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Coronavirus Disease 2019 and the Global Economy

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Abstract

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JEL Classification: F60, I10

Key Words: COVID-19; Coronavirus; Baltic Dry Index; Crude Oil Prices

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Abstract

Using daily data on the coronavirus disease 2019 (COVID-19) cases from China and the rest of the world, this paper investigates the corresponding effects on the global economic activity. The empirical results based on a structural vector autoregression model using crude oil prices (COP) and the Baltic Exchange Dry Index (BDI) are consistent with increases in COVID-19 cases acting as negative demand shocks in the global economic activity (reflected as reductions in COP) and negative supply shocks in the global transportation of commodities (reflected as increases in BDI). The historical decomposition results further suggest that the effects of COVID-19 cases on COP and BDI have been mostly observed in the early COVID-19 period.

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1 Introduction

The World Health Organization has declared the coronavirus disease 2019 (COVID-19) a pandemic on March 11th, 2020, more than two months after the first reported case in Wuhan, China on December 31st, 2019. Since this pandemic is economically different due to the number of cases reported in several developed countries and China, these countries have been hit hard by the corresponding negative effects (e.g., see Baldwin and di Mauro (2020)). These negative effects have quickly spilled over to other countries not only due to the contagious nature of COVID-19 medically but also due to the supply chain disruptions economically, because about 55% of world supply and demand is accounted for by China, Korea, Italy, Japan, the U.S. and Germany that have the most reported cases of COVID-19 according to Baldwin and Tomiura (2020).

As discussed in studies such as by Ivanov, Tsipoulanidis, Schönberger, et al. (2017) or Ivanov (2020), supply chain disruptions can occur due to natural disasters (e.g., the earthquake and the tsunami in Japan in 2011), man-made catastrophes (e.g., an explosion at BASF factory in Germany in 2016) or employee strikes. These low-frequency-high-impact events can result in immediate disruptions in supply chains, because supplies, producers, transporters and distributors can be all affected due to one broken link. Accordingly, as discussed in studies such as by Ivanov, Sokolov, and Dolgui (2014), Garvey, Carnovale, and Yeniyurt (2015), Dolgui, Ivanov, and Sokolov (2018), Pavlov, Ivanov, Werner, Dolgui, and Sokolov (2019), Dolgui, Ivanov, and Rozhkov (2020) or Li and Zobel (2020), material shortages and delivery delays are experienced in sectors involved in the supply chain, resulting in the *ripple effect* and thus productivity reductions.

Unlike supply chain disruptions (discussed so far) that are localized, pandemics such as COVID-19 can affect multiple supply chains simultaneously and cover multiple regions globally. Hence, these effects last longer, they can be more unpredictable, and they can result in simultaneous disruptions in supply, demand, and logistics infrastructure. For example, according to Ivanov (2020), 94% of the Fortune 1000 companies have experienced supply chain disruptions due to COVID-19. Similarly, Araz, Choi, Olson, and Salman (2020) underline that COVID-19 has broken many global supply chains simultaneously. Although these effects are not unique to COVID-19, and they were also observed in earlier epidemic outbreaks (e.g., see Johanis (2007), Chou, Kuo, and Peng (2004), Calnan, Gadsby, Kondé, Diallo, and Rossman (2018) or Büyüktahtakın, des Bordes, and Kıbış (2018)), its scale and geographical coverage have made COVID-19 a global phenomenon.

Based on this background, this paper investigates the effects of COVID-19 on the global economy. This is achieved by considering the corresponding effects on crude oil prices (COP) and the Baltic Exchange Dry Index (BDI). Specifically, COP can capture demand changes (among others) in the global economic activity as suggested in studies such as by Kilian (2009), whereas BDI is daily published by the Baltic Exchange in London, and it reflects the shipping costs (due to using vessels of various sizes covering multiple maritime routes) regarding the transportation of raw commodities (e.g., grain, coal, iron ore, copper). Since these shipping costs are determined by the supply and demand forces in the global market, they are robust to any speculative manipulation or any government intervention by construction (e.g., see Bildirici, Kayıkçı, and Onat (2015) or Graham, Peltomäki, and Piljak (2016)). Accordingly, several early or recent studies in the literature such as by Isserlis (1938), Tinbergen (1959), Stopford (2008), Klovland (2002), Kilian (2009), Fan and Xu (2011), Qiu, Colson, Escalante, and Wetzstein (2012) and Makridakis, Merikas, Merika, Tsionas, and Izzeldin (2020) have suggested using BDI (or similar indices) to identify global changes in the transportation of commodities.

The formal investigation is achieved by using a structural vector autoregression (SVAR) model, where the endogenous variables are selected as weekly percentage changes in daily

COP and daily BDI. Since COVID-19 is an exogenous shock (i.e., it is not determined by either COP or BDI), percentage changes in daily COVID-19 cases in China and the rest of the world (ROW) are included as exogenous variables in this framework. Using daily data covering the period between January 28th, 2020 and November 15th, 2021, cumulative impulse responses of COP and BDI are estimated to identify the effects of COVID-19 on the global economy.

The corresponding results suggest that 1% of a weekly increase in daily COVID-19 cases in China results in about 0.02% of a cumulative increase in BDI after one week and about 0.03% of a cumulative increase after three months. Similarly, 1% of a weekly increase in daily COVID-19 cases in ROW results in about 0.05% of a cumulative increase in BDI after one week, although the effects become insignificant in longer horizons. These results are consistent with increases in COVID-19 cases acting as negative supply shocks in the transportation of commodities, similar to earlier studies such as by Ivanov, Sokolov, and Dolgui (2014), Garvey, Carnovale, and Yeniyurt (2015), Dolgui, Ivanov, and Sokolov (2018), Pavlov, Ivanov, Werner, Dolgui, and Sokolov (2019), Dolgui, Ivanov, and Rozhkov (2020) or Li and Zobel (2020) who have shown that material shortages and delivery delays due to supply chain disruptions can easily result in the *ripple effect* and thus productivity reductions.

The results also suggest that 1% of a weekly increase in daily COVID-19 cases in China results in about 0.02% of a cumulative reduction in COP, whereas 1% of a weekly increase in daily COVID-19 cases in ROW results in about 0.13% of a cumulative reduction in COP after one week and 0.15% after one month. These results are consistent with a lower global demand (reflected as reductions in COP) following increases in COVID-19 cases. The historical decomposition results suggest that the effects of COVID-19 cases on BDI and COP have mostly been observed in the early COVID-19 period.

The relationship between BDI and COP further suggests that positive BDI shocks result in cumulative reductions in COP in the long run, whereas positive COP shocks result in cumulative increases in BDI both in the short run and the long run that are consistent with a complete pass-through of COP into BDI. It is implied that unexpected BDI increases in the SVAR model mostly capture negative supply shocks in the global transportation of commodities, because an increase in BDI results in a reduction of the demand for crude oil, which is a cost factor in the transportation sector. This result is supported by the Joint Open Letter to United Nations agencies from the global maritime transport industry on March 19th, 2020, where the global maritime transport industry has requested certain exemptions for international seafarers as the national regulations disrupt the supply of transportation.

With respect to the existing literature, the results of this paper are line with studies such as by Ivanov (2020) who have shown in their multi-stage supply chain model with suppliers, producers/factories, distribution centers and customers that transportation/shipment is an essential part in the flow of materials and finished products. Accordingly, having a supply chain disruption due to the national regulations in the transportation sector can easily result in productivity reductions as discussed in studies such as by Ivanov, Sokolov, and Dolgui (2014), Garvey, Carnovale, and Yeniyurt (2015), Dolgui, Ivanov, and Sokolov (2018), Pavlov, Ivanov, Werner, Dolgui, and Sokolov (2019), Dolgui, Ivanov, and Rozhkov (2020) or Li and Zobel (2020), and these supply chain disruptions can should be evaluated by policy makers with utmost attention. The results in this paper are also consistent with studies such as by Baldwin and Tomiura (2020) who have predicted that COVID-19 is both a supply and a demand shock. These predictions are reflected in this paper as negative demand shocks in the global economic activity and negative supply shocks in the global transportation of commodities.

The rest of the paper is organized as follows. The next section introduces the data set and methodology used. Section 3 depicts empirical results, while Section 4 concludes.

2 Data and Estimation Methodology

We would like to measure the effects of COVID-19 cases in China and ROW on the global economic activity by using COP and BDI. While COP can capture demand changes in the global economic activity as suggested in studies such as by Kilian (2009), BDI reflects changes in the global transportation of commodities as suggested in studies such as by Isserlis (1938), Tinbergen (1959), Stopford (2008), Klovland (2002), Kilian (2009), Fan and Xu (2011), Qiu, Colson, Escalante, and Wetzstein (2012) and Makridakis, Merikas, Merika, Tsionas, and Izzeldin (2020). Based on this motivation, we utilize the SVAR model of $z_t = (\Delta b_t, \Delta o_t)'$ using daily data, where Δb_t represents the weekly percentage change in daily BDI, and Δo_t represents the weekly percentage change in daily COP.

Daily COP are measured by "Europe Brent Spot Price FOB (Dollars per Barrel)" downloaded from the web page of the Federal Reserve Economic Data (FRED).[1] Daily data on BDI are obtained from the web page of Trading Economics.[2] Weekly percentage changes in daily COVID-19 cases in China and ROW, represented by Δc_t^{CHINA} and Δc_t^{ROW}, respectively, are included as an exogenous variable in this framework; the corresponding data have been obtained from the webpage of Our World in Data.[3] The combination of all data sets results in a daily sample period between January 28th, 2020 and November 15th, 2021.[4] In the estimation, all daily variables are represented as weekly percentage changes to control for

[1] The web page is https://fred.stlouisfed.org/.

[2] The web page is https://tradingeconomics.com/commodity/baltic.

[3] The web page is https://ourworldindata.org/coronavirus. Daily COVID-19 cases in the rest of the world are obtained as the sum of daily cases in countries other than China.

[4] Although data on the global COVID-19 cases are available for each day in the sample, data on COP and BDI are not available on holidays and weekends. These missing observations have been linearly interpolated.

any seasonality concern by construction. The corresponding series included in the estimation are given in Figure 1, where weekly percentage changes in daily COVID-19 cases have been more volatile during the early COVID-19 period.

In formal terms, the SVAR model is given by:

$$A_o z_t = a + \sum_{k=1}^{14} A_k z_{t-k} + \Phi c_t + u_t \tag{1}$$

where $c_t = \left(\Delta c_t^{CHINA}, \Delta c_t^{ROW}\right)'$ and u_t is the vector of serially and mutually uncorrelated structural innovations. For estimation purposes, the model is expressed in reduced form as follows:

$$z_t = b + \sum_{k=1}^{14} B_k z_{t-k} + \Omega c_t + e_t \tag{2}$$

where $b = A_o^{-1}a$, $B_k = A_o^{-1}A_k$ for all k, and $\Omega = A_o^{-1}\Phi$. The number of lags (of 14) has been determined by minimizing the Deviance Information Criterion across alternative lags (between 1 and 30) of which details are also given in Figure 1. The model variables are confirmed to be stable as none of the roots lie outside the unit circle. It is postulated that the structural impact multiplier matrix A_o^{-1} has a recursive structure such that the reduced form errors e_t can be decomposed according to $e_t = A_o^{-1}u_t$, where the sizes of shocks are standardized to unity (i.e., the identification is by triangular factorization). The recursive structure imposed on A_o^{-1} requires an ordering of the endogenous variables used in the estimation, for which we use the one that is given by $z_t = (\Delta b_t, \Delta o_t)'$. Accordingly, COP immediately reacts to developments in BDI, whereas BDI reacts to developments in COP after one day.[5]

The estimation is achieved by a Bayesian approach with independent normal-Wishart priors. This corresponds to generating posterior draws for the structural model parameters by

[5] The other alternative ordering was also considered, for which the results were highly similar. Such results are available upon request.

transforming each reduced-form posterior draw. In particular, for each draw of the covariance matrix from its posterior distribution, the corresponding posterior draw for A_o^{-1} is constructed by using by triangular factorization so that the sizes of shocks are standardized to unity. In the Bayesian framework, a total of 2,000 samples are drawn, where a burn-in sample of 1,000 draws is discarded. The remaining 1,000 draws are used to determine the structural impulse responses and the historical decomposition that are necessary for the estimation of COVID-19 effects. The effects of COVID-19 cases on BDI (COP) are measured as the cumulative impulse response of BDI (COP) to a percentage change in COVID-19 cases. While the median of each distribution is considered as the Bayesian estimator, the 16th and 84th quantiles of distributions are used to construct the 68% credible intervals (which is the standard measure considered in the Bayesian literature).

3 Estimation Results

The effects of COVID-19 cases on BDI (measured by the corresponding cumulative impulse responses) are given in Table 1 as snapshots after one week, one month and three months, whereas the continuous cumulative impulse responses are given in Figure 2. As is evident, 1% of a weekly increase in daily COVID-19 cases in China results in 0.02% of a cumulative increase in BDI after one week and 0.03% of a cumulative increase after one month or three months. Similarly, 1% of a weekly increase in daily COVID-19 cases in ROW results in 0.05% of a cumulative increase in BDI after one week, although the effects become insignificant in longer horizons. Also based on the corresponding credible intervals, these results are consistent with increases in COVID-19 cases acting as negative supply shocks in the transportation sector, resulting in higher BDI. This result is in line with earlier studies such as by Ivanov, Sokolov, and Dolgui (2014), Garvey, Carnovale, and Yeniyurt (2015), Dolgui, Ivanov, and Sokolov (2018), Pavlov, Ivanov, Werner, Dolgui, and Sokolov (2019), Dolgui, Ivanov, and Rozhkov (2020) or Li and Zobel (2020) who have shown that material shortages and delivery delays due to supply chain disruptions can easily result in the *ripple effect* and thus productivity reductions.

The effects of COVID-19 cases on COP (measured by the corresponding cumulative impulse responses) are also given Table 1 and Figure 2. As is evident, the effects of COVID-19 cases in both China and ROW are negative and significant on COP. Specifically, 1% of a weekly increase in daily COVID-19 cases in China results in about 0.02% of a cumulative reduction in COP both in the short run and the long run, whereas 1% of a weekly increase in daily COVID-19 cases in ROW results in about 0.13% of a cumulative reduction in COP after one week, and 0.15% of a cumulative reduction after three months. These results are consistent with a lower global demand (reflected as reductions in COP) following increases in COVID-19 cases.

Regarding the patterns over time, according to Figure 2, the cumulative impulse responses get close to their long-run value only in a couple of weeks, suggesting rapid effects of COVID-19 cases on BDI and COP. When the historical decomposition results in Figure 3 are considered, the global effects of COVID-19 cases (i.e., total effects of COVID-19 cases in China and ROW) are observed relatively more on COP compared to BDI, and they have been more effective in the early COVID-19 period.

The relationship between BDI and COP are given in Figure 4 as cumulative impulse responses. As is evident, positive BDI shocks result in cumulative reductions in COP, especially in the long run, whereas positive COP shocks result in cumulative increases in BDI both in the short run and the long run, consistent with a complete pass-through of COP shocks into BDI. It is implied that unexpected BDI increases in this framework captures supply (rather than demand) shocks in the transportation of commodities, because an increase in BDI (i.e., the price of transportation) results in a reduction of the demand for (and thus price of) crude oil which is a cost factor in the transportation sector. This result is also supported by "Joint Open Letter to United Nations agencies from the global maritime transport industry" on March 19th, 2020 that requests certain exemptions for international seafarers as the national regulations disrupt the supply of transportation:

> "As the COVID-19 pandemic takes hold, it is important for the world's governments to fully understand that around 90% of global trade is transported by commercial shipping, which moves the world's food, energy and raw materials, as well as manufactured goods and components – including vital medical supplies and many products sold in supermarkets, items that are necessary (due to complex supply chains) for the preservation of many jobs in manufacturing – without which modern society simply cannot function.
>
> In this time of global crisis, it is more important than ever to keep supply chains open and maritime trade and transport moving.
>
> In particular, this means keeping the world's ports open for calls by visiting commercial ships, and facilitating crew changes and the movement of ships' crews with as few obstacles as possible.
>
> Every month, around 100,000 seafarers need to be changed over from the ships which they operate in order to comply with relevant international maritime regulations, governing safe working hours and crew welfare, so that they can continue to transport global trade safely.
>
> We therefore wish to emphasise the vital need for the world's professional merchant seafarers to be granted appropriate exemptions from any national travel restrictions, when joining or leaving their ships, in order to keep the world's maritime supply chains functioning."

where the COVID-19 is shown to be responsible for transportation supply disruptions.[6]

Therefore, supply chain disruptions due to COVID-19 have been responsible for the reduction in the global economic activity. This result is line with studies such as by Ivanov (2020) who have shown in their multi-stage supply chain model with suppliers, producers/factories, distribution centers and customers that transportation/shipment is an essential part in the flow of materials and finished products. Accordingly, having a supply chain disruption due to the national regulations in the transportation sector have resulted in productivity reductions, consistent with earlier studies such as by Ivanov, Sokolov, and Dolgui (2014), Garvey, Carnovale, and Yeniyurt (2015), Dolgui, Ivanov, and Sokolov (2018), Pavlov, Ivanov, Werner, Dolgui, and Sokolov (2019), Dolgui, Ivanov, and Rozhkov (2020) or Li and Zobel (2020).

Overall, increases in COVID-19 cases have acted as negative demand shocks in the global economic activity and negative supply shocks in the global transportation of commodities. This result is consistent with studies such as by Baldwin and Tomiura (2020) who have predicted that COVID-19 is both a supply and a demand shock.

4 Conclusion

This paper has investigated the effects of the coronavirus disease 2019 (COVID-19) on the global economic activity by considering its implications on the Baltic Exchange Dry Index (BDI) and crude oil prices (COP). This investigation has been achieved by using daily data between January 28th, 2020 and November 15th, 2021, where a structural vector autoregression model has been used. The empirical results based on cumulative impulse responses are consistent with increases in COVID-19 cases acting as negative demand shocks in the global economic activity (reflected as reductions in COP) and negative supply shocks in the global

[6]The letter can be found at http://www.ics-shipping.org/news/press-releases/2020/03/19/joint-open-letter-to-united-nations-agencies-from-the-global-maritime-transport-industry

transportation of commodities (reflected as increases in BDI). The historical decomposition results further suggest that the effects of COVID-19 cases on BDI and COP have mostly been observed in the early COVID-19 period.

The empirical results have also shown that there is evidence for complete pass-through of COP into BDI, and unexpected BDI increases capture supply shocks in the global transportation of commodities. The Joint Open Letter to United Nations agencies from the global maritime transport industry on March 19th, 2020 supports this result, where the global maritime transport industry requests certain exemptions for international seafarers as the national regulations disrupt the supply of transportation. Hence, supply chain disruptions (through transportation supply disruptions) due to COVID-19 have been responsible for the reduction in the global economic activity, which is consistent with earlier studies (as discussed above) having transportation/shipment as an essential part in the flow of materials and finished products.

References

Araz, O. M., T.-M. Choi, D. Olson, and F. S. Salman (2020): "Data analytics for operational risk management," *Decision Sciences.*

Baldwin, R., and B. W. di Mauro (2020): "Economics in the Time of COVID-19," *CEPR Press VoxEU. org.*

Baldwin, R., and E. Tomiura (2020): "Thinking ahead about the trade impact of COVID-19," *CEPR Press VoxEU. org.*

Bildirici, M. E., F. Kayikçi, and I. Ş. Onat (2015): "Baltic Dry Index as a major economic policy indicator: the relationship with economic growth," *Procedia-Social and Behavioral Sciences*, 210, 416–424.

Büyüktahtakin, İ. E., E. des Bordes, and E. Y. Kibiş (2018): "A new epidemics–logistics model: Insights into controlling the Ebola virus disease in West Africa," *European Journal of Operational Research*, 265(3), 1046–1063.

Calnan, M., E. W. Gadsby, M. K. Kondé, A. Diallo, and J. S. Rossman (2018): "The response to and impact of the Ebola epidemic: towards an agenda for interdisciplinary research," *International journal of health policy and management*, 7(5), 402.

Chou, J., N.-F. Kuo, and S.-L. Peng (2004): "Potential impacts of the SARS outbreak on Taiwan's economy," *Asian Economic Papers*, 3(1), 84–99.

Dolgui, A., D. Ivanov, and M. Rozhkov (2020): "Does the ripple effect influence the bullwhip effect? An integrated analysis of structural and operational dynamics in the supply chain," *International Journal of Production Research*, 58(5), 1285–1301.

Dolgui, A., D. Ivanov, and B. Sokolov (2018): "Ripple effect in the supply chain: an analysis and recent literature," *International Journal of Production Research*, 56(1-2), 414–430.

Fan, Y., and J.-H. Xu (2011): "What has driven oil prices since 2000? A structural change perspective," *Energy Economics*, 33(6), 1082–1094.

Garvey, M. D., S. Carnovale, and S. Yeniyurt (2015): "An analytical framework for supply network risk propagation: A Bayesian network approach," *European Journal of Operational Research*, 243(2), 618–627.

Graham, M., J. Peltomäki, and V. Piljak (2016): "Global economic activity as an explicator of emerging market equity returns," *Research in International Business and Finance*, 36, 424–435.

Isserlis, L. (1938): "Tramp shipping cargoes, and freights," *Journal of the Royal Statistical Society*, 101(1), 53–146.

Ivanov, D. (2020): "Predicting the impacts of epidemic outbreaks on global supply chains: A simulation-based analysis on the coronavirus outbreak (COVID-19/SARS-CoV-2) case," *Transportation Research Part E: Logistics and Transportation Review*, 136, 101922.

Ivanov, D., B. Sokolov, and A. Dolgui (2014): "The Ripple effect in supply chains: trade-off âĂŸefficiency-flexibility-resilienceâĂŹin disruption management," *International Journal of Production Research*, 52(7), 2154–2172.

Ivanov, D., A. Tsipoulanidis, J. Schönberger, et al. (2017): "Global supply chain and operations management," *A Decision-Oriented Introduction to the Creation of Value*.

Johanis, D. (2007): "How Toronto Pearson International Airport applied lessons from SARS to develop a pandemic response plan," *Journal of Business Continuity & Emergency Planning*, 1(4), 356–368.

Kilian, L. (2009): "Not all oil price shocks are alike: Disentangling demand and supply shocks in the crude oil market," *American Economic Review*, 99(3), 1053–69.

Klovland, J. T. (2002): "Business cycles, commodity prices and shipping freight rates: Some evidence from the pre-WWI period," *SNF REPORT NO 48/02*.

Li, Y., and C. W. Zobel (2020): "Exploring supply chain network resilience in the presence of the ripple effect," *International Journal of Production Economics*, p. 107693.

Makridakis, S., A. Merikas, A. Merika, M. G. Tsionas, and M. Izzeldin (2020): "A novel forecasting model for the Baltic dry index utilizing optimal squeezing," *Journal of Forecasting*, 39(1), 56–68.

Pavlov, A., D. Ivanov, F. Werner, A. Dolgui, and B. Sokolov (2019): "Integrated detection of disruption scenarios, the ripple effect dispersal and recovery paths in supply chains," *Annals of Operations Research*, pp. 1–23.

Qiu, C., G. Colson, C. Escalante, and M. Wetzstein (2012): "Considering macroeconomic indicators in the food before fuel nexus," *Energy Economics*, 34(6), 2021–2028.

Stopford, M. (2008): *Maritime economics 3e*. Routledge.

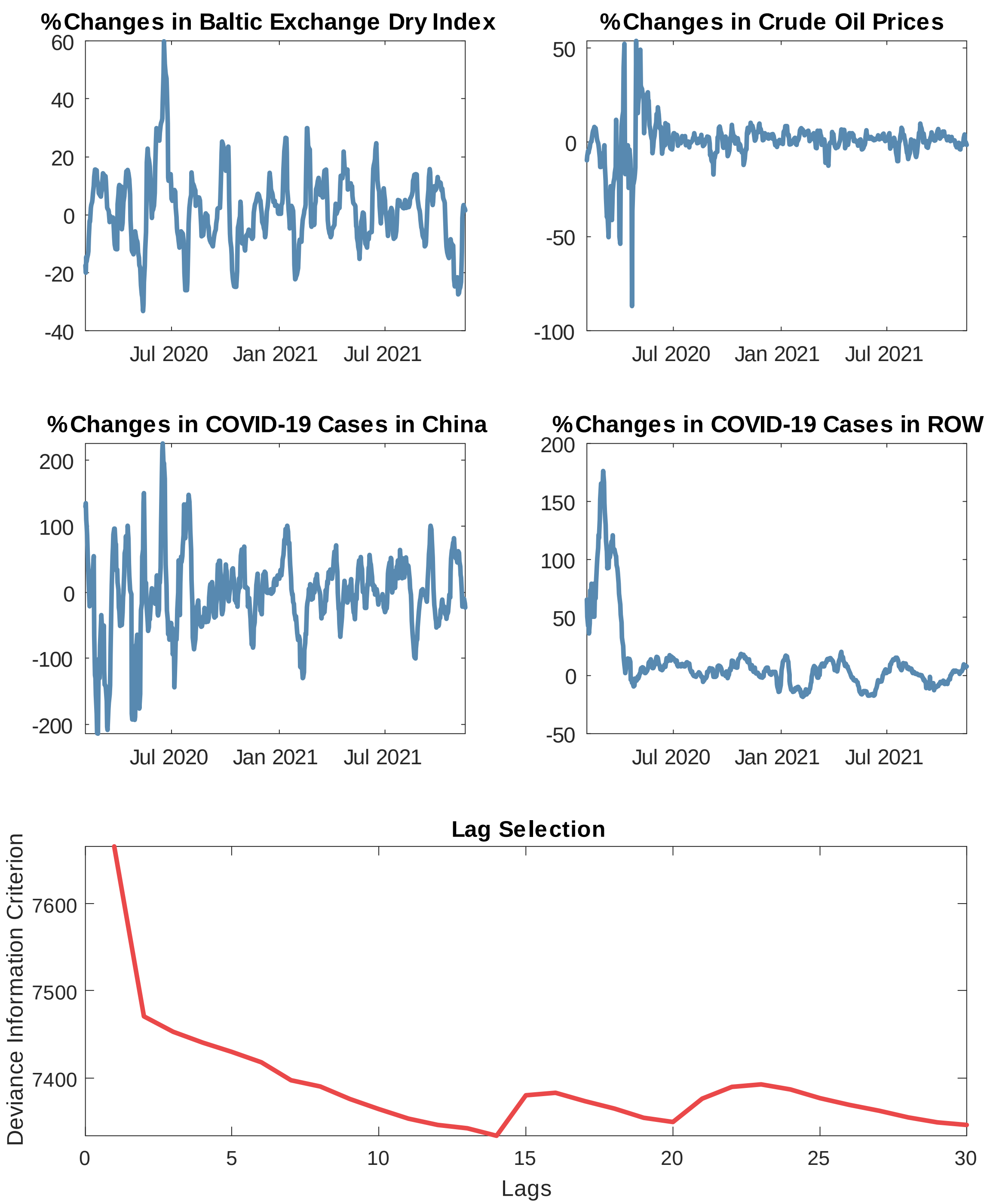
Tinbergen, J. (1959): "Tonnage and freight," *Jan Tinbergen Selected Papers*, pp. 93–111.

Table 1 - Effects of COVID-19 on the Global Economy

Effects of:	After 1 Week	After 1 Month	After 3 Months
COVID-19 Cases in China on	0.022^*	0.029^*	0.029^*
Baltic Exchange Dry Index (%)	$[0.004, 0.039]$	$[0.002, 0.056]$	$[0.001, 0.056]$
COVID-19 Cases in ROW on	0.048^*	0.044	0.043
Baltic Exchange Dry Index (%)	$[0.011, 0.083]$	$[-0.009, 0.094]$	$[-0.010, 0.094]$
COVID-19 Cases in China on	-0.018^*	-0.023^*	-0.023^*
Crude Oil Prices (%)	$[-0.029, -0.005]$	$[-0.036, -0.007]$	$[-0.037, -0.007]$
COVID-19 Cases in ROW on	-0.133^*	-0.152^*	-0.152^*
Crude Oil Prices (%)	$[-0.161, -0.106]$	$[-0.183, -0.124]$	$[-0.183, -0.123]$

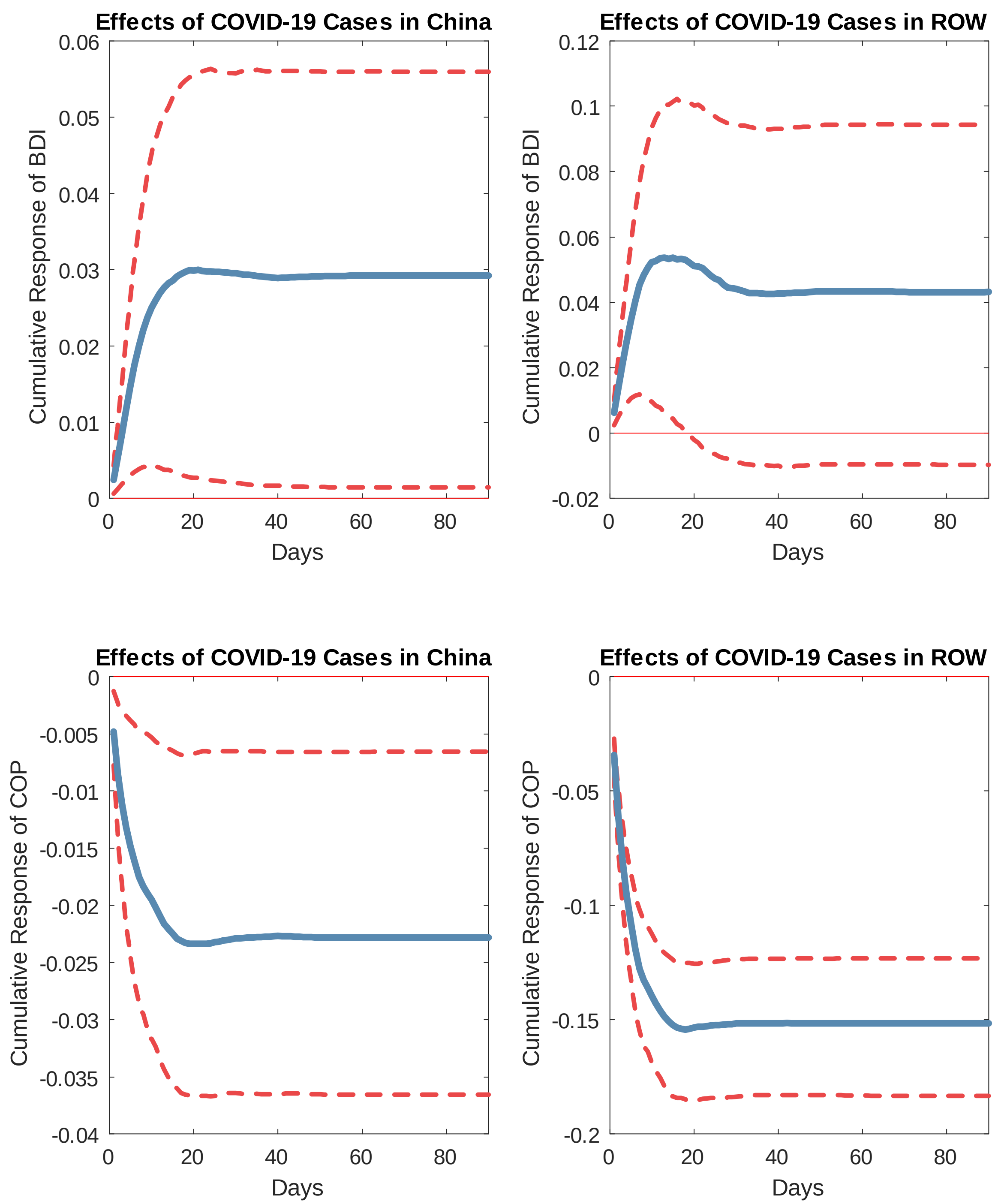
Notes: The estimates represent the median across 1,000 draws. Lower and upper bounds in brackets represent the 68% credible intervals, whereas * represents significance based on these intervals.

Figure 1 - Descriptive Statistics and Lag Selection



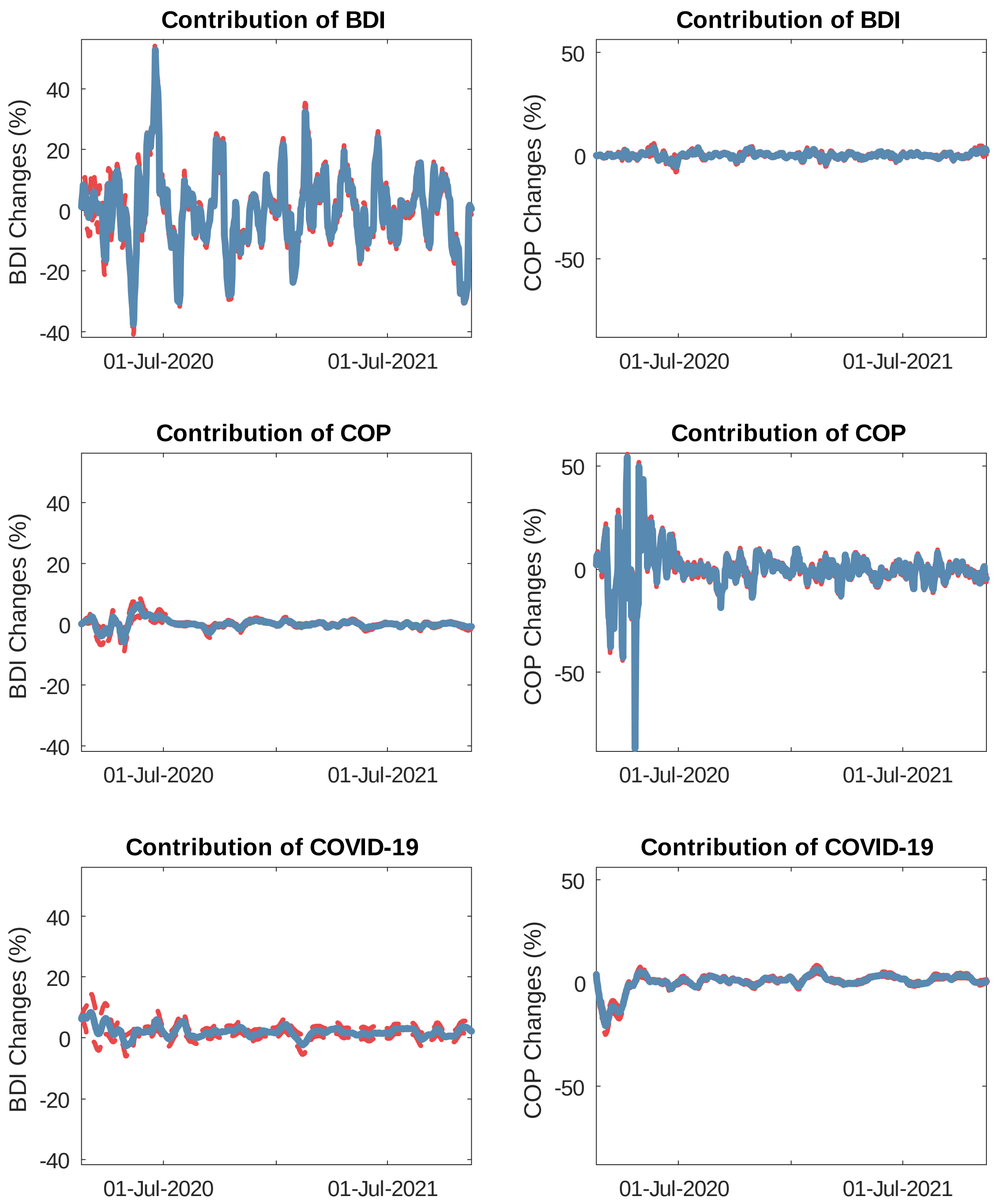
Notes: Data are represented as weekly percentage changes in daily variables.

Figure 2 - Effects of COVID-19 on BDI and COP



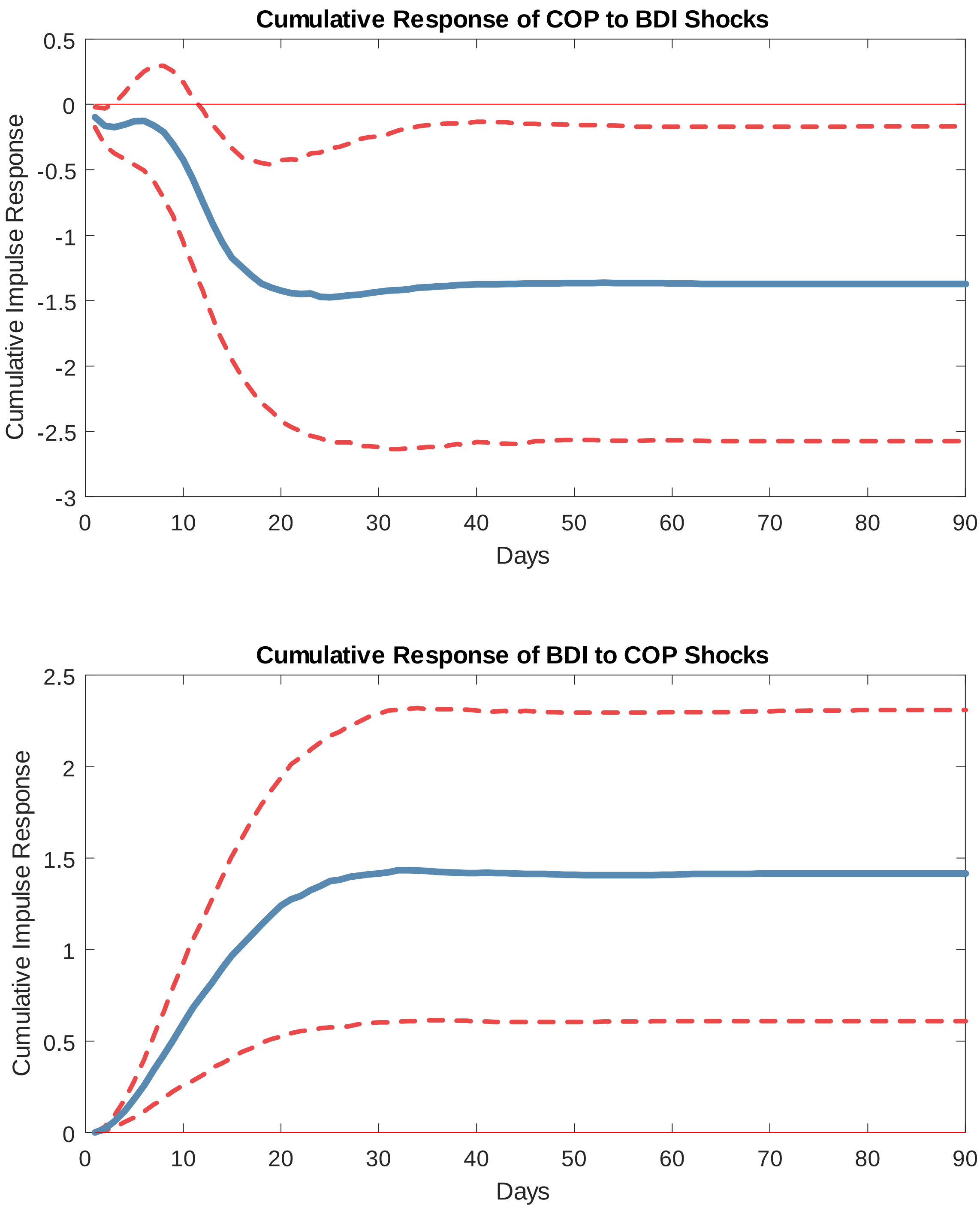
Notes: The solid lines represent the estimates, while dashed lines represent lower and upper bounds that correspond to the 68% credible intervals.

Figure 3 - Historical Decomposition of BDI and COP



Notes: The solid lines represent the estimates, while dashed lines represent lower and upper bounds that correspond to the 68% credible intervals.

Figure 4 - Interaction between BDI and COP



Notes: The solid lines represent the estimates, while dashed lines represent lower and upper bounds that correspond to the 68% credible intervals.