



The Economic Impact of COVID-19 on China
and Implications for Canada

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Executive Summary

The economic impact of the COVID-19 outbreak on China's economy is estimated to be more severe than that of SARS in 2002/2003. The forecasts of China's growth rate in 2020 vary widely, but most fall into the range of 5.5-6%. This estimate may be too optimistic if the epidemic persists for several more months. The estimated growth rate for the first quarter of 2020 is more pessimistic, certainly lower than 5% and possibly close to zero. The impact of the virus is spilling over to the rest of the world and may slow the global economy by 0.2-0.5%, as predicted by economists who underscore China's increasingly important role in the global supply chain.

To contain the coronavirus outbreak, China introduced aggressive measures including city lockdowns, business and factory shutdowns, transportation cut-offs, and mandatory home quarantines for citizens. These measures helped to curb the spreading virus, but also hurt consumption and production in China. All sectors are impacted by the epidemic, but retail, transportation, hotels and restaurants, and leisure and tourism have been hit the hardest. On the other side, the digital economy surrounding the internet has gained an opportunity to rise. E-commerce, food delivery services, gaming, online-education, online-health care, and telecommuting have seen opportunities to grow. These are likely the new drivers of China's economic growth in 2020.

The disruption caused by the virus to China's demand side may also have a significant impact on the outlook of Canadian economy. The travel industry will see a decline in numbers of Chinese tourists due to the cancellation of flights and quarantines in most Chinese cities. The agricultural sector also faces the possibility of declining orders from China. Canada-China canola talks have also been stalled by the virus. The energy sector will also likely pay the price for the coronavirus. Although China's direct imports of oil from Western Canada are minimal, declining oil prices due to COVID-19's disruption of demand from China is not good news for Canadian energy exports.

If this disease harms economic activities in large portions of the global economy, it will also slow China's own recovery by sapping demand for Chinese exports.

Report

COVID-19 originated in Wuhan, central China's largest city with a population of 11 million and a GDP equivalent to Peru. As of February 28th, the virus outbreak has caused 83,000 infection cases and more than 2,800 deaths in 49 countries. This is much more severe than SARS which also broke out in China and spread globally during the period of 2002-2003. At least 48 Chinese cities, including Wuhan, are locked down, and many more are semi-locked down or quarantined. Chinese top epidemiologist, Zhong Nanshan, who won fame for combating the SARS epidemic in 2003, predicted the disease's peak would appear by the end of February.¹ A more pessimistic prediction from Hong Kong and Japan estimates the disease will peak between April to May.^{2,3} Recently, two prominent epidemic trends have been identified for COVID-19. First, data from the national and provincial CDCs in China (Figure 1) shows that the increase in both confirmed and suspected cases have stabilized since February 6th, except for a big spike on February 12 after China changed the diagnostic methods. The World Health Organization (WHO) mission team in Wuhan also confirmed that there was a steep decline in newly-reported cases based on the collection of different sources of information.⁴ Second, the global spread of the disease appears to be accelerating. South Korea, Italy, and Iran are seeing a significant uptick in the numbers of reported cases. In response to this, the WHO has warned countries about a global outbreak of coronavirus and raised the coronavirus threat assessment to its highest level on February 28.⁵ More details of COVID-19 can be found in Appendix 1.

Forecasts of China's Growth

The outbreak of COVID-19 is disrupting China's economy in many areas, with the unprecedented and aggressive containment measures enacted by China to prevent the virus from spreading. These measures, including city lockdowns, business and factory shutdowns, transportation cut-offs, and home quarantines, are halting China's economy. SARS stunted China's economy by decelerating the growth rate from 11.1% in the first quarter of 2003 to 9.1% in the second quarter. The global economy is estimated to have evaporated \$40 billion dollars due to the 2003 epidemic of SARS, which was 0.1% of the global GDP. Based on the changes in

¹ "Exclusive: Coronavirus outbreak may be over in China by April – expert". Reuters. February 11, 2020. <https://www.reuters.com/article/us-china-health-doctor-exclusive/exclusive-coronavirus-outbreak-may-be-over-in-china-by-april-expert-idUSKBN2050VF>

² "Researchers say the coronavirus may be more contagious than current data shows". CNBC. February 4, 2020. <https://www.cnbc.com/2020/02/04/researchers-say-the-coronavirus-may-be-more-contagious-than-current-data-shows.html>

³ "When will the coronavirus outbreak peak?". Nature. February 18, 2020. <https://www.nature.com/articles/d41586-020-00361-5>

⁴ "Steep decline in Coronavirus cases in China: WHO expert". The Economic Times. February 25, 2020. <https://economictimes.indiatimes.com/news/international/world-news/steep-decline-in-coronavirus-cases-in-china-who-expert/articleshow/74289629.cms>

⁵ "WHO warns countries the coronavirus will be 'literally knocking at the door'". <https://www.cnbc.com/2020/02/25/coronavirus-who-warns-virus-will-be-literally-knocking-at-the-door.html>

China's economic structure (e.g., increasing weight of the service sector in GDP) and external uncertainties (e.g., the trade war with U.S.), COVID-19 is predicted to have a more profound impact to China's economy compared to SARS in 2003. For the time being, most economists forecast that China's economic growth rate for 2020 to be 5%-6%, with a rate certainly lower than 5%, possibly zero, for the first quarter. China has recently been gradually resuming production. By February 23rd, 30 out of 36 major Chinese cities released the progress of the resumption of production to the public.⁶ In [Figure 2](#), economists from Morgan Stanley provided three scenarios of China's economic growth in 2020, which depend on how quickly production can resume.⁷ The most pessimistic prediction said China's growth rate for the first quarter might be negative. In contrast, economists from China are more optimistic in their predictions, saying that similar to SARS, the current epidemic will only have a short-term impact on Chinese economy and growth will start to rebound in the second quarter of this year.⁸ However, the recently published Purchasing Managers' Indices (PMIs), which confirmed the collapse of China's manufacturing sector in February, will slash Chinese growth forecast for the first quarter. Furthermore, if the COVID-19 harms the economic activity in large portions of the global economy, this will also slow China's own recovery. The slowing global economy will also sap demand for China's exports which accounts for 20% of China's GDP.

Impacts on China's Macro-Economy

The COVID-19 outbreak will dampen both supply and demand in China for the first quarter of 2020, while the impact on consumption could be more direct and pronounced due to the national-wide quarantine and city lockdowns. Demand for transportation, retail, entertainment and recreation, tourism, hotels and catering services, financial services, oil and gas will experience a significant drop in the first quarter of 2020. Consumption during the Chinese New Year holiday, which contributes 8% of the total annual consumption, also plunged with fears of infection that kept people at home. Similar to the situation during SARS outbreak (shown in [Figure 3](#)) the dive in consumption is mainly attributed to the declining demand for services.

The supply-end impact is that the virus potentially limits production capacity in the face of a postponed return to work, disrupted transportation, and workers placed under quarantine. These precautionary measures make it more challenging for enterprises to recruit employees, deliver orders, adjust inventories, and operate production. Many provinces, whose aggregate GDP accounts for 70% of China's total GDP, extended the Chinese New Year holiday to the second week of February, suggesting an extensive shutdown of manufacturing plants. The disease may also prevent the return of 288 million migrant workers from rural areas. This will not only curb the growth of Chinese manufacturing but also be a drag on global production and consumption, as China is a major supplier of consumer goods, auto parts, electrical equipment, electronics, and cell phones.

⁶ "The map of production resumption in China". Ifeng.com. February 25 2020. <http://finance.ifeng.com/c/7uLMqvyKdUW>

⁷ "Morgan Stanley says China's first-quarter growth could fall as low as 3.5% due to coronavirus". CNBC. February 19, 2020. <https://www.cnbc.com/2020/02/19/coronavirus-morgan-stanley-economic-forecasts-for-chinas-growth.html>

⁸ "The economic impacts of the 'pneumonia'". Sina.com. February 7, 2020. <https://finance.sina.com.cn/other/hsnews/2020-02-07/doc-iimxxste9474014.shtml>

The spreading of the virus will further weaken China's multilateral trade, which has already been struggling with rising external uncertainties driven by the US-China trade war. The trade in services was the first to suffer a direct decline, given the shrinking overseas demand for tourism, transportation, catering and hotels. Merchandise trade will be affected, especially after COVID-19 being identified as a global health emergency by WHO, albeit in a lesser degree than the service trade. Exports and imports from most trading partners both face pressure due to travel restrictions and quarantine. Trade volume in several sectors such as agricultural and agri-food, oil and gas, and consumer goods, may experience an immediate fall but may rebound with strong demand in the future, judging by data from the SARS outbreak. Notably, the anticipated exports surge arising from the U.S.-China "Phase One" agreement signed on January 15 may be delayed at this critical moment.

The coronavirus impact on foreign investment may be complex. FDI data during SARS (in [Figure 4](#)) shows foreign investment flows to China continued to climb in 2003. The primary reason is that China's fast-growing economy attracted global investors and the strengthening ties of Chinese economy to the world since China joined WTO in 2001. Now, in the larger context, global FDI flows are shrinking even though FDI to China is still increasing and reached a record high in 2018. The coronavirus outbreak may frighten international investors and exert a shock in FDI flow at least in the short term.⁹

The coronavirus outbreak triggered a plunge of stock prices in the Chinese market on the first day of trading after the Chinese New Year holiday, marking the biggest fall since 2015 (Shown in [Figure 5](#)). Manufacturing, consumer goods, airlines, tourism companies were among the hardest hit, while bio-medicine shares soared. After the big plunge, China's stock market indexes appeared to recuperate from the coronavirus shock, boosted by government's stimulus policies. It is still too early to predict the impact of the epidemic on the Chinese stock market in the long run. The Chinese stock market remained depressed almost throughout 2003 when SARS broke out, given weak investor confidence. Stock markets around the world will also be dampened as concerns rise that COVID-19, a public health crisis, may turn into a sustained economic shock. The recent Chinese cash injection and other moves somewhat restrained volatility and improved investors' confidence in the global market. However, as fears about the global spreading of the coronavirus mount, the global stock markets plummeted again during the last week of February, which was reportedly the worst week since the financial crisis of 2008. The U.S. stock indices drop sharply amid coronavirus fears, relinquishing gains from earlier this year. The S&P 500 fell 4.4% on February 27th, the largest single-day decline since 2011. The Dow Jones Industrial Average's 1,190 drop hit the new low record since 2008. The plunge of European and Asian stock markets was also significant, over 3% for most of the indices. The slide of stocks continued on February 28th, indicating that the global financial markets may be more volatile in the future if the fear of coronavirus pandemic escalates.

It is noteworthy that Chinese RMB fell to the level of 7-per-dollar in onshore trading on February 3rd and climbed back to just below 7 on Feb 4th. Over the past 6 months, the Chinese

⁹ "The impact on China's Economy after the coronavirus epidemic was declared a global emergency by the WHO". People.cn. January 30, 2020. <http://finance.people.com.cn/n1/2020/0131/c1004-31566000.html>

RMB has gone up from 7.11-to-the-dollar level in 2019 August to 6.99, as shown in [Figure 6](#). Economists predict coronavirus may have a time-limited effect shock on the Chinese currency rather than a long-term impact, given expected significant liquidity and stimulus packages from Beijing in the first quarter of 2020.¹⁰

In December 2019, China's growth rate of Consumer Price Index (CPI) and Producer Price Index (PPI) were 4.5% and -0.5%, respectively. Predictions were that CPI growth would peak around 2020 Chinese New Year and fall in the second quarter of 2020. PPI was forecasted to grow at a mild rate, as businesses started to increase inventory in early 2020. But now the outbreak of coronavirus has hit the supply chains which may further lead to a lengthened period of CPI growth and a delayed rise of PPI. During the peak period of SARS (March and April 2003), CPI grew more aggressively than in January and February 2003 and May and June 2003.¹¹ The latest statistics from the National Bureau of Statistics showed that China's CPI spiked to 5.4% in January, 20% up from December 2019. The PPI rose 0.1% from a year earlier and reversed the 0.5% drop in December.¹² February's Purchasing managers' Index (PMI) fell to a record low of 35.7 from 50.0 in January.¹³

The labor market is also facing downward pressure as the virus continues to spread. China's economic slowdown had already led to great pressure on structural unemployment for the 7 million college students graduating in 2020. Now the epidemic will likely worsen the situation. Rural migrant workers may also face unemployment after returning from the Chinese New Year holiday. Small and medium-sized Enterprises (SMEs) which contribute to over 80% China's employment are now struggling with operation and refinance during the coronavirus epidemic. The national unemployment rate is forecasted to be higher than 5.3% in the first half of 2020.

Industry-level Impacts

Many sectors in China face disruption. With people remaining confined to their homes, the service-related sectors such as transportation, retail, hotels and restaurants, leisure and entertainment, and tourism are among the hardest hit, yet economists believe these sectors will bounce back, even though the recovery may not be as strong as during the SARS outbreak. Other sectors such as sports and education will also suffer impacts due to the quarantines, holiday extensions, and transportation restrictions.

Manufacturing is also significantly impacted, as factories, excepted the ones who produce medical supplies, were urged to shut down to lower the risk of the virus contagion at least

¹⁰ "The onshore and offshore RMB both rose 200 points and rolled back to 6.9 per USD". Chinanews.com. February 4, 2020. <https://baijiahao.baidu.com/s?id=1657606240596556947&wfr=spider&for=pc>

¹¹ "Estimating the negative impacts of the coronavirus epidemic to China's economy". China-cer.com. January 30, 2020. http://www.china-cer.com.cn/guwen/202001301968_3.html

¹² "China's CPI up in January". Xinhuanet.com. February 10, 2020. http://www.xinhuanet.com/english/2020-02/10/c_138770589.htm

¹³ "Purchasing Managers Index for February 2020". National Bureau of Statistics of China. March 2, 2020. https://stats.gov.cn/english/PressRelease/202003/t20200302_1729254.html

during the first half of February. Compared with SARs during which manufacturing was not hit as hard as other sectors such as retail and transportation, the impact of COVID-19 on China's manufacturing could be much bigger. Caixin survey showed China's manufacturing activity slumped in February.¹⁴ The Caixin/Markit manufacturing Purchasing Managers' Index fell from 51.1 in January to 40.3 in February, the lowest reading since the survey was launched in 2004.¹⁵ As the coronavirus is reportedly stabilizing, China is pushing business to resume production. Data from Chinese sources show that as of February 25th, over 80% of businesses were reported to have reopened in 24 cities in China¹⁶, including steel (67.4%), metals (86.3%), mining (76%), railway cargo (95%), and mask (110.3%).¹⁷

However, the digital economy appears to have partially offset the coronavirus' disruption to Chinese economy as people increase stay-at-home activities. Related sectors such as online shopping and food ordering, gaming, web education, telemedicine apps and telecommuting apps have gained an opportunity to generate revenue.

More details on the analysis of industry-level impact can be found in Appendix 2.

China's Policy Remedies

It is worth noting that with slowing economic growth, Chinese private enterprises, small businesses, wage workers, and migrant workers from rural areas are taking a harder hit. Relative to SOEs, the private enterprises have limited access to loan and credit provided by banks. They are more likely to fail while facing a big unknown such as the coronavirus. SMEs, comprising 97% of the Chinese service sector, are battered by the virus outbreak which is disrupting China's consumption of service. Wage workers and rural migrant workers, most of whom are employed by service businesses or consumer good manufacturers, are also struggling during the virus outbreak.

As during and after SARS, relatively flexible and loose monetary policy and expansionary fiscal policy are essential components of the stimulus package. Similar policy support is expected to mitigate the coronavirus shock on domestic market. From February 3 to 10, the central bank injected US\$370 billion via reverse repo operations into financial market to ease the volatility of the stock market. This is reported to be only one of the 30 measures China will take to fuel the economy against the coronavirus shock.¹⁸ More have or are expected to be implemented, including cutting the medium-term lending facility (MLF) rate, the benchmark loan prime rate (LPR), the reserve requirement ratio (RRR), and developing industrial-targeted loan programs.¹⁹ These measures may allow businesses that produce medical supplies and consumer goods

¹⁴ Caixin is a Beijing-based media group that provides primarily business and financial news.

¹⁵ "Coronavirus: China manufacturing collapse confirmed as private sector factory survey hits record low". South China Morning Post. March 2, 2020. <https://www.scmp.com/economy/china-economy/article/3064542/coronavirus-china-manufacturing-collapse-confirmed-new>

¹⁶ "The map of production resumption in China". Ifeng.com. February 25 2020. <http://finance.ifeng.com/c/7uLMqvyKdUW>

¹⁷ The numbers in parenthesis are capacities that have been recuperated.

¹⁸ "China to inject US\$174 billion of liquidity into markets amid new coronavirus outbreak". South China Morning Post. February 2, 2020. <https://www.scmp.com/economy/china-economy/article/3048618/china-inject-us174-billion-liquidity-markets-amid-new>

have more access to loans. Multiple Chinese authorities have announced tax cuts for small & medium-sized businesses bearing coronavirus costs, especially those doing business in wholesaling and retailing, restaurants and hotels, transportation, and tourism. Chinese economists have also suggested to increasing government spending in the public health sector and to increase transfer payments to the regions hardest hit by the virus. However, in face of ongoing uncertainties in the spreading of the virus, the policy support may not have an immediate impact on China's economy which has been slowing since 2014.

Global Impacts and Implications for Canada

Back in 2003 when SARS broke out, China was the world's sixth largest economy versus the second largest today. China's economic growth is now driven by consumption with a contribution rate of 70%. Relative to the agriculture and manufacturing sectors, the service sector is expanding and accounts for over 50% of total GDP in 2019. The COVID-19, which hit consumption and service hard appears to be a bigger menace for China's economy. Furthermore, it may take longer to restore growth after the outbreak than the recovery from SARS. During the past 17 years, China has evolved into a principal element of the global economy, making the epidemic a substantially more potent threat to global prosperity. China's contribution to global GDP increased from 4% in 2003 to 17% in 2020. This means the global spillover if China's growth slumps will be larger as well. Some economists have estimated the new coronavirus may slow global economy growth by 0.2-0.5%.²⁰ Due to the concern on coronavirus's global pandemic, the outlook of the growth of the global economy tends to be gloomier. The International Monetary Fund (IMF) has already claimed to downgrade global growth due to the fast-spreading coronavirus outside China. The OECD lowered its global growth forecast from 2.9% to 2.4%, and warned that the virus would halve global economic growth this year.²¹

For many Multinational Enterprises (MNEs) in retail, automotive, technology, airlines, and hotels, the shrinking market and idling manufacturing in China means a dramatic loss of profits. These MNEs are struggling with a downturn in both manufacturing and sales, given the disruptions of Chinese demand and supply chain. Apple, Starbucks, and McDonald's have temporarily shut stores in China. The virus may slash demand for smartphones by 50% in the first quarter in China. Apple recently warned the investors that it will not meet revenue expectations for the first quarter of 2020, as many of its products are manufactured in China.

China is Canada's second largest trading partner (well behind the United States), accounting for 4% of Canadian merchandise exports and 12% of Canadian merchandise imports. In 2019,

¹⁹ "China floods economy with cash with coronavirus outbreak set to hit economic growth hard". South China Morning Post. February 20, 2020. <https://www.scmp.com/economy/china-economy/article/3051637/china-floods-economy-cash-coronavirus-outbreak-set-hit>

²⁰ "Coronavirus sends ripples through global economy". Financial Times. February 11, 2020. <https://www.ft.com/content/e9fbbb78-4901-11ea-aeb3-955839e06441>

²¹ "OECD warns coronavirus could halve global growth". Financial Post. March 2, 2020. <https://business.financialpost.com/news/economy/oecd-warns-coronavirus-could-halve-global-growth>

Canada exported CA\$24 billion worth of goods to China. Agri-food, motor vehicles, wood pulp and lumber are among the products most exported by Canadian companies. The disruption caused by the virus to China's demand side could have a notable impact on the outlook of Canadian economy. The agri-food sector may face falling orders from China, as coronavirus saps China's demand for imported food. Nova Scotia's seafood industry already felt the pinch from the decline in seafood export caused by the virus outbreak. Canadian wine exporters, who sell about 80-90% of their wine in China during the Lunar New Year holidays, also saw a dip in sales. China is also Canada's largest source of tourists from the Asia-Pacific region with a record 737,000 visits in 2018. With flight suspensions, the travel and tourism sectors will be hard hit with a significant decrease in the number of Chinese tourists at least in the first half of 2020. As risk of the virus spreading beyond China builds, stock, grain, and oil prices have tumbled, which is a signal for Canada to prepare for more trade uncertainties. Canada-China canola talks have already been stalled by the virus. Although China's direct imports of oil from Western Canada are minimal, the declining oil prices due to the COVID-19's disruption to demand from China is obviously not good news for Canadian energy exports. The Canadian dollar slid to two-month low in early February as the virus hit oil demand. With the speeding global spreading of the coronavirus, the WTI price dropped to \$44.76 per barrel, and the Brent price fell to \$50.749 a barrel which is a 14-month low. With the spreading of the virus, Canada's TSX dip to a new low level since 2015 with tumbling oil prices.

Appendix 3 provides more details on the coronavirus impact on different sectors in Canadian economy.

Figure 1. Trend of COVID-19 development in China



Figure 2. The impact of COVID-19 on China's economic growth by Morgan Stanley

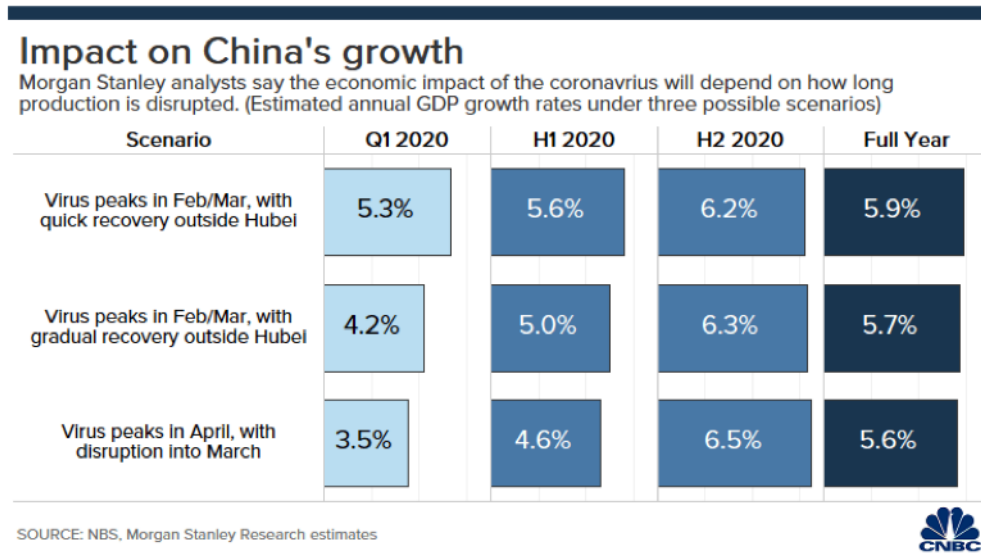


Figure 3. Monthly Growth Rate of Consumption during SARS (%)

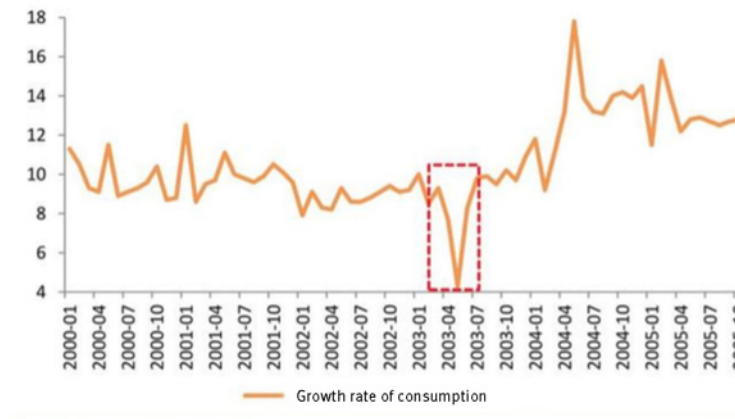


Figure 4. China's Foreign Direct Investment (U.S. dollar, 100 million)

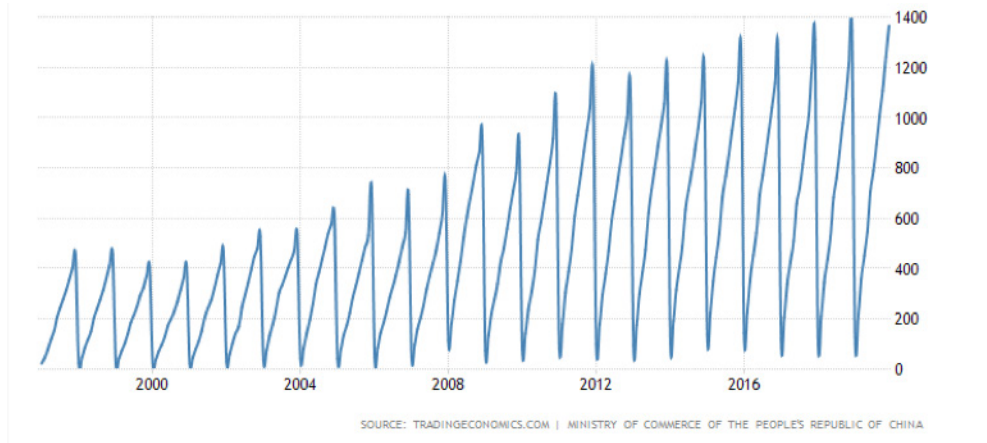


Figure 5. China's Stock Markets during COVID-19



Figure 6. Exchange Rate of Chinese RMB



Appendix 1. An Overview of COVID-19 Outbreak

COVID-19, also as known as Wuhan coronavirus, is a new coronavirus that may cause flu-like symptoms, or pneumonia, kidney failure, and death. The COVID-19 is a zoonotic disease which is believed to have originated in bats. The first confirmed case in Wuhan was identified on December 1st. As of February 29, 2020, the coronavirus has resulted in 78,962 infections and 2791 deaths. Shown in Figure 7, all 34 regions in China confirmed cases of coronavirus. Wuhan, the epicenter of coronavirus, has confirmed 48,137 cases of infection and 2132 deaths. To stop virus spreading, Wuhan was locked down on January 23rd, 2020. At least 48 Chinese cities are locked down and more are semi-locked down or quarantined.²² It still remains unclear how long the Coronavirus outbreak will last. Hubei extended the Chinese New Year holiday to February 13th. Most provinces delayed the resumption of businesses and schools to February 9th or later. Some scientists in China said the outbreak could peak between February 12-19. Chinese top epidemiologist, Zhong Nanshan, who won fame for combating the SARS epidemic in 2003, is more optimistic and predicted the peak would appear by the end of February.²³ The most pessimistic prediction from Hong Kong and Japan estimates the disease will peak in between April to May.^{24,25} Figure 2 which illustrates the trend of the epidemic shows that the increase in confirmed cases tends to slow down since February 4, except for the big spike on February 12 when China changed the diagnostic methods that day. The increase in suspected cases has also slowed down since February 6.

Figure 7. Distribution of Coronavirus in Mainland China



²² "Under China's coronavirus lockdown, millions have nowhere to go". Reuters. February 14, 2020. <https://www.reuters.com/article/us-china-health-scale/under-chinas-coronavirus-lockdown-millions-have-nowhere-to-go-idUSKBN208IDB>

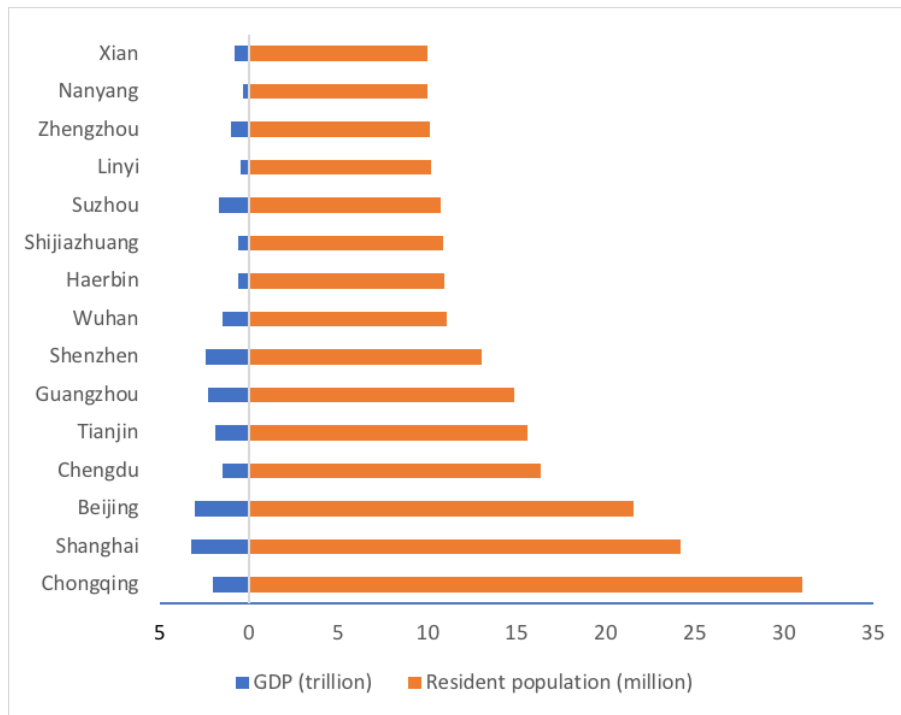
²³ "Exclusive: Coronavirus outbreak may be over in China by April – expert". Reuters. February 11, 2020. <https://www.reuters.com/article/us-china-health-doctor-exclusive/exclusive-coronavirus-outbreak-may-be-over-in-china-by-april-expert-idUSKBN2050VF>

²⁴ "Researchers say the coronavirus may be more contagious than current data shows". CNBC. February 4, 2020. <https://www.cnbc.com/2020/02/04/researchers-say-the-coronavirus-may-be-more-contagious-than-current-data-shows.html>

²⁵ "When will the coronavirus outbreak peak?". Nature. February 18, 2020. <https://www.nature.com/articles/d41586-020-00361-5>

The outbreak of COVID-19 in late 2019 is a drag on China’s economic growth for 2020, and also threatens to challenge the global economy. Wuhan (in Figure 8), a city with 11 million people, produced GDP of US\$224 billion in 2018, which is equivalent to the total GDP of Peru. Wuhan is also well known for its role in domestic transportation and referred to as “the Chicago of China”. Steel, new technology, and automobile are three main pillars of Wuhan’s economy. The lockdown in 17 Hubei cities (including Wuhan) and strict restrictions of transportation and logistics in many other Chinese cities, towns, and villages, are significantly disrupting production and consumption and further damaging China’s economic growth. Moreover, increasing international travel curbs and flight suspensions are straining the global economy. Oil prices plunged to US\$ 55 per barrel in early February, as China’s daily crude consumption slumped by 20%.²⁶ With the speeding global spreading of the coronavirus, the WTI price dropped to \$44.76 per barrel, and the Brent price fell to \$50.749 a barrel which is a 14-month low.

Figure 8. Population and GDP in China



The COVID-19 is eerily similar to SARS. SARS swept through China in 2003 and soon spread globally, infecting 8,437 (7,083 in China) people and killing 813 (636 in China).²⁷ The SARS outbreak, starting in November 2002 and ending in July 2003 (peaked in April and May), slowed China’s economy and impacted the global economy.

²⁶ “China Oil Demand Has Plunged 20% Because of the Virus Lockdown”. Bloomberg. February 2, 2020. <https://www.bloomberg.com/news/articles/2020-02-02/china-oil-demand-is-said-to-have-plunged-20-on-virus-lockdown>

²⁷ Lee JW and McKibbin WJ. “Estimating the global economic costs of SARS”. 2004. <https://www.ncbi.nlm.nih.gov/books/NBK92473/>

Appendix 2. Industry-level Analysis

The Wuhan coronavirus has affected all sorts of sectors across China's economy, including transportation, retail, tourism, restaurants and catering services, recreation and sports, education, health and pharmaceutical.

A. Transportation and Logistics

The need for supplies to combat the coronavirus epidemic led to rising demands for logistical services in China. As reported by State Post Bureau, the post industry has received 81.25 million packages from January 24 to 29, an increase of 76.6% year-on-year. Meanwhile, the postal industry delivered 78.17 million packages, an increase of 110.34% year-on-year. As reported in a survey conducted by China Federation of Logistics & Purchasing and JD.com, demand for logistics rose by 1.2% in January, 2020 due to the increasing demand for online shopping arising from quarantines.

In spite of transportation required for emergency supplies, the transportation industry has suffered because of the restrictions on population mobility. Air China stock has been falling since January 17, and it suffered a large decrease of 4.4% in Jan. 23, the last day before China's stock market closed for Chinese New Year. During the SARS outbreak in 2003, the stock prices of China Eastern Airlines and Shanghai Airlines decreased by 20.2% and 16.9% respectively. They rebounded by 34.9% and 39.2% from November 2003 to April 2004. China's transportation industry should recover after the coronavirus is controlled.

B. Retail

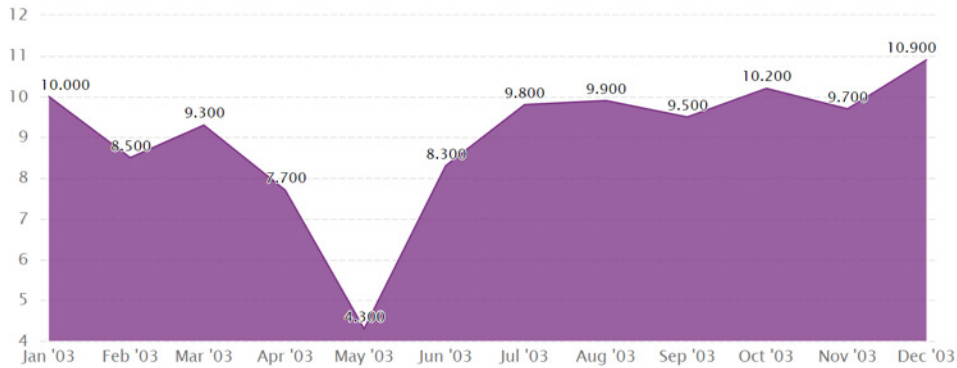
With many stores closed and quarantine measures in place in many cities and communities across China, retail sector trade has been severely restricted. Both the incentives and opportunities to purchase are low due to quarantines. During the SARS epidemic, total retail sales dropped by almost 50% for the first half year of 2003. As shown in Figure 9, the growth rate of China's retail industry decreased during SARS, achieving a bottom value in May. However, the sector recovered and experienced rapid growth in the second half of 2003. Thus, the recovery of China's retail industry is also expected after the coronavirus is fully controlled.

With people confined to their homes, there should be a boon for ecommerce. As published in January 30 by JD Big Data Research Institute, while demand for outdoors equipment decreased, demand for household consumption increased by more than 100%, and the value of transactions of grain and oil increased 15 times during Chinese New Year. Meanwhile, the prosperity of China's ecommerce is little affected due to the difficulty of delivering the orders, as Chinese ecommerce platforms such as Alibaba and JD.com are hiring thousands of temporary workers to ensure that orders could be delivered on time, although logistics are still restricted due to quarantines and the short supply of masks for couriers. However, in addition to a delivery labor shortage, the companies are facing supply shortages as well, since production is postponed and reduced because of quarantines. Chinese ecommerce platforms are seeking products outside China to ensure supply and stabilize the prices. However, port delays may complicate this effect.

C. Tourism

During the Chinese New Year of 2019, China's tourism received 415 million passengers with a revenue of 513.9 billion RMB Yuan, an increase of 8.2% year-on-year, a phenomenon which will

Figure 9. Monthly Growth Rate of China's Retail Industry in 2003 (%)



Data Source: CEIC Database.

not be seen in 2020.

Wuhan announced in January 23 that all museums, memorial halls, public libraries and cultural centers will be closed from January 23 to February 8. Besides, all tour groups must be cancelled. Beijing has decided to close the Palace Museum since January 25, with the re-opening date still to be decided. Following Wuhan and Beijing, multiple local governments, including Tianjin, Zhejiang, Shanghai, Shanxi, Guangdong, Yunnan, Sichuan, Nanjing and Xiamen, have also announced to close tourist sites.

In January 25, the China Association of Travel Agents announced that all travel agents and online travel service platforms must close their business for tour groups and independent travel services with flight tickets and hotel reservation.

In addition, many countries, including the U.S. Australia, New Zealand, Canada and the United Kingdom have issued travel advisories for China.

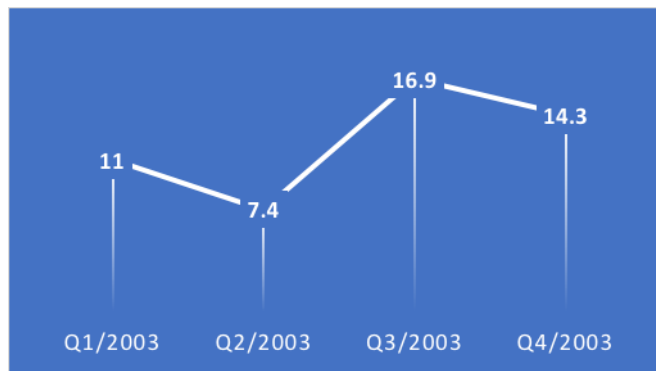
Accompanying the sharply declining demand for tourism, the stock price of China International Travel Services has decreased from 90.15 CNY in Jan. 20 to 82 CNY in Jan. 23. Casino operators in Macau, which are highly dependent on tourism, has also suffered a major decline in their stock prices. For instance, Wynn Macau stock decreased by 4.8%, and Galaxy Entertainment decreased by 3.6%.

In 2003, SARS caused China to lose 13% of the annual tourist flow, with a decline of 28% in the tourism industry in general. Even though the fatality rate of the coronavirus is lower, the confirmed cases has reached 75,997 as of February 27, more than 14 times the number of SARS. Combined with the quarantine policy, the negative shock of coronavirus on China's tourism sector is expected to be much larger than that of SARS.

D. Restaurant and Catering

During the SARS outbreak, China's restaurant and catering industry experienced a relatively lower growth rate of 11% and 7.4% respectively in the first two quarters of 2003 (Figure 10). However, it rapidly recovered to a 16.9% growth rate in the third quarter. Since the outbreak of Wuhan coronavirus, dining in restaurants has become impractical due to quarantines. A negative impact of coronavirus on China's catering industry for 2020 is guaranteed.

Figure 10. Quarterly Growth Rate of China's Catering Industry (%)



Data Source: China International Capital Corporation Research Institute.

However, restaurants that survive the coronavirus may embrace a speedy recovery. Once the coronavirus outbreak is over, the months of suppression of consumption will be followed by a subsequent outburst of purchases. Therefore, the catering industry will likely witness a recovery in the second half of 2020. Meanwhile, to counter the negative impacts of the coronavirus, the central government will most likely implement more liberal economic policies to stimulate the economy. With the signing of China-US Phase I Trade Agreement, the price of agricultural products may decrease. Hence, we should expect a decline in costs for catering industry over the course of 2020.

E. Recreation and Sports

On January 23, seven movies which were scheduled to release in theatres were postponed, which caused great losses for China's film industry. IMAX China stock declined by 17.5%. Chinese New Year Fairs were cancelled. Instead of attending social gatherings and recreational activities, people stayed home for the entire holiday. In January 21, Wuhan cancelled its New Year activities. The next day, Beijing and Shanghai also cancelled their New Year celebration fairs and activities. Several concerts that were originally scheduled to be held in Hubei are also postponed or cancelled.

Several qualification contests for Tokyo 2020 Olympic Games, which were scheduled to be held in Wuhan, are now rescheduled to other locations. The 2019-20 Alpine skiing World Cup in Yanqing (Beijing) was cancelled because of the coronavirus. The World Indoor Championships in Athletics

2020 in Nanjing was postponed and rescheduled to March, 2021. The General Administration of Sports of China has announced the cancellation of all sports events before April. The 14th Winter Games of the PRC which were scheduled to be held from February 16 to 26 was postponed, with the date to be decided later.

With the restriction and cancellation of recreational activities and sports, people turn to online games. The turnover of “Honor of Kings”, China’s most popular mobile game, reached 2 billion yuan on a single day of Chinese New Year Eve, with a year-on-year growth rate of 50%. Multiple analysts have claimed that the turnover of video game products would increase by 20% to 40% in February, 2020.

F. Education

The Ministry of Education of China requested on January 21 that no schools hold collective activities, if not essential. Schools and universities including Peking University and Tsinghua University, two top Chinese institutions, have switched to online teaching for the spring semester. Meanwhile, after-school training institutes are suffering from the negative shock caused by coronavirus. In 2003, SARS had a destructive impact on China’s after-school training industry. Institutes including New Oriental, a leading corporation in China’s after-school training industry, were forced to fully refund students’ tuition. Multiple after-school training institutes did not survive through SARS. However, the situation for the after-school training industry is now better with the popularization of online education. After-school training institutes including New Oriental, TAL Education, NewChannel etc., have declared that students can access to their online courses during the suspension of on campus education. While quarantines offer great opportunities for the development of online education, it remains a question whether China’s online education industry will be able to sustain its prosperity after the epidemic is curbed.

International English Language Testing System (IELTS) has decided to cancel tests that were originally scheduled in February 8, 13 and 20 in Wuhan. Tests in other locations in China will provide “enhanced epidemic prevention”. Meanwhile, the National Education Examinations Authority has decided to cancel all IELTS and TOEFL (Test of English as a Foreign Language) tests in February in Hubei province. Examinees in other provinces can cancel their exams and receive a full refund. On January 28, the Ministry of Education suggested Chinese students studying abroad postpone their travel.

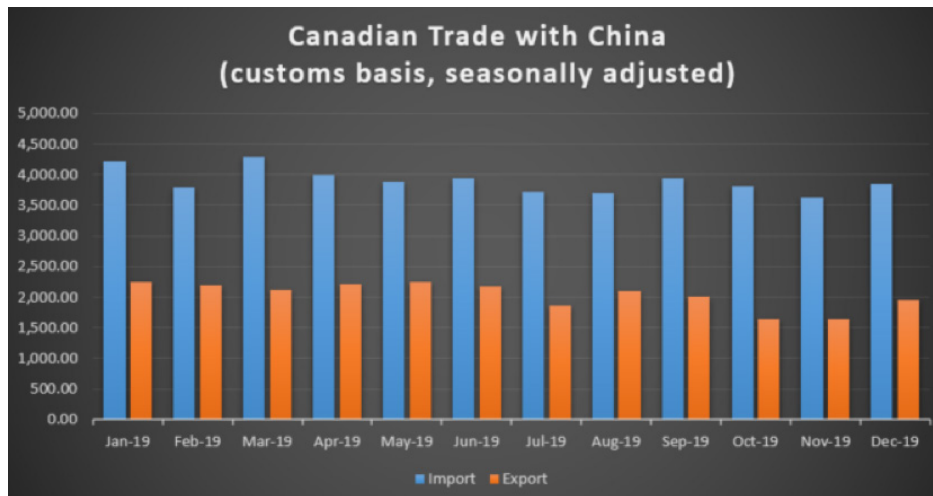
G. Health and pharmaceutical

With the spread of the coronavirus, the demand for masks has seen a sharp increase. China’s e-commerce platforms have implemented penalties for raising the prices of masks. The Hubei government has declared that masks and protective garments produced by Hubei province are not able to meet the demand, and requested support from other provinces. Meanwhile, the Ministry of Industry and Information Technology of China has stated that the demand for protective garments exceeds China’s production ability, and called for overseas help. Meanwhile, masks in the United States, Canada and Japan has been purchased in large volume by Chinese customers. The stock price of Tianjin Teda, a mask producer in China, increased by 10%, which is the maximum gain set by China Securities Regulatory Commission. Meanwhile, Chinese pharmaceutical enterprises, including Jiangsu Sihuan Bioengineering Corp., Shandong Lukang Pharmaceutical Corp. and Jiangsu Hengrui Medicine, have all seen a single-day increase of 10% in their stock prices.

Appendix 3. The Economic Impacts on Canada

As shown in Figure 11, Canada imported around CA\$4 billion of products per month from China and exported around CA\$2 billion per month to China in 2019. Canada, through trade with China, will undoubtedly be affected by the Chinese virus epidemic. A wide range of sectors, such as retail, insurance, mining and manufacturing, are bracing for the impact. Companies including Canada Goose Holdings Inc., Sun Life Financial, Teck Resources Ltd., and Magna International Inc. (which has nearly 19,000 employees in China) put employees' travel plans on hold or instructed staff to work from home. All except Sun Life saw their stock fall between 5 and 15 per cent since January 20, when authorities confirmed human-to-human transmission of the virus. Imax Corp. says it postponed the release of five films after China's more than 60,000 movie theatres shut down, including the company's more than 600 locations.

Figure 11. Canada-China Trade (Canadian dollars, million)

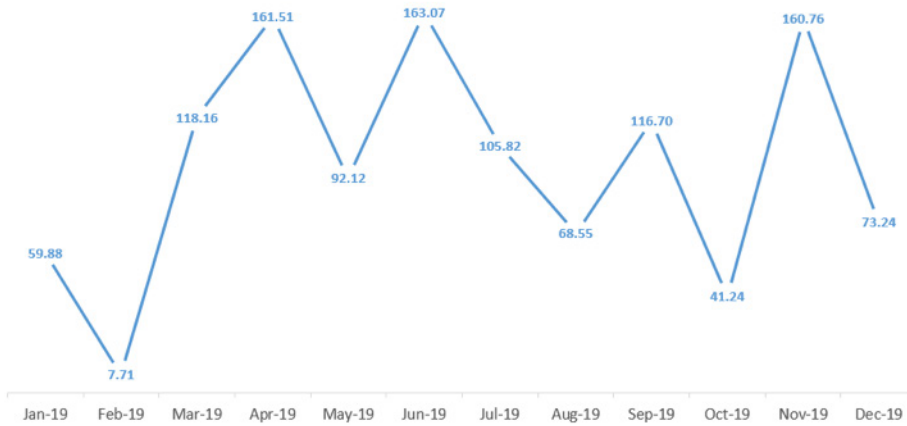


Data Source: Statistics Canada

A. Energy

As the world's second largest oil consumer and the world's largest importer, China's economic slowdown triggered by Wuhan coronavirus will certainly decrease global demand. Jinlianchuang, a Chinese bulk commodity service provider, has predicted that the Chinese domestic price of refined oil products will decrease by 15%-20% in January and February, 2020. China's daily demand for petroleum will decrease by 300 million barrels for February and 120 million barrels for the first quarter. With the intensifying anxiety regarding the coronavirus, crude oil futures prices have decreased by more than 6% from January 21 to 25, which is the highest weekly decline for the past year. Brent crude oil has decreased by more than 20% from the beginning of January to February 6. As presented in Figure 12, Canada exports millions worth of fuels to China in the past year. The decline in Chinese demand and the decrease in global fuel's price will negatively affect Canada's energy industry.

Figure 12. Canada's Exports in Mineral Fuel to China (Canadian dollars, million)

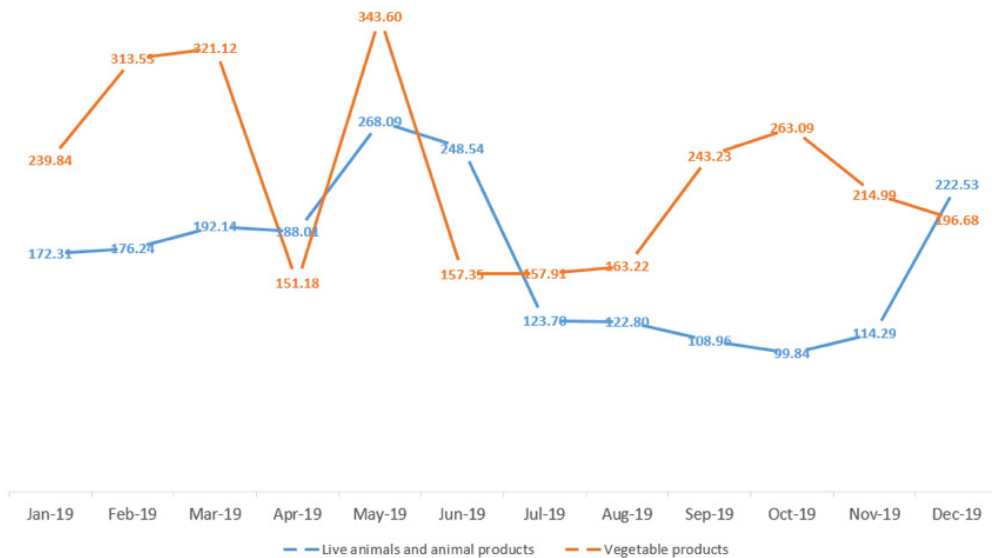


Data Source: Statistics Canada

B. Agriculture and Agri-food

Agricultural exports have long been an essential part of Canada-China trade. As illustrated in Figure 13, Canada's exports in live animals and animal products reached a peak of CA\$343.6 million in May, 2019, and the exports in grains and other corps also reached a peak of CA\$268.09 million in May, 2019. With the outbreak of Wuhan coronavirus, and the following suspended international airline flights between Canada and China, Chinese demand for some high value Canadian agricultural products may shrink in 2020.

Figure 13. Canada's Exports in Agricultural Products to China (Canadian dollars, million)



Data Source: Statistics Canada

Among all other agricultural products, Canadian lobster exports have already experienced a sharp decline due to shrinking demand from China. Stewart Lamon of the Tangier Lobster Corporation, has said that the Chinese decline in demand for Canadian lobsters is not only drastic in volume, but has it also happened rapidly. In only a few days, Chinese orders for lobsters almost disappeared.

With China and the United States achieving their Phase One Trade Agreement, China is obligated to purchase more agricultural products from the United States this year. It may be a tough year for Canadian agricultural exports even without the outbreak of the coronavirus.

C. Transportation and Logistics

Air Canada saw its stock fall by 12% after its announcement to pause all routes between Canada and China from January 30 through March 27. Meanwhile, because of the sharp decline in demand for lobster, cargo routes from Skylease Corp., which deliver of lobsters directly from Nova Scotia to China, have been closed. Bombardier Inc., the Montreal-based train-and-plane maker employing some 8,000 workers in China, echoed other Canadian companies with a foothold on the mainland, saying that it is “monitoring the evolving situation” and asking staff to “strictly follow the travel and public health instructions issued by the Chinese authorities.”

D. Tourism

Even though the Canadian government has decided not to restrict Chinese travel to Canada, the Embassy of Canada has still closed all visa application centers in China. Combined with quarantines imposed by the Chinese government, a negative shock to Canada’s tourism is likely. As reported by Global News, “tour companies and hotels in destinations popular with Chinese tourists, like Banff, Jasper and Yellowknife, are starting to see cancellations after a new form of virus that has led to mass quarantines.” In 2019, there have been over 750,000 tourists visiting Canada from China. According to Figure 14, Chinese tourist numbers tend to be low between December and May, which is followed by a summer peak from June to September. If the current epidemic is fully contained by May or June like SARS, Canada’s tourism may still have the opportunity to fill the normal strong demand between June and September.

Figure 13. Canada’s Exports in Agricultural Products to China (Canadian dollars, million)

