The Impact of COVID-19 on Korean Export

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Scope Statement

.The COVID-19 pandemic, which caused immense suffering worldwide, was not merely a medical and health crisis but also severely impacted the economies of many nations. In particular, lockdown measures inevitably led to a significant contraction in domestic and international production activities. This analysis aims to examine the impact of COVID-19, the effects of lockdown policies, and the effectiveness of government fiscal spending in response to the pandemic. Specifically, we selected South Korea, a highly open economy with a substantial economic scale, to analyze how COVID-19 affected its exports. Through this analysis, we aim to provide insights into how governments around the world should respond to similar crises in the future.

Conflict of interest statement

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest

Credit Author Statement

Sang-Kee Kim: Conceptualization, Data curation, Formal Analysis, Investigation, Methodology, Project administration, Writing – original draft, Writing – review & editing. Sang-Yong Oh: Data curation, Investigation, Supervision, Visualization, Writing – review & editing. Lin-Ran Wang: Conceptualization, Formal Analysis, Methodology, Writing – original draft.

Keywords

COVID-19, international trade, Exports, lockdown measures, Government stimulus

Abstract

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This study investigates how the pandemic affects South Korean export performance.Based on the empirical analysis, this study analyzes the relationship between South Korean exports and a series of independent variables, including COVID-19 confirmed cases, death tolls, the stringency of lockdown measures, government fiscal stimulus policies, and factor endowments across countries. Empirical findings reveal that South Korean exports are positively associated with the severity of the pandemic and lockdown restrictions. Second, many countries' government fiscal stimulus to alleviate the pandemic increases South Korean export. Third, during this period, South Korean export expand to labor-abundant economies while contracting in capital-abundant ones.The pandemic's effects on domestic production, which led to an increase in reliance on imports, are what caused the surge in exports to nations with abundant labor. This finding partially supports the Heckscher-Ohlin theorem.

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Keywords: COVID-19, International Trade, Exports, Lockdown Measures, Government Stimulus

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1 Introduction

The COVID-19 pandemic has caused widespread economic crises, leading to factory closures, business shutdowns, and stock market crashes. According to the OECD, global GDP has plummeted by 5.6 trillion dollar, underscoring the severity of the economic downturn. The pandemic has had a devastating impact on global supply chains, which were crucial to economic growth before the crisis, distorting production and consumption patterns and deteriorating international trade as well. Lock-downs, prevalent during the pandemic, have curtailed domestic production, resulting in supply shortages that necessitate Imports from other countries to meet domestic demand. This study attempts to explore the plausible linkage between the severity of the pandemic and international trade, with a particular focus on South Korean exports. South Korea, known for its high trade openness and effective pandemic response, provides a valuable case for examining the interconnection between the pandemic and international trade. The study calculates the impact of the pandemic's severity on South Korean exports by taking into account confirmed cases and death tolls in various nations.

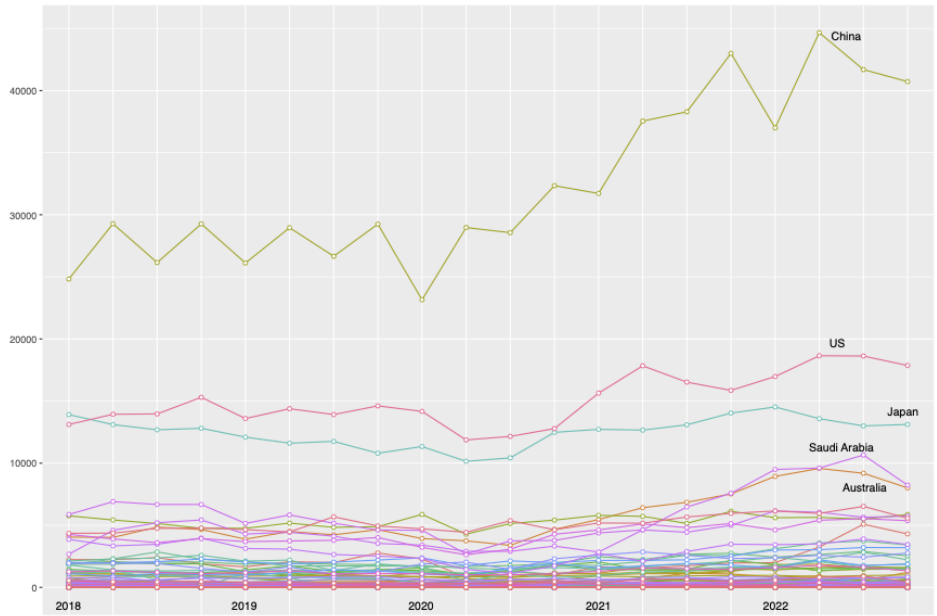

Figure 1: Korean Export

Figure 1 illustrates a significant decline in South Korean exports to major trading partners during the initial and subsequent quarters of 2020, coinciding with the onset of the COVID-19 pandemic. This significant decline reflects the pandemic's disruptive effects on international trade as a result of supply chain disruptions, weakening consumer demand, and global containment measures. The figure underscores the substantial economic challenges posed by the pandemic and the need for adaptive trade strategies.

This study analyzes the impact of a pandemic on production based on factor endowments. Developing countries, which are labor-intensive and labor-abundant by nature, are more susceptible to production disruptions caused by labor shortages during pandemics. Conversely, capital-intensive and abundantly developed economies may be more resilient. This suggests that developing countries might increase imports to meet domestic demand, potentially boosting exports from other countries. As the pandemic in developing countries becomes more severe, imports from foreign countries will likely increase. This study aims to examine this hypothesis, aligning with the Heckscher-Ohlin theorem.

In order to combat the pandemic-related economic downturn, governments finally implemented various policies. These measures include direct payments to individuals at the micro level and large-scale economic stimulus packages at the macro level to boost overall economic activity. The policies aimed to stimulate both individual and aggregate demand. While increased domestic demand can lead to higher imports, this study examines whether these policies ultimately boosted South Korean exports.

To sum up, in this study, we analyze the impact of the pandemic severity on South Korean exports, the impact of the relative labor abundance on South Korean exports, and the impact of government policies on South Korean exports. To do this, this study employs a gravity model to analyze the impact of COVID-19, including lockdown and alleviation policies, on South Korean exports. We utilized quarterly export data from 2020 to 2021, covering 91 countries. Confirmed cases, death tolls, labor-capital ratio, individual direct payments, and government stimulus packages serve as key independent variables in describing

the pandemic's impact.

The paper is organized as follows: Chapter 2 provides a literature review establishing the theoretical foundation and research gaps. Chapter 3 outlines the research methodology, including data sources and analytical techniques. Chapter 4 presents the empirical findings on the impact of COVID-19 lockdown policies on Korean exports. Finally, Chapter 5 summarizes the study, discusses implications, and suggests avenues for future research.

2 Literature Review

The literature review synthesizes existing research on the pandemic's economic impacts, examining how it transformed economic landscapes, disrupted trade, and exposed systemic vulnerabilities. By understanding these complexities, this review aims to inform future research and policy-making.

The COVID-19 pandemic triggered significant disruptions in global stock markets. Ngwakwe (2020) documented substantial declines in global stock indices. Subsequent studies by He et al. (2020) and Liu et al. (2022) further emphasized the pandemic's negative impact on stock markets. Nicola et al. (2020) focused on the U.S. market, analyzing the performance of major indices and the government's response. The U.S. implemented fiscal policies to stabilize the market. These studies collectively highlight the severe economic consequences of the pandemic and the need for coordinated policy responses.

Al-Awadhi et al. (2020) found a strong correlation between rising COVID-19 cases and stock market declines in China. Anh and Gan (2021) expanded on this, showing that the financial sector was disproportionately impacted, while the manufacturing and consumption sectors were also significantly affected. Goodell (2020) attributed this to the financial industry's vulnerability to shocks. Tran et al. (2020) advocated for targeted government support for non-financial sectors, such as agriculture, apparel, automotive, aviation, food production, and tourism, which are often overlooked but crucial for economic resilience.

Goolsbee and Syverson (2021) used cellphone data to analyze consumer behavior during the COVID-19 pandemic. Despite significant declines in overall business visits, shutdown orders contributed minimally to this drop. Instead, consumer behavior shifted towards essential businesses like grocery stores. Baldwin and Tomiura (2020) complements this by showing that import-dependent nations experienced reduced imports due to changes in consumer spending patterns, such as decreased shopping and increased savings.

Koopmans (2020) found a correlation between global tourism and COVID-19 mortality rates. Abiad et al. (2020) emphasized the significant economic impact of declining tourism on developing Asian countries. Beyond tourism, disruptions to supply chains and medical services exacerbated the overall economic downturn.

Singh et al. (2021) highlights the profound disruptions caused by the COVID-19 pandemic on production, logistics, and supply chains across various sectors. The study emphasizes challenges in the food industry, particularly in ensuring the supply of essential goods. These findings underscore the complex interplay of factors affecting businesses during the pandemic.

Yilmazkuday (2022) analyzes the relationship between daily COVID-19 cases and global economic indicators, including oil prices and the Baltic Exchange Dry Index. Employing a structural vector autoregression model, the study finds that rising COVID-19 cases negatively impact global economic activity by decreasing oil prices and increasing the Baltic Index, indicating supply chain disruptions. These effects were more pronounced during the early stages of the pandemic.

Ozili and Arun (2020) examined the impact of COVID-19-related policies, including restrictions, monetary and fiscal measures, and public health interventions, on economic activity and stock market performance. The study found that prolonged lockdowns, monetary policy decisions, and travel restrictions significantly affected economic indicators and stock prices. Additionally, rising COVID-19 cases and deaths correlated with increased inflation, unemployment, and energy commodity prices.

The COVID-19 pandemic triggered widespread lockdowns, profoundly disrupting global

economies. This study examines the complex relationship between these lockdowns and their economic consequences, including supply chain disruptions and altered consumer behavior.

Abiad et al. (2020) highlights the severe economic consequences of lockdowns in developing Asian nations, where widespread business closures and labor restrictions led to production declines. These measures disrupted domestic economies and hindered international trade by restricting labor and capital movements. Dingel and Neiman (2020) emphasizes the varying impacts of remote work across countries, underscoring the complex interplay between lockdowns, business operations, and global trade. In a similar context, this study examines the differential impacts of the COVID-19 pandemic on OECD and non-OECD countries. Given the distinct factor endowments of developed and developing economies—capital-abundant versus labor-abundant—we hypothesize that the pandemic's effects on trade vary across these groups. Applying the Heckscher-Ohlin framework, we analyze the relationship between factor endowments, production structure, and South Korea's export performance.

Hoang et al. (2020) found that technologically advanced firms were more adept at adapting to government regulations during the COVID-19 pandemic. These companies increased their spending, leveraging government support to drive innovation and resilience. This discovery is consistent with the observations made by Czarnitzki and Toole (2011) and Vo and Le (2017), who argue that companies with a high level of technological sophistication have a particular ability to withstand external disruptions. Technologically advanced firms exhibit greater resilience, effectively navigating and adapting to challenging environments. By leveraging external support, these companies can strategically invest and overcome disruptions. These findings underscore the critical role of technology in fostering adaptability and resilience, providing valuable insights for policymakers and businesses operating in complex economic landscapes.

Fernandes and Tang (2020) analyzes the long-term impacts of the SARS outbreak on Chinese industrial trade. The study shows that smaller businesses suffered disproportionately from the crisis, while those in capital- and technology-intensive industries recovered more

quickly. These findings offer valuable insights into the differential vulnerabilities of firms during health crises.

Tajani et al. (2021) assesses a study on the market for residential properties in six prominent Italian cities, both prior to and following the emergence of COVID-19, which indicates a significant change in consumer preferences. The study reveals that COVID-19 lockdowns significantly altered consumer preferences for housing. A notable shift towards larger, more secluded residences emerged. This reflects changing priorities, with ample space and privacy becoming increasingly valued. The findings highlight the dynamic nature of the real estate market in response to societal and economic shifts caused by the pandemic.

Existing research primarily focuses on the impact of COVID-19 on major economies. However, studies examining the specific effects of lockdowns on South Korean exports remain limited. This study addresses this gap by analyzing the relationship between lockdown measures and Korean export performance from January 2020 to December 2021 using a gravity model.

3 Data and Methodology

In the field of international economics, the patterns and trends of worldwide trade have experienced remarkable changes, especially as a result of the COVID-19 pandemic. The complex network of global trade connections, regulated by several economic theories, has encountered numerous obstacles in these turbulent times. The Gravity Model of International Trade is a theoretical framework that has attracted considerable interest and relevance. The gravity model, initially proposed by Tinbergen (1962), states that the amount of trade between two countries is directly related to their economic sizes and inversely related to the distance separating them. Anderson and Van Wincoop (2003) has since demonstrated its efficacy as a reliable analytical instrument for comprehending cross-border trade trends.

$$x_{ij} = \frac{g y_i y_j}{d} \tag{1}$$

Equation (1) is the classic gravity model, which serves as a fundamental framework for comprehending bilateral economic connections between nations. The variable x_{ij} in this model represents the volume of bilateral trade between countries i and j, whereas the constant parameter g is used. According to the relative economic might of the trading partners, y_i for country i and y_j for country j represent the economic size of each country. Additionally, $d_i j$ represents the distance between countries i and j, acknowledging that the spatial proximity or distance between trading partners affects trade flows. The fundamental gravity model is essential for evaluating and predicting patterns of international commerce. It helps to understand the complex relationship between economic scale, geographic proximity, and the dynamics of bilateral trade.

The conventional gravity model can be used to create two empirical models, each employing a distinct dependent variable to quantify trade volume: exports and imports. These models are fundamental frameworks used to analyze bilateral trade relationships between countries. Additionally, as Equation (2) demonstrates, using non-economic factors as explanatory variables can improve the effectiveness of the gravity model.

$$ln(x_{it}) = \beta_0 + \beta_1 ln(y_{it}) + \beta_2 ln(d_i) + \beta_3 \Gamma_{it} + \epsilon_t \tag{2}$$

In this equation, $ln(x_{it})$ represents the natural logarithm of the trade volume between home and country i at time t, while $ln(y_{it})$ and $ln(d_i)$ denote the natural logarithms of the economic sizes and geographic distances between the entities, respectively. Moreover, β_3 denotes the vector of the coefficients associated with the vector of the non-economic variables Γ_{it}, while ϵ_t represents the error term in the model. By including non-economic factors, the model can offer a more complete knowledge of the factors that influence the dynamics of bilateral commerce. This, in turn, improves the accuracy and explanatory ability of the gravity model

when evaluating international trade interactions.

In the following chapters, we will thoroughly examine these variables. The models used offer a strong analytical framework for comprehending the dynamics of global commerce, enabling a thorough examination of the factors that impact trade flows between countries. The emergence of the COVID-19 pandemic in late 2019 has not only caused a worldwide health crisis but has also resulted in significant disruptions to global trade dynamics. The complex interaction of economic variables, geopolitical issues, and public health interventions has fundamentally transformed the global business environment. As we explore this intricate phenomenon, it is crucial to examine how the gravity model might be applied and adjusted in the context of the unique problems presented by the current pandemic.

This study utilizes panel data analysis, utilizing Korean trade quarterly data from January 2020 to December 2021, spanning both OECD and non-OECD nations. The total number of countries included in the analysis is 91. This study seeks to employ panel data in order to examine the dynamic interaction of variables over time and across different countries. The objective is to gain a thorough understanding of the factors that influence trade patterns in Korea throughout the chosen time frame. Furthermore, it is possible to enhance the gravity model utilized in this analysis by integrating non-economic variables, as outlined in Table 1.

Table 1: Variables Description

Variable	Description
Export	real Korean exports, quarterly, unadjusted in millions of US dollars
GDP	real gross domestic product, quarterly, unadjusted in millions of US dollars
Distance	distance in km between Korea and trading partner
FTA	free trade agreements between Korea and trading partner, dummy
Case	new cases of COVID-19 in trading partners
Stringency	index including school closures, workplace closures, and travel bans
DPI	direct payment to individuals
LKR	amount of labor employed to every unit of capital employed
Fiscal	Fiscal Response to COVID-19, % of GDP

The data for Cases and Death variables, which represent the COVID-19 situation, is

Table 2: Summary of Statistics

Variable	Observation	Mean	Std.dev.	Minimum	Maximum
Export	546	1370165	44494700	379	3.97e+07
GDP	546	70817	447389	3.05	4177971
Case	546	304763	1203814	0	1.82e+07
Death	546	6792	21421	0	235986
Stringency	546	53.60	21421.62	0	235986
Distance	546	9273.31	3951.83	855.65	19629.5
RTA	546	0.69	0.46	0	1
LKR	546	0.003	0.0003	0.00	0.0018
Fiscal	546	1044	14339	0	263301
DPI	546	2.53	24.84	0	404.1

obtained from Our World in Data (OWID). The study utilizes the number of confirmed cases and deaths from various countries. The SGR (Stringency of Government Responses) Index data serves as the variable for government lockdown measures. This index is developed by Oxford University and continuously updated since the COVID-19 outbreak. Fiscal data for each country is sourced from Porcher (2023). This data represents the types of government subsidies provided in each country. The inclusion of DPI and Fiscal highlights the significant importance of fiscal policy in mitigating the socio-economic consequences of the COVID-19 crisis and promoting the recuperation and adaptability of domestic markets. The labor-to-capital ratio, export, and GDP data are obtained from the World Bank. Table 1 contains statistics summarized from the above major variables. These independent variables provide valuable information about several factors that influence bilateral trade interactions, thus improving the model's ability to explain and predict outcomes. The application of panel data in conjunction with an augmented gravity model allows for a comprehensive examination of the factors that influence the dynamics of Korean commerce on a global scale. Table 1 contains statistics summarized from the above major variables.

4 Methodology

Based on Equation 2, we outline four separate empirical models specifically designed to thoroughly investigate these impacts. The initial empirical regression takes the following form(3). Export, GDP, and Distance are expressed in logarithms.

$$ln(Export_{it}) = \beta_0 + \beta_1 ln(GDP_{it}) + \beta_2 ln(Distance_i) + \beta_3 FTA_{it} + \beta_4 Stringency_{it} + \beta_5 Case_{it} + \epsilon_t \tag{3}$$

The dependent variable $Export_{it}$ is exports of goods to country i at time t. As independent variables, three economic variables and two pandemic variables are included. GDP as measures of the size of the economy and Distance as measure of trade cost. Establishing a free trade agreement(FTA) reduces a trade cost. Stringency and Cases shows the severity of the pandemic. As the severity of the pandemic increases, the domestic production decrease, then the import will substitute the domestic production. Thus as the pandemic severity of the import country i increases, the export of South Korea will increase implying β_4 and β_5 are expected to be positive.

Then considering countries' labor-capital ratio(LKR). The impact of the pandemic will also differ depending on whether a country's production structure depends on labor or capital. The subsequent equation, labeled as Equation (4), describes the second regression model.

$$\begin{aligned} ln(Export_{it}) = & \beta_0 + \beta_1 ln(GDP_{it}) + \beta_2 ln(Distance_i) + \beta_3 FTA_{it} + \\ & \beta_4 Stringency_{it} + \beta_5 Case_{it} + \beta_6 LKR_{it} + \epsilon_t \end{aligned} \tag{4}$$

We introduce a new variable called LKR in our study to gain a deeper understanding under the international trade. LKR represents the labor-capital ratio. The introduction of this variable is intended to examine the effects of factor abundance, as described in the Hecksher-Ohlin model. Trade patterns are contingent upon the comparative availability of factors

of production. The variable plays a pivotal role in clarifying the fundamental economic circumstances and their consequences for trade trends, offering valuable perspectives on the interaction between factor endowments and global trade.

The subsequent equation, labeled as Equation (6), describes the third regression model.

$$\begin{aligned} ln(Export_{it}) =& \beta_0 + \beta_1 ln(GDP_{it}) + \beta_2 ln(Distance_i) + \beta_3 FTA_{it} + \\ & \beta_4 Stringency_{it} + \beta_5 Case_{it} + \beta_6 DPI_{it} + \epsilon_t \end{aligned} \tag{5}$$

To respond to market failures that occurred during the COVID-19 period, governments around the world used active fiscal policies. These direct payments were implemented as a strategic measure to mitigate the adverse economic impacts of the pandemic, providing financial support to individuals grappling with job losses, reduced incomes, and other financial challenges. Thus, in the estimation, we introduce DPI, which stands for direct payments to individuals. The inclusion of DPI in our analysis enables us to explore the influence of these government transfers on various economic indicators and assess their effectiveness in ameliorating the economic consequences of the pandemic on individuals and households.

The subsequent equation, labeled as Equation (6), describes the fourth regression model.

$$\begin{aligned} ln(Export_{it}) =& \beta_0 + \beta_1 ln(GDP_{it}) + \beta_2 ln(Distance_i) + \beta_3 FTA_{it} + \\ & \beta_4 Stringency_{it} + \beta_5 Case_{it} + \beta_6 Fiscal_{it} + \epsilon_t \end{aligned} \tag{6}$$

We introduce one another important policy variable, Fiscal, which is the broadest indicator of the total amount of government intervention. By considering Fiscal in our analysis, we can delve deeper into how government intervention impacted different economic measures. This will help us evaluate how well these policy measures lessened the economic hardship caused by the pandemic for a country.

5 Results

Table 3: The Impact of COVID-19 to Korean Export

	All	non-OECD	OECD
ln(GDP)	0.244***	0.227***	0.383***
	(-0.0253)	(-0.0285)	(-0.0427)
ln(Distance)	-1.845***	-2.018***	-0.243
	(-0.135)	(-0.144)	(-0.282)
FTA	1.848***	1.635***	-0.358
	(-0.155)	(-0.177)	(-0.426)
Stringency	0.0125***	0.0146***	0.00753
	(-0.00318)	(-0.00363)	(-0.00473)
Case	4.06e-07***	2.12e-07***	3.55e-07***
	(-6.06E-08)	(-7.52E-08)	(-8.76E-08)
Constant	24.89***	26.19***	12.60***
	(-1.248)	(-1.337)	(-2.4)
Observations	546	336	210
R-squared	0.501	0.582	0.449

*Note: Robust standard errors in parenthesis. *p<0.1; **p<0.05; ***p<0.01*

This chapter presents the findings of our empirical investigation, specifically examining the influence of alterations in non-economic factors on exports. In the present analysis, GDP is regarded as a pivotal indicator for assessing the economic magnitude of nations engaged in bilateral commerce. The results shown in Table 3 indicate that the coefficients for GDP variables pertaining to trading partners are positive and statistically significant, which is consistent with our anticipated outcomes. The aforementioned observation indicates that while the economies of nations involved in bilateral trade undergo expansion, there is a concomitant rise in the worth of Korean exports. The obtained results provide support for the conclusions drawn in previous studies, highlighting the strength and reliability of

the association between economic size and export performance. Our work enhances our comprehension of the mechanisms that influence trade dynamics in the global context by emphasizing the importance of GDP variables in shaping export results.

Aside from GDP, the gravity model includes two supplementary control factors: distance and the Free Trade Agreement (FTA) dummy. These variables are included to accord with our anticipated results. The impact of control variables on bilateral trade ties is of utmost importance and is expected to have substantial effects on trade patterns. The consideration of distance recognizes the geographical proximity or remoteness between trading partners, which affects transportation expenses and trade patterns. In a similar vein, the FTA dummy variable serves to represent the existence of FTAs among nations, indicating the provision of preferential treatment and the reduction of trade barriers. These factors are anticipated to have a favorable effect on trade volumes. The alignment between these control variables and our expected outcomes strengthens the reliability of the gravity model in clarifying the elements that influence trade dynamics, enabling a thorough comprehension of the determinants that drive bilateral trade ties.

Aside from economic reasons, non-economic variables such as the stringency index, which includes measures like school closures, workplace shutdowns, and travel restrictions, as well as the number of new COVID-19 cases, have a notable and favorable effect on exports. The notable and substantial effect seen highlights the tremendous impact of public health interventions and the dynamic COVID-19 landscape on export operations. As the level of lockdown policy increases, there is an impact on internal economic activity without a corresponding reduction in consumption. Consequently, the stringency index demonstrates a positive causal relationship with Korean exports. Likewise, the quantity of COVID-19 cases yields an equivalent outcome.

Table 3 demonstrates our research, which involves breaking down the dataset between OECD and non-OECD nations in order to determine the impact of economic progress. The results indicate that all variables demonstrate statistical significance inside the non-OECD

member group, while their significance is clearly constrained within the OECD member group. The observed difference implies that in advanced economies, such as those found in OECD countries, non-economic shocks may be more easily assimilated. The heightened susceptibility of non-OECD economies to external influences, particularly non-economic shocks, is underscored by the relevance of variables among these economies. The aforementioned gap highlights the significance of taking into account market size when examining the influence of different factors on trade dynamics. This analysis offers significant insights into the intricate dynamics that shape bilateral trade ties in diverse economies.

Table 4: The Impact of Labor-Capital Ratio to Korean Export

	All	non-OECD	OECD
ln(GDP)	0.308***	0.271***	0.367***
	(-0.0241)	(-0.028)	(-0.0429)
ln(Distance)	-1.498***	-1.781***	-0.289
	(-0.129)	(-0.142)	(-0.28)
FTA	1.262***	1.365***	-0.529
	(-0.153)	(-0.174)	(-0.429)
LKR	-2,093***	-1,427***	4,366**
	(-205.4)	(-232.9)	(-1,988)
Stringency	0.0110***	0.0129***	0.00706
	(-0.00292)	(-0.00346)	(-0.0047)
Case	3.51e-07***	2.01e-07***	3.58e-07***
	(-5.58E-08)	(-7.14E-08)	(-8.68E-08)
Constant	22.52***	24.68***	12.99***
	(-1.167)	(-1.293)	(-2.384)
Observations	546	336	210
R-squared	0.582	0.625	0.462

*Note: Robust standard errors in parenthesis. *p<0.1; **p<0.05; ***p<0.01*

Table 4 demonstrates that, with the exception of relative labor abundance, the remaining

variables display a robust pattern in comparison to the preceding model. A notable adverse effect of relative labor abundance on exports is observed across all nations. This implies that there is a negative relationship between increasing relative labor abundance and consumption, resulting in a decline in Korean exports to these nations. Nevertheless, in the case of OECD countries, we observe a favorable influence on exports, suggesting the presence of a capital-intensive industry structure that is widespread in these nations. Consequently, the repercussions of the COVID-19 pandemic on their respective industries are comparatively less significant in contrast to non-OECD nations, leading to comparatively lesser declines in both income and consumption. As a result, OECD nations have augmented their importation of intermediate and final goods, so making a significant contribution to the growth of Korean exports. This conclusion highlights the complex relationship between the resources available to a country, the structure of industries, and the influence of external events like COVID-19 on trade patterns among various groupings of countries.

Table 5 demonstrates that, apart from direct payment to individuals, the remaining variables display a predictable trend in comparison to the preceding model. A notable beneficial influence of direct payments on exports is observed across all nations. This implies that the implementation of direct payments has a positive impact on export volumes in all sectors. Nevertheless, when analyzing the data based on OECD members, we observe that this effect lacks statistical significance. This finding suggests that although direct payments may have a favorable impact on exports as a whole, their influence on export volumes within OECD member nations does not achieve statistical significance. The aforementioned nuanced conclusion emphasizes the significance of taking into account various country groups when examining the influence of variables on trade dynamics. This accentuates the possibility of differences in the consequences of policy initiatives within different economic circumstances.

Our data, as shown in Table 6, demonstrates a direct correlation between fiscal stimulus measures and exports. Significantly, a statistically significant relationship is shown across all countries, suggesting that fiscal stimulus has a generally positive impact on export quantities.

Table 5: The Impact of Direct Payment to Korean Export

	All	non-OECD	OECD
ln(GDP)	0.242***	0.220***	0.383***
	(-0.025)	(-0.0282)	(-0.0428)
ln(Distance)	-1.849***	-1.979***	-0.251
	(-0.133)	(-0.142)	(-0.283)
FTA	1.925***	1.591***	-0.324
	(-0.153)	(-0.176)	(-0.435)
Stringency	0.0138***	0.0146***	0.00798
	(-0.00314)	(-0.00358)	(-0.00487)
Case	2.83e-07***	1.98e-07***	3.28e-07***
	(-6.63E-08)	(-7.44E-08)	(-1.09E-07)
DPI	0.0135***	0.128***	0.00134
	(-0.00315)	(-0.041)	(-0.00324)
Constant	24.82***	25.87***	12.63***
	(-1.228)	(-1.324)	(-2.405)
Observations	546	336	210
R-squared	0.518	0.594	0.45

*Note: Robust standard errors in parenthesis. *p<0.1; **p<0.05; ***p<0.01*

Table 6: The Impact of Fiscal Stimulus to Korean Export

	All	non-OECD	OECD
ln(GDP)	0.245***	0.225***	0.375***
	(-0.0253)	(-0.0285)	(-0.0433)
ln(Distance)	-1.851***	-1.983***	-0.139
	(-0.135)	(-0.146)	(-0.296)
FTA	1.883***	1.621***	-0.654
	(-0.155)	(-0.178)	(-0.5)
Stringency	0.0128***	0.0146***	0.00743
	(-0.00317)	(-0.00363)	(-0.00473)
Case	4.06e-07***	2.12e-07***	3.27e-07***
	(-6.04E-08)	(-7.52E-08)	(-9.10E-08)
Fiscal	1.06e-05**	0.00272	-5.24E-06
	(-4.96E-06)	(-0.00229)	(-4.63E-06)
Constant	24.89***	25.89***	12.02***
	(-1.244)	(-1.36)	(-2.453)
Observations	546	336	210
R-squared	0.506	0.584	0.453

*Note: Robust standard errors in parenthesis. *p<0.1; **p<0.05; ***p<0.01*

However, when we break out the data according to OECD membership, we observe that its importance decreases. In the context of OECD membership, the statistical relevance of fiscal stimulus in promoting exports diminishes, notwithstanding its continued influence on exports for all nations collectively. This subtle observation indicates that there may be differences in how well fiscal policies affect export patterns among various groupings of countries. This highlights the significance of taking into account different economic circumstances when evaluating the influence of policy interventions on trade results.

6 Conclusion

The present study's analysis offers significant insights into the complex interplay between multiple factors and the dynamics of Korean exports amidst the COVID-19 epidemic. This study investigates the effects of various factors, such as government transfer, labor-capital ratio, and fiscal stimulus, on Korean exports using panel data from January 2020 to December 2021. The analysis encompasses both OECD and non-OECD nations. The results of our study suggest that several factors, including direct payments to individuals and fiscal stimulus, have a favorable influence on exports in all nations. This highlights the efficacy of these measures in enhancing trade volumes during periods of economic instability. Upon conducting a more thorough analysis, it becomes evident that the importance of these variables decreases when examining OECD member nations on an individual basis. This implies that there may be variances in the efficacy of policy initiatives across diverse economic circumstances. Furthermore, our analysis underscores the significance of variables such as the relative quantity of labor and the size of the market in shaping export trends, revealing noteworthy disparities between nations belonging to the Organisation for Economic Co-operation and Development (OECD) and those outside of it. In general, the aforementioned findings highlight the intricate and unique characteristics of trade dynamics in periods of crisis, hence emphasizing the necessity for customized policy measures to tackle the various

obstacles encountered by economies worldwide. In the face of the persistent problems presented by the epidemic, policymakers must possess a comprehensive comprehension of the various elements that influence export dynamics. This understanding is crucial for devising efficacious initiatives aimed at fostering economic recovery and resilience in the aftermath of the pandemic.

References

Abiad, Abdul, Mia Arao, Suzette Dagli et al. (2020) "The Economic Impact of the COVID-19 Outbreak on Developing Asia," ADB Briefs, Asian Development Bank, Manila, Philippines, 10.22617/BRF200096.

Al-Awadhi, Abdullah M., Khaled Alsaifi, Ahmad Al-Awadhi, and Salah Alhammadi (2020) "Death and Contagious Infectious Diseases: Impact of the COVID-19 Virus on Stock Market Returns," *Journal of Behavioral and Experimental Finance*, 27, 100326, 10.1016/j.jbef.2020.100326.

Anderson, James E and Eric Van Wincoop (2003) "Gravity with Gravitas: A Solution to the Border Puzzle," *American Economic Review*, 93 (1), 170–192, 10.1257/000282803321455214.

Anh, Dao Le Trang and Christopher Gan (2021) "The Impact of the COVID-19 Lockdown on Stock Market Performance: Evidence from Vietnam," *Journal of Economic Studies*, 48 (4), 836–851, 10.1108/JES-06-2020-0312.

Baldwin, Richard and Eiichi Tomiura (2020) "Thinking Ahead about the Trade Impact of COVID-19," *Economics in the Time of COVID-19*, 59–71.

Czarnitzki, Dirk and Andrew A. Toole (2011) "PATENT PROTECTION, MARKET UNCERTAINTY, AND R&D INVESTMENT," *The Review of Economics and Statistics*, 93 (1), 147–159.

Dingel, Jonathan I. and Brent Neiman (2020) "How Many Jobs Can Be Done at Home?" *Journal of Public Economics*, 189, 104235, 10.1016/j.jpubeco.2020.104235.

Fernandes, Ana and Heiwai Tang (2020) "How Did the 2003 SARS Epidemic Shape Chinese Trade?" *SSRN Electronic Journal*, 10.2139/ssrn.3603699.

Goodell, John W. (2020) "COVID-19 and Finance: Agendas for Future Research," *Finance Research Letters*, 35, 101512, 10.1016/j.frl.2020.101512.

Goolsbee, Austan and Chad Syverson (2021) "Fear, Lockdown, and Diversion: Comparing Drivers of Pandemic Economic Decline 2020," *Journal of Public Economics*, 193, 104311,

10.1016/j.jpubeco.2020.104311.

He, Qing, Junyi Liu, Sizhu Wang, and Jishuang Yu (2020) "The Impact of COVID-19 on Stock Markets," *Economic and Political Studies*, 8 (3), 275–288, 10.1080/20954816.2020.1757570.

Hoang, Khanh, Muhammad Arif, and Cuong Nguyen (2020) "Corporate Investment and Government Policy during the COVID-19 Crisis," *International Review of Economics & Finance*.

Koopmans, Ruud (2020) "A Virus That Knows No Borders? Exposure to and Restrictions of International Travel and the Global Diffusion of COVID-19,"Technical Report SP VI 2020-103, WZB Berlin Social Science Center.

Liu, Xuepeng, Emanuel Ornelas, and Huimin Shi (2022) "The Trade Impact of the COVID-19 Pandemic," *The World Economy*, 45 (12), 3751–3779, 10.1111/twec.13279.

Ngwakwe, Collins C (2020) "Effect of COVID-19 Pandemic on Global Stock Market Values: A Differential Analysis," *Acta Universitatis Danubius. OEconomica* (16(2)), 255–269.

Nicola, Maria, Zaid Alsafi, Catrin Sohrabi, Ahmed Kerwan, Ahmed Al-Jabir, Christos Iosifidis, Maliha Agha, and Riaz Agha (2020) "The Socio-Economic Implications of the Coronavirus Pandemic (COVID-19): A Review," *International Journal of Surgery*, 78, 185–193, 10.1016/j.ijsu.2020.04.018.

Ozili, Peterson K and Thankom Arun (2020) "Spillover of COVID-19: Impact on the Global Economy," *SSRN Electronic Journal*, 10.2139/ssrn.3562570.

Porcher, Simon (2023) "A Dataset of Governments' Economic Responses to COVID-19," *Data in Brief*, 47, 109021, 10.1016/j.dib.2023.109021.

Singh, Sube, Ramesh Kumar, Rohit Panchal, and Manoj Kumar Tiwari (2021) "Impact of COVID-19 on Logistics Systems and Disruptions in Food Supply Chain," *International Journal of Production Research*, 59 (7), 1993–2008, 10.1080/00207543.2020.1792000.

Tajani, Francesco, Felicia Di Liddo, Maria Rosaria Guarini, Rossana Ranieri, and Debora Anelli (2021) "An Assessment Methodology for the Evaluation of the Impacts of the

COVID-19 Pandemic on the Italian Housing Market Demand," *Buildings*, 11 (12), 592, 10.3390/buildings11120592.

Tinbergen, Jan (1962) "Shaping the World Economy: Suggestions for an International Economic Policy," *The Twentieth Century Fund*.

Tran, Thi Phuong Thao, Thanh Ha Le, Thi Ngoc Phuong Nguyen, and Van Minh Hoang (2020) "Rapid Response to the COVID-19 Pandemic: Vietnam Government's Experience and Preliminary Success," *Journal of Global Health*, 10 (2), 020502, 10.7189/jogh.10.020502.

Vo, Lai Van and Huong Thi Thu Le (2017) "Strategic Growth Option, Uncertainty, and R&D Investment," *International Review of Financial Analysis*, 51, 16–24, 10.1016/j.irfa.2017.03.002.

Yilmazkuday, Hakan (2022) "Coronavirus Disease 2019 and the Global Economy," *Transport Policy*, 120, 40–46, 10.1016/j.tranpol.2022.03.003.