

The Impact of Pandemic Control on GVC Division: A Simulation Analysis Based on COVID-19

PAN Peichen

Graduate School of Economics, Kobe University

The COVID-19 pandemic that broke out in early 2020 has experienced an unprecedented, widespread, and lasting impact on the global economy. The pandemic not only led to a decline in global trade but also profoundly reshaped the GVC division system. The traditional gross trade framework cannot effectively reflect the adjustments in the GVC division system caused by the pandemic control.

This study is based on the quantitative trade model developed by Caliendo and Parro (2015), whose model is an extension of the improved Ricardo trade model by Eaton and Kortum (2002) and pioneeringly introduces intermediate goods trade, sectoral heterogeneity, and input-output linkages. In this model, trade policy shocks are defined as changes in trade costs. Using the exact-hat algebra method put forward by Dekle et al. (2007), the general equilibrium solution can be obtained. The changes in trade costs attributed to pandemic control are derived by using a gravity model with monthly bilateral trade data. Using data of the year 2018 from the OECD-ICIO database, the study conducts counterfactual analysis to simulate scenarios of global pandemic control and the post-pandemic era.

Key findings of this study include: (1) Pandemic control significantly increases trade costs for all economies, resulting in an average rise of 4.14% as an importer and 3.72% as an exporter. (2) Global trade values are anticipated to decrease by 11.23% due to pandemic control. At the sectoral level, trade values decline across all sectors except for the Chemicals & Medical sector. (3) From the GVC perspective, these control measures prompt adjustments of GVC division, which reduce the degree of GVC participation and make each economy more inclined to focus on local production. By calculation, the pandemic control has led to the world average GVC participation close to that of 2009. (4) Pandemic control reduces the welfare levels of economies, with a world average decline of 1.85% and a 0.51% decline for China. From the perspective of trade in gross, the welfare effects of pandemic control are highly correlated with the initial level of trade openness in each economy. From the GVC perspective, these measures adversely affect the welfare levels of economies by reducing imports of intermediate goods, with the impact strengthening as initial GVC participation increases. (5) In the post-pandemic era, the reopening leads to substantial rebounds in trade values, GVC participation, and welfare levels for all economies.

Keywords: Pandemic control; Quantitative trade model; Global value chains (GVCs)