Predicting the Economic Impact of Coronavirus on the Global Economy

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The coronavirus outbreak[1] originating in Wuhan, China in January 2020 caught China and the rest of the world off guard. As of March 1, 2020, 88,339 cases have been confirmed in China and more than five dozen countries: 79,828 in Mainland China (90% of the total cases), 3,736 in South Korea, 1,694 in Italy, 978 in Iran, 946 in Japan, 130 in France, 129 in Germany, 106 in Singapore, 100 in Hong Kong, 79 in Spain, and 73 in the U.S., etc. Among these cases, 42,728 (48%) have recovered, 7,607 (8.6%) are in serious or critical condition. There were 3,001 deaths, most of which (2,870; 96% of the total deaths) were in China, 54 in Iran, 34 in Italy, 21 in South Korea, and 2 in the U.S., etc. Although the fatality rate of the coronavirus has been estimated at around 2-3%, lower than SARS (Severe Acute Respiratory Syndrome) in 2003, it has killed four times as many people in one month than SARS did in eight months.[2] The reason is because of the coronavirus' high contagious rate. And this is why it has caused more financial panic than SARS did in 2003. To contain the outbreak, Wuhan and Hubei Province and many cities in China are in lockdown or curfew as well as some areas in South Korea and Italy. As of March 1, many countries have imposed travel restrictions or warnings with varying degrees on China, Iran, South Korea and Italy. For instance, the U.S. imposed an entry ban on all foreign nationals who were in Mainland China in the past 14 days on February 2; and issued the same ban for Iran on February 26.

In China, with slowing growth of new cases, retail stores, restaurants, schools, offices, and factories have gradually reopened after their extended holidays after the Chinese New Year due to the coronavirus. But their hours and capacity are still limited due to precaution measures and a shortage of face-masks, laborers, or customers. In contrast, it is troubling to see the new cases are rising outside China.

This report tries to analyze the possible impact of the coronavirus on the global economy, and in particular for the U.S. economy. The main takeaways are two: (1) We predict the impact of the coronavirus on the global economy to be around 0.9 percentage point reduction of global GDP growth. The impact on the U.S. economy is estimated to be 0.5 percentage point reduction of GDP growth. (2) International tourism will be the hardest-hit industry. It estimated that the cost to the U.S. will be $4.3 billion a month on average. The whole global impact is estimated to be $26 billion a month.

1. The official name of the coronavirus disease is COVID-19. First started in December 2019 in Wuhan, the capital of Hubei Province, China.
2. SARS (Severe Acute Respiratory Syndrome) outbreak occurred from November 2002 to July 2003 with 10% fatality rate.

Global Economic Costs: From SARS to Coronavirus

Due to the coronavirus epidemic, some consumption, services, investment, production, transportation, and travel activities have been either canceled or delayed in China and other serious infected countries. Stalled sales and production could lead to cash crunch for small business and workers despite the various financial supports and subsidies from the Chinese government. Some economic events might come back later (with pent-up demand) in the year if/when the epidemic got controlled, while some economic activities will be forgone permanently. It is reasonable to predict the Chinese economy will suffer the biggest blow because of being the original center of the disease. For instance, China's non-manufacturing Purchasing Managers Index (PMI) plunged to 29.6 in February 2020 from 54.1 in January 2020, in which above 50 means expansions while below 50 means contractions. The Chinese economy is in a contraction during this great contagion.

Beyond China, countries will see reduced GDP growth based on how severely they are impacted by the epidemic. To be sure, South Korea, Italy, Iran, and Japan are on the top of the list for now. The IMF predicted the negative impact is a reduction of 0.1 percentage point of global growth and 0.4 percentage point of China's growth. We suggest that IMF's estimate is too optimistic. In their base scenario, McKinsey is prediction of 0.35% to 0.7% percentage point reduction of global GDP growth.[3]

First, let's use SARS outbreak between November 2002 to July 2003 (but started to be reported in late March 2003) as a benchmark to measure the likely economic impact on the global economy. SARS caused 8,098 confirmed cases, 774 reported deaths in 17 countries with 9.6% fatality rate. The countries affected the most are China's 5,327 cases and 349 deaths; Hong Kong's 1,755 cases and 299 deaths; Taiwan's 346 cases and 73 deaths, Canada's 251 cases and 43 deaths, Singapore's 238 cases and 33 deaths, Vietnam's 63 cases and 5 deaths, U.S.'s 27 cases and zeros death.

Economists Jong-Wha Lee and Warwick McKibbin[4] used their global model to estimate the global economic cost of the SARS: $40 billion. Their model captures not only canceled tourist trips, declined retail trade but also multiplier impacts through linkages across sectors and across countries, which including financial market confidence and international investment. They estimated the economic impact of SARS on countries' GDP is as follows: Hong Kong: -2.63%, China: -1.05%, Taiwan: -0.49%, Singapore: -0.47%, Malaysia: -0.15%, South Korea's 0.1%, U.S.: 0.07%, etc.

If we assume their model is not far from the reality, we can use a simple back-of-the- envelope method to calculate the economic impact of the coronavirus now. Their estimated cost of SARS of $40 billion was about 0.1% of the global GDP in 2003. If we assume the number of deaths could reveal the actual panic and the whole disruptive impacts within and across countries, then we should estimate the current deaths (which is 4 times as SARS) of coronavirus should at least cause 0.4% of the global GDP reduction as of now. Assuming 2019's global GDP of $88 trillion, that is a cost of $352 billion. However, two factors will make the economic impact of the coronavirus larger: (1) China is a much larger economy and plays a much more important role in terms of global supply chains now. Note that China's GDP share over the world's was 4% in 2003 and now is 16%. (2) Several of the largest economies in the world, such as Japan, Italy, South Korea, have been affected seriously this time. Therefore, the overall negative impact on the global economy would be bigger.

With China's $13 trillion economy, 1% reduction of GDP is $130 billion. There are 8 times more deaths in 2020 due to the coronavirus so far than in 2003 due to SARS in China. Since the estimated impact of China's GDP is -1% in 2003, the coronavirus impact could be up to 8% of GDP in 2020. That translates to around $1 trillion. Of course, the Beijing government has injected hundreds of billions into the economy, which will help mitigate the financial impact. If the deaths continue to rise, we could assume the economic cost will increase incrementally. Here with the best knowledge we have, we estimate that the negative impact on China's economy is 4 percentage point reduction of its GDP ($520 billion) in 2020 and 0.9 percentage point reduction of the global GDP ($790 billion).

3. *See "COVID-19: Implications for Business" by McKinsey & Company, March 2020.*
4. *See "Estimating the Global Economic Costs of SARS," in Learning from SARS: Preparing for the Next Disease Outbreak – Workshop Summary (2004), National Academic Press.*

Impact on International Tourism

To be sure, across the globe, the airline and tourism industries will see the most negative impact due to the travel restrictions. SARS caused a significant panic in Hong Kong as mentioned above between March and June 2003. Figure 1 shows the monthly travelers who have visited Hong Kong since 1996. We can clearly see a plunge of visitors of 1.4 million from March 2003 to 0.5 million in April, 0.46 million in May, 0.8 million in June, and returning to normalcy of 1.3 million in July. That said, a V-shaped recovery could be possible after the end of coronavirus epidemic. Note that we see another rapid plunge at the end of Figure 1. That is due to the protest against the extradition bill in Hong Kong started in June 2019.

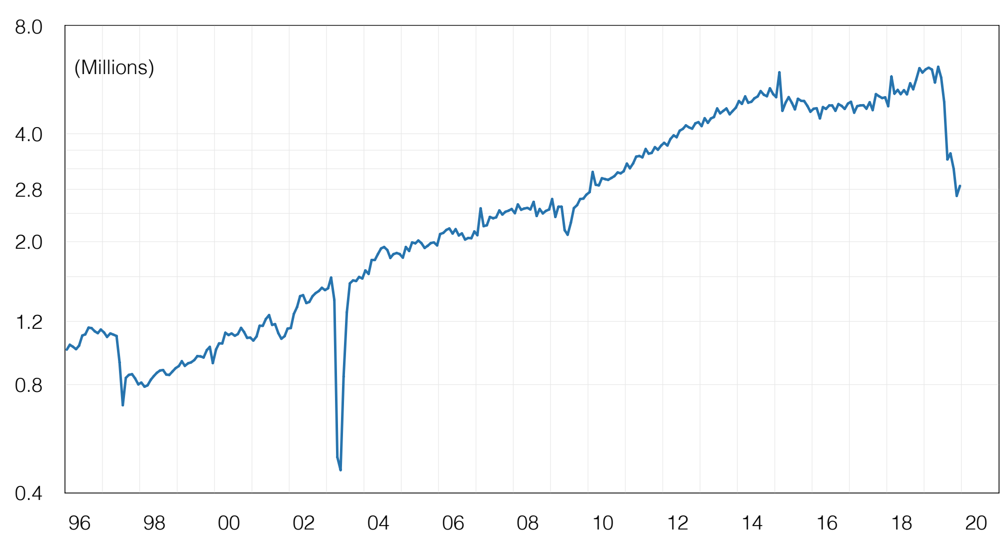
In the U.S., we see a similar plunge of international tourism (Figure 2) in September 2001 due to the September 11 terrorist attack. It took a while (U-shaped) to recover perhaps with other economic factors and continued travel restrictions. In Figure 3, we see the U.S. international tourism revenue dropped significantly at the same time.

In 2019, the U.S. international tourism revenue (U.S. exports) was around $260 billion (1.3%) of GDP. Based on the current travel ban for China and Iran and recommendation to avoid travel to South Korea, Italy, and Japan, we can do another back-of-the-envelope calculation. Chinese tourists account for about 4% of all international tourists to the U.S. However, Chinese tourists spent about 15% of all international tourist spending, including education; Japanese tourists spent about 6%, and Korean tourists spent about 3%. If we assume 20% international tourism spending will be reduced due to the travel restrictions, we can estimate the international tourism loss will be around $4.3 billion a month to the U.S. Of course, if the epidemic gets worse, international tourism will face further blow.

Locally, California and L.A. metro, by and large, accounts for 21% and 12%, respectively, of the total international tourism revenue in the U.S. Note that Chinese and other Asian tourists are more likely to spend more in California and L.A. than the national average because of geographic and racial connections. Therefore, we assume their market share of the U.S. market will be higher, say 42% and 24%, respectively. That is the economic impact on California economy and L.A. will be $1.8 billion and $1 billion a month.

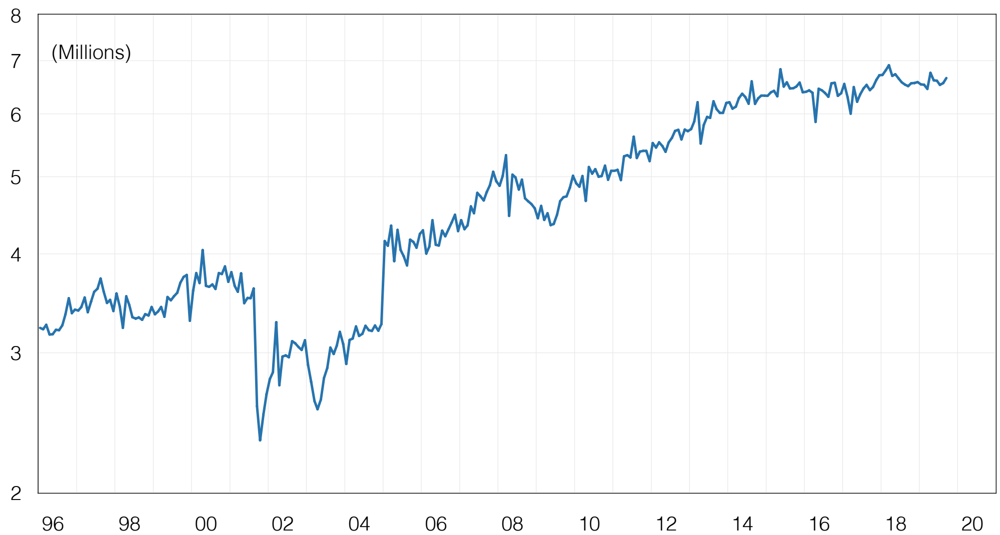
Note that there will be some diversion effect as well. Some Americans who had planned to go to China may decide to go to Disneyland in Orange County instead. If so, that would be an import reduction, which would boost GDP. Here we leave this possibility aside because there are so many moving parts involved. For example, some domestic or international tourists (not on the travel-ban list) may cancel trips to the U.S. all together for their own safety concerns. A case in point is that IHS Markit is cancelling CERAWeek 2020, the premier energy conference in the world, scheduled to take place in Houston in March, which could have attracted 5,500 delegates around the world. Additionally, Facebook

Figure 1 Monthly International Visitor Arrivals in Hong Kong, Seasonally Adjusted



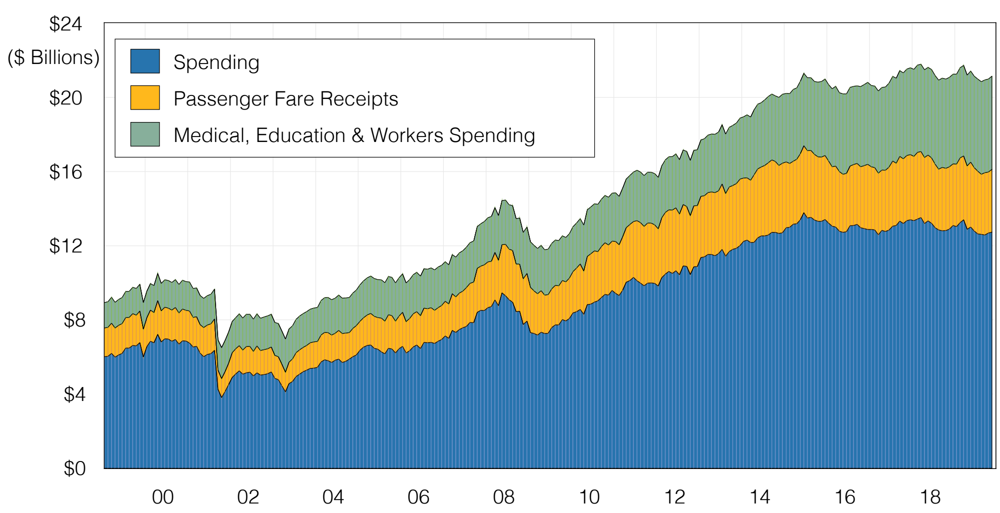
Source: CEIC

Figure 2 Monthly International Visitor Arrivals in the U.S. , Seasonally Adjusted



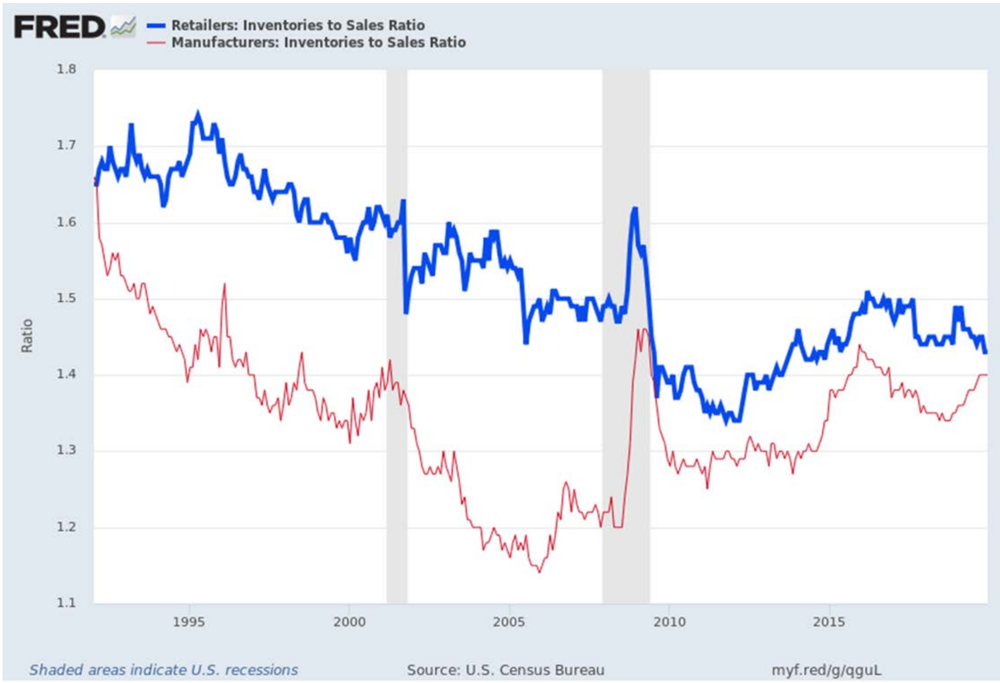
Source: CEIC

Figure 3 Monthly International Tourism Revenue in the U.S.



Source: CEIC

Figure 4 U.S. Inventories to Sales Ratios for Retailers and Manufacturers



said it is canceling its F8 developer conference in May, which could attract more than 5,000 developers, creators, and entrepreneurs from around the globe.

In 2019, the total international tourism revenue in the world was about $1.6 trillion (1.9% of the global GDP). Assuming the impact of 20% reduction, we are looking at about $26 billion loss a month globally. Some countries will hurt more because of their higher share of international tourism revenue in GDP, such as Thailand (13.7%), Iceland (12.3%), Hong Kong (11.1%), Greece (9.3%), Spain (5.2%), etc.

In the Anderson Forecast's quarterly economic outlook report for March 2020, the senior economist David Shulman describes a cut in the U.S. GDP growth forecast in 2020 by 0.5 percentage point ($100 billion), reflecting the estimated negative impact on the U.S. economy. Note that our forecast has factored in that the Federal Reserve will cut the interest rates to calm down wobbly Wall Street.

Supply Chain Disruption

China has been working hard to reopen their factories. As of now, we heard there is only 30 to 50% production capacity resumed. Foxconn and other contractors and Chinese government have used all kinds of ways to bring workers back to the factories. But the concerns over the possible resurging of the coronavirus outbreak have resulted in the production resumption being at a slow pace. The Chinese National Bureau of Statistics Manufacturing PMI (Purchasing Managers Index) in February 2020 dropped to 35.7 from 50 in January 2020, the lowest level on record, even lower than the value of 38.8 in December 2008 during the financial crisis.

It usually takes, on average, 30 days to ship by sea from China to the U.S. or Europe. This implies the final shipment before the Chinese New Year holiday on January 24 will arrive at Ports of Los Angeles and Long Beach in late February. Figure 4 displays the inventory-to-sales ratios for

U.S. retailers and manufacturers. They are both about 1.4, meaning that it will take 1.4 month (about 6 weeks) to sell the inventory on average. Assuming U.S. manufacturers or retailers have 2 to 6 weeks of inventory, the U.S. will begin to face a significant supply chain disruption in mid-March if the cargo ships from Asian ports are not sufficient enough for the American market.

The following blog news on February 24 from the Institute of Supply Chain Management provided a good summary for the current state of global supply chains relying on China: "…One thing is certain, as we go to print, with so many supply chains relying on supply chains within China for their raw materials, parts, and products, panic levels are beginning to rise. Procurement departments are desperately attempting to source local suppliers to stock up inventory levels, while logistics experts are working relentlessly to find ways around the restrictions to move products. With so much dependence on China's manufacturing industry, the eyes of the business world are firmly fixed on the country as we are forced into a waiting game with no end in sight."

In July 2019, the U.S.-China Economic and Security Review Commission held a hearing on the U.S.' growing reliance on China's pharmaceutical products. Rosemary Gibson noted in her testimony[5] that centralization of the global supply chain of medicines in a single country makes it vulnerable to interruption whether by mistake or design. She said that millions of Americans are taking prescription drugs made in China and don't know it. Now the coronavirus outbreak in China should make the U.S. to rethink if our medicine supply chains are safe and risk averse.

Conclusion

- The overall economic impact of the coronavirus depends on how long and how broad the epidemic will spread. With the current causalities, we predict its impact on the global economy to be around 0.9 percentage point reduction of global GDP growth. The impact on the U.S. economy is estimated to be 0.5 percentage point reduction. If there are more deaths in the coming months, more panic and more disruption that will cause the loss to increase incrementally.
- International tourism will be the hardest-hit industry. It estimated that the cost to the U.S. will be $4.3 billion a month at the current scale of the epidemic, mostly due to the loss of Chinese tourism. The whole global impact is estimated to be $26 billion a month on average. The longer the epidemic lasts, the larger the loss.

5. *https://www.uscc.gov/sites/default/files/RosemaryGibsonTestimonyUSCCJuly152019.pdf*