Economics and Finance in Indonesia

Volume 68
Number 1 *Volume 68, Number 1, June 2022*

Article 3

12-31-2021

Exporters in the Time of COVID-19 Pandemic: Evidence from Indonesia

Realita Eschachasthi
Institute for Economic and Social Research, escha@bps.go.id

Economics and Finance in Indonesia
Vol. 68 No. 1, June 2022 : 1–16
p-ISSN 0126-155X; e-ISSN 2442-9260

Exporters in the Time of COVID-19 Pandemic: Evidence from Indonesia

Realita Eschachasthi[a,*]

[a] *BPS-Statistics Indonesia*

Manuscript Received: 9 March 2021; Revised: 29 December 2021; Accepted: 31 December 2021

Abstract

The export of Indonesia has contracted rapidly in response to the COVID-19 outbreak. However, little is known about the crisis-trade relationship, which is important for the policymakers to design the relevant policies. To that end, this study examines how exporters adjust in the time of pandemic as well as estimates the impact of COVID-19 on export performance by using microdata of monthly export transactions from January 2019 to August 2020. This relationship is analyzed by employing intensive and extensive margins as well as a panel fixed effects specification. The result shows that capital goods, mainly manufactured products, have been hit the hardest compared to consumption and intermediate goods. The evidence also suggests that the exporters have been primarily affected at the extensive margin or leaving the market. During the crisis, the rate of ceasing export transactions is approximately 40%, while the rate of decline in export value is 14%. The aftermath of COVID-19 is expected to disrupt export performance by 0.15 percentage points of mid-point growth. The result is robust subsequent to performing several alternative specifications. Finally, the study discovers that the virus does not discriminate; it hits all exporters regardless of their size.

Keywords: mid-point growth; intensive margin; extensive margin; panel data; microdata

JEL classifications: C33; F10; F14

1. Introduction

The COVID-19 outbreak in December 2019 continues to spread worldwide and deliver a global crisis. The disruption of COVID-19 does not only cause casualties, but also hinders human activities, leading to economic turmoil. Mitigation strategies to limit the transmission, however, have become a policy of suppression (Bekkers et al. 2020). As one may expect, global trade is one sector inevitably affected by COVID-19. The coronavirus hits both supply and demand sides simultaneously for trade of either goods or services (Baldwin & Tomiura 2020). Businesses are forced to close or at least reduce their production capacity due to health protocols. Meanwhile, the demand side is down due to the uncertain situation and income loss. Production and shipping delays have led to increased trade costs and disrupted global value chain (GVC) activities, which in turn reduce world trade.

Considering the supply and demand shocks, global merchandise trade has dropped by 5% in the first quarter of 2020 (United Nations Conference on Trade and Development [UNCTAD] 2020a). Disruption to one country is predicted to cause an immense and simultaneous impact on world trade flows as most of the contagious countries account for 70% interconnectedness of GVCs (World Bank 2020, pp. 42–45). While most countries will experience double-digit trade declines, export from North America and Asia will be hit the most (World Trade Organization [WTO] 2020). Trade disruption in Asian countries can be further exacerbated by the fact that China is their leading trading partner, the center of intermediate goods and the country where COVID-19 originates (World Bank 2020).

Indonesia can be one of those countries as China appears to be the largest trading partner in re-

*Corresponding Address: Jl. Dr. Sutomo No. 6–8, Kel. Pasar Baru, Kec. Sawah Besar, Kota Jakarta Pusat, DKI Jakarta 10710 Indonesia. Email: escha@bps.go.id.

cent years, where the export and import values in 2019 reached 17% and 27%, respectively (Statistics Indonesia [BPS] 2020a,b). In May 2020, export decreased to a value of 29% (year-on-year) with only less than US$10 million – the lowest since 2016 – only two months following the discovery of the first COVID-19 case in Indonesia (BPS 2020c). This decline in trade is likely to be exacerbated by the supply-side disruption considering that the active cases of COVID-19 in Indonesia are still increasing. In addition, Indonesia is recorded as the country with the second highest fatality rate among Southeast Asian countries (Center for Strategic and International Studies [CSIS] 2020).

This study attempts to explore the channels through which the exporters of Indonesia adjust and estimate the impact of the crisis on export. The aim is straightforward, namely to provide rigorous evidence of export performance and the effects of heterogeneity on exporters, which may help policymakers formulate policy response for trade recovery. This study contributes to a large number of studies assessing the impact of macroeconomic shocks on trade. To the extent of our knowledge, this is the first paper studying the impact of COVID-19 on export in Indonesia using comprehensive disaggregate exporter data. In addition, the paper employs monthly data providing more reliable results of the impact of the crisis on the trade sector.

This paper finds that most exporters tend to adjust their behavior by leaving the market in response to the corona virus shock. During the pandemic, the rate of quitting transactions contributes around 40%, while the rate of decline in export value is merely 14%. Furthermore, the aftermath of COVID-19 is expected to decrease export performance by 0.15 percentage points of mid-point growth. The result is robust subsequent to several alternative specifications providing relatively similar estimated effects. Finally, the analysis finds no different impact of the outbreak on export performance across the size of the exporters. It is important to note that COVID-19 does not discriminate as it harms all exporters despite their size.

The rest of this study continues as follows. Section 2 reviews several relevant academic works of literature. Section 3 explains the method including the description of data and variables utilized and the empirical strategy. Section 4 is a discussion of results, followed by an examination of robustness and the impact of heterogeneity. Finally, section 5 is a summary of the main findings, policy implications, and caveats.

2. Literature Review

The basic framework of this research refers to the literature on how exporters change their behavior in response to global crises or infectious diseases and how these shocks undermine trade. The adjustment made by exporters to the crisis can be identified in several ways. This study focuses on the decomposition of adjustment into intensive and extensive margins, as proposed by Chaney (2008). The intensive margin shows the change in the size of trade with the current flow, either growing value (positive intensive) or reducing value (negative intensive). Meanwhile, the extensive margin represents flows with new (entry) or destroyed (exit) relations.

Several papers have examined how international trade develops two margins concerning the impact of various events by using country-level data. For example, the implementation of a common euro currency (Baldwin & Nino 2006), bilateral trade (Felbermayr & Kohler 2006), trade facilitation (Beverelli, Neumueller & Teh 2014), and trade liberalization (Frensch 2010). Meanwhile, utilizing firm-level data, Buono, Fadinger & Berger (2008) investigate the dynamic export flow of French exporters in the period 1995–1999. The study discovers that inflows or outflows only contribute to small changes, while considerable variation occurs for changes in export value. To the extent of macroeconomic shock, Bernard et al. (2009) discover that there have been substantial negative changes in both extensive and intensive margins of the exporters of the United States (US) during the Asian financial crisis. It implies that exporting firms adjust to the

https://scholarhub.ui.ac.id/efi/vol68/iss1/3
DOI: http://dx.doi.org/10.47291/efi.v68i1.945

crisis by leaving the market and reducing export value. However, the reduction in export value or intensive margin adjustment appears to be more influential than the extensive one. Behrens, Corcos & Mion (2013) conduct a similar study, investigating the impact of the 2008–2009 financial crisis on Belgian exporters and importers. They discover that either exporting or importing firms are more likely to conduct intensive margin than extensive margin adjustment, i.e. exiting the market. Bricongne et al. (2012) determine that the decline in French export due to Global Financial Crisis (GFC) can be substantially explained by the net intensive margin where exporters tend to reduce export. Meanwhile, smaller-size exporters respond to the shock by reducing their market destination or exiting the market.

A growing body of empirical works on how trade fluctuates due to the COVID-19 shocks has been produced. International organizations such as WTO, Organisation for Economic Co-operation and Development (OECD), and World Bank are several of them; publishing the reports on the prediction of the impact of a pandemic on world trade for both trade in goods and services. Meanwhile, one can learn from the impact of previous crises such as GFC or epidemic diseases such as HIV/AIDS, SARS, and influenza.

Regarding the impact of GFC, Baldwin (2009) identifies the decline in trade during a crisis period as "sudden, severe, and synchronized". Observed from July 2008 to June 2009, trade decreased simultaneously in at least 104 countries with the most profound fall occurring in sectors highly connected with GVCs, i.e. machinery and vehicles. Interestingly, the decline in the mineral and oil sector per se was more rapid than the total trade value due to falling prices. Furthermore, the study discovers that the primary cause of the collapse is a sudden drop in the demand side, particularly on postponeable goods. Bems, Johnson & Yi (2012) find that the global recession hurts international trade performance, at least through three main drivers. They are changes in final expenditure, credit supply shocks, and inventory adjustments, attributing to trade drops of approximately 65%–80%, 15%–20%, and 20%, respectively. Meanwhile, trade policy is less likely to have a significant effect on causing an aggregate trade collapse. Focusing on the manufacturing sector, Eaton et al. (2016) employ a general equilibrium model and find that international trade in manufacturing decreased by about 29% during the 2008–2009 recession.

Several studies also focus on investigating the impact of the financial crisis on trade performance in certain countries. Levchenko, Lewis & Tesar (2010) suggest that the trade collapse during GFC is more significant compared to the previous shocks. The study utilizes the firm-level data of US export and import controlling for sector-level variables, vertical production linkages, compositional effect, and trade credit to determine which channel leads to a trade collapse. They find that the overall decline in import is around 40%, while export and import using intermediate input are likely to be hit the hardest. Meanwhile, Bricongne et al. (2012) find that GFC harms both French export and import performance. The crisis causes financial credit difficulties for firms, accounting for around 20% of export to decline.

The effect of GFC on the trade sector of Indonesia is found to be detrimental through the export linkage; though the impact is considerably mild (Basri & Rahardja 2010; Patunru & Zetha 2010; Thee 2012). According to Basri & Rahardja (2010), GFC negatively affects export value, arguably due to price shocks rather than changes in volume. Nevertheless, the impact on the aggregate economy is relatively small compared to neighboring countries such as Singapore, Malaysia, and Thailand. A good and reliable policy response given by the central bank and government, combined with the confidence of economic agents, appears to be the main reason. Another plausible cause is the relatively low global trade participation of Indonesia compared to its surrounding countries (Hill 2012). In addition, the contribution of export to Gross Domestic Product (GDP) is relatively small (Basri & Raharja 2010;

Patunru & Zetha 2010). Therefore, even though the crisis hits export, it does not significantly disrupt the economy as a whole. However, export remains playing an essential role in economic growth as it reflects the integration of Indonesia with the global network (Basri & Raharja 2010).

This study also links to the growing literature on the impact of infectious diseases on trade. A study by Fernandes & Tang (2020) examines the effect of 2003 SARS on the export and import of China using firm-level data. The result shows that SARS has a negative causal effect for both export and import growth. Utilizing the difference-in-difference method controlling for trade value in the first lag, they find that firms in the infected region experience two years of decline in trade even after the disease has ended. Meanwhile, a recent study by Friedt & Zhang (2020) examines the impact of COVID-19 on Chinese exporters using a gravity model. The finding shows that export is expected to fall by 2.5%–4.6% for every 1% increase in local and overseas COVID-19 cases. In the aggregate level, the pandemic is predicted to cause export losses of around 40%–45% in the first semester of 2020. The GVC disruption is the leading cause of the decline in export as the effect persists more than three months compared to supply and demand shocks.

The existing literature has brought evidence of a crisis-trade relationship. However, there remains a limited number of studies that examine the effect of the recent pandemic, namely COVID-19, on exporter behavior and export performance. Therefore, this study aims to fill the gap by employing microdata of monthly exporters in an emerging country, Indonesia.

3. Method

3.1. Data and Measures

This study employed panel data of all exporters of Indonesia from January 2019 to August 2020. The data from January 2019 to February 2020 represent the condition prior to the COVID-19 outbreak in Indonesia, while March 2020 to August 2020 is a period during the pandemic. The primary data sources in this study are customs export transactions of Indonesia and the United Nations (UN) Comtrade Database. The customs export data are compiled by Statistics Indonesia (BPS). The compiled data include monthly export transactions of firms and individuals from three sources, i.e. customs export declaration, state-owned postal service company (PT. Pos Indonesia) records, and cross-border marine enumeration. Most exporters are identified by a tax identification number (NPWP), while exporters of transboundary sea transactions are identified by identity cards or passport numbers. Each exporter sends one or more product at 8-digit Harmonized System (HS) 2017 nomenclature to at least one destination country in the form of Free on Board (FOB) in US dollar value.

Three types of transactions were excluded from the dataset for research purpose. First, transactions from PT. Pos Indonesia contained in HS chapter 99 (special transaction trade) and export from courier companies were exempted since such transactions do not represent the behavior of exporters in general. Second, the records of personal goods in HS 63090000 nomenclature were also removed as the code records households or personal moving items sent abroad. Lastly, this study also excluded transaction records of diplomatic corps. All exporters were observed supposing they exported at least once during the period. Transactions of each exporter per destination country were then collapsed to 2-digit HS in order to allow us to combine the data from UN Comtrade Database and estimate the effect of COVID-19 on export performance.

The outcome variable of interest is the export performance which will be measured using mid-point growth. This strategy was adopted from Bricongne et al. (2012), following studies by Davis & Haltiwanger (1992) and Buono, Fadinger & Berger (2008). The idea of utilizing mid-point growth instead of different levels as a parameter of export performance is to alleviate several concerns when working with large monthly transaction data.

https://scholarhub.ui.ac.id/efi/vol68/iss1/3
DOI: http://dx.doi.org/10.47291/efi.v68i1.945

Bricongne et al. (2012) argue that mid-point growth has the advantage of eliminating seasonality and various working days as well as the irregular export transactions, which may contribute to unbalanced panel data. Mid-point growth also helps in addressing a relatively short period of observation. These concerns appear to be the case of the data of monthly export transactions of Indonesia.

Despite its strength, the utilization of mid-point growth may raise bias since we omitted the actual actions of exporters during the recession. This study found it hard to distinguish whether the exporters are actually exiting the market permanently or only temporarily. The exporters might merely withhold export due to the policies of importing countries. For example, dynamic lookdowns in the destination countries, tightening inspection of goods causing containers scarcity, and disruption to logistics distribution might affect export transactions.

The equation of mid-point growth is:

$$\mathrm{G_{icht}} = \frac{\mathrm{X_{icht}} - \mathrm{X_{ich(t-12)}}}{\frac{1}{2}\left(\mathrm{X_{icht}} + \mathrm{X_{ich(t-12)}}\right)} \qquad (1)$$

In equation (1), i denotes exporter, c destination country, h 2-digit HS, and t monthly period. Meanwhile, G and X are mid-point growth and export value in USD, respectively. As displayed in Equation (1), the calculation of mid-point growth requires data of previous 12 months. Therefore, the 2018 data were included in this study to obtain the mid-point growth of 2019.

The variable of interest is the time dummy for the COVID-19 period. The value is one for March 2020 to August 2020, referring to the coronavirus outbreak in Indonesia, and zero otherwise. Three explanatory variables that are likely to be potential determinants of export performance were also included in this specification. Unfortunately, data were unavailable for the other potential determinants such as the characteristics of individual exporters.

The first control variable, net-import (in a natural logarithm form), is obtained from export value of Indonesia per 2-digit HS netted of its import value. Net-import is expected to control changes in the global demand of each sector (Bricongne et al. 2012). Thus, the effect is expected to be positive since the increase in global demand will escalate export value. The total import value of each country per 2-digit HS is collected from UN Comtrade Database. During the period of study, the number of countries whose import data were available in UN Comtrade Database amounted to 106 countries representing 46% of export destination countries of Indonesia.

The second explanatory variable is the export value of the previous month in a natural logarithm form to overcome its large magnitude. Buono, Fadinger & Berger argue that '... having exported in the previous period increase the probability of exporting in the current period ...' (2008, p. 3). Therefore, the previous value of each exporter is expected to have a positive correlation with the current export.

The last covariate is a time dummy variable for Eid al-Fitr which occurs in slightly different months each year. Considering that the majority of the population of Indonesia is Muslim, Eid al-Fitr is a special occasion when most businesses stop their operation for several weeks. During the period of study, Eid al-Fitr took place in June 2019 and May 2020. Export tends to drop in the Eid al-Fitr month and increase in the next month. In 2019, for example, export declined by 20% in June and increased by 30% in July (BPS 2020d). Therefore, those time-varying determinant needs to be controlled. The variable takes the value of one for June 2019 and May 2020, and zero otherwise. The summary statistics of the variables used in this study are presented in Appendix 1.

3.2. Empirical Strategy

This study proposed two main objectives. First, to examine the channels through which exporters adjust to the COVID-19 shock, i.e. extensive and intensive margins. Second, to estimate the impact of COVID-19 on export performance under the null hy-

pothesis that there is a significant negative impact.

To the extent of exploring the types of adjustment made by exporters, mid-point growth can be classified into four sub-types following studies by Buono, Fadinger & Berger (2008) and Bricongne et al. (2012). To capture the dynamic export flow at the highest disaggregate level, mid-point growth presented in equation (1) is calculated using export transactions at 8-digit HS instead of at 2-digit level. Note that in equation (1), the value of mid-point growth will range between -2 and 2. All transactions can be classified into extensive and intensive margin. First, it is a positive extensive margin (entry) supposing the value is +2. It indicates that exporters perform a new transaction either in terms of new products or entry into new market destination. Second, it is a negative extensive margin (exit) supposing the value is -2, suggesting that exporters quit exporting. Third, it is a positive intensive margin (expanding) supposing the value is between 0 and +2, showing that exporters manage to export at higher export values. Lastly, it is a negative intensive margin (reduced) supposing the value is between -2 and 0, implying that exporters ship their products at lower values. Furthermore, extensive margin can be disaggregated into market and product entry/exit in order to inspect which channel of extensive adjustment is preferred by exporters, i.e. market or product diversification.

Referring to the second objective, this study examined the impact of COVID-19 on export performance. The model to estimate the impact was adopted from Bricongne et al. (2012) and following Fernandes & Tang (2020). The specification takes the following form:

$$\begin{aligned} \mathrm{G_{icht}} &= \alpha + \tau \mathrm{C_t} + \gamma_1 \mathrm{K1_{icht}} + \gamma_2 \mathrm{K2_{icht}} \\ &\quad + \gamma_3 \mathrm{K3_{icht}} + \mathrm{d_c} + \mathrm{p_h} + \mathrm{w_t} + \varepsilon_{\mathrm{icht}} \end{aligned} \tag{2}$$

As explained in the previous section, i denotes exporter, c destination country, h 2-digit HS, and t monthly period. $\mathrm{G_{icht}}$ is the outcome variable, mid-point growth. $\mathrm{C_t}$ denotes COVID-19 time-dummy variable in month t. The value is one for March–August 2020 and zero otherwise. Variables $\mathrm{K1}$, $\mathrm{K2}$, and $\mathrm{K3}$ are net-import (in a natural logarithm form), the export value of the previous month (in a natural logarithm form), and Eid al-Fitr time dummy, respectively. $\mathrm{d_c}$, and $\mathrm{p_h}$ are country and 2-digit HS fixed-effects, controlling for any time-invariant effects on market destination and 2-digit sector. $\mathrm{w_t}$ is monthly fixed effects, controlling for any period shocks affecting export performance of all exporters. Lastly, $\varepsilon_{\mathrm{icht}}$ denotes the error term. This study focuses on $\hat{\tau}$, or the estimated effect of COVID-19 on mid-point growth.

The author is aware that this study was only able to control a limited number of explanatory variables. As a consequence, there might be a case that the estimation suffers from an omitted-variable bias. Therefore, this study employed ordinary least square (OLS) panel fixed effects specification to mitigate the issue. The fixed effects model is preferred due to its superiority in minimizing the presence of bias due to unobserved time-varying covariates (Wooldridge 2012). The time-invariant variables can be the national trade policies imposed on specific sector and market destination as well as the commodities price boom of a particular product on a specific period. Such determinants can be mitigated by using country, sector, and time fixed effects. In addition, the application of a fixed effects strategy is also supported by evidence from the Hausman test, in a view that the fixed effects model is preferred than random effects. The output of the Hausman test is provided in Appendix 2.

Nevertheless, the panel fixed effects method cannot eliminate the possible omitted variable bias from unobserved time-varying covariates. The characteristics of individual exporters such as exporting age, type of ownership, type of business process, number of competitor firms, and firm productivity may be potential determinants of export performance. Unfortunately, as previously explained, variables on the characteristics of exporters were unavailable. This study, however, attempts to reduce the presence of an en-

https://scholarhub.ui.ac.id/efi/vol68/iss1/3
DOI: http://dx.doi.org/10.47291/efi.v68i1.945

dogeneity issue due to the omitted variable bias by including one-month lags of export value and net-import.

This study is also keen to examine whether the estimated effect of COVID-19 on export performance explained in the model is robust. Therefore, robustness check was performed through several approaches to examine the magnitude, sign, and significance of the estimated effect. First, this study applied a different measure of export performance as an outcome variable. The panel fixed effects model was employed with export growth at a different level as the dependent variable. This strategy provides a view of whether the impact is relatively robust by using two different outcome variables. In the second approach, the analysis employed mid-point growth as the outcome variable and run the regression in several models, i.e. pooled OLS, panel fixed effect without explanatory variables, and Tobit.

Considering that COVID-19 may affect export performance in different ways depending on the size of the exporters, this study aims to analyze whether the effect is different among different types of exporters. Therefore, this study investigated the effect of heterogeneity on the size of the exporters by constructing a model with an interaction term between a shock variable and size dummy as an explanatory variable. The strategy to identify the size of the exporters followed a study by Fernandes & Tang (2020). First, the median export value of each 2-digit HS in the dataset was defined. Second, the largest export value of 2-digit HS for each exporter was determined. Third, the main export value of each exporter was compared to its corresponding median. The exporters then were classified as a small type supposing the value is below the median and a large exporter supposing the value is at least equal to or above the median. Lastly, a dummy variable was given to determine the size of the exporters. The value is one for large exporters and zero otherwise.

4. Results and Analysis

4.1. Descriptive Findings

This section provides an overview of the export of Indonesia during the pandemic. The foreign trade of Indonesia, however, is not immune to COVID-19. As presented in Figure 1, export performance drops slowly at around 3% in Q1 2020, and it becomes profound in Q2 2020 at 17%. It can also be noted that the drop in Q2 2020 might be due to the double effects of COVID-19 and Eid al-Fitr holiday that occurred in May since businesses usually stop their activities. Interestingly, as the number of positive cases is rising, export manages to increase sharply, at around 18% in the third quarter. Compared to the aftermath of GFC, the decline in export in the time of pandemic is still in a better position. During GFC, export drops significantly in the last quarter of 2008 and the first quarter of 2009 at around 21%. Meanwhile, import appears to have a mild drop in Q1 and Q2 2020, at around 12% and 18%, respectively. Afterwards, it increases at around 3% in the third quarter. Despite the declining export and import, the trade balance is in surplus from Q1 2020 to Q3 2020.

Furthermore, this study explores the channels through which export drops based on Broad Economic Categories (BEC). The BEC classification, established by the UN Statistics Division, allows us to distinguish goods based on their end-user category as well as in relation to GVC (UN 2018). At the aggregate level, BEC classifies goods into three classes based on System of National Accounts (SNA), namely capital, intermediate, and consumption.

Figure 2 presents the export of Indonesia based on the BEC category from Q1 2017 to Q2 2020. Overall, the export of the three categories declines during the COVID-19 outbreak, particularly in the second quarter of 2020. As the pandemic continues, the export of capital products falls more significantly compared to consumption and intermediate goods in the Q2 2020, around 40%. Capital goods such

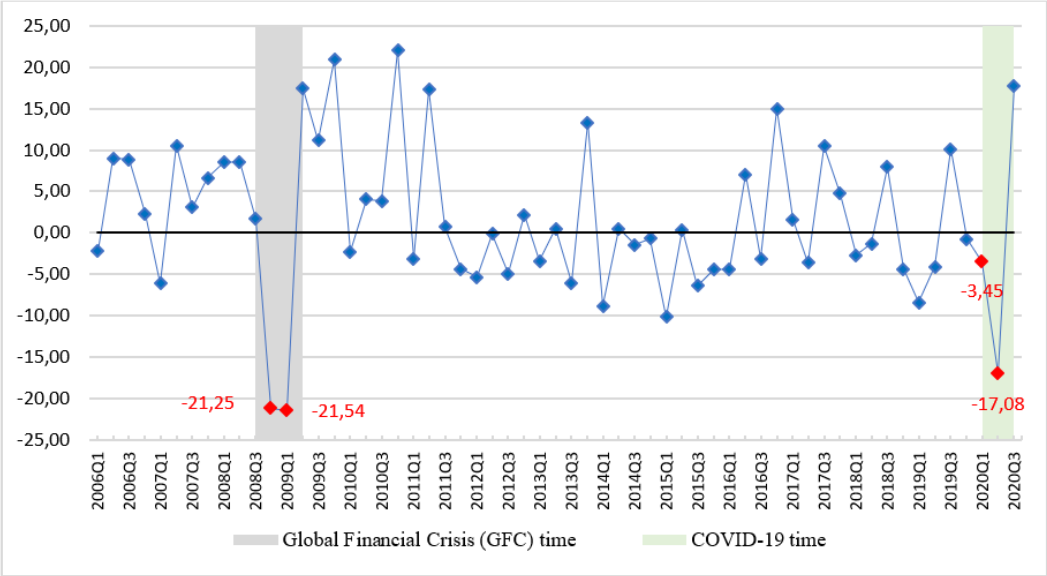

Figure 1. Quarter on Quarter Growth, the Export of Indonesia, Q1 2006 to Q3 2020
Source: BPS, author's calculation

as products in HS chapter 87 (vehicles other than railway, parts, and accessories thereof), and 85 (electrical machinery, equipment, and parts thereof) are manufacturing products.

The largest drop in the export of capital goods during the pandemic might be due to the hardest hit on the demand and supply sides simultaneously. As the global economy slows down, demand decreases. On the supply side, production materials and the activities of labor-intensive factories in the manufacturing industry are affected by the policies on the containment of the virus, i.e. mobility restrictions and social distancing policies. These findings correspond to a decline in Purchasing Managers Index (PMI) of Indonesia in April, May, and June, which are 27.5%, 28.6%, and 39.1% respectively; with April appears to have the lowest value in the last two year (Global Economy 2020). The index is an indicator of economic health in the manufacturing sector, in which a value below 50 represents contraction.

According to UNCTAD (2020b), delivery in global trade using sea transport contributes to more than 80% in volume and 70% in value. As a result, ship quarantine policies—imposed by counterparts countries — will possibly impede the export transactions of consumption and intermediate merchandise. In more detail, the majority of consumer goods that experiences a severe drop are HS 27 (mineral fuels), 64 (footwear), 62 (clothes), and 03 (fishery products). Meanwhile, intermediary goods with the highest fall are HS 15 (animal and vegetable fats/oils), and 72 (iron and steel).

The number of exporters decreases on the first three months following the COVID-19 outbreak, as shown in Figure 3 and Table 1. Since April, the number slowly decreases to around 7,600 exporters in May. Afterwards, the number starts to increase from June to August. The drop in the number of exporters seems to be correlated with the decline in export value. In more detail, during the period of pandemic in March to August, there are around 12,500 exporters. This number decreases by 3.1% year-on-year. During January–August 2020, there are around 13,600 exporters, similar to last year. Meanwhile, the number appears to be higher compared to the same period of 2018, which is only around 12,700 exporters.

https://scholarhub.ui.ac.id/efi/vol68/iss1/3
DOI: http://dx.doi.org/10.47291/efi.v68i1.945

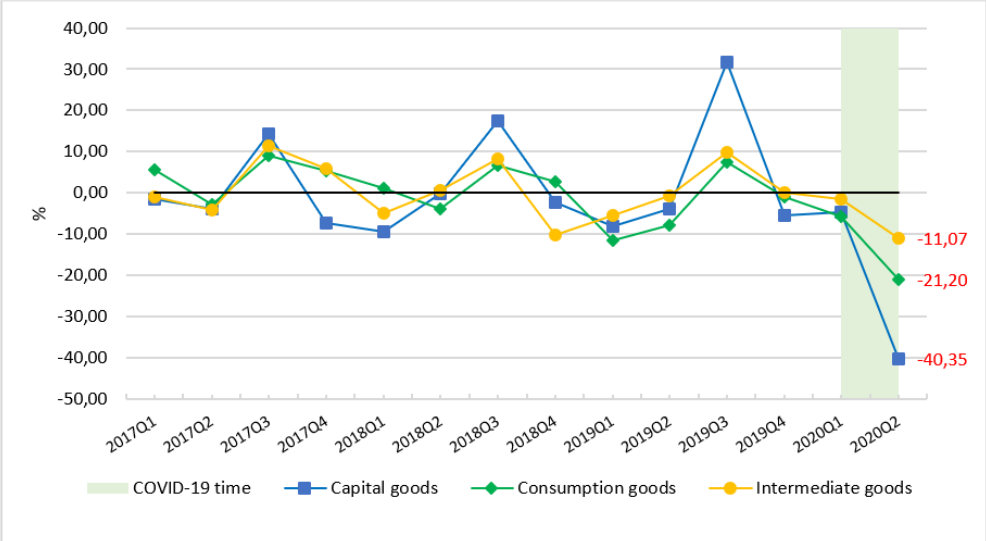

Figure 2. Quarter on Quarter Growth, the Exports of Indonesia Based on BEC, Q1 2017 to Q2 2020
Source: BPS, author's calculation

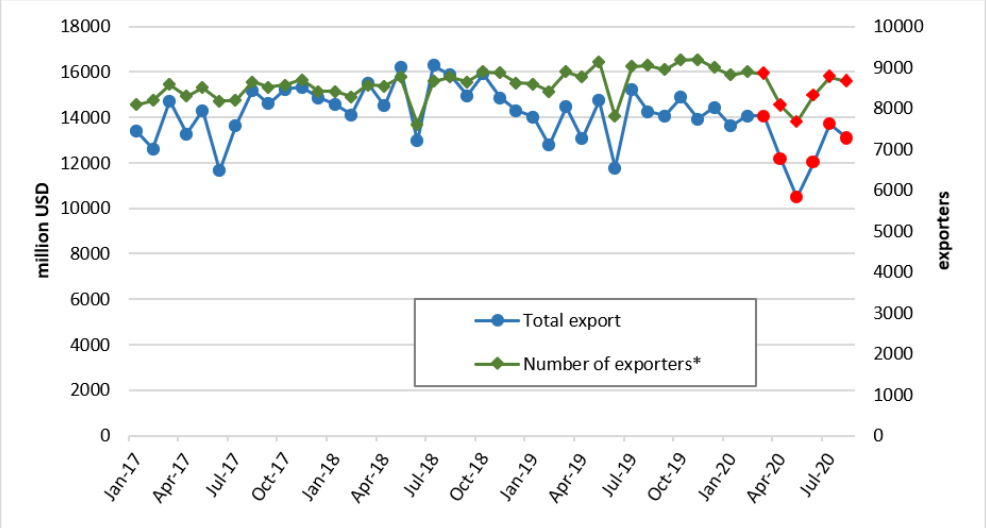

Figure 3. The Exports Value and Number of Exporters of Indonesia, January 2017–August 2020
Source: BPS, author's calculation
Note: *)Transactions of personal effects, courier companies, postal goods, and diplomatic corps are excluded.

Table 1. The Number of Exporters and the Percentage Growth, 2018–2020

Description	January–August			March–August		
	2018	2019	2020	2018	2019	2020
(1)	(2)	(3)	(4)	(5)	(6)	(7)
The number of exporters	12,767	13,692	13,68	12,084	12,989	12,585
% growth	2.19	7.25	-0.09	1.66	7.49	-3.11

Source: BPS, author's calculation
Note: Transactions of personal effects, courier companies, postal goods, and diplomatic corps are excluded.

4.2. The Adjustment During Crisis

Table 2 shows the composition of intensive and extensive margin adjustments of exporters using an alternative period from January to August and March to August of 2018–2020. The first column is the intensive and extensive margin category at the aggregate and disaggregate levels. Net extensive margin is obtained by subtracting the percentage of entry from exit, whereas net intensive margin is the difference between positive and negative intensives. Overall, during the COVID-19 outbreak in March–August 2020, either net intensive or net extensive has negative signs. It suggests that in response to the shock, most exporters change their behavior by stopping export or leaving the market and by reducing their export value.

As presented in Table 2, the percentage of outgoing transactions is higher than the incoming transactions in January–August and March–August 2020. In more detail, the rate of exit is 5.8% higher than the new transaction during the COVID-19 outbreak. As a result, net extensive margin appears negative. It indicates that the pandemic significantly disrupts the export of Indonesia through exit linkage where exporters tend to choose not to export. Compared to two previous years, net extensive margin appears to have a positive sign. Therefore, in the absence of the COVID-19 shocks, export expansion has a likelihood to outweigh the outbound transactions.

Similarly, the percentage of reduced transactions (negative intensive margin) is higher than positive intensive transactions in 2020. Moreover, the percentage of negative intensive margin in 2020 is greater compared to the two previous years. In March–August 2020, the rate of change in net intensive margin is negative by 2.08%, indicates that the decline in the value of export transactions is higher than the increase in transactions. Considering that the magnitude of net extensive margin is greater than the net intensive margin, we can conclude that the extensive margin contributes more to the decline in export during the pandemic than intensive margin channel.

In January–August 2020, both net extensive and net intensive margins have negative signs. However, the magnitudes are slightly lower compared to March–August in the same year. This result implies that during January–February, where COVID-19 has not yet hit Indonesia, there might be a sign of higher expanding transactions and higher positive intensive transactions.

As previously explained, extensive margin contributes more to the decline in the export of Indonesia during the COVID-19 period; therefore, it is interesting to explore the changes at the disaggregate level. This study then examines the change in exporter behavior concerning the extensive margin in terms of products exported and market destination. Overall, either net market or net product appears to be negative during March–August 2020, at 7.3% and 5.9%, respectively. This reduction occurs for both market destination and product diversification. Once again, the magnitude tends to be relatively higher than January–August in the same year. As the magnitude of the net market adjustment is higher than the net product, this indicates that the contribution to extensive margin is primarily at the market level. A possible explanation is that import restrictions imposed by foreign countries and logistical disruptions create incentives for exporters to exit the market rather than exit the product. It may be the case that the foreign demand change is relatively small, however, the restriction and quarantine strategy to imported goods hinder export transactions.

4.3. Estimation Results and Robustness Check

Table 3 provides the estimated effect of COVID-19 on export performance. Column 2 is the results of panel fixed effects using growth at a different level as the dependent variable. Column 3 to 6 are the results of pooled OLS, panel fixed effects without covariates, Tobit marginal effects, and panel fixed effects with covariates using mid-point growth as the outcome variable.

https://scholarhub.ui.ac.id/efi/vol68/iss1/3
DOI: http://dx.doi.org/10.47291/efi.v68i1.945

Table 2. The Composition of Mid-Point Growth (Percentage), 2018–2020

Description	January–August			March–August		
	2018	2019	2020	2018	2019	2020
(1)	(2)	(3)	(4)	(5)	(6)	(7)
Aggregate						
Total entry	37.83	37.25	35.15	37.27	37.14	34.24
Total exit	35.90	35.90	38.68	35.88	36.07	40.05
Net extensive margin	1.94	1.35	-3.52	1.39	1.06	-5.82
Positive intensive	13.52	12.93	12.23	13.75	12.87	11.77
Negative intensive	12.63	13.80	13.86	12.98	13.80	13.85
Net intensive margin	0.88	-0.86	-1.63	0.77	-0.93	-2.08
Disaggregate Extensive Margin						
Market entry	28.53	27.87	26.18	28.35	27.77	25.55
Market exit	27.09	28.16	31.56	27.22	28.33	32.80
Net market	1.44	-0.29	-5.39	1.13	-0.56	-7.26
Product entry	34.85	35.49	33.11	34.20	35.54	32.02
Product exit	33.79	32.51	35.31	33.78	32.41	36.67
Net product	1.28	3.65	-2.80	0.51	3.84	-5.89

Notes: Mid-point growth is calculated using data transaction at 8-digit HS level.
Transactions of personal effects, courier companies, postal goods, and diplomatic corps are excluded.

Table 3. The Estimated Effect of COVID-19 on Export Performance

Variable	$\triangle$ ln export		Mid-point growth		
	Panel fixed effects	Pooled OLS	Panel fixed effects	Tobit (Marginal effects dy/dx)	Panel fixed effects
(1)	(2)	(3)	(4)	(5)	(6)
COVID-19 dummy	-0.207**	-0.052***	-0.170***	-0.073***	-0.151**
	(0.095)	(0.005)	(0.009)	(0.005)	(0.063)
Ln (Net import)	0.349***	0.007***	No	0.021***	0.233***
	(0.012)	(0.001)		(0.017)	(0.007)
First lag of ln (export)	0.113***	0.017***	No	0.023***	0.052***
	(0.008)	(0.001)		(0.001)	(0.003)
Eid al-Fitr dummy	-0.400***	-0.091***	No	-0.083***	-0.277***
	(0.096)	(0.008)		(0.007)	(0.063)
Constant	-0.207**	-0.173***	0.042***	-	0.517***
	(0.095)	(0.013)	(0.006)		(0.045)
Sector fixed-effects	Yes	No	Yes	No	Yes
Country fixed-effects	Yes	No	Yes	No	Yes
Month fixed-effects	Yes	No	Yes	No	Yes
Observations	214,516	214,516	483,849	214,516	214,516
R-squared	0.024	0.004	0.008	-	0.027

Notes: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.
Transactions are at 2-digit HS level.
Standard errors are in parentheses.
Pooled OLS model uses robust standard errors.
Standard errors are clustered at export transactions per country destination per 2-digit HS level for panel fixed effects model.

Observed from columns 2 to 6, the estimated effects of COVID-19 are negative and statistically significant at least at 5% level with relatively similar magnitude. As expected, the results suggest that the COVID-19 outbreak in Indonesia leads to a decline in export performance. Column 6 shows that the estimated effect is -0.151 and statistically significant at 5% level. This result implies that in the time of crisis, on average, mid-point growth is expected to decrease by 0.151 percentage points compared to the pre-pandemic period. We suspect that the relatively small estimated effect is due to the short-lived decline in export, occurring only in April and May, as export slowly reverses three months following the outbreak. The results presented in Table 3, at the same time, can actually provide evidence

of robustness check using various specifications, suggesting that the estimated effect of COVID-19 on export performance is relatively robust.

The results presented in column 2 Table 3 also provide an alternative of robustness check using a different outcome. The estimated effect of COVID-19 is negative and statistically significant at 5% level. The two estimated coefficients in columns 2 and 6, however, are not directly comparable. Nevertheless, using different measures of export performance, the results suggest that the estimated effect is relatively robust.

The brief decline in export during the period of uncertainty can be attributed to strong export performance and growing optimism of global demand. In addition, several government policies providing incentives for entrepreneurs such as tax incentives, simplifying and reducing export restrictions, accelerating export-import for entrepreneurs with good reputations, and improving export-import services through the National Logistic Ecosystem (NLE) also have a positive impact on improving business.

Furthermore, how other covariates affect export performance of Indonesia can be explored from column 6. The result suggests that export performance has a positive and significant relationship with global demand—as represented by net-import—and the previous export value. It suggests that a 1% increase in global demand is estimated to increase the mid-point growth of export by 0.23 percentage points. Meanwhile, export performance is expected to increase by 0.05 percentage points for every 1% increase in the previous export value. It implies that changes in global demand have a higher estimated effect than changes in previous export. As expected, the Eid al-Fitr moment has a negative relationship with export performance. During this occasion, export performance is forecasted to decrease by 0.28 percentage points. In this period, the government usually imposes collective leave days up to two weeks to accommodate residents conducting mass homecoming (*mudik*) from Jakarta or other big cities to their villages. As a result, exporting firms tend to delay their export transactions and shipment.

4.4. Heterogeneity Analysis

This section provides an estimate of the heterogeneity impact on large and small exporters. Table 4 shows the estimated effect of COVID-19 based on the size of the exporters. As observed, the estimated coefficient of an interaction term between exporter type and the COVID-19 dummy is -0.34, and it is statistically insignificant. Meanwhile, the estimated coefficients of other covariates are relatively similar to the main result provided in Table 3 column 6 in terms of magnitude, sign, and significance. These results indicate that there is no different impact of COVID-19 on export performance between large and small exporters. Therefore, the size of the exporters does not matter. COVID-19 does not discriminate since the virus hits both types of exporters.

Table 4. The Estimated Effect of COVID-19 on Export Performance Based on the Size of the Exporters

Variable	Mid-point growth
(1)	(2)
COVID-19 dummy	-0.151**
	(0.063)
Size x COVID-19	-0.335
	(0.255)
Ln (Net import)	0.233***
	(0.007)
First lag of ln (export)	0.052***
	(0.003)
Eid al-Fitr dummy	-0.277***
	(0.063)
Constant	0.518***
	(0.045)
Sector fixed-effects	Yes
Country fixed-effects	Yes
Month fixed-effects	Yes
Observations	214,516
R-squared	0.027

Notes: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.
Transactions are at 2-digit HS level.
Standard errors are in parentheses.
Standard errors are clustered at export transactions per country destination per 2-digit HS level.

https://scholarhub.ui.ac.id/efi/vol68/iss1/3
DOI: http://dx.doi.org/10.47291/efi.v68i1.945

5. Conclusion

This study investigates the impact of COVID-19 pandemic on the exporters of Indonesia using monthly export transactions. Our analysis explores the channels through which export collapses. Using the BEC classification, this study finds that capital products—mainly electronics, vehicles, and machinery from the manufacturing industry—are hit the hardest by the coronavirus compared to consumption and intermediate products. In addition, most adjustments implemented by exporters are extensive margins, followed by reducing export value. In the time of the pandemic, exporters exiting transactions contribute around 40%, while value adjustments contribute around 14%. At the disaggregate level, net market extensive margin contributes more to the adjustment than the net product extensive margin. Finally, this study reveals a negative relationship between the pandemic and the mid-point growth of export, a measure of export performance. On average, the pandemic is estimated to reduce overall export by 0.15 percentage points of mid-point growth. The result is robust as evidenced from several specifications showing relatively similar estimated coefficients for magnitude, direction, and significance. In terms of the heterogeneity impact, there is no different impact among the size of the exporters since the virus disrupts both large and small exporters.

It is also important to note that despite the contraction on April and May, export appears to have slowly reversed since June, three months following the outbreak. However, considering no sign of a flattening COVID-19 curve, export may require a long period to recover. Mobility limitation, travel restriction, social distancing, and business closure may hinder the recovery process. Therefore, policies should be designed to provide more temporary assistance and financial/credit facilities for exporters as well as simplicity of regulation to promote export recovery and prevent the next episode of export decline. Turning-inwards policies, i.e. implementing export restriction, will not help the recovery process. These policies do not only hinder the potential of Indonesia, but also disrupt the international trade supply chain (Patunru & Gupta 2020).

While our analysis provides several useful insights on the impact of coronavirus on the export of Indonesia, nevertheless, this study notes several caveats. First, the underlying estimation sample only considers export transactions that match with the UN Comtrade import data. Initially, the export dataset of Indonesia during January 2019–August 2020 consists of 229 country destinations, however only 106 countries are available in the UN Comtrade database, contributing to around 46%. In addition to relatively a few matching countries, these countries appear to be the majority of export market destinations of Indonesia. Second, this study is absent in controlling specific characteristics of exporters that may be important determinants of export performance. Lastly, this study uses export transactions collapsed into 2-digit HS to allow us combined them with the data obtained from UN Comtrade. As a consequence, there are limitations in exploring the heterogeneity impact based on GVC sector or International Standard of Industrial Classification (ISIC) that requires dataset in full-digit HS code. As the data become more available, further research can investigate the impact of the pandemic by adding relevant variables focusing on a specific sector using higher-level disaggregate data. Alternatively, the future study may explore the channels — whether supply, demand, or logistics — through which the pandemic induces export contraction.

Acknowledgement

The author would like to express gratitude to BPS-Statistics Indonesia for support and permission; Arianto Patunru (supervisor of Master's Research Essay at the Australian National University (ANU)) for insightful discussion and suggestion; and Professor Renee McKibbin (course convener of Master's Research Essay at the ANU) for valuable lectures and comments.

References

[1] Baldwin, R 2009, 27 November, 'The great trade collapse: what cause it and what does it mean?', *VoxEU*. viewed 29 August 2020, <https://voxeu.org/article/great-trade-collapse-what-caused-it-and-what-does-it-mean>.

[2] Baldwin, R & Nino, VD 2006, 'Euros and zeros: the common currency effect on trade in new goods', *NBER Working Paper, 12673*, National Bureau of Economic Research. doi: 10.3386/w12673.

[3] Baldwin, R & Tomiura, E 2020, 'Thinking ahead about the trade impact of COVID-19' in R Baldwin & BW Mauro (Eds.), *Economics in the time of COVID-19*, CEPR Press, pp. 59-71.

[4] Basri, MC & Rahardja, S 2010, 'The Indonesian economy amidst the global crisis: good policy and good luck', *ASEAN Economic Bulletin*, vol. 27, no. 1, pp. 77-97. doi: https://doi.org/10.1355/AE27-1E.

[5] Behrens, K, Corcos, G & Mion, G 2013, 'Trade crisis? what trade crisis?', *Review of Economics and Statistics*, vol. 95, no. 2, pp. 702-709. doi: https://doi.org/10.1162/REST_a_00287.

[6] Bekkers, E, Keck, A, Koopman, R & Nee, C 2020, 24 April, 'Trade and COVID-19: the WTO's 2020 and 2021 trade forecast', *VoxEU*. viewed 27 August 2020, <https://voxeu.org/article/trade-and-COVID-19-wto-s-2020-and-2021-trade-forecast>.

[7] Bems, R, Johnson, RC & Yi, KM 2012, 'The great trade collapse', *NBER Working Paper, 18632*, National Bureau of Economic Research. doi: 10.3386/w18632.

[8] Bernard, AB, Jensen, JB, Redding, SJ & Schott, PK 2009, 'The margins of US trade', *American Economic Review*, vol. 99, no. 2, pp. 487-493. doi: https://doi.org/10.1257/aer.99.2.487.

[9] Beverelli, C, Neumueller, S & Teh, R 2014, 'A new look at the extensive trade margin effects of trade facilitation', *Staff Working Papers ERSD, 16*, World Trade Organization. doi: https://doi.org/10.30875/4445c521-en.

[10] BPS 2020a, *Indonesia foreign trade statistics exports 2019*, BPS-Statistics Indonesia.

[11] BPS 2020b, *Indonesia foreign trade statistics imports 2019*, BPS-Statistics Indonesia.

[12] BPS 2020c, *Press release: Indonesia export and import May 2020*, BPS-Statistics Indonesia.

[13] BPS 2020d, *Oil-nonoil export value (US$ million) 2019*, BPS-Statistics Indonesia.

[14] Bricongne, JC, Fontagné, L, Gaulier, G, Taglioni, D & Vicard, V 2012, 'Firms and the global crisis: French exports in the turmoil', *Journal of International Economics*, vol. 87, no.1, pp. 134-146. doi: https://doi.org/10.1016/j.jinteco.2011.07.002.

[15] Buono, I, Fadinger, H & Berger, S 2008, 'The micro dynamics of exporting: evidence from French firms', *MPRA Paper, 12940*, Munich Personal RePEc Archive. viewed 29 August 2020, <https://mpra.ub.uni-muenchen.de/12940/1/MPRA_paper_12940.pdf>.

[16] Chaney, T 2008, 'Distorted gravity: the intensive and extensive margins of international trade', *American Economic Review*, vol. 98, no. 4, pp. 1707-1721. doi: https://dx.doi.org/10.1257/aer.98.4.1707.

[17] CSIS 2020, *Southeast Asia COVID-19 tracker*, Centre for Strategic and International Studies. viewed 29 August 2020, <https://www.csis.org/programs/southeast-asia-program/southeast-asia-COVID-19-tracker-0>.

[18] Davis, SJ & Haltiwanger, J 1992, 'Gross job creation, gross job destruction, and employment reallocation', *The Quarterly Journal of Economics*, vol. 107, no. 3, pp. 819-863. doi: https://doi.org/10.2307/2118365.

[19] Eaton, J, Kortum, S, Neiman, B & Romalis, J 2016, 'Trade and the global recession', *American Economic Review*, vol. 106, no. 11, pp. 3401-3438. doi: https://doi.org/10.1257/aer.20101557.

[20] Felbermayr, GJ & Kohler, W 2006, 'Exploring the intensive and extensive margins of world trade', *Review of World Economics*, vol. 142, no. 4, pp. 642-674. doi: https://doi.org/10.1007/s10290-006-0087-3.

[21] Fernandes, A & Tang, H 2020, 'How did the 2003 SARS epidemic shape Chinese trade?', *CESifo Working Paper, 8312*, CESifo. viewed 29 August 2020, <https://www.cesifo.org/en/publikationen/2020/working-paper/how-did-2003-sars-epidemic-shape-chinese-trade>.

[22] Frensch, R 2010, 'Trade liberalisation and import margins', *Emerging Markets Finance and Trade*, vol. 46, no. 3, pp. 4-22, doi: https://dx.doi.org/10.2753/REE1540-496X460301.

[23] Friedt, FL & Zhang K 2020, 'The triple effect of COVID-19 on Chinese exports: first evidence of the export supply, import demand and GVC contagion effects', *CEPR Press Covid Economics Vetted and Real-time Papers, 53*, pp. 72-109, Centre for Economic Policy Research. viewed 29 August 2020, <https://cepr.org/file/9864/download?token=sFkb-kwp>.

[24] Global Economy 2020, *Indonesia: purchasing managers index (PMI), manufacturing*. viewed 26 October 2020, <https://www.theglobaleconomy.com/Indonesia/pmi_manufacturing/>.

[25] Hill, H 2012, 'The best of times and the worst of times: Indonesia and economic crises', *Working Papers in Trade and Development, 2012/03*, ANU College of Asia and the Pacific. viewed 23 October 2020, <https://acde.crawford.anu.edu.au/sites/default/files/publication/acde_crawford_anu_edu_au/2016-10/wp_econ_2012_03_hill.pdf>.

[26] Levchenko, AA, Lewis, LT & Tesar, LL 2010, 'The collapse of international trade during the 2008-09 crisis: in search of the smoking gun', *IMF Economic Review*, vol. 58, no. 2, pp. 214-253. doi: https://dx.doi.org/10.3386/w16006.

[27] Patunru, AA & Gupta, K 2020, 16 June, 'Indonesia's PPE export ban backfires', *East Asia Forum*. viewed 24 October 2020, <https://www.eastasiaforum.org/2020/06/16/indonesias-ppe-export-ban-backfires/>.

[28] Patunru, AA & Zetha, E 2010, 'Indonesia's savior: fiscal, monetary, trade or luck?', *Public Policy Review*, vol. 6, no. 4, pp. 721-740.

[29] Thee, KW 2012, 'The Indonesian economy after the global financial crisis', *Presentation*, Arndt-Corden Department of

https://scholarhub.ui.ac.id/efi/vol68/iss1/3
DOI: http://dx.doi.org/10.47291/efi.v68i1.945

Economics Crawford School of Public Policy ANU. viewed 23 October 2020, <https://crawford.anu.edu.au/acde/ip/pdf/lpem/2012/2012_10_24_-_SEADI_Thee_Kian_Wie.pdf>.

[30] UN 2018, 'Classification by Broad Economic Categories rev. 5', *Statistical Papers Series M No. 53, Rev.5*, UN Department of Economic and Social Affairs - Statistics Division. viewed 5 August 2020, <https://unstats.un.org/unsd/trade/classifications/SeriesM_53_Rev.5_17-01722-E-Classification-by-Broad-Economic-Categories_PRINT.pdf>.

[31] UNCTAD 2020a, 11 June, *Global trade continues nosedive, UNCTAD forecasts 20% drop in 2020*, United Nations Conference on Trade and Development. viewed 27 August 2020, <https://unctad.org/en/pages/newsdetails.aspx?OriginalVersionID=2392>.

[32] UNCTAD 2020b, 'Impact of the COVID-19 pandemic on trade and development: transitioning to a new normal', United Nations Conference on Trade and Development. viewed 29 December 2020, <https://unctad.org/system/files/official-document/osg2020d1_en.pdf>.

[33] Wooldridge, JM 2012, *Introductory econometrics: a modern approach* (5th edition), South-Western Cengage Learning.

[34] World Bank 2020, *From containment to recovery: Economic update for East Asia and the Pacific, October 2020*. viewed 29 August 2020, <https://www.worldbank.org/en/region/eap/publication/east-asia-pacific-economic-update>.

[35] WTO 2020, *Trade set to plunge as COVID-19 pandemic upends global economy*, World Trade Organization. viewed 29 August 2020, <https://www.wto.org/english/news_e/pres20_e/pr855_e.htm>.

Appendix

Appendix 1. Summary Statistics of the Variables

Description	Obs.	Mean	Std. Dev.	Min	Max
(1)	(2)	(3)	(4)	(5)	(6)
Mid-point growth	483,849	-0.039	0.942	-2	2
COVID-19 dummy variable	908,612	0.276	0.447	0	1
Ln Net import	474,229	-4.608	1.897	-23.072	5.31
Ln export value (t-1)	549,245	10.153	2.784	-4.962	20.167
Eid al-Fitr dummy variable	908,612	0.081	0.273	0	1

Appendix 2. Hausman Test Fixed Effects (FE) and Random Effects (RE)

Variable	(b) FE	(B) RE	(b-B) Difference	Sqrt(diag(V_b-V_B)) S.E.
(1)	(2)	(3)	(4)	(5)
COVID-19 dummy	-0.125	-0.082	-0.042	0.002
Ln (Net import)	0.230	0.029	0.201	0.004
First lag of ln (export)	0.051	0.026	0.025	0.001
Eid al-Fitr dummy	-0.045	-0.084	0.039	0.002

b = consistent under Ho and Ha; obtained from xtreg
B = inconsistent under Ha, efficient under Ho; obtained from xtreg
Test: Ho: difference in coefficients is not systematic
chi2(4) = (b-B)'[(V_b-V_B)^(-1)](b-B) = 2630.45
Prob>chi2 = 0.0000

https://scholarhub.ui.ac.id/efi/vol68/iss1/3
DOI: http://dx.doi.org/10.47291/efi.v68i1.945