

# COVID-19 and Trade Disruptions Due to China

by

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COVID-19, was known in Wuhan, China, in December 2019, the virus has spread around the world infecting more than 860,000 people in 200 countries, with 43,000 deaths. And the staggering figures are rising. To curb the spread of the virus, the Chinese government first instituted a lockdown of Wuhan, a city of 11 million people on January 23, 2020. All non-essential companies were shut down too. The lockdown also affected many other cities in the same province, as well as many major cities in the other provinces. Lives of millions are upended and economic activities are suspended. China is the world's factory and the hub of global value chains, the lockdown led to a major adverse supply shock of the world trade. As the virus spreading around the world, many countries are also implementing lockdown and border closure, which further disrupted production and trade flows. How is this going to play out? What are the short term and long term impacts of this pandemic? This note focuses on the first round short term impacts on trade due to lockdown in China.

According to the latest survey on the U.S. based companies conducted by the Institute for Supply Management in the first two weeks of March, 2020, about 75% of companies are reporting supply chain disruptions due to COVID-19-related transportation restrictions, and more than 80% believe that their organization will experience some impact because of COVID-19 virus disruptions. The survey also found that the lockdown in China has resulted in manufacturers operating only at 50 percent capacity which leads to major delays in delivering their products. The Financial Times also reported that shipments from China

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in Long Beach port is down by 50-75% since the outbreak started.

It is clear that world trade are affected by this negative shock originated from China. If factories in China cut down their output by 50%, this may cause the prices of their products to increase in the world market due to the shortage. The magnitude of price increase depends on the responsiveness of the demand for Chinese products or the import elasticity. Assuming constant import elasticity, the percentage change in price is the percentage change in quantity (50%) divided by the import elasticity. With a conventional elasticity estimate of -4, a 50 percent reduction in supply may cause world prices to increase by  $(-0.5/-4=)$  12.5 percent.<sup>2</sup> Price changes for individual countries or specific products depend on their elasticities with respect to Chinese imports. Countries which use Chinese products as inputs in their supply chain, their demand for these products are much less elastic, which could lead to larger price increase when faced with the shortage. Likewise, for products that are inputs in global value chains are likely to have less elastic import demand, the adverse China shock will increase their prices significantly.

Table 1 presents the estimated price changes for a range of countries due to production disruptions in China. These calculations use the average elasticity of these countries, constructed based on the bilateral elasticity estimates that is specific to the products imported from China by these countries.<sup>3</sup> Differences across countries reflect both the specific bilateral elasticity at product level as well as the composition of products these countries imported from China. Results show that countries such as EU, Mexico and Japan may experience price increase as much as 15 percent as China cut its production by half.

For many countries, particularly small developing countries, China is their main importing partner. Such big price changes may lead to large welfare impacts, measured in terms of

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<sup>2</sup>Elasticity estimate from Simonovska and Waugh (2014).

<sup>3</sup>These bilateral elasticity estimates are from Kee and Nicita (2020), based on bilateral data on non-tariff measures, tariffs and trade flows.

GDP. The approximate welfare effect of the price change is the percentage change in price times the share of Chinese imports in GDP.<sup>4</sup> The last 2 columns of Table 1 presents the rough welfare calculations, both for the immediate short-run GDP impacts, and the annualized GDP impacts. For those countries that are more exposed to Chinese imports, the decrease in GDP due to such a negative terms-of-trade shock could be more than 1% in the short-run. For example, more than 1/3 of imports of Paraguay (PRY) and Cambodia (KHM) are from China, the lockdown in China may cause their GDP to contract by more than 2 percent in the short-run, and more than 0.25 percent annualized, assuming that the 50% reduction in Chinese imports only affects GDP in the 1st quarter of 2020. For some countries, perhaps the decrease in the specific products due to lockdown is higher than 50%, then the percentage change in price and GDP will be higher and can be adjusted accordingly.

Similar calculations can be done at the industry level, pooling across all importing countries to construct the average price elasticities of these industries. Table 2 presents the industry breakdown as China cut its production by half. Products such as electronics and apparels may experience 20 to 30 percent price increase in the short-run, given China's enormous role in the world market in these products.

It should be noted that, this is only the short-run impacts and only takes into account supply chain interruption due to lockdown in China, up to the time of the survey, which is early March 2020. With the spread of COVID-19, other major countries around the world, such as the US, EU, and South Korea are themselves implementing lockdowns which further interrupt economic activities, changing both the demand and supply of products around the world. In addition, many COVID-19-related essential products, such as ventilators, masks and gloves are in high demand with shortages in many countries as the virus spreads. The calculations provided in this paper are at best lower bound estimates which do not take

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<sup>4</sup>Please refer to Kohli (1991) and Kee (2009) for details regarding the welfare impact of a terms-of-trade shocks on GDP.

into account possible reduction in demand in the importing countries when they implement lockdowns as the virus spreads. A full general equilibrium model will be necessary to infer the price and welfare calculations in those cases.

## References

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Table 1: Short-Run Price Increases by Countries due to China's Lockdown, Jan - March, 2020

Country code	Average elasticity	Price change (%)	Chinese imports in total imports (%)	Chinese imports in GDP (%)	GDP change (%)	Annualized GDP change (%)
ARG	-4.89	10.23	18.45	2.32	-0.24	-0.06
BOL	-3.33	15.01	20.66	5.15	-0.77	-0.19
BRA	-4.26	11.73	19.16	1.86	-0.22	-0.05
CHL	-2.40	20.83	23.59	5.87	-1.22	-0.31
COL	-2.77	18.07	20.58	3.19	-0.58	-0.14
CRI	-3.08	16.23	13.71	3.78	-0.61	-0.15
ECU	-4.81	10.40	18.91	4.02	-0.42	-0.10
EGY	-4.06	12.31	10.48	0.00	-0.08	-0.02
EUN	-4.13	12.09	19.93	0.00	0.00	0.00
GTM	-3.00	16.66	11.21	2.84	-0.47	-0.12
IDN	-2.23	22.39	24.13	4.37	-0.98	-0.24
IND	-3.12	16.05	14.63	3.33	-0.53	-0.13
JPN	-3.29	15.22	23.20	3.49	-0.53	-0.13
KAZ	-2.85	17.55	16.00	3.00	-0.53	-0.13
KEN	-4.14	12.07	7.99	0.00	-0.08	-0.02
KHM	-5.28	9.48	35.11	25.02	-2.37	-0.59
LBN	-1.58	31.61	10.25	3.62	-1.14	-0.29
LKA	-4.87	10.26	19.65	4.71	-0.48	-0.12
MDG	-2.69	18.57	20.18	5.95	-1.10	-0.28
MEX	-3.20	15.60	12.82	0.00	-0.04	-0.01
MUS	-2.59	19.30	16.51	6.58	-1.27	-0.32
NAM	-4.62	10.83	5.66	3.23	-0.35	-0.09
NPL	-5.29	9.46	4.93	0.00	-0.01	0.00
PAK	-3.34	14.95	24.18	4.62	-0.69	-0.17
PER	-2.40	20.86	23.33	4.53	-0.95	-0.24
PRY	-1.31	38.29	28.23	9.29	-3.56	-0.89
SEN	-3.34	14.96	10.69	3.61	-0.54	-0.13
SLV	-3.50	14.28	14.01	6.36	-0.91	-0.23
SYR	-2.20	22.75	6.71	0.00	-0.15	-0.04
TUN	-4.81	10.39	3.00	0.00	-0.06	-0.01
TZA	-2.44	20.52	20.70	3.05	-0.63	-0.16
UGA	-5.56	8.98	17.60	4.31	-0.39	-0.10
URY	-5.42	9.23	18.87	2.82	-0.26	-0.06

Notes: Calculations based on China cut its production by 50%, from Jan-Mar, 2020. Elasticity estimates from Kee and Nicita (2020). Imports and GDP data are for 2018, from Comtrade and WDI; Price change (%) = -0.5 / average elasticity; GDP change (%) = Chinese imports in GDP (%) \* Price change (%) / 100; Annualized GDP change (%) = GDP change (%) / 4.

Table 2: Short-Run Price Increases by Industries due to China's Lockdown, Jan - March, 2020

ISICRev. 2	Description	Average Elasticity	Price Change (%)	Share of China in the World (%)
390	Other Manufacturing	-2.14	23.4	61.3
324	Footwear	-7.86	6.4	44.3
322	Apparel	-1.64	30.5	37.5
332	Furniture	-0.71	70.4	33.5
356	Plastic products	-2.34	21.4	29.4
362	Glass products	-1.82	27.5	25.2
321	Textiles	-2.73	18.3	25.1
383	Electrical machinery	-2.86	17.5	20.4
331	Wood and cork products	-5.68	8.8	20.2
323	Leather products	-5.08	9.8	15.2
342	Printing and publishing	-3.21	15.6	14.3
371	Iron and steel	-3.94	12.7	13.9
381	Fabricated metal products	-2.60	19.2	13.1
351	Industrial chemicals	-3.61	13.8	11.8
385	Scientific instruments	-4.50	11.1	11.6
355	Rubber products	-1.90	26.3	10.4
382	Machinery	-5.09	9.8	10.1
311/312	Food manufacturing	-3.10	16.1	10.1
341	Paper products	-1.40	35.7	8.9
352	Other chemical products	-4.31	11.6	6.6
354	Petroleum and coal products	-0.86	58.2	5.9
384	Transport equipment	-2.93	17.1	5.6
369	Other mineral products	-2.33	21.4	5.5
361	Pottery and earthenware	-1.42	35.3	5.3
353	Petroleum refineries	-0.69	72.8	2.6
314	Tobacco manufactures	-0.56	89.1	2.3
313	Beverage industries	-0.70	71.4	1.6
372	Non-ferrous metal	-1.43	34.9	1.5

Notes: Calculations based on China cut its production by 50%. Elasticity estimates from Kee and Nicita (2020).