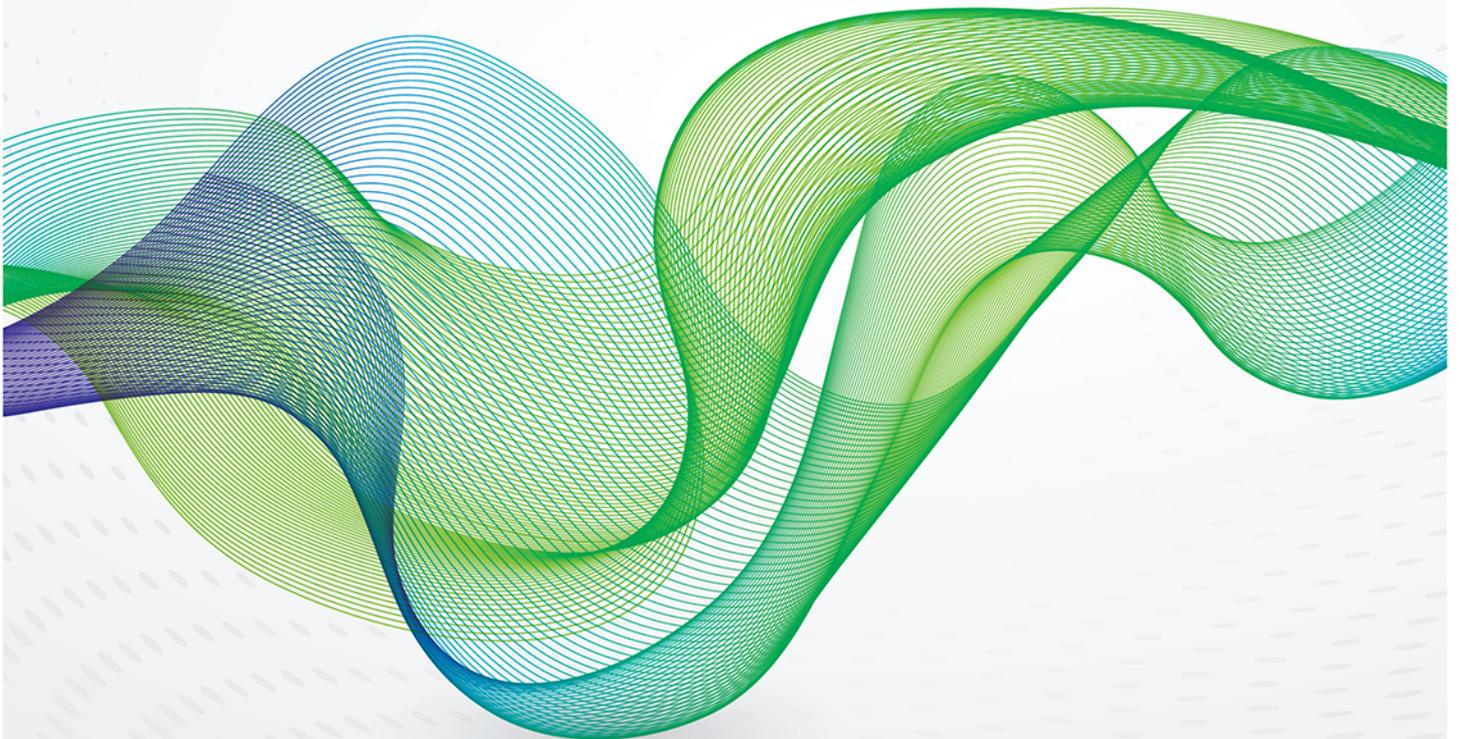




THE OXFORD
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STUDIES

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When China sneezes...



2020 looked to be off to a good start for China. Macroeconomic data pointed to stabilisation as manufacturing activity in December expanded for the second straight month, industrial production growth accelerated, and retail sales continued to rise. Fixed asset investments in December surged and the 'Phase One' deal that was signed in Washington on 15 January 2020 supported market sentiment. But as the Year of the Pig ended, celebrations to welcome the Year of the Rat were marred by the outbreak of the novel coronavirus (2019-nCoV). Beijing's efforts to control the spread of the virus, followed by the World Health Organisation's declaration that the novel coronavirus is an international public health emergency are set to weigh on economic activity as well as energy demand through H1 20. Assessing the economic, and therefore energy, impact of the coronavirus is no easy feat. Comparisons with the SARS outbreak in 2003 offer only limited insights as China's economic structure and policy trajectory have changed dramatically and its global weight increased.

Preliminary conclusions, however, suggest that China's oil demand in Q1 20 could fall by at least 0.50 mb/d y/y, with the lost demand weighted toward jet and gasoline due to the heavy travel restrictions in place. Diesel and natural gas demand are also set to fall in Q1 20 but the medium-term impact will depend mainly on the length of the industrial shutdowns and the provinces that remain under quarantine. Activities across the country could resume already by the end of Q1 20, but Hubei province—the epicentre of the contamination which is also a large industrial hub—could be affected for longer. That said, in terms of diesel demand, industrial use has been falling steadily alongside the economic rebalancing with freight now playing a larger role in supporting diesel use. With consumers turning increasingly to online shopping, demand for both plastics in packaging and diesel for transport could offset some of the slowdown associated with weaker economic activity. Moreover, the one-off hit to transportation demand during the holiday season cannot be recovered later, but industrial activity can make up for earlier losses.

Nonetheless, as China's domestic end product demand plummets in the next month, refiners will need to export excess products, suggesting a strong uptick in outflows, especially given that they had stocked in preparation of the Lunar New Year. Moreover, refiners are set to cut runs by as much as 2 mb/d in February and March, suggesting that crude imports are also set to plummet. A growing concern in the immediate term for Chinese buyers is that shippers will shun China as a delivery location. At the same time, if run cuts and rising product exports tighten prices domestically, refiners will need to moderate planned run cuts and exports, so it will be important to track domestic prices.

Natural gas demand will also be dented in the near term by the industrial outages just as travel restrictions are also making LNG trucking more complicated. Moreover, given that inventories at the LNG import terminals tend to be high ahead of the Lunar New Year holiday, the reduced demand currently is leading buyers to defer cargoes or even invoke force majeure. Of China's 22 LNG import terminals, 13 are in provinces where holidays have been extended. So while both oil and gas demand are set to soften considerably in Q1 20, with some weakness persisting in Q2 20 (assuming that the outbreak is brought under control within weeks), the question will increasingly be: how strong will the H2 20 recovery be? The government's pledged goal to double per capita incomes from 2010 levels would require a massive stimulus that could prove detrimental for China's medium-term growth.

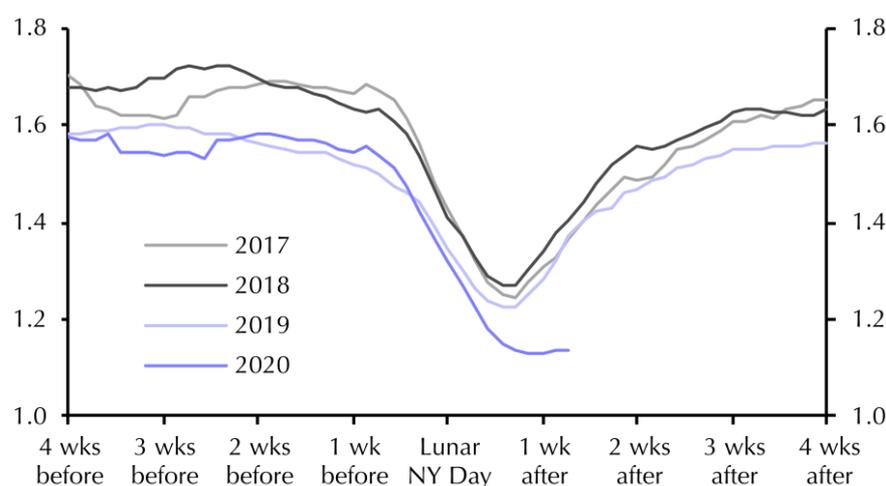
The Chinese economy grinds to a standstill in late January

After the novel coronavirus outbreak was officially confirmed, its epicentre, Wuhan and surrounding cities in Hubei province went into lockdown. All but essential industries are shut and most of the local population remains at home. Hubei province accounts for close to 5 per cent of China's GDP and Wuhan, a city of 11 million known as the Chicago of China, is a large manufacturing base for traditional industries such as automobiles as well as new hi-tech industries. Wuhan alone accounts for 1.6 per cent of China's economic output. As the outbreak continues to evolve, Hubei province remains the hardest hit. According to Johns Hopkins CSSE online dashboard¹, of the 20,704 confirmed cases on 4 February 2020, 20,492 were in mainland China and 13,522 in Hubei province. 414 of the 427 deaths recorded were also in Hubei.

¹ <https://gisanddata.maps.arcgis.com/apps/opsdashboard/index.html#/bda7594740fd40299423467b48e9ecf6>

The province will therefore likely remain the most heavily constrained in terms of industrial activity and transport flows. At the same time, given that the 2019-nCoV was officially confirmed and announced several weeks after it reportedly started², and just before the Lunar New Year holidays, millions of people had already left Wuhan to return to their native provinces, allowing the virus to spread throughout the country. As a result, travel bans and quarantines were rapidly introduced throughout the country. A large number of public events to celebrate the Lunar New Year were cancelled, while the week-long holiday, which began on 25 January, has been extended. Financial markets will remain shut until at least 8 February and manufacturing hubs have postponed the return to work of millions of migrant workers. Restaurants and commercial centres are also likely to be shut, or see extremely low flows. Anecdotal reports suggest that traffic in most Chinese cities has thinned dramatically. In Shanghai, for example, live traffic monitoring services indicated that congestion averaged between 0–5 per cent between 24 and 31 January, when it usually averages around 30–40 per cent (Figure 1). In early February, 24 provinces, municipalities and cities, accounting for more than 80 per cent of China’s GDP, have said businesses should not restart operations until the second week of February at least³. At the time of writing, much of the economic activity and transport bans could well remain in place through most of February.

Figure 1: Average Road Congestion across 100 Cities in China (ratio of peak to non-peak travel times, 7-day average)



Source: Capital Economics

Known nCoVs and known unknowns

But when attempting to assess the impact, the first question markets must grapple with is how long the lockdowns and quarantines will last and how disruptive this could prove for the economy and in turn, for energy demand. Yet the numerous uncertainties in the current situation complicate the analysis. First, the spread and lethality of the epidemic—which remain unclear—directly affect economic activity. The new virus appears to be more contagious than seasonal flu and similar to the pathogen behind the severe acute respiratory syndrome (SARS) outbreak in 2002 and 2003. Based on the available infection figures and the mortality rate from China’s National Health Commission, lethality seems to be at around 2 per cent. A closer look at the data, however, suggests it could be lower. If removing Hubei—where the mortality rate is around 3 per cent or Wuhan where it is around 6 per cent—from national level data, the mortality rates are under 0.5 per cent. To be sure, the official statistics are likely underreporting both

² Chris Buckley, Steven Lee Myers, “As New Coronavirus Spread, China’s Old Habits Delayed Fight”, *New York Times*, 1 February 2020, <https://www.nytimes.com/2020/02/01/world/asia/china-coronavirus.html>

³ Evelyn Cheng, “More than half of China extends shutdown over virus”, CNBC, 1 February 2020, <https://www.cnbc.com/2020/02/01/coronavirus-more-of-china-extend-shutdown-accounting-for-80percent-of-gdp.html>



the number of infected cases and deaths, but are also likely missing milder, non-lethal cases that are not being prioritised by the already over stretched hospitals⁴. But if the lethality rate is indeed around 0.5 per cent, then 2019-nCoV is closer to the seasonal flu, or to swine flu than it is to SARS, which had a fatality rate of 10 per cent⁵.

The next question is how contagious the 2019-nCoV is, and can it spread during the incubation period and before patients develop symptoms? There are no definitive answers to either of those questions, although most studies estimated that 2 to 2.5 people on average are infected by one patient, which is higher than the flu but lower than SARS. So, controlling the epidemic seems to rely on rapid identification and isolation⁶. Assuming that China's containment measures prove effective and that the fatality rates are as suggested above, the number of confirmed cases is expected to increase exponentially in a matter of weeks, but the epidemic could peak in mid- to late-February. This seems to be the prevailing view in China based on the assessment of Zhong Nanshan, one of China's most renowned respiratory scientists who fought SARS, although he had originally suggested the virus could peak by around 8 February⁷, amending it later to around 16 February⁸. Other overseas experts have reportedly suggested that the outbreak will take longer to peak, especially since that are no vaccines for the virus⁹, suggesting that a peak between May and June would be more probable¹⁰. Markets will therefore need to watch the transmission rates over the next few weeks to determine which scenario is more realistic.

Assuming a peak in February...

What we do know, however, is that Beijing's steps to contain the virus have brought the domestic economy to a virtual standstill. As such, it is already clear that the scale of the response will have a meaningful impact on economic growth and the initial hit to activity will be much larger than during SARS. And given China's role in the global economy, so too will the knock-on effects. But if the Chinese government's aggressive containment efforts are effective over the next two to three weeks, then the downside impact will be overwhelmingly contained in Q1 20. The working assumption in China seems to be, at the time of writing, that the virus will peak in mid-February and will be brought under control in March, allowing activity to return to normal in April. This does, however, suggest muted economic activity for another month. Based on this, estimates by economists at the Chinese Academy of Social Sciences, a government affiliated think-tank, expect GDP growth to fall below 5 per cent in Q1 20 and recover thereafter.

This may be a somewhat benign view and the real economic impact will inevitably depend on the length of the shutdown and the provinces involved. This will also determine the extent to which global supply chains will be disrupted. In addition, international air travel is now taking a sharp dip, following the

⁴ See Houze Song, Economic Impact of Coronavirus Will Likely Be Modest, 29 January 2020, <https://macropolo.org/economic-impact-of-coronavirus-likely-modest/>

⁵ For an interesting chart of the fatality rate and how it compares to other diseases, see How Bad Will the Coronavirus Outbreak Get?, New York Times, 1 February 2020, <https://www.nytimes.com/interactive/2020/world/asia/china-coronavirus-contain.html?action=click&module=RelatedLinks&pgtype=Article>

⁶ "Here's What Scientists Do And Don't Know About Wuhan Coronavirus So Far", AFP, 29 January 2020, <https://www.sciencealert.com/here-s-what-scientists-do-and-don-t-know-about-wuhan-coronavirus-so-far>

⁷ Zhong Nanshan: The epidemic could peak in a week or ten days" (Chinese), Caixin, 28 January 2020, <http://www.caixin.com/2020-01-28/101509118.html>

⁸ "Zhong Nanshan amends prediction for coronavirus peak", China Daily, 2 February 2020, <https://www.chinadaily.com.cn/a/202002/02/WS5e36ddafa310128217274381.html>

⁹ Chao Deng, Jeremy Page, "Experts Race to Figure Out How Contagious the Coronavirus Is", Wall Street Journal, <https://www.wsj.com/articles/experts-race-to-figure-out-how-contagious-the-wuhan-virus-is-11580672317>

¹⁰ Laurie Chen, "China's 'demon' virus leaves health experts at odds on when infection rate will slow", South China Morning Post, 29 January 2020, <https://www.scmp.com/news/china/society/article/3048020/chinese-experts-say-wuhan-coronavirus-outbreak-will-not-last>; Donald G. McNeil Jr., "Wuhan Coronavirus Looks Increasingly Like a Pandemic, Experts Say", New York Times, 2 February 2020, <https://www.nytimes.com/2020/02/02/health/coronavirus-pandemic-china.html?action=click&module=Top%20Stories&pgtype=Homepage>

WHO's declaration that the coronavirus outbreak is a global emergency, even though it did not recommend any trade or travel restrictions¹¹.

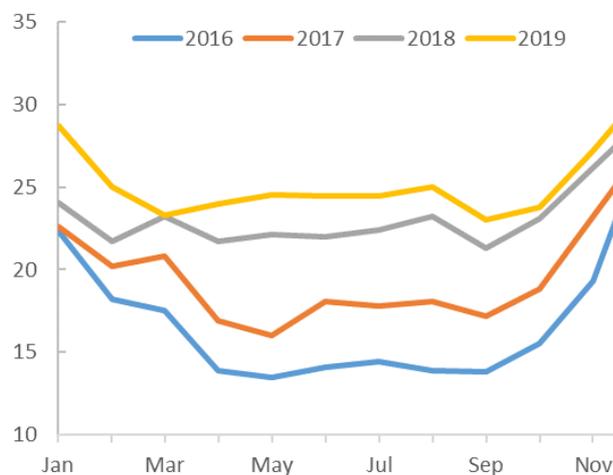
At the very least then, China's economic activity and energy demand must be adjusted for a sharp drop in activity over these two weeks, followed by a subdued outlook through February and even March. The first sectors to be impacted by the virus within China were travel and hospitality—weighing on gasoline and jet demand—but as manufacturers shut their facilities, industry is the next to suffer, weighing on diesel. Taking the more moderate estimates, of a demand hit of 1 mb/d in February, Q1 20 demand could still end up flat y/y (at around 12.7 mb/d) with total oil demand this year up by around 0.3 mb/d from 13 mb/d in 2019. But when factoring an average 70 per cent decline in total passenger activity and a 50 per cent reduction in freight activity, the demand impact in early February could be as high as 3-4 mb/d, accounting for more than a quarter of December 2019 demand levels (estimated at 13.5 mb/d - Figure 2), extending to March as well, albeit at a lower rate. That, in turn, would bring Q1 20 oil demand lower y/y by at least 0.5 mb/d. With a strong recovery starting in late Q2 20, oil demand in China could still increase by around 0.2-0.3 mb/d in 2020, compared to an 0.55 mb/d increment in 2019. While that is our base case for now, the risks are firmly to the downside and a more protracted outage (or sharper deceleration through H1 20) could leave oil demand growth this year at 0.10 mb/d y/y.

Figure 2: Implied product demand, mb/d



Source: Customs, NBS, OIES

Figure 3: Gas demand, bcm



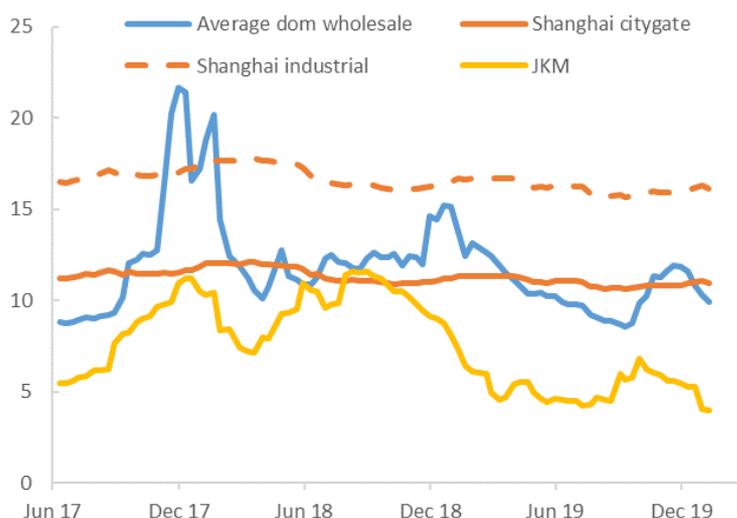
Source: Customs, NBS, OIES

The economic hit will also weigh on gas demand. While the Lunar New Year is a weak season for industrial demand and even transport, to the extent that natural gas is used increasingly in freight, a weak industrial complex through February and parts of March could lead to a 10-12 bcm demand destruction (see Figure 3). A rebound in activity, especially if there are gas use targets to be met could offset this weak and lead to still-strong demand growth for the year. For now, though, the Chinese gas market is well supplied with reports of buyers deferring cargoes and invoking force majeure on LNG, highlighting the growing strain at the ports and the logistical challenges. The choice of invoking force majeure could however augur a slew of contract renegotiations given the majors' hefty losses last year and falling JKM spot prices (see Figure 4). Truck loadings from the terminals have fallen and while weak spot LNG prices could spur some buying from private importers, volumes are still likely to be limited. But as domestic production continues and there has not been a cold spell to support

¹¹ WHO, "Statement on the second meeting of the International Health Regulations (2005) Emergency Committee regarding the outbreak of novel coronavirus (2019-nCoV)", 30 January 2020, [https://www.who.int/news-room/detail/30-01-2020-statement-on-the-second-meeting-of-the-international-health-regulations-\(2005\)-emergency-committee-regarding-the-outbreak-of-novel-coronavirus-\(2019-ncov\)](https://www.who.int/news-room/detail/30-01-2020-statement-on-the-second-meeting-of-the-international-health-regulations-(2005)-emergency-committee-regarding-the-outbreak-of-novel-coronavirus-(2019-ncov))

considerable heating demand, the supply situation will likely be more than enough to meet the slackening demand, weighing on Chinese LNG takes.

Figure 4: Domestic gas prices, JKM, \$ per mmbtu



Note: Domestic wholesale prices as assessed by NBS every ten days; Variations in the Shanghai citygate benchmark and industrial citygate prices are due to changes in RMB/USD conversion values

Source: NBS, NDRC, Platts, OIES

In the interim, the changes to consumption patterns (a sharp decline in what is typically peak demand for transport fuels) will also entail substantial shifts in crude buying and product outflows.

...run cuts will lead to large product exports in H1 20

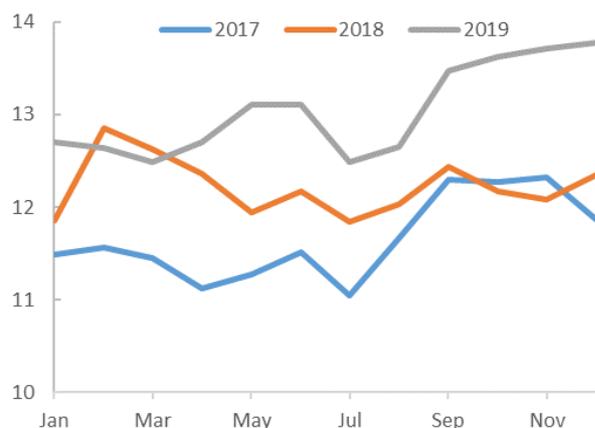
A combination of softer than expected demand growth and ample product stocks—given that refiners were preparing for peak demand during the Lunar New Year—are leading China’s refiners to cut throughput levels. Run rates in Shandong have already reportedly fallen from close to 70 per cent in December to under 50 per cent in February. A number of refiners that shut down for the Chinese New Year have failed to resume operations as transport restrictions and a shortage of truck drivers limit their ability to sell products, while other independents have been discounting products to reduce their inventories. The independents’ run cuts alone would account for 0.7-0.8 mb/d of lost throughputs, with Sinopec also reportedly cutting 0.6 mb/d of runs initially¹², although reductions are likely to be higher. PetroChina is mulling cuts of around 20 per cent and with CNOOC and Sinochem also likely to reduce throughputs, run cuts are set to rise to 1.5-2 mb/d in February (on December 2019 levels, see Figure 5) and depending how domestic prices fare, could extend to March too (assuming domestic costs do not spike due to localised shortages).

Product exports are therefore likely to rise in the coming months, especially gasoline and jet, demand for which has likely been the hardest hit. The impact on diesel demand is likely to be more muted given that it is led by road freight, rather than industrial demand, and unlike in 2003 when China was in the middle of a resource-intensive industrialisation, road diesel demand has been weakening already since

¹² Chen Aizhu, Muyu Xu, “China’s independent refiners slash operations as virus hits fuel sales”, 3 February 2020, <https://www.reuters.com/article/us-china-health-refineries-shandong/chinas-independent-refiners-slash-operations-as-virus-hits-fuel-sales-idUSKBN1ZX0V4>

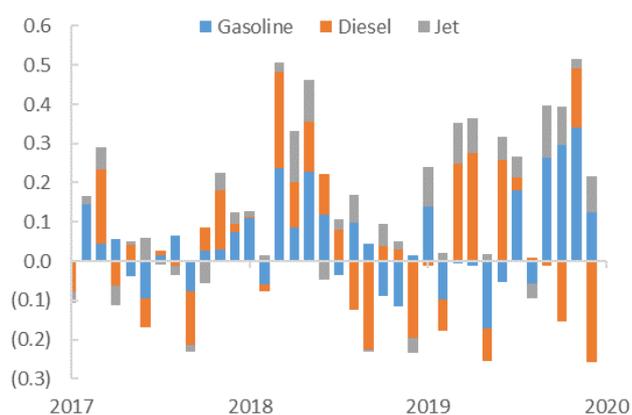
2019. Government support for infrastructure projects later this year and increased freight demand from e-commerce could offset some of the demand destruction.

Figure 5: Refinery runs, mb/d



Source: Customs, NBS, OIES

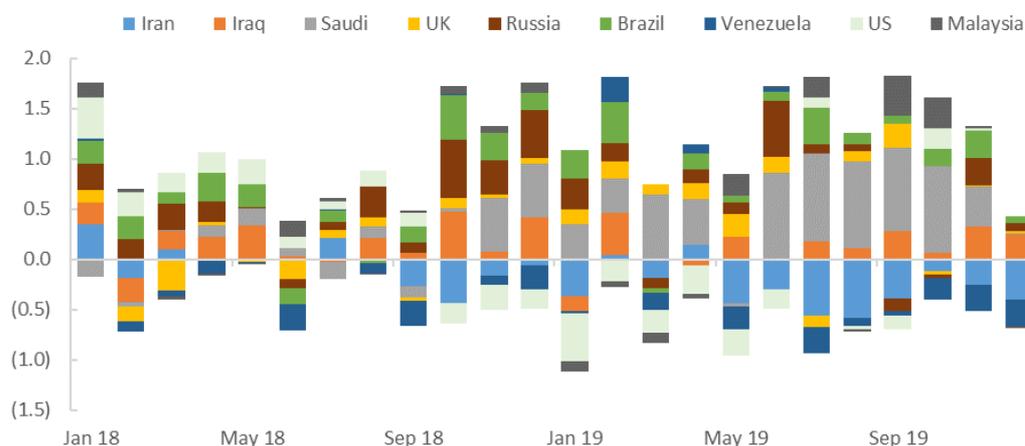
Figure 6: Product exports y/y, mb/d



Source: Customs, NBS, OIES

At the same time, China's appetite for crude is likely to wane too. Refiners are growing concerned that shippers will shun Chinese ports for fear of contagion, while a depreciating currency will weigh on imports. In addition, the short term overhang in both crude and products is exacerbated by the timing of the outbreak: The independent refiners had stocked up on crude at the end of 2019, seeking to maximise import licenses, causing crude to build in port storage tanks and creating a backlog of vessels waiting at the Shandong ports. So with reduced appetite for crude, Chinese buyers are unlikely to return to the market before April, assuming that the epidemic is under control. Some opportunistic buying, to take advantage of low crude costs could occur but that will likely be limited given the extreme uncertainty regarding the outlook for demand. If anything, for cash strapped independents, the coronavirus is an opportunity to declare force majeure on cargoes and avoid lifting committed crudes. The floating cargoes offshore Chinese ports in January due to overbuying could now be exacerbated by refiners wary of lifting.

Figure 7: Crude imports by country, mb/d, y/y change



Source: China customs

Lower crude imports also mean that China will struggle to fulfil its pledges to purchase US crude (among other commodities) as part of the 'phase one' deal. Already a number of Chinese buyers are reportedly requesting that sellers defer or cancel their deliveries, impacting West African crudes—with Unipet

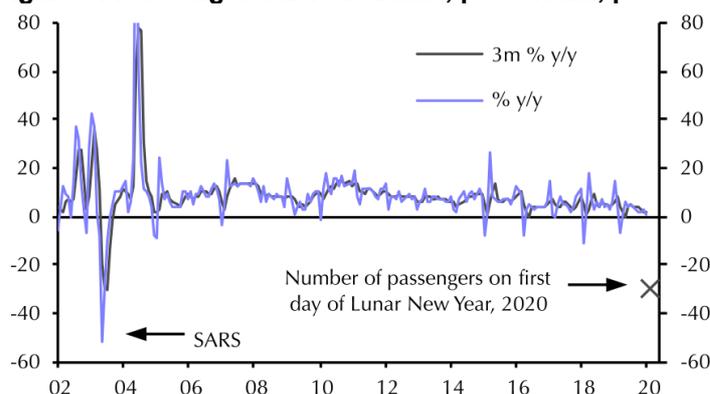
reportedly reselling Angolan grades—as well as Russian ESPO, Iraqi Basrah Light, Oman and Brazilian Lula. The latter is particularly sensitive to changes in demand in Shandong as Brazilian grades have become a favourite among the independents, alongside Norway’s new Johan Sverdrup. The state-owned majors, for their part, are likely to prioritise their term contracts, suggesting that arrivals of Saudi crudes will remain the strongest, although refiners are still likely to opt for the lower-end of their contractual obligation.

The elusive H2 stimulus

Many analyses have drawn on the SARS outbreak to assess the impact of the current epidemic both in determining the extent of the disruption and predict the strength of the recovery. During the SARS outbreak, China’s economic growth dipped from 11.1 per cent in the first quarter of 2003 to 9.1 per cent the following quarter. With the outbreak contained, growth recovered to 10 per cent in the third quarter. Back then, efforts to contain the spread of the virus led to a sharp but short disruption followed by a recovery thanks to government support and pent up demand. People also shunned public transport and opted to drive more, which led to a strong rebound in car sales.

But even these lessons may have limited bearing in today’s China. First, interconnections within China have grown dramatically. In 2019, 659 million passengers travelled on domestic flights and 3.38 billion by rail compared to 87 million air passengers in 2003 and 972 million by rail. This year, railway transport on the first day of the lunar new year was lower y/y by 42 per cent (compared with the first day of the lunar new year in 2018), according to the transport ministry while passenger flights were down by an estimated 42 per cent y/y (Figure 8). Back in May 2003, the peak month of the SARS outbreak, rail passenger traffic fell by 57 per cent y/y and road passenger traffic was lower by 45 per cent y/y. But the negative impact on transport fuels is considerably higher in absolute terms compared to 2003 while, given the increased interconnections within China and the rapid spread of the 2019-nCoV, industrial quarantines and transport restrictions large swaths of the country. Back in 2003, the curbs were mainly in Southern China.

Figure 8: Passenger traffic in China, person-km, per cent y/y change



Source: Capital Economics

The knock-on effect on economic activity is therefore much higher, especially given the government’s ability to harness artificial intelligence and big data to monitor population movements and enforce quarantines¹³.

Second, the Chinese economy now relies more heavily on consumption than it did in 2003. Back then, industries such as retail, restaurants, entertainment and tourism, which are the most affected by government-imposed bans to contain the outbreak, accounted for 42 per cent of GDP. Today, service industries account for 54 per cent of GDP. In addition, much of the growth after SARS peaked was related to pent up demand being unleashed (with government support). This time around, the travel

¹³ Liza Lin, “China Marshals Its Surveillance Powers Against Coronavirus”, Wall Street Journal, 4 February 2020, <https://www.wsj.com/articles/china-marshals-the-power-of-its-surveillance-state-in-fight-against-coronavirus-11580831633>

and spending that would have occurred during the New Year festivities will be harder to recoup. Indeed, car sales, that were on a strong growth trajectory back in 2003, were slowing before the 2019-nCoV hit. Sales could pick up a little as urban dwellers shun public transport, but incomes are not rising as fast as they did in 2003 and government policies to restrict tail-pipe emissions alongside congestion on Chinese roads still act as deterrents for large increases in car sales. At the same time, Hubei province is home to around 9 per cent of China's carmakers and industrial restrictions there could last longer than those in other provinces.

Finally, as China's weight in global supply chains has increased, so too has the global impact of industrial curbs. Back in 2003, China was the world's sixth largest economy, accounting for 4 per cent of global GDP. Today it is the second largest, accounting for 17 per cent of the world's GDP. Its share of global trade has more than doubled from 5.3 per cent in 2003 to 12.8 per cent in 2019. Moreover, the number of outbound tourists increased from 16.6 million trips in 2003 to 149.7 million in 2018. And given that China also accounts for 20 per cent of global manufacturing, extended shutdowns in China impact supply chains around the world. Shortages in auto parts or semiconductors due to the quarantines in China will weigh demand for consumer goods in developing countries, curbing demand for the fuels to package and transport them.

So not only is the lockdown more severe and its impact wider reaching, but the recovery may not be as strong. Back in 2003, China had just joined the World Trade Organization and was harnessing its seemingly limitless supply of low-wage workers to produce consumer goods for sale both in China and overseas. China was at the beginning of a growth cycle whereas today it is facing a structural slowdown. The government resisted a strong stimulus to deal with the impact of the US-China trade war as the medium-term costs associated with a strong stimulus (more bad debt, for example) have made it a less appealing policy choice for the government.

That might change this year. As we highlighted in our key themes for 2020¹⁴, once the spread of the virus is controlled, will Beijing prioritise its growth targets for the year? Going into 2020, markets had expected China to issue a GDP growth target of 6 per cent in order to allow the Chinese government to meet its pledge of doubling the size of the economy between 2010 and 2020. Market consensus was that China would just about manage to meet that growth target, but now, the longer the lockdown, the harder it will get.

Once the contagion has peaked, Beijing could opt to spur growth through property and industrial investment but these are already saddled with excess capacity and bad debt, suggesting limited returns from such a policy choice. Moreover, there can be a lag from the minute the financing is committed to the time projects break ground. Beijing will be able to introduce more fiscal easing through tax cuts, mainly for the affected sectors and small, private companies, as well as some infrastructure investment to help offset weaker consumption. The problem with infrastructure investments in 2019 was that local governments were becoming more selective on their spending and the massive funding made available to them went to repay debt rather than spur growth. This year, however, their marching orders might be firmer. Already, commentary in the Chinese press is highlighting that economic growth may not necessarily take a hit this year¹⁵ and should the government decide to prioritise growth targets, the credit taps could open more widely.

But these are still early days. Before looking to the recovery, markets will need to brace for a very sharp slowdown as China's sneeze turns into a global flu.

¹⁴ Michal Meidan, China: Key themes for 2020; <https://www.oxfordenergy.org/publications/china-key-themes-for-2020/?v=79cba1185463>

¹⁵ Wei Jianguo, "China's Q1 GDP won't drop below 5% despite coronavirus", Global Times, 4 February 2020, <https://www.globaltimes.cn/content/1178394.shtml>