

COVID-2019 IMPACT: APRIL 7TH UPDATE

April 7, 2020

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TECHCET Supply-Chain Impact Summary (TSIS) provides an update on the coronavirus (COVID-19) situation. Information includes trends pertaining to the spread of the virus and the impact on economic activity.

1. SUMMARY

The recent TECHCET COVID-19 survey confirmed logistic issues are emerging as a concern to CMC member companies and the semiconductor industry at large.

Information with regard to impact on the supply-chain, 30% of IDM survey respondents indicated that wafer starts are starting to be negatively impacted. 31% of materials supplier surveyed indicated that they are having supply-chain disruptions from their raw material suppliers. and all non-essential personnel are required to work from home.

Industry contacts indicate that materials ordering activity is also normal, and in some cases better than usual. Discussions lead us to believe that BCP protocols have been implemented by device makers (and OEMS), so these companies may be building up material supply in anticipation of future, unknown disruptions because of the COVID-19 situation.

The global spread of the coronavirus outside of China continues to worsen as expanded availability to testing shows increasing cases in other countries and regions, especially in Europe and the U.S. As noted in last week's update, governments around the world have instituted border closures, travel restrictions, and community shutdowns. It is now recognized that the global economy experience a contraction in the first half of 2020 given the restricted economic activity caused by the response to address the COVID-19 virus pandemic.

Industry contacts in China reaffirm the improving work situation there as more employees are returning to the office to work though employees wear facemasks at work.

In the past week, there have been news reports of additional closures of facilities and restrictions in other regions within Mainland China so to maintain control of potential outbreak clusters.

Korea continues to take precautions with work from home policies still in place, however industry sources indicate that in-person meetings are happening on a limited basis.

On April 1st, the Malaysian government extended its anti-COVID19 measures until April 14th. These measures include limits on travel within Malaysia and government restrictions on what type of businesses could continue operations. As noted in previous COVID updates from TECHCET, exemptions have been made for fabs and assembly & packaging operations in Malaysia, and other companies have applied and received exemptions too as long as they follow government protocols for employee health and safety. A potential issue for the semiconductor

industry is that other companies (material suppliers, machine shops, service providers, etc.) in the industry supply chain have not received exemptions and this could cause some constraints in electronics manufacturing.

On April 3rd, Singapore announced the adoption of stricter , as Singapore adopts stricter safe distancing measures to stem the transmission of Covid-19 (per the Strait Times): closing all non-essential businesses and workplaces beginning on April 7th. “Semiconductor, Pharmaceutical, and Biomedical Science companies and their suppliers” are exemption from the new government mandate.

[\(https://covid.gobusiness.gov.sg/essentialservices/manufacturing/\)](https://covid.gobusiness.gov.sg/essentialservices/manufacturing/).

In Japan, a State of Emergency because of Covid-19 was declared on April 7th and covers seven prefectures. Abe's news conference followed the official declaration of a state of emergency earlier in the day. The declaration will last through May 6th (End of the Golden Week holiday) and covers Tokyo, Saitama, Kanagawa, Chiba, Osaka, Hyogo and Fukuoka prefectures.

Expansion of the COVID-19 virus is impacting business and commerce across Europe. In the past several days, Spain has become the European country with the largest number of cases on the continent. For Italy the rate of increase in reported new cases has been declining over the past several days. Cases are increasing in other countries including Germany, France, The Netherlands, Switzerland, and the United Kingdom.

Mandated shelter in place orders have become more prevalent in various U.S. states, with only a handful of states making it optional. The virus first appeared on the coastal areas including NY, Seattle, and San Francisco, but the number of cases has now grown to encompass every major city in the US. Testing is expanding in the US as noted by the increased in positive test. New York, Michigan, and Louisiana are hot beds for the virus. The situation is changing day to day.

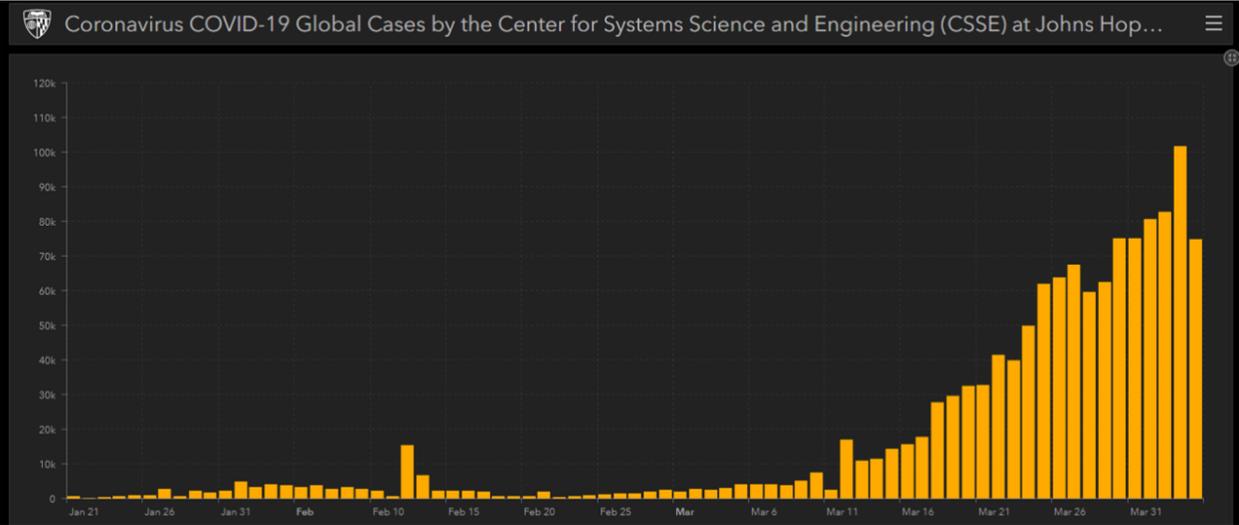
2. GLOBAL RATE OF INFECTION

The rate of new cases within China has slowed, though the crisis is growing in Europe and the U.S. continues to grow. Source: Johns Hopkins University.

Figure 1 shows total new cases reported each day. The observed increase over the past week is a function of

1. the spread of the COVID-19, especially outside of Asia
2. the increase availability of testing

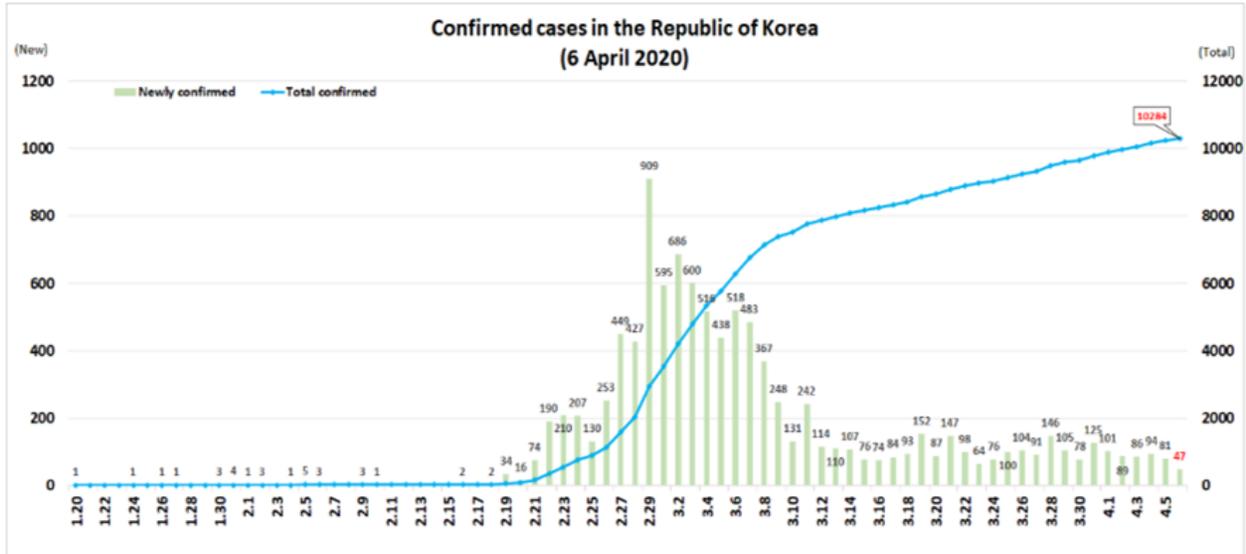
Figure 1: Coronavirus COVID-19 Global Cases Reported



Source: <https://gisanddata.maps.arcgis.com/apps/opsdashboard/index.html#/bda7594740fd40299423467b48e9ecf6>

Figure 2 highlights the reported new cases by the Korean CDC as of April 6th. New cases have trended below 100/day for the past five days. Of the 10,284 positive cases reported in South Korea, almost 6,600 have been discharged from isolation; while another 3,500 remain in isolation. The Korean CDC officials have been acting upon an outbreak of small clusters over the past ten days including in Seoul and Gyeonggi province.

Figure 2: Coronavirus COVID-19 Daily New Cases and Daily Reported Recovery in South Korea



Source: <https://www.cdc.go.kr/board/board.es?mid=a30402000000&bid=0030>

South Korea has implemented strict measures in screening and testing of visitors to that country. Although the cases per week are much lower than a month ago, industry sources indicate that new centers of infection have recently been identified (~3/20) which are now being addressed by healthcare workers and local government.

3. GLOBAL ECONOMIC INDICATORS

A typical indicator of economic trends, is the London Metals Exchange (LME) daily pricing for key metals used in manufacturing and construction. The LME is viewed as a measure of economic activity. The index declined dramatically over the past two weeks, dropping below \$5000/tonne on March 18th. LME Copper pricing has been trending in the \$4750/tonne range for over one week, reflecting the growing uncertainty because of the coronavirus and prospects for a deepening economic decline for 2020, as see in the following figure.

Figure 3: Daily LME Copper Metal Pricing Through April 2nd 2020



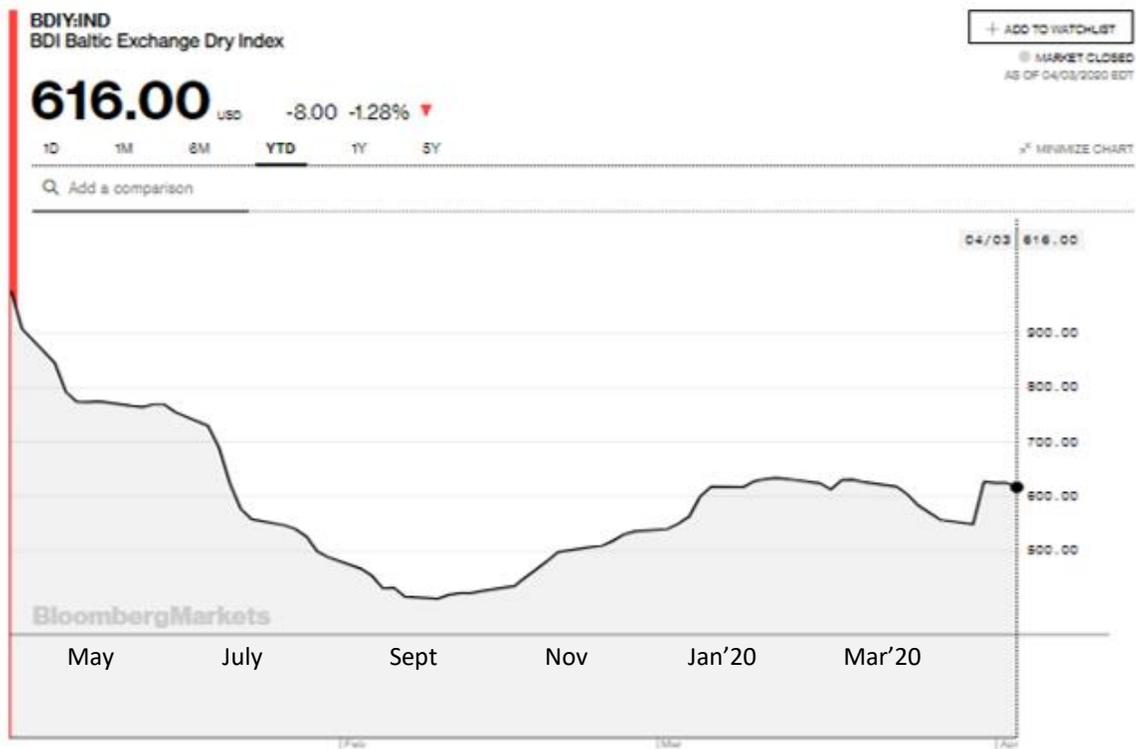
Source: <https://www.lme.com/Metals/Non-ferrous#tabIndex=0>

In addition to LME copper pricing trends, crude oil pricing is another measure of economic strength/growth (though intertwined with the complexes of geopolitics). Average crude oil pricing in 2019 was in the \$50 to \$60/barrel range, while in recent weeks it has dropped below \$30/barrel. With reduced demand related to travel and economic activity, and with low pricing for crude and natural gas producers, a consequence will be potentially lower petroleum refining and chemical production over the coming months. Depending on the severity of this trend, it will have an impact on the pricing and availability of key chemicals that depend on crude oil including H₂SO₄, HF, and solvents.

The Baltic Dry Index (BDI), generated by the London-based Baltic Exchange, is reported as a daily bellwether of trade and economic activity. The index measures the demand for shipping capacity. The demand for shipping will vary with the amount of cargo that is being traded (supply & demand) or moved in and out of various markets. In short, the BDI measures the daily demand for shipping capacity.

The latest index shows a slight uptick. However, it is expected that it will cycle up and down as the world slowly recovers from the virus. The demand for shipping capacity has not yet recovered to pre-January levels, and is not expanding as the COVID-19 situation spreads globally.

Figure 4: Daily Baltic Dry Index Through April 3rd 2020



Source: <https://www.bloomberg.com/quote/BDIY:IND>

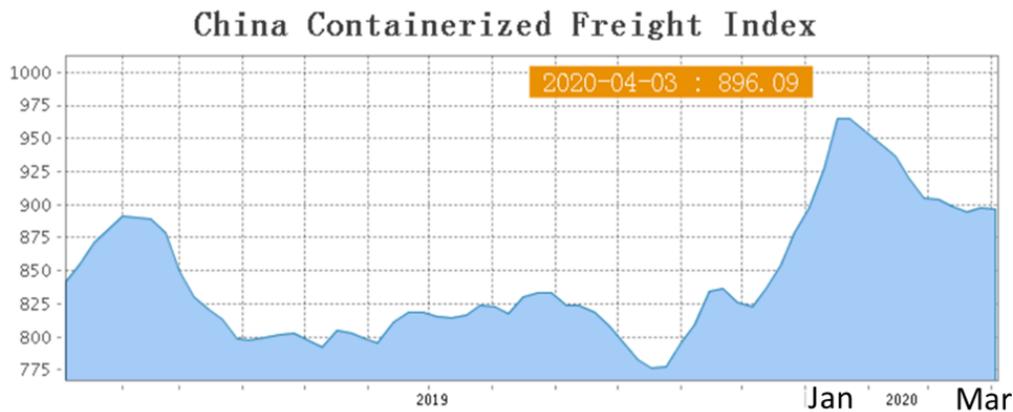
4. CHINA FREIGHT TRANSPORT TRENDS AND METRICS

China's shipping metrics include various indexes tracked by the Ministry of Transport of the People's Republic of China and that are updated weekly. The rate of decline for indices is slowing.

CHINA (EXPORT) CONTAINERIZED FREIGHT INDEX (CCFI)

This index represents export containers for the ports in China. It is a metric which indicates the fluctuation in shipping price per container. The April 3rd data shows another slight decline. Although China businesses are starting to resume operations, they appear to be far from normal. The new normal includes face masks and shifts in staffing to minimize the chance for another outbreak, as cases still exist in most major provinces.

Figure 5 China Export Containerized Freight Index (CCFI) Trends Chart



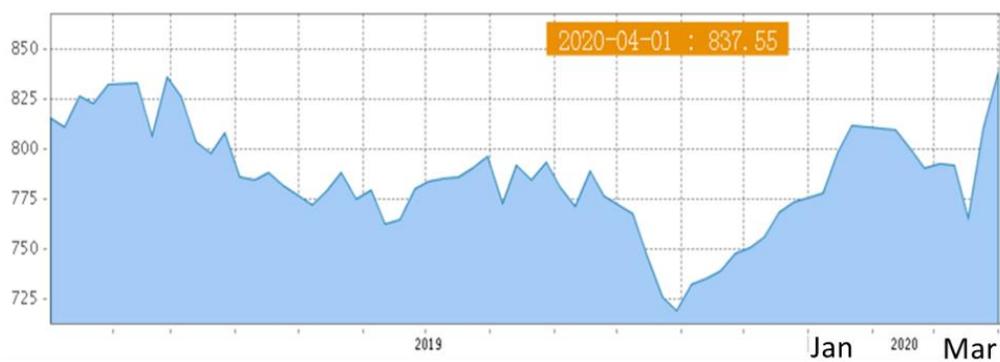
CCFI Export (Containerized Freight Index - Shipped from China)		
Date	Comprehensive Index	Weekly Growth (%)
4/3/20	896.09	-0.2%
3/27/20	897.69	0.4%
3/20/20	894.23	-0.5%
3/13/20	898.44	-0.6%
3/6/20	904.24	-0.1%
2/28/20	905.4	

Source: Shanghai Shipping Exchange (updated on 04/03/2020), <https://en.sse.net.cn/indices/cbfinew.jsp>

CHINA (IMPORT) CONTAINERIZED FREIGHT INDEX (CCFI)

Imports to China continue increasing over the past two weeks. This CCFI index is for import containers for Chinese ports. Similar to the export CCFI, this index is a relative indicator of shipping prices of containers being imported to China. There was a sharp decline in the index reported on March 18th, though by the March 25th report there was a sharp uptick in the index. The increase indicates more freight arriving into China as economic activity begins its recovery from constraints reported in February. **On a regional basis, the import index exhibited the biggest improvement, attributed to imported containers from the Europe and East Coast of the U.S.**

Figure 6 China Import Containerized Freight Index (CCFI)



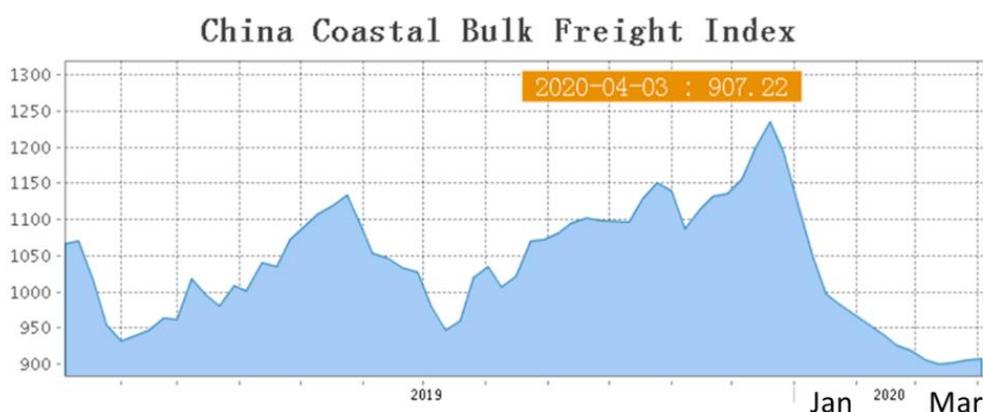
CCFI Import (Containerized Freight Index - Shipped to China)		
Date	Comprehensive Index	Weekly Growth (%)
4/1/20	837.55	3.4%
3/25/20	809.86	5.8%
3/18/20	765.44	-3.3%
3/11/20	791.72	-0.1%
3/4/20	792.49	0.3%
2/26/20	790.21	

Source: Shanghai Shipping Exchange (updated on 04/01/2020): <https://www.sse.net.cn/index/singleIndex?indexType=cicfi>

CHINA COASTAL BULK FREIGHT INDEX (CBFI)

Shipping between ports within China appears to remain unusually low although net positive. This index is a measure of the transportation of dry bulk goods between the different ports within China. In other words, this is an intra-China shipping index, and is based on the average revenue and average price of shipping. The low levels are compatible with reports of continued COVID-19 local restrictions. We have heard reports of some companies working in split shifts to minimize the number of people within a given facility.

Figure 2: China Coastal Bulk Freight Index (CBFI) Trends Chart



CBFI (Costal Bulk Freight Index - Intra China Port Shipping Index)		
Date	COMPOSITE INDEX	Weekly Growth (%)
4/3/20	907.22	0.2%
3/27/20	905.34	0.4%
3/20/20	901.34	0.0%
3/13/20	901.18	-0.4%
3/6/20	905.09	-1.5%
2/28/20	918.56	

Source: Shanghai Shipping Exchange (updated on 04/03/2020), <https://en.sse.net.cn/indices/cbfinew.jsp>