, 104(3), 793–831.
- Hale, T., Petherick, A., Phillips, T., & Webster, S. (2020). *Variation in government responses to covid-19*. Oxford, UK: Blavatnik School of Government.

- Hayakawa, K., & Mukunoki, H. (2021b). The impact of covid-19 on international trade: Evidence from the first shock. *Journal of the Japanese and International Economies*, 60, 101135. <https://doi.org/10.1016/j.jjie.2021.101135>
- Hayakawa, K., & Mukunoki, H. (2021a). Impacts of covid-19 on global value chains. *The Developing Economies*. <https://doi.org/10.1111/deve.12275>
- Hayakawa, K., & Mukunoki, H. (2021c). Impacts of lockdown policies on international trade. *Asian Economic Papers*, 73–91. https://doi.org/10.1162/asep_a_00804
- Hummels, D., Ishii, J., & Yi, K.-M. (2001). The nature and growth of vertical specialization in world trade. *Journal of international Economics*, 54(1), 75–96. [https://doi.org/10.1016/S0022-1996\(00\)00093-3](https://doi.org/10.1016/S0022-1996(00)00093-3)
- Hyun, H.-J. (2018). Institutional quality and trade in intermediate goods. *Journal of Korea Trade*, 22(2), 162–186. <https://doi.org/10.1108/JKT-02-2018-0009>
- IMF. (2021). *World economic outlook update: Fault lines widen in the global recovery*. International Monetary Fund. <https://www.imf.org/en/Publications/WEO/Issues/2021/10/12/world-economic-outlook-october-2021>
- Islamaj, E., Ruch, F. U., & Vashakmadze, E. (2021). *Demand and supply dynamics in east asia during the covid-19 recession*. World Bank, Malaysia. <https://openknowledge.worldbank.org/bitstream/handle/10986/35671/Demand-and-Supply-Dynamics-in-East-Asia-During-the-COVID-19-Recession.pdf?sequence=1>
- Iyke, B. (2020). The disease outbreak channel of exchange rate return predictability: Evidence from covid-19. *Emerging Markets Finance and Trade*, 56(10), 2277–2297. <https://doi.org/10.1080/1540496X.2020.1784718>
- Javorcik, B. (2020). Reshaping of global supply chains will take place, but it will not happen fast. *Journal of Chinese Economic and Business Studies*, 18(4), 321–325. <https://doi.org/10.1080/14765284.2020.1855051>

- Johnson, R. C., & Noguera, G. (2012). Accounting for intermediates: Production sharing and trade in value added. *Journal of International Economics*, 86(2), 224–236. <https://doi.org/10.1016/j.jinteco.2011.10.003>
- Majune, S. (2020). *The effect of lockdown policies on international trade flows from developing countries: Event study evidence from Kenya*. World Trade Organization. https://www.wto.org/english/news_e/news20_e/rese_15dec20_e.pdf
- Majune, S., & Addisu, L. (2021). *The effect of lockdown policies on international trade flows from developing countries: Event study evidence from Kenya (working paper 148)*. Brookings Institution. <https://www.brookings.edu/wp-content/uploads/2021/03/The-effects-of-Lockdown-Policies-Kenya.pdf>
- Maliszewska, M., Mattoo, A., & Van Der Mensbrugge, D. (2020). *The potential impact of covid-19 on gdp and trade: A preliminary assessment (policy research working paper 9211)*. The World Bank Group. <https://openknowledge.worldbank.org/bitstream/handle/10986/33605/The-Potential-Impact-of-COVID-19-on-GDP-and-Trade-A-Preliminary-Assessment.pdf>
- Manova, K., Wei, S.-J., & Zhang, Z. (2015). Firm exports and multinational activity under credit constraints. *Review of Economics and Statistics*, 97(3), 574–588.
- Mendoza, A. (2021). Disruptions in global value chains due to covid-19: Stylized facts and policy lessons. *Philippine Review of Economics*, 57(2), 214–240. <https://doi.org/10.37907/9ERP1202JD>
- Minondo, A. (2021). Impact of covid-19 on the trade of goods and services in Spain. *Applied Economic Analysis*, 29(85), 58–76. <https://doi.org/10.1108/AEA-11-2020-0156>
- Murakami, E., Shimizutani, S., & Yamada, E. (2021). Projection of the effects of the covid-19 pandemic on the welfare of remittance-dependent households in the Philippines. *Economics of Disasters and Climate Change*, 5(1), 97–110. <https://doi.org/10.1007/s41885-020-00078-9>

- Pei, J., de Vries, G., & Zhang, M. (2021). International trade and covid-19: City-level evidence from china's lockdown policy. *Journal of Regional Science*. <https://doi.org/10.1111/jors.12559>
- Rose, A., Walmsley, T., & Wei, D. (2021). Spatial transmission of the economic impacts of covid-19 through international trade. *Letters in Spatial and Resource Sciences*, 1–28. <https://doi.org/10.1007/s12076-021-00271-8>
- Serti, F., & Tomasi, C. (2014). Export and import market-specific characteristics. *Empirical Economics*, 47(4), 1467–1496. <https://doi.org/10.1007/s00181-013-0783-5>
- Taglioni, D., & Baldwin, R. (2014). Gravity chains: Estimating bilateral trade flows when parts and components trade is important. *Journal of Banking and Financial Economics*, 2(2), 61–82.
- Thorbecke, W., & Pai, H.-K. (2015). The sophistication of east asian exports. *Journal of the Asia Pacific Economy*, 20(4), 658–678. <https://doi.org/10.1080/13547860.2015.1045328>
- Ullah, S., Zaefarian, G., Ahmed, R., & Kimani, D. (2021). How to apply the event study methodology in stata: An overview and a step-by-step guide for authors. <https://doi.org/10.1016/j.indmarman.2021.02.004>
- Vidya, C., & Prabheesh, K. (2020). Implications of covid-19 pandemic on the global trade networks. *Emerging Markets Finance and Trade*, 56(10), 2408–2421. <https://doi.org/10.1080/1540496X.2020.1785426>
- Wagner, J. (2016). A survey of empirical studies using transaction level data on exports and imports. *Review of World Economics*, 152(1), 215–225. <https://doi.org/10.1007/s10290-015-0235-8>
- WTO. (2021). *Annual report 2021: Economic resilience and trade*. World Trade Organization. https://www.wto.org/english/res_e/publications_e/wtr21_e.htm

- Yamada, E., Simizutano, S., & Murakami, E. (2021). The covid-19 pandemic, remittances and financial inclusion in the philippines. *Philippine Review of Economics*, 57(1), 18–41. <https://doi.org/10.37907/2ERP2020J>
- Yi, K.-M. (2003). Can vertical specialization explain the growth of world trade? *Journal of political Economy*, 111(1), 52–102.
- Yu, K. D. S., Aviso, K. B., Santos, J. R., & Tan, R. R. (2020). The economic impact of lockdowns: A persistent inoperability input-output approach. *Economies*, 8(4), 109. <https://doi.org/10.3390/economies8040109>
- Zhao, Y., Zhang, H., Ding, Y., & Tang, S. (2021). Implications of covid-19 pandemic on china's exports. *Emerging Markets Finance and Trade*, 57(6), 1716–1726. <https://doi.org/10.1080/1540496X.2021.1877653>

Appendix

A1 COVID-19 cases in East Asia

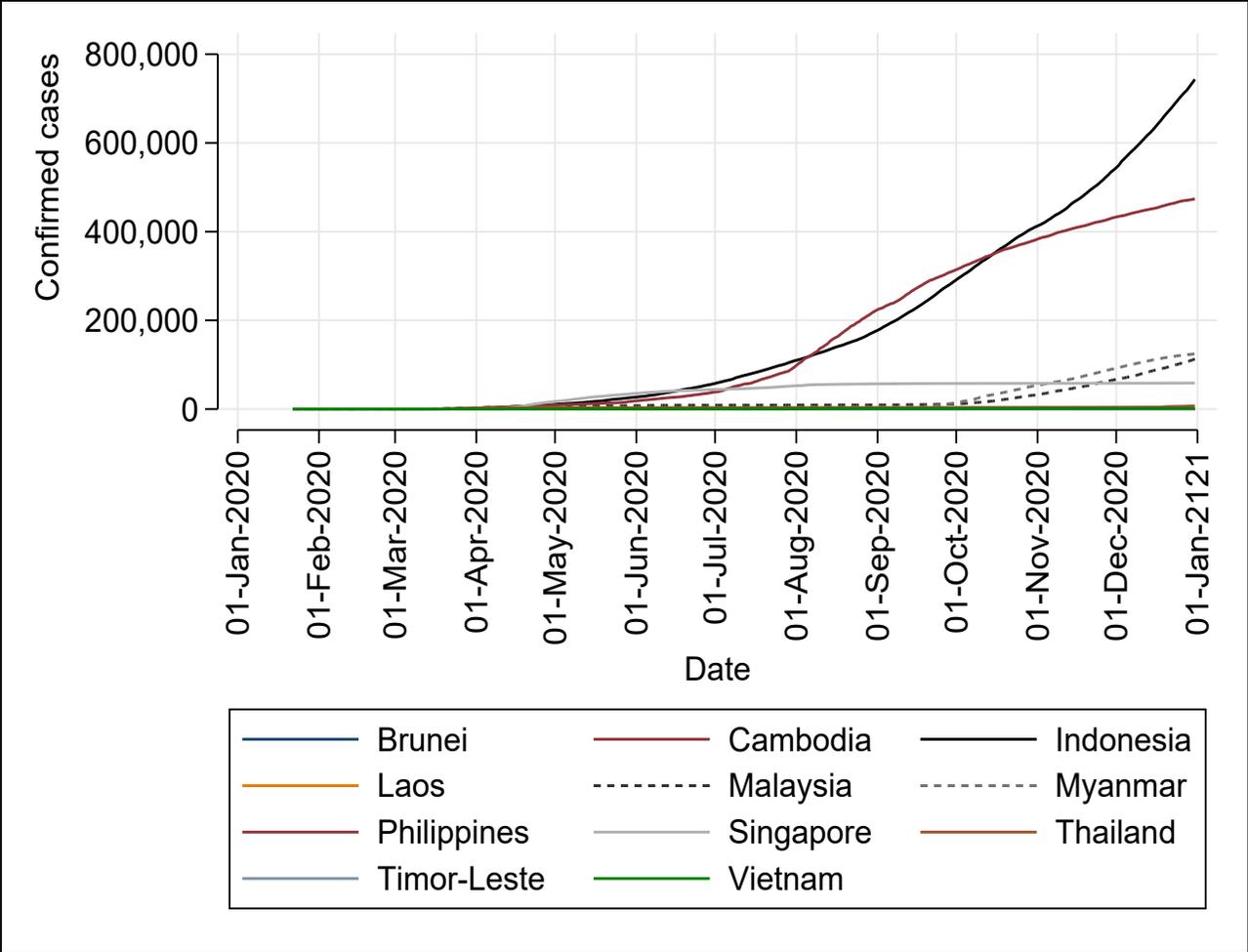


Figure A1: COVID-19 cases in East Asia (January 2020-December 2020)

Source: Author's compilation using data from Hale et al. (2020)

A2 COVID-19 deaths in East Asia

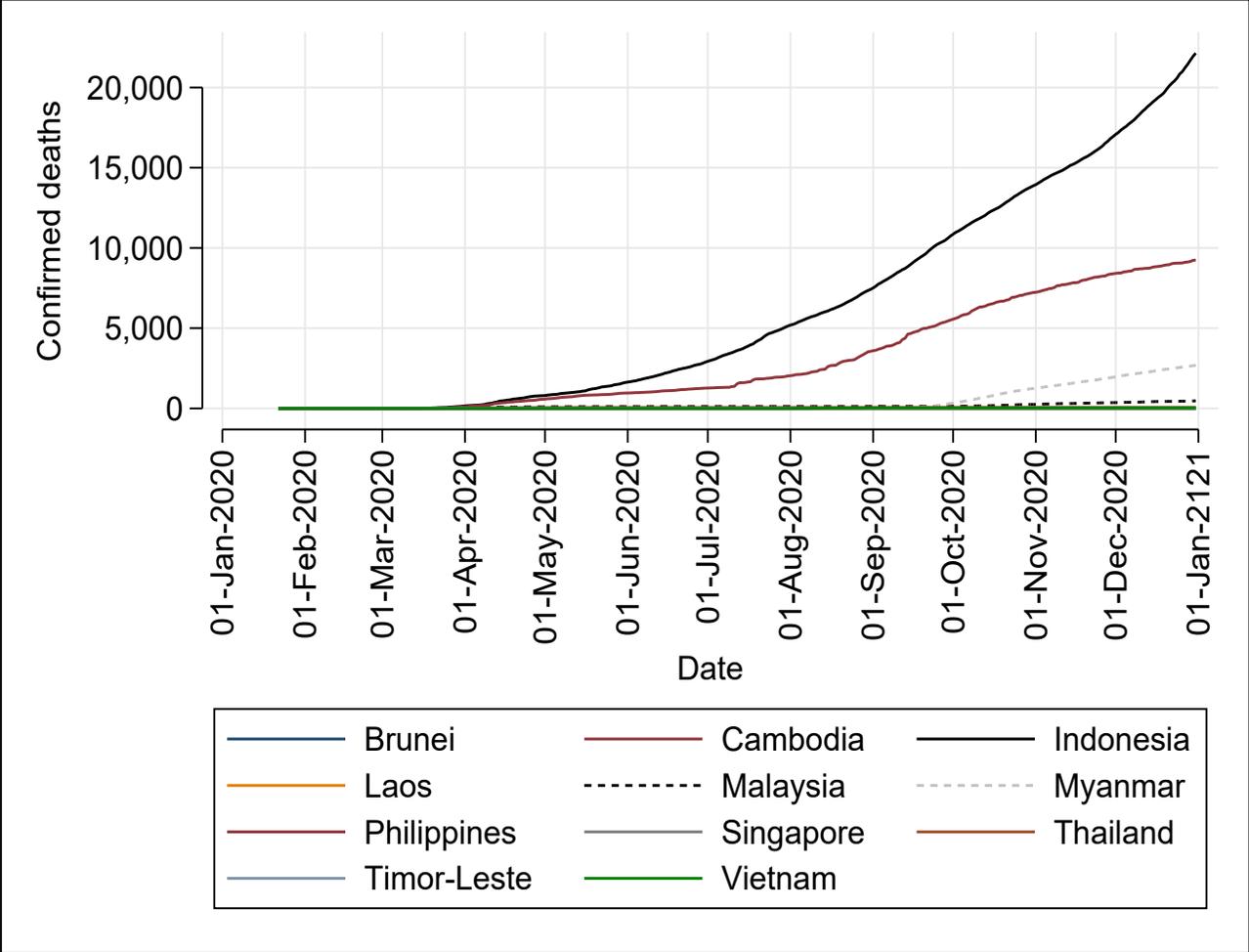


Figure A2: COVID-19 deaths in East Asia (January 2020-December 2020)
 Source: Author's compilation using data from Hale et al. (2020)

A3 Event-study analysis: Results of intermediate goods

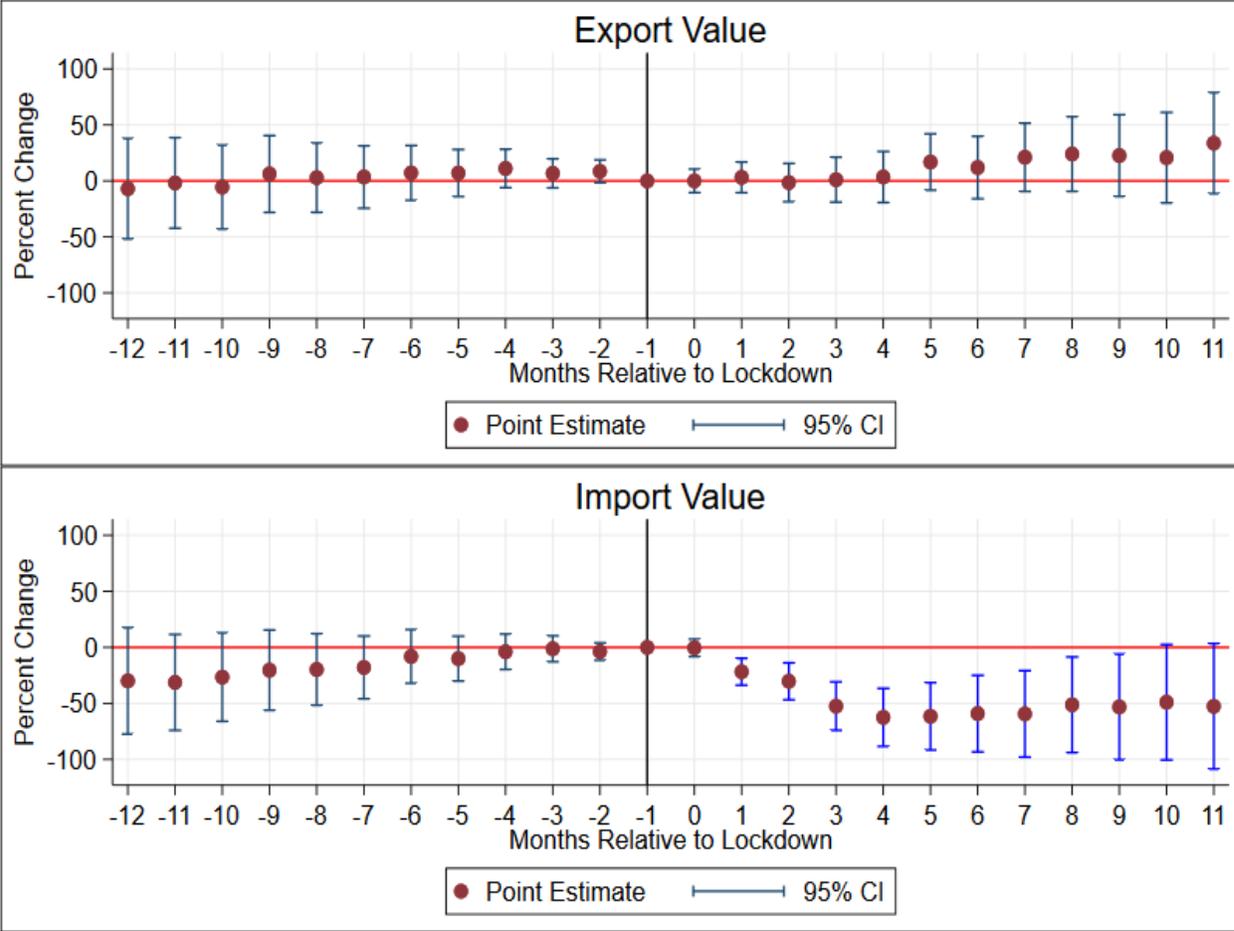


Figure A3: Effects of lockdown policies on Philippines' export and import trade of intermediate goods

A4 Event-study analysis: Results of import values by products

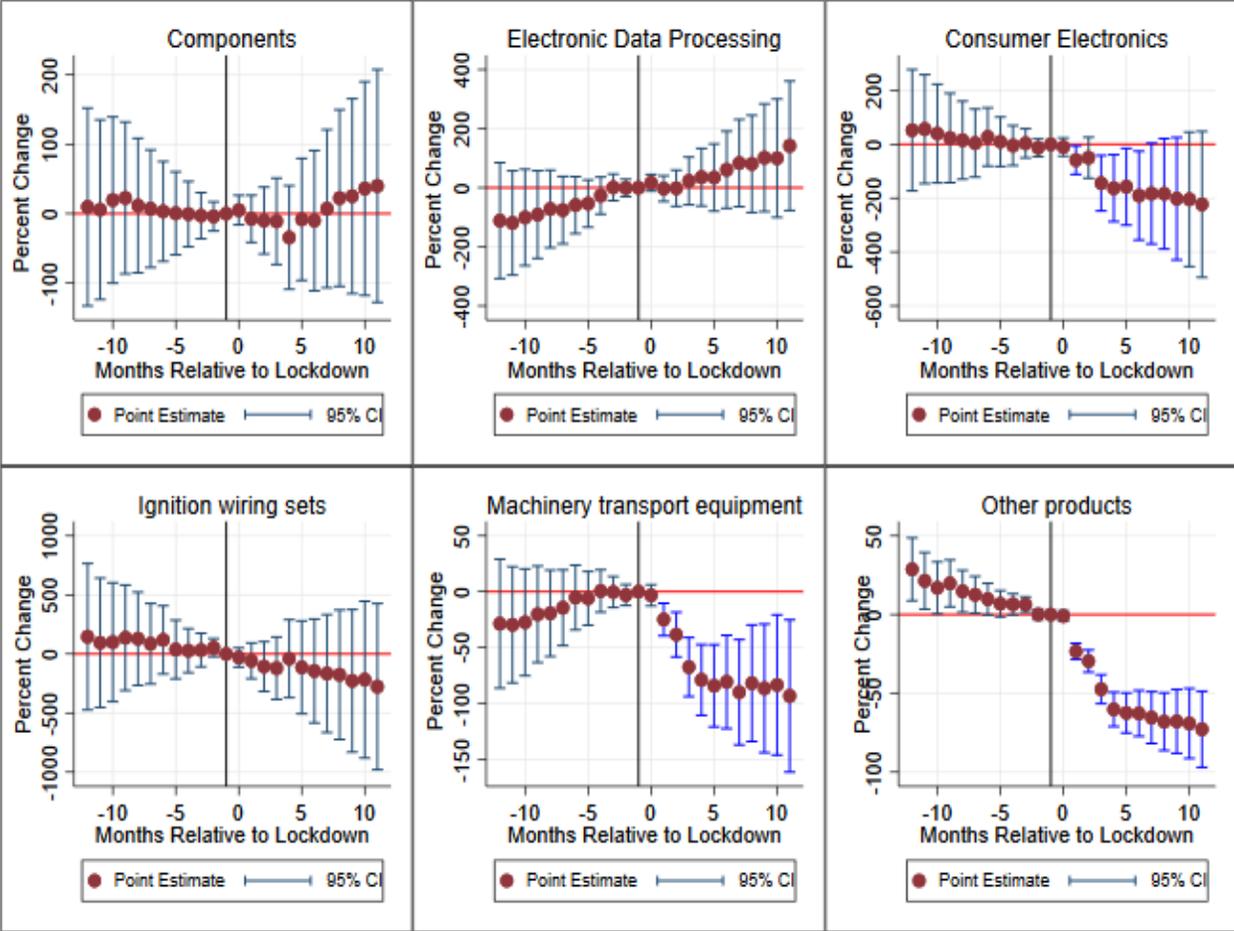


Figure A4: Effects of lockdown policies on the Philippines' import values of by products

A5 Event-study analysis: Results of overall top ten partners

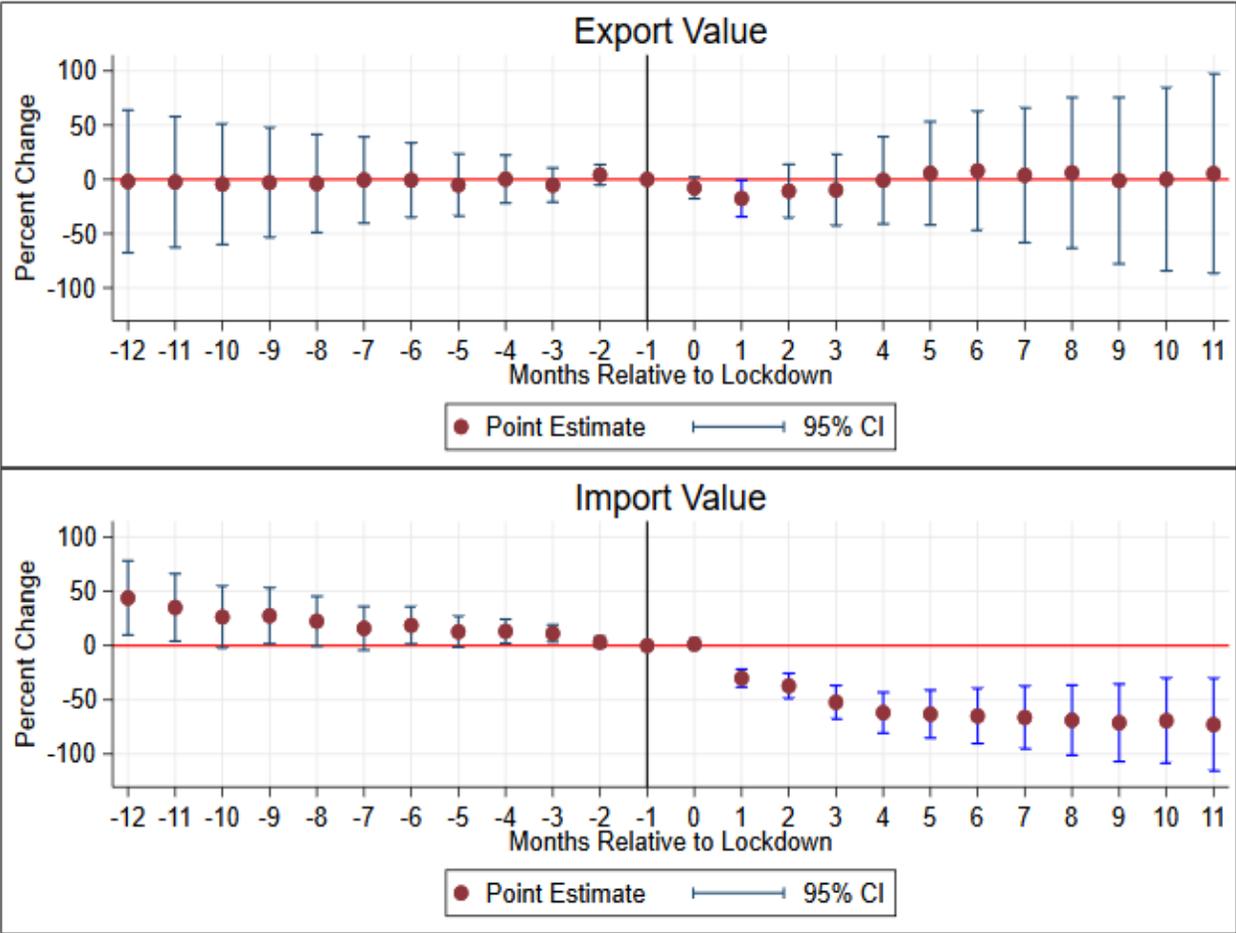


Figure A5: Effects of lockdown policies on Philippines' export and import trade with top ten partners

A6 Event-study analysis: Results of strict lockdown policies

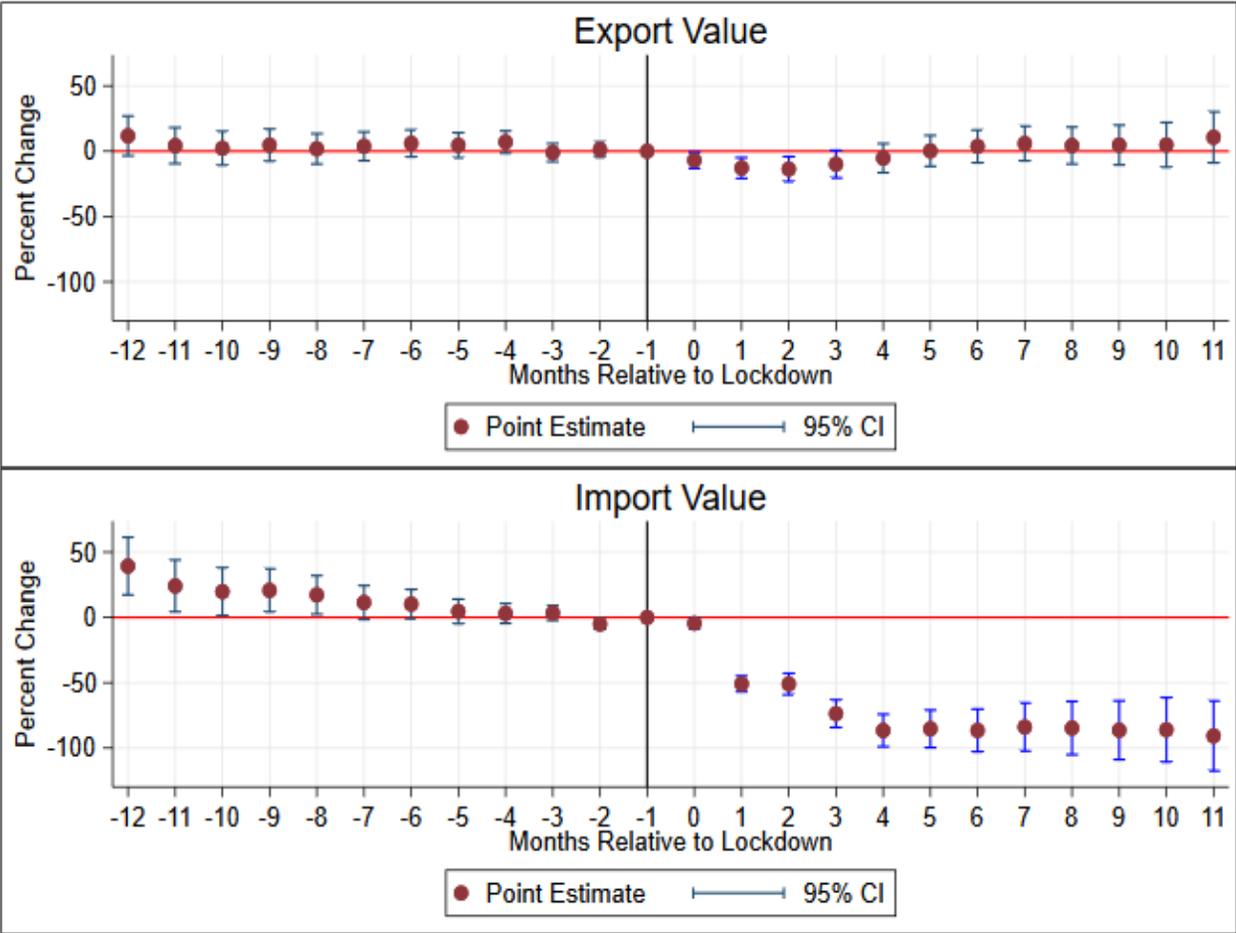
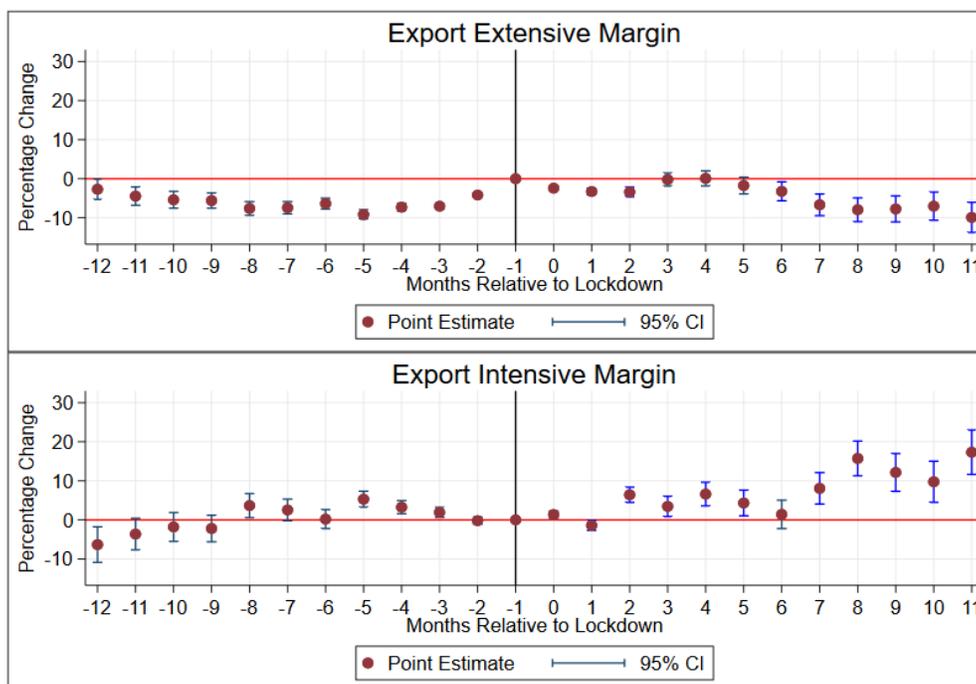
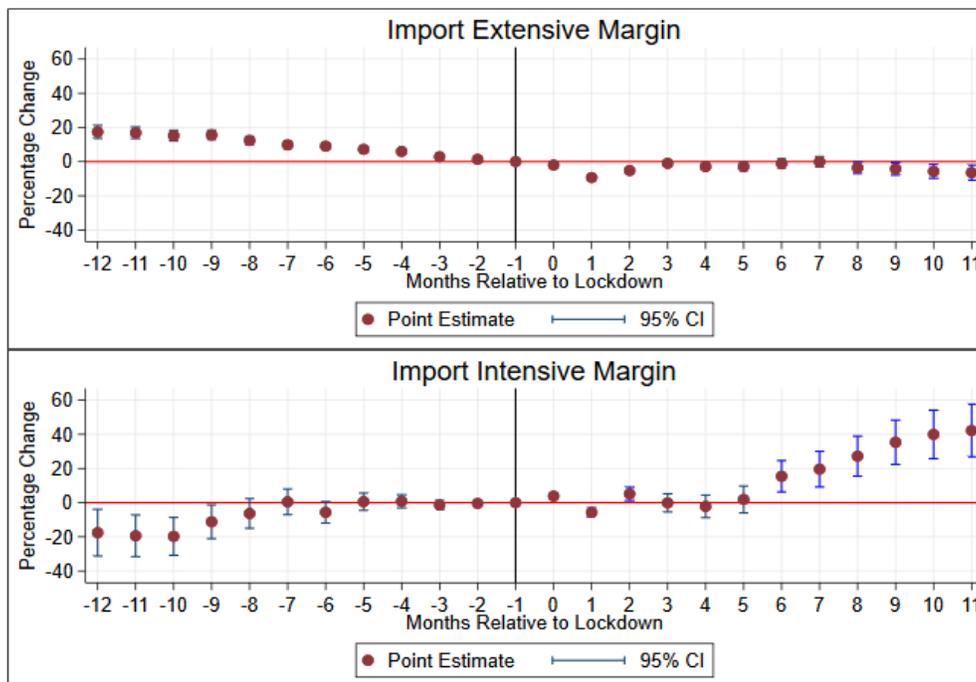


Figure A6: Effects of strict lockdown policies on Philippines' export and import values by all trading partners

A7 Event-study Results: Overall intensive and extensive margins



(a) Effects of lockdown policies on Philippines' number of HS-10 products exported



(b) Effects of lockdown policies on the number of HS-10 products imported

Figure A7: Effects of lockdown policies on Intensive and Extensive Margins

A8 Description of Other Products

Table A1: Philippine’s export and import shares of top 5 Other Products pre and during the lockdown

Exports				Imports			
Pre-lockdown		Lockdown		Pre-lockdown		Lockdown	
Product	Share (%)	Product	Share (%)	Product	Share (%)	Product	Share (%)
Other manufactures	5.73	Other manufactures	5.64	Other manufactures	12.44	Special transactions	11.39
Bananas (fresh)	2.72	Other mineral products	3.32	Special transactions	9.33	Other manufactures	10.42
Metal components	2.14	Bananas (fresh)	2.55	Chemicals	9.24	Chemicals	9.93
Other mineral products	1.99	Cathodes & sections of c	2.25	Processed food and beverages	8.41	Processed food and beverages	9.16
Gold	1.96	Gold	1.87	Petroleum Products	6.47	Petroleum Products	4.95

Note: Lockdown represents months trading partners of the Philippines imposed restrictions
Source: Authors’ compilation using PSA data

A9 Event-study Results of imports of top five partners

Table A2: Effects of lockdown policies on import trade by top five countries and RoW

Lockdown event dummies	China	Japan	United States	Korea, Rep.	Hong Kong SAR, China	RoW
Lead12	-1.335 (3.060)	0.884 (4.075)	-14.225*** (4.084)	-10.406** (4.372)	11.547** (5.569)	-14.625*** (1.861)
Lead11	-37.734*** (3.219)	23.310*** (4.089)	-5.495 (4.551)	-2.229 (4.881)	-27.952*** (5.982)	-14.491*** (1.929)
Lead10	-35.780*** (3.130)	21.261*** (3.910)	-6.837 (4.627)	-17.244*** (4.896)	-6.067 (5.529)	-15.490*** (1.870)
Lead9	-23.520*** (3.106)	12.670*** (3.990)	-4.981 (4.584)	-14.106*** (4.785)	-7.606 (5.555)	-8.741*** (1.884)
Lead8	-18.051*** (3.040)	-0.442 (3.999)	-0.110 (4.562)	-20.949*** (4.863)	-3.303 (5.583)	-12.486*** (1.868)
Lead7	-24.402*** (3.071)	14.213*** (3.907)	-11.801*** (4.574)	-23.773*** (4.781)	-9.241* (5.611)	-10.974*** (1.854)
Lead6	-13.462*** (2.966)	4.898 (3.913)	-4.552 (4.505)	-23.272*** (4.803)	-4.655 (5.326)	-12.070*** (1.799)
Lead5	-18.698*** (3.074)	10.423*** (3.839)	-12.563*** (4.495)	-24.489*** (4.728)	-5.627 (5.515)	-13.430*** (1.780)
Lead4	-15.356*** (2.932)	6.030 (3.731)	-6.392 (4.385)	-11.741*** (4.487)	-1.454 (5.251)	-13.221*** (1.745)
Lead3	-16.515*** (2.859)	13.654*** (3.669)	1.128 (4.375)	-12.962*** (4.658)	-3.630 (5.064)	-11.153*** (1.715)
Lead2	-18.419*** (2.798)	9.052** (3.667)	-10.888** (4.459)	-16.836*** (4.699)	-12.974** (5.093)	-12.346*** (1.599)
Lag0	-14.336*** (2.827)	-1.516 (3.714)	-15.674*** (4.426)	-21.690*** (4.634)	-17.409*** (5.087)	0.778 (1.632)
Lag1	-133.103*** (3.592)	29.477*** (3.749)	-9.807** (4.511)	-5.055 (4.800)	-52.727*** (6.032)	11.627*** (1.781)
Lag2	-58.872*** (3.257)	7.993** (3.848)	7.385 (5.336)	-22.257*** (6.259)	-14.225** (5.550)	7.767*** (1.747)
Lag3	-62.086*** (3.834)	-1.682 (4.888)	2.291 (4.857)	-31.403*** (5.395)	-23.382*** (7.445)	5.533*** (2.075)
Lag4	-55.019*** (3.501)	-5.186 (4.423)	-10.370** (4.949)	-30.012*** (5.140)	-1.627 (6.230)	-3.446* (1.947)
Lag5	-16.783*** (3.157)	-16.080*** (4.066)	-15.077*** (4.769)	-18.098*** (5.056)	-6.594 (5.702)	-5.848*** (1.946)
Lag6	-13.384*** (3.172)	7.596* (3.953)	-23.427*** (4.832)	-15.488*** (5.120)	-29.300*** (5.701)	-5.517*** (1.928)
Lag7	-14.588*** (3.234)	-7.120* (4.062)	-17.239*** (4.865)	-19.841*** (4.984)	-13.774** (5.975)	-6.617*** (1.938)
Lag8	-11.561*** (3.156)	-2.749 (4.060)	-13.763*** (4.625)	-14.039*** (4.986)	-14.751** (6.075)	-9.105*** (1.938)
Lag9	-21.848*** (3.162)	18.996*** (3.941)	-27.435*** (4.789)	-17.247*** (4.933)	-24.180*** (6.033)	-6.809*** (1.967)
Lag10	-11.041*** (3.140)	16.948*** (3.903)	-25.886*** (4.808)	-13.539*** (5.086)	-8.924 (5.921)	-9.989*** (2.221)
Lag11	-14.527*** (3.245)	7.392* (4.029)	0.000 (0.000)	0.000 (0.000)	-22.191*** (5.951)	-10.241*** (2.442)
Constant	932.674*** (1.087)	932.618*** (1.054)	933.751*** (1.041)	933.337*** (1.031)	932.082*** (1.025)	941.342*** (1.500)
Observations	848,334	848,334	848,334	848,334	848,334	848,334
Number of pair_id	119,907	119,907	119,907	119,907	119,907	119,907
R-squared	0.020	0.017	0.017	0.017	0.017	0.018

Note: Estimation was conducted on the monthly trade data using a fixed effects estimator that accounts for cross-country-product heterogeneities. Robust standard errors are reported in parentheses. Asterisk indicate the level of significance, *** $p < 0.01$, **

$p < 0.05$, * $p < 0.1$.

A10 Event-study analysis: Results of export extensive margin by products

Table A3: Effects of lockdown policies on the Philippines' export extensive margin by products

Lockdown event dummies	Components	Electronic	Consumer	Ignition	Machinery	Other
Lead12	-8.897*** (2.342)	-2.039 (3.906)	-2.836 (7.234)	-16.164*** (5.436)	-9.249 (6.289)	-2.195 (1.479)
Lead11	-11.250*** (2.290)	-3.330 (3.449)	-3.852 (7.072)	-14.327*** (5.350)	-9.828* (5.550)	-3.958*** (1.342)
Lead10	-11.704*** (2.176)	-3.834 (3.200)	-3.083 (6.611)	-15.803*** (5.612)	-10.536** (5.128)	-4.975*** (1.224)
Lead9	-10.922*** (2.021)	-4.152 (2.720)	-2.813 (6.328)	-14.724*** (4.357)	-10.305** (4.629)	-5.271*** (1.110)
Lead8	-12.761*** (1.849)	-6.941*** (2.353)	-6.201 (5.769)	-12.444*** (3.418)	-10.997*** (4.081)	-7.319*** (0.992)
Lead7	-12.221*** (1.757)	-7.267*** (2.298)	-6.993 (5.395)	-7.775** (3.024)	-10.352*** (3.524)	-7.102*** (0.891)
Lead6	-12.652*** (1.547)	-5.923*** (2.103)	-6.509 (4.986)	-9.664*** (2.587)	-8.999*** (2.989)	-5.835*** (0.799)
Lead5	-11.766*** (1.334)	-6.939*** (2.075)	-6.927 (4.284)	-10.846*** (2.542)	-11.221*** (2.463)	-9.108*** (0.694)
Lead4	-10.196*** (1.275)	-6.285*** (1.619)	-4.542 (3.485)	-9.786*** (2.086)	-8.808*** (1.968)	-7.197*** (0.576)
Lead3	-9.099*** (1.005)	-4.800*** (1.270)	-4.837* (2.633)	-8.182*** (2.111)	-7.839*** (1.382)	-7.053*** (0.425)
Lead2	-5.253*** (0.723)	-2.707** (1.136)	-0.865 (1.867)	-6.506*** (1.727)	-4.335*** (0.892)	-4.273*** (0.279)
Lag0	-4.956*** (0.816)	-2.313** (1.089)	-1.221 (1.545)	-1.477 (1.658)	-3.113*** (0.961)	-2.047*** (0.304)
Lag1	-8.087*** (1.235)	-2.278 (1.598)	-2.377 (2.504)	-1.779 (2.578)	-1.532 (1.472)	-2.777*** (0.490)
Lag2	-7.751*** (1.346)	-2.998 (2.189)	-6.888* (3.639)	-1.310 (3.026)	-0.441 (2.193)	-2.788*** (0.726)
Lag3	-4.401** (1.757)	3.625 (2.571)	-5.690 (5.291)	-0.029 (4.578)	4.904 (3.185)	0.210 (0.993)
Lag4	-3.381* (1.893)	5.358* (3.187)	-2.098 (5.723)	1.084 (4.805)	5.197 (3.783)	0.323 (1.137)
Lag5	-3.206 (1.987)	5.827* (3.155)	0.164 (5.982)	1.951 (4.522)	5.344 (4.273)	-2.055 (1.261)
Lag6	-2.774 (2.029)	4.373 (3.177)	2.066 (6.167)	-2.448 (3.899)	4.677 (4.929)	-3.780*** (1.424)
Lag7	-5.094** (2.164)	3.606 (3.154)	-1.568 (6.650)	-4.032 (3.249)	3.154 (5.662)	-7.538*** (1.630)
Lag8	-6.056** (2.367)	4.738 (3.458)	-0.063 (7.005)	-2.472 (3.194)	1.908 (6.397)	-8.966*** (1.780)
Lag9	-4.736* (2.636)	8.179** (3.440)	3.759 (7.761)	-3.883 (3.195)	4.384 (7.256)	-9.164*** (1.944)
Lag10	-3.669 (2.877)	12.678*** (3.832)	3.639 (8.496)	1.632 (3.583)	7.088 (7.993)	-8.761*** (2.094)
Lag11	-7.349** (3.192)	11.561*** (4.292)	3.742 (9.552)	0.132 (4.611)	2.440 (8.926)	-11.522*** (2.235)
Observations	17101	7959	5157	1647	15955	195707
Number of pair id	1613	972	819	171	3681	37536
R-squared	0.591	0.555	0.436	0.645	0.566	0.474

Note: Extensive margin is the number of products exported to a specific trade partner. Estimation was conducted on the monthly trade data using a fixed effects estimator that accounts for cross-country-product heterogeneities. Robust standard errors are reported in parentheses. Asterisk indicate the level of significance, *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

A11 Event-study analysis: Results of export intensive margin by products

Table A4: Effects of lockdown policies on the Philippines' export intensive margin by products

Lockdown event dummies	Components	Electronic	Consumer	Ignition	Machinery	Other
Lead12	-0.677 (5.038)	18.765** (9.359)	31.148* (17.335)	-21.685 (15.355)	-9.468 (9.070)	-7.854*** (2.614)
Lead11	1.803 (4.748)	20.577** (8.504)	27.788* (14.443)	-19.207 (14.366)	-7.141 (8.060)	-5.016** (2.318)
Lead10	5.573 (4.464)	16.726** (7.791)	28.633** (12.829)	-19.557 (16.054)	-5.539 (7.330)	-3.114 (2.110)
Lead9	3.356 (4.325)	12.476* (7.402)	23.284** (11.778)	-13.987 (11.112)	-5.880 (6.601)	-3.153 (1.943)
Lead8	9.517** (3.972)	17.480*** (6.574)	27.047*** (10.220)	-6.913 (10.808)	-1.929 (5.743)	2.844 (1.760)
Lead7	8.932** (4.229)	15.543** (6.488)	21.102*** (8.128)	1.056 (9.900)	0.361 (5.243)	1.406 (1.573)
Lead6	11.209*** (3.572)	19.072*** (5.302)	14.961** (6.705)	-0.171 (8.993)	-2.588 (4.554)	-1.615 (1.386)
Lead5	11.956*** (2.926)	22.012*** (5.094)	17.026*** (5.742)	13.527** (6.697)	4.423 (3.748)	3.804*** (1.164)
Lead4	5.478** (2.559)	11.894*** (4.458)	7.404* (4.470)	5.256 (4.991)	3.297 (3.040)	2.707*** (0.960)
Lead3	5.051*** (1.914)	10.777*** (3.812)	7.247* (3.696)	3.388 (4.947)	0.994 (2.239)	1.265* (0.738)
Lead2	2.157 (1.612)	5.895* (3.332)	2.996 (2.666)	0.064 (4.511)	0.039 (1.794)	-0.769 (0.520)
Lag0	-0.672 (1.270)	1.416 (1.889)	-3.244 (2.566)	2.775 (4.252)	4.245** (1.669)	1.431*** (0.522)
Lag1	-5.210** (2.097)	-0.976 (3.042)	-11.075*** (4.134)	-8.204* (4.832)	0.381 (2.478)	-0.912 (0.745)
Lag2	6.387** (2.827)	13.238*** (4.654)	1.800 (6.149)	-2.441 (6.415)	6.660* (3.770)	5.981*** (1.122)
Lag3	0.221 (3.473)	11.614** (5.336)	-6.590 (7.839)	3.526 (9.742)	6.385 (5.036)	2.971** (1.510)
Lag4	0.519 (3.766)	17.821*** (6.105)	3.851 (9.221)	4.096 (11.910)	15.382** (6.068)	5.621*** (1.755)
Lag5	-0.708 (4.065)	10.592* (6.320)	0.835 (10.461)	-2.927 (13.027)	8.752 (6.659)	3.754** (1.898)
Lag6	-2.155 (4.919)	0.295 (6.772)	-8.743 (10.057)	-10.756 (10.251)	7.504 (7.467)	1.080 (2.093)
Lag7	2.039 (5.480)	6.038 (7.206)	-6.810 (10.407)	-15.070 (9.697)	12.680 (8.414)	8.269*** (2.306)
Lag8	7.475 (5.968)	8.037 (7.782)	-6.582 (11.120)	-13.026 (11.930)	21.238** (9.399)	16.531*** (2.537)
Lag9	-3.181 (6.261)	1.166 (8.388)	-15.880 (12.357)	-18.286 (11.585)	16.251 (10.479)	13.950*** (2.753)
Lag10	-7.115 (6.648)	-4.329 (9.187)	-15.403 (13.569)	-25.596** (10.625)	14.559 (11.371)	11.763*** (3.002)
Lag11	-7.108 (6.941)	0.431 (9.640)	-18.407 (14.705)	-10.970 (13.333)	23.165* (12.422)	20.165*** (3.244)
nstant	1266.627*** (6.334)	1249.118*** (23.172)	1233.806*** (28.131)	1337.493*** (33.453)	1289.065*** (9.155)	1265.353*** (5.006)
Observations	17101	7959	5157	1647	15955	195707
Number of pair id	1613	972	819	171	3681	37536
R-squared	0.051	0.054	0.070	0.083	0.067	0.044

Note: Intensive margin is the average value of sales per product. Estimation was conducted on the monthly trade data using a fixed effects estimator that accounts for cross-country-product heterogeneities. Robust standard errors are reported in parentheses. Asterisk indicate the level of significance, *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

A12 Event-study analysis: Results of import extensive margin by products

Table A5: Effects of lockdown policies on Philippines' import extensive margin by products

Lockdown event dummies	Components	Electronic	Consumer	Ignition	Machinery	Other
Lead12	23.584*** (4.521)	4.241 (5.045)	15.344*** (5.499)	37.556*** (10.263)	13.346*** (3.954)	18.264*** (2.265)
Lead11	22.081*** (4.047)	5.794 (4.513)	14.697*** (5.006)	36.196*** (9.709)	13.492*** (3.524)	17.617*** (2.021)
Lead10	20.032*** (3.672)	4.374 (4.143)	13.762*** (4.451)	36.166*** (9.772)	12.620*** (3.210)	15.795*** (1.842)
Lead9	20.067*** (3.350)	7.243* (3.746)	14.217*** (3.934)	34.547*** (8.839)	13.221*** (2.852)	16.114*** (1.641)
Lead8	16.445*** (2.902)	3.508 (3.320)	10.406*** (3.485)	29.378*** (8.379)	10.080*** (2.511)	12.866*** (1.444)
Lead7	13.151*** (2.492)	1.612 (2.922)	8.657*** (3.032)	23.769*** (7.076)	7.858*** (2.174)	10.226*** (1.246)
Lead6	12.174*** (2.137)	2.889 (2.539)	8.125*** (2.563)	21.001*** (5.853)	6.921*** (1.832)	9.407*** (1.045)
Lead5	9.469*** (1.759)	1.952 (2.135)	6.445*** (2.118)	14.896*** (4.756)	5.234*** (1.498)	7.596*** (0.848)
Lead4	7.704*** (1.380)	2.267 (1.747)	5.996*** (1.682)	12.135*** (3.605)	4.554*** (1.146)	6.228*** (0.646)
Lead3	3.936*** (0.945)	-0.072 (1.337)	3.555*** (1.183)	7.944*** (2.576)	1.995** (0.779)	3.042*** (0.440)
Lead2	1.360** (0.674)	-1.092 (1.097)	1.374** (0.636)	4.891*** (1.676)	0.746* (0.411)	1.526*** (0.235)
Lag0	-3.412*** (0.631)	-0.439 (0.962)	-1.361* (0.703)	-6.329*** (1.926)	-1.688*** (0.415)	-2.042*** (0.229)
Lag1	-11.545*** (1.221)	-6.250*** (1.837)	-10.512*** (1.440)	-16.250*** (4.311)	-9.263*** (0.853)	-9.273*** (0.458)
Lag2	-6.557*** (1.759)	-0.272 (2.631)	-6.251*** (2.201)	-18.921*** (6.739)	-5.886*** (1.288)	-5.151*** (0.688)
Lag3	-9.050*** (2.332)	2.088 (3.394)	0.270 (3.214)	-17.183** (8.265)	0.428 (1.735)	-0.978 (0.926)
Lag4	-9.544*** (2.722)	4.773 (3.990)	1.634 (3.735)	-18.492** (9.333)	-0.249 (2.107)	-3.315*** (1.132)
Lag5	-11.528*** (3.226)	4.747 (4.622)	1.535 (4.230)	-19.750* (10.709)	0.233 (2.502)	-3.304** (1.343)
Lag6	-12.339*** (3.724)	6.662 (5.221)	3.378 (4.581)	-18.942* (11.286)	2.620 (2.876)	-1.471 (1.550)
Lag7	-14.160*** (4.210)	6.318 (5.925)	3.920 (4.991)	-17.297 (12.150)	4.622 (3.257)	-0.501 (1.756)
Lag8	-20.091*** (4.765)	1.128 (6.619)	-1.071 (5.469)	-23.963* (12.809)	2.376 (3.631)	-4.105** (1.959)
Lag9	-21.697*** (5.320)	1.263 (7.358)	-2.387 (6.033)	-27.823* (14.194)	2.822 (4.014)	-4.824** (2.164)
Lag10	-24.510*** (5.915)	-1.284 (8.152)	-4.966 (6.564)	-33.671** (15.251)	2.470 (4.391)	-6.441*** (2.370)
Lag11	-26.508*** (6.518)	-3.737 (8.920)	-5.709 (7.102)	-40.077** (16.307)	2.792 (4.764)	-7.272*** (2.576)
Constant	708.097*** (4.885)	652.649*** (5.589)	679.412*** (5.920)	630.338*** (10.583)	730.955*** (4.212)	657.492*** (2.460)
Observations	23280	13109	12531	1697	118260	680106
Number of pair id	2494	1579	1955	190	18331	95749
R-squared	0.709	0.686	0.768	0.741	0.742	0.692

Note: Extensive margin is the number of products imported from a specific trade partner. Estimation was conducted on the monthly trade data using a fixed effects estimator that accounts for cross-country-product heterogeneities. Robust standard errors are reported in parentheses. Asterisk indicate the level of significance, *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

A13 Event-study analysis: Results of import intensive margin by products

Table A6: Effects of lockdown policies on the Philippines' import intensive margin by products

Lockdown event dummies	Components	Electronic	Consumer	Ignition	Machinery	Other
Lead12	-39.336*** (9.371)	11.214 (35.623)	-65.215*** (24.802)	-36.383* (21.341)	-44.665*** (7.709)	-13.053 (8.186)
Lead11	-35.665*** (8.566)	8.301 (32.006)	-65.651*** (22.152)	-35.713* (19.864)	-44.868*** (6.897)	-15.228** (7.294)
Lead10	-40.661*** (7.749)	-0.872 (29.309)	-62.248*** (19.288)	-31.332* (18.311)	-41.923*** (6.274)	-15.765*** (6.645)
Lead9	-29.877*** (7.284)	5.999 (26.441)	-50.746*** (16.657)	-22.272 (17.262)	-31.890*** (5.606)	-7.485 (5.914)
Lead8	-18.781*** (6.178)	10.429 (23.338)	-38.852*** (14.824)	-12.367 (14.968)	-25.552*** (4.926)	-3.133 (5.202)
Lead7	-11.598** (5.479)	13.343 (20.381)	-26.912** (12.814)	-10.078 (13.350)	-17.969*** (4.272)	3.640 (4.483)
Lead6	-13.455*** (4.993)	8.646 (16.683)	-25.504** (10.697)	-19.734* (11.198)	-22.162*** (3.592)	-3.066 (3.757)
Lead5	-9.653** (3.966)	8.781 (13.849)	-12.873 (8.661)	-11.516 (10.037)	-11.910*** (2.907)	2.724 (3.030)
Lead4	-5.731* (3.348)	10.101 (10.408)	-8.031 (6.685)	-7.925 (8.488)	-8.738*** (2.236)	2.311 (2.296)
Lead3	-6.698** (2.696)	2.478 (7.293)	-2.799 (4.841)	-9.777 (7.216)	-7.145*** (1.650)	-0.421 (1.574)
Lead2	0.709 (1.767)	5.440 (3.892)	3.754 (2.673)	-4.711 (5.329)	-2.275** (0.922)	-0.457 (0.820)
Lag0	3.143** (1.598)	0.469 (3.514)	7.090*** (2.600)	5.480 (3.953)	5.606*** (0.871)	3.634*** (0.805)
Lag1	-6.783*** (2.416)	-9.585 (6.589)	-0.473 (4.757)	-2.116 (6.444)	-0.776 (1.609)	-6.275*** (1.563)
Lag2	4.819 (3.610)	0.915 (9.972)	12.732* (6.963)	15.467** (7.433)	13.289*** (2.350)	3.962* (2.343)
Lag3	5.831 (4.878)	-2.746 (13.551)	9.485 (9.735)	22.511* (12.449)	8.197** (3.252)	-1.656 (3.169)
Lag4	8.108 (5.714)	-4.425 (16.472)	5.752 (12.058)	19.853 (15.606)	7.066* (4.031)	-3.960 (3.941)
Lag5	13.528** (6.525)	-2.308 (19.244)	15.442 (14.043)	33.955* (17.578)	13.461*** (4.721)	-0.360 (4.713)
Lag6	29.999*** (7.347)	12.237 (22.033)	34.932** (16.037)	46.653** (18.937)	29.905*** (5.448)	12.610** (5.485)
Lag7	36.334*** (8.319)	14.915 (24.892)	46.973*** (17.959)	56.754*** (20.456)	34.687*** (6.179)	16.571*** (6.253)
Lag8	49.327*** (9.060)	22.595 (27.732)	60.950*** (19.873)	71.577*** (21.809)	45.074*** (6.916)	23.448*** (7.010)
Lag9	56.014*** (9.953)	29.404 (30.745)	78.897*** (21.991)	79.503*** (24.368)	55.377*** (7.672)	31.234*** (7.757)
Lag10	63.367*** (10.734)	33.065 (33.704)	90.179*** (23.979)	80.910*** (26.194)	61.105*** (8.329)	35.552*** (8.495)
Lag11	61.905*** (11.528)	40.109 (36.666)	94.905*** (25.985)	94.956*** (26.802)	65.658*** (8.985)	37.497*** (9.221)
Constant	1209.451*** (12.008)	1166.826*** (37.356)	1264.964*** (26.245)	1217.055*** (22.413)	1260.350*** (8.544)	1206.856*** (8.865)
Observations	23280	13109	12531	1697	118260	680106
Number of pair id	2494	1579	1955	190	18331	95749
R-squared	0.087	0.092	0.183	0.219	0.153	0.121

Note: Intensive margin is the average value of sales per product. Estimation was conducted on the monthly trade data using a fixed effects estimator that accounts for cross-country-product heterogeneities. Robust standard errors are reported in parentheses.

Asterisk indicate the level of significance, *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

A14 Robustness Check: Event-study Results of exports and imports of the Philippines by lockdown indicators

Table A7: Average event-study coefficients for exports and imports of the Philippines by lockdown indicators

Exports				
Period	Workplace	Stay-at-home	Internal movement	International travel
Overall	-1.115	4.465	-5.229	-4.679
1-3 months	-7.896	-3.832	-8.971	-5.217
4-6 months	2.423	4.191	-2.358	-6.719
7-9 months	-0.038	5.380	-5.451	-3.432
10-11 months	2.133	15.950	-3.592	-2.682
Imports				
Overall	-27.655	-19.493	-16.893	-10.645
1-3 months	-30.685	-24.170	-23.905	-7.295
4-6 months	-35.905	-24.511	-26.016	-12.652
7-9 months	-25.159	-16.326	-12.298	-10.509
10-11 months	-14.479	-9.700	0.419	-12.866

Source: Authors' compilation

A15 Robustness Check: Event-study Results of exports and imports of the Philippines with only month-time fixed effects

Table A8: Effects of PH lockdown policies on its export and import trade without product-partner and product-month fixed effects

Lockdown event dummies	Export value	Export quantity	Import value	Import quantity
Lead14	-15.511 (62.154)	65.140 (72.661)	-386.634*** (141.001)	-374.841*** (143.181)
Lead13	-15.328 (49.629)	54.030 (57.341)	-407.255*** (126.666)	-398.172*** (130.346)
Lead12	-8.641 (49.796)	40.187 (56.716)	-325.837*** (117.223)	-300.217** (120.368)
Lead11	5.131 (42.467)	72.938 (53.279)	-308.900*** (114.038)	-303.604** (119.339)
Lead10	-0.520 (40.693)	53.510 (47.562)	-303.197*** (97.629)	-268.943*** (101.711)
Lead9	-18.818 (39.045)	43.649 (46.200)	-260.832*** (90.787)	-261.483*** (97.964)
Lead8	37.080 (34.932)	67.580 (45.143)	-220.100*** (84.832)	-182.522** (87.282)
Lead7	-26.262 (35.083)	9.799 (46.201)	-272.638*** (78.179)	-248.918*** (81.569)
Lead6	1.410 (31.766)	51.401 (42.233)	-182.935*** (69.694)	-156.303** (69.609)
Lead5	1.662 (30.495)	28.270 (39.198)	-187.508*** (69.936)	-198.157*** (70.073)
Lead4	-30.384 (26.850)	26.826 (36.770)	-149.243*** (49.606)	-113.886** (49.104)
Lead3	-10.697 (24.723)	5.551 (29.897)	-28.553 (42.835)	-56.511 (42.604)
Lead2	-3.683 (31.461)	7.343 (50.934)	-51.890 (33.554)	-15.839 (35.578)
Lag0	-19.200 (77.922)	13.990 (87.346)	-426.396*** (140.996)	-422.985*** (143.176)
Lag1	-28.056 (73.433)	12.767 (84.878)	-377.823*** (135.013)	-382.690*** (130.610)
Lag2	-24.427 (69.413)	1.893 (79.156)	-360.908*** (120.965)	-354.980*** (120.174)
Lag3	-23.226 (62.159)	4.768 (72.655)	-357.935*** (117.487)	-344.402*** (112.180)
Lag4	-46.657 (63.870)	-47.085 (72.724)	-348.738*** (112.264)	-382.741*** (105.156)
Lag5	-8.172 (59.176)	-4.117 (66.462)	-357.130*** (101.284)	-351.949*** (99.506)
Lag6	-25.674 (56.618)	-3.486 (62.451)	-371.600*** (94.956)	-362.186*** (95.769)
Lag7	-21.044 (52.298)	-4.060 (59.614)	-369.976*** (91.195)	-354.751*** (93.422)
Lag8	-52.125 (53.339)	-31.265 (58.960)	-351.037*** (90.271)	-320.170*** (103.938)
Lag9	-12.935 (54.438)	-4.687 (68.343)	-364.370*** (84.283)	-337.407*** (97.036)
Constant	993.207*** (62.190)	670.366*** (72.690)	1319.789*** (141.014)	1003.070*** (143.193)
Observations	243526	243526	848983	848983
Number of pair id	44792	44792	120298	120298
R-squared	0.010	0.015	0.016	0.026

Note: Estimation was conducted on the monthly trade data using a fixed effects estimator that only accounts for monthly heterogeneities. Robust standard errors are reported in parentheses. Asterisk indicate the level of significance, *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

A16 Robustness Check: Event-study Results of product differences of export and import trade between the Philippines and China

Table A9: Effects of lockdown policies on product differences with China

Lockdown event dummies	Components		Electronic Data Processing		Machinery & Transport Equipment	
	Exports	Imports	Exports	Imports	Exports	Imports
Lead12	-30.935 (37.847)	4.740 (26.200)	-2.236 (37.690)	-44.475 (30.168)	34.666 (41.040)	-0.479 (8.007)
Lead11	-10.252 (33.724)	-48.670** (24.705)	72.629* (44.091)	-57.948** (27.259)	36.834 (37.836)	-30.745*** (8.426)
Lead10	7.476 (27.492)	-17.720 (25.725)	33.804 (47.487)	-10.458 (26.281)	59.294 (41.412)	-24.822*** (8.184)
Lead9	3.773 (31.657)	-30.452 (23.441)	10.273 (37.865)	-6.840 (23.344)	34.920 (38.653)	-11.182 (8.133)
Lead8	-38.139 (33.158)	-33.307 (21.985)	10.889 (34.899)	-75.445** (33.290)	49.326 (43.704)	-13.249 (8.198)
Lead7	-42.988 (36.986)	-43.208 (28.870)	56.973 (41.567)	-54.110* (28.566)	23.588 (39.317)	-22.578*** (8.475)
Lead6	-35.389 (27.866)	-8.912 (24.344)	52.745* (29.954)	-3.102 (25.696)	46.851 (39.134)	-1.704 (7.790)
Lead5	-6.456 (31.993)	-15.160 (24.412)	58.827** (29.872)	-31.460 (30.733)	-14.850 (46.060)	-14.971* (8.537)
Lead4	-9.497 (27.745)	-2.188 (18.944)	61.997** (29.730)	-4.117 (25.063)	9.599 (41.509)	-12.782 (8.093)
Lead3	-30.806 (28.730)	1.722 (20.622)	55.539* (30.770)	-4.733 (22.989)	32.159 (35.742)	-13.614* (7.501)
Lead2	11.655 (27.360)	-12.524 (14.920)	4.474 (31.708)	-10.884 (27.296)	2.606 (38.201)	-9.263 (8.073)
Lag0	-3.441 (26.620)	-34.135** (16.343)	-54.702 (42.736)	-0.936 (24.074)	62.250 (43.574)	-1.210 (7.541)
Lag1	-31.313 (31.744)	-135.143*** (28.328)	71.627** (34.727)	-111.204*** (26.836)	15.024 (37.863)	-136.715*** (9.515)
Lag2	1.690 (29.707)	-27.426 (19.906)	7.569 (36.789)	-63.066* (33.255)	27.442 (34.730)	-73.987*** (9.674)
Lag3	-39.790 (31.986)	-44.959* (26.341)	-3.556 (50.801)	-1.806 (30.120)	109.661** (45.776)	-92.939*** (10.521)
Lag4	11.709 (27.723)	5.323 (22.147)	54.463 (47.155)	-17.611 (35.025)	62.740 (41.890)	-65.100*** (9.790)
Lag5	-17.957 (31.574)	32.257 (21.055)	65.340 (60.470)	-18.542 (33.629)	83.521** (41.588)	-9.654 (8.687)
Lag6	-13.208 (27.170)	-30.587 (21.286)	42.178 (39.517)	21.950 (33.739)	107.437** (42.986)	-17.137** (8.684)
Lag7	-46.148 (34.952)	-2.327 (21.143)	51.026 (40.665)	2.719 (33.973)	89.932** (38.192)	-10.214 (8.769)
Lag8	-22.126 (27.553)	24.794 (21.268)	12.876 (52.085)	3.785 (30.918)	65.085 (39.765)	-15.715* (8.889)
Lag9	-19.417 (26.206)	8.453 (22.910)	56.860 (37.482)	33.534 (30.784)	22.362 (47.314)	-12.415 (8.498)
Lag10	-9.511 (27.970)	-8.470 (24.068)	23.580 (40.395)	-12.869 (35.027)	44.455 (43.244)	-7.166 (8.574)
Lag11	-6.380 (30.088)	19.242 (21.786)	1.485 (37.084)	15.430 (30.106)	60.445 (40.395)	-12.864 (8.816)
Constant	983.979*** (1.910)	932.671*** (0.997)	983.955*** (1.909)	932.694*** (0.997)	983.674*** (1.916)	932.960*** (1.017)
Observations	237,016	848,334	237,016	848,334	237,016	848,334
Number of pair id	42,619	119,907	42,619	119,907	42,619	119,907
R-squared	0.011	0.017	0.011	0.017	0.011	0.018

Note: Estimation was conducted on the monthly trade data using a fixed effects estimator that accounts for cross-country-product heterogeneities. Robust standard errors are reported in parentheses. Asterisk indicate the level of significance, *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

A17 Robustness Check: Event-study Results of product differences of export and import trade between the Philippines and the United States

Table A10: Effects of lockdown policies on product differences with the United States

Lockdown event dummies	Components		Electronic Data Processing		Machinery & Transport Equipment	
	Exports	Imports	Exports	Imports	Exports	Imports
Lead12	-3.707 (30.388)	-16.681 (24.349)	32.018 (53.686)	28.432 (33.221)	12.271 (31.229)	-26.640** (11.517)
Lead11	16.078 (29.301)	-36.510 (26.019)	45.900 (66.513)	17.369 (40.606)	10.435 (34.905)	-14.822 (13.284)
Lead10	-2.109 (33.217)	-25.144 (30.998)	-68.398 (60.773)	44.687 (37.064)	-67.100** (29.834)	-27.541** (13.347)
Lead9	14.486 (35.645)	-8.931 (30.457)	6.642 (55.405)	25.700 (38.934)	-42.890 (28.969)	-2.538 (13.025)
Lead8	-5.830 (32.451)	-8.739 (26.893)	-37.348 (63.000)	-44.816 (41.270)	-65.247* (34.961)	-14.640 (13.718)
Lead7	0.786 (30.178)	-36.653 (30.866)	-6.602 (59.240)	-20.275 (44.717)	-24.342 (35.004)	-27.189** (13.545)
Lead6	-3.250 (25.652)	-31.269 (28.229)	50.020 (46.820)	25.350 (41.582)	-29.487 (31.781)	-15.233 (13.357)
Lead5	-39.393 (28.268)	-24.747 (29.442)	44.277 (45.586)	6.405 (42.704)	38.108 (24.243)	-28.949** (13.381)
Lead4	18.057 (31.768)	11.249 (27.572)	38.322 (37.973)	14.555 (37.298)	6.572 (29.360)	-14.155 (12.947)
Lead3	1.161 (30.466)	7.603 (26.136)	40.168 (40.162)	22.742 (38.614)	-39.869 (30.967)	-8.694 (12.645)
Lead2	19.347 (25.057)	-11.133 (21.769)	11.228 (51.314)	-32.467 (39.062)	14.647 (29.157)	3.117 (12.797)
Lag0	-8.925 (28.105)	-54.715* (28.791)	-35.808 (32.167)	24.704 (36.986)	24.571 (21.232)	-21.987* (12.163)
Lag1	24.633 (27.579)	6.309 (26.243)	48.374 (60.061)	-23.705 (35.963)	-5.732 (26.433)	-10.730 (13.758)
Lag2	-34.250 (34.521)	-22.601 (29.135)	19.875 (52.490)	-68.338 (45.311)	-65.406* (35.375)	20.111 (15.866)
Lag3	-23.303 (27.765)	8.694 (25.971)	32.594 (58.192)	-24.353 (42.086)	-24.585 (34.592)	15.310 (14.292)
Lag4	-20.893 (27.990)	-71.067** (30.498)	19.748 (54.507)	48.599 (43.811)	-1.970 (26.186)	2.387 (14.650)
Lag5	28.238 (29.160)	2.093 (24.783)	54.003 (55.830)	-14.859 (37.896)	5.975 (24.314)	-28.488** (13.452)
Lag6	-6.753 (23.335)	-33.141 (29.770)	15.913 (71.034)	4.324 (45.711)	-10.468 (24.510)	-32.115** (14.215)
Lag7	-16.333 (27.069)	-17.327 (27.393)	22.310 (56.028)	30.996 (38.630)	13.544 (27.194)	-27.879** (14.172)
Lag8	-3.211 (24.738)	-5.452 (30.391)	19.528 (60.575)	24.895 (34.783)	18.876 (23.925)	-6.145 (13.726)
Lag9	13.289 (26.868)	-63.669** (29.896)	-8.133 (63.680)	41.425 (38.033)	46.320 (30.822)	-27.956* (14.331)
Lag10	-14.594 (23.865)	-25.995 (25.558)	-21.866 (70.649)	-4.036 (39.440)	-17.144 (27.407)	-35.083** (14.114)
Lag11	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
Constant	984.025*** (1.912)	932.767*** (0.997)	984.013*** (1.908)	932.721*** (0.996)	984.042*** (1.915)	933.050*** (1.004)
Observations	237,016	848,334	237,016	848,334	237,016	848,334
Number of pair id	42,619	119,907	42,619	119,907	42,619	119,907
R-squared	0.011	0.017	0.011	0.017	0.011	0.017

Note: Estimation was conducted on the monthly trade data using a fixed effects estimator that accounts for cross-country-product heterogeneities. Robust standard errors are reported in parentheses. Asterisk indicate the level of significance, *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.