



Mapping & Analyzing the Possible Impact of #Covid-19

March 4, 2020

KPMG Economics

Constance L. Hunter, CBE
Chief Economist
[@constancehunter](https://twitter.com/constancehunter)
constancehunter@kpmg.com

Henry Rubin
Economic Analyst
henryrubin@kpmg.com

Kenneth Kim, CBE
Senior Economist
kennethkim2@kpmg.com



Executive Summary of Economic Impact of Covid-19

China

- Our base case is -5.0% GDP growth in China for Q1
- China's population self insures for health care which can deter sick individuals from seeking care. This combined with the suppression of data on the outbreak likely amplified the initial Wuhan explosion of the virus
- The virus infected less than 0.5% of Wuhan's population yet caused severe strain on the medical system
- **China's firms are highly indebted** making the likely economic impact a "U" rather than a "V" even with government measures to ease credit access and engage in loan forbearance
- China comprises 16% of global GDP, Japan 6% and Korea 2%; however the supply chain impacts are greater

Developed Economies (OECD)

- Our base case for U.S. GDP is -0.9% for 2020
- With more advance warning and greater transparency, it stands to reason that absent virus mutations that make it more contagious, developed economies may have less adverse economic impact than China
- Countries with the greatest percent of the population over 70 face the possibility of greater mortality rates
- Countries with high levels of either household or corporate debt are more vulnerable to prolonged slowdowns if temporary economic shutdown impacts the ability to repay debt
- The U.S., with 9.4% uninsured and 24% having no paid sick leave, may have greater risks than other OECD countries in terms of economic impact unless assistance programs are expanded
- World Bank analysis of Ebola shows economic cost and "aversion behavior" cause 80% of the slowdown in GDP

Source: KPMG Economics, South China Morning Post, CNB, Bureau of Economic Analysis, Bureau of Labor Statistics, World Bank, Haver Analytics





The global economy in precarious place to handle shocks

Real GDP Growth Rates %				
Top 10 Countries by GDP		2017	2018	2019
1	U.S.	2.4	2.9	→ 2.3
2	China	6.9	6.7	→ 6.1
3	Japan	2.2	0.3	→ 0.8
4	Germany	2.8	1.5	→ 0.6
5	U.K.	1.9	1.3	→ 1.4
6	France	2.4	1.7	→ 1.3
7	India	7.0	6.7	→ 5.3
8	Italy	1.8	0.7	→ 0.2
9	Brazil	1.3	1.3	→ 1.4
10	Canada	3.2	2.0	→ 1.6

Notes: Annual growth rate y/y%; YTD Q1 to Q3 2019 SAAR % for Brazil
 Source: KPMG Economics, Respective Countries' National Statistics Office, Haver Analytics

- Global GDP slowed in 2019 causing central bank action.
- As Europe's factory, Germany to be hard hit from Covid-19, enough to likely loosen fiscal purse strings.
- Japan's GDP slumped by 6.3% in Q4 due to a consumption tax hike, Q1 likely also negative.
- Covid-19 is a significant demand and supply shock for Q1 GDP in China and globally.
- **While normally "V" shaped economic impact has been seen in past health crises, the indebtedness of firms and households will interact with length of virus and other policy responses to determine the path of downturn/recovery.**



Covid-19 shows up in high frequency PMI data

Mfg PMI	Jun-19	Jul-19	Aug-19	Sep-19	Oct-19	Nov-19	Dec-19	Jan-20	Feb-20
Europe									
France	51.9	49.7	51.1	50.1	50.7	51.7	50.4	51.1	49.8
Germany	45.0	43.2	43.5	41.7	42.1	44.1	43.7	45.3	48.0
Ireland	49.8	48.7	48.6	48.7	50.7	49.7	49.5	51.4	51.2
Italy	48.4	48.5	48.7	47.8	47.7	47.6	46.2	48.9	48.7
Spain	47.9	48.2	48.8	47.7	46.8	47.5	47.4	48.5	50.4
U.K.	48.0	48.0	47.4	48.3	49.6	48.9	47.5	50.0	51.7
Americas									
Brazil	51.0	49.9	52.5	53.4	52.2	52.9	50.2	51.0	52.3
Canada	49.2	50.2	49.1	51.0	51.2	51.4	50.4	50.6	51.8
Mexico	49.2	49.8	49.0	49.1	50.4	48.0	47.1	49.0	50.0
U.S.	50.7	50.4	50.3	51.1	51.3	52.6	52.4	51.9	50.7
Asia & Pacific									
Australia	52.0	51.6	50.9	50.3	50.0	49.9	49.2	49.6	50.2
China	49.4	49.9	50.4	51.4	51.7	51.8	51.5	51.1	40.3
Japan	49.3	49.4	49.3	48.9	48.4	48.9	48.4	48.8	47.8
Korea	47.5	47.3	49.0	48.0	48.4	49.4	50.1	49.8	48.7
India	52.1	52.5	51.4	51.4	50.6	51.2	52.7	55.3	54.5
Indonesia	50.6	49.6	49.0	49.1	47.7	48.2	49.5	49.3	51.9
Malaysia	47.8	47.6	47.4	47.9	49.3	49.5	50.0	48.8	48.5
Singapore	49.6	49.8	49.9	49.5	49.6	49.8	50.1	50.3	
Vietnam	52.5	52.6	51.4	50.5	50.0	51.0	50.8	50.6	49.0

- The PMIs are the first batch of global economic data to show the impact of the coronavirus.
- Manufacturing was in a somewhat precarious place before the virus outbreak; the virus has disrupted manufacturing supply, reduced energy and commodity demand, and given a significant blow to the sector.
- We anticipate services PMIs to also begin falling as the fallout spreads from air travel and tourism to leisure and hospitality and entertainment.

Source: KPMG Economics, IHS Markit, Haver Analytics (Feb 2020)

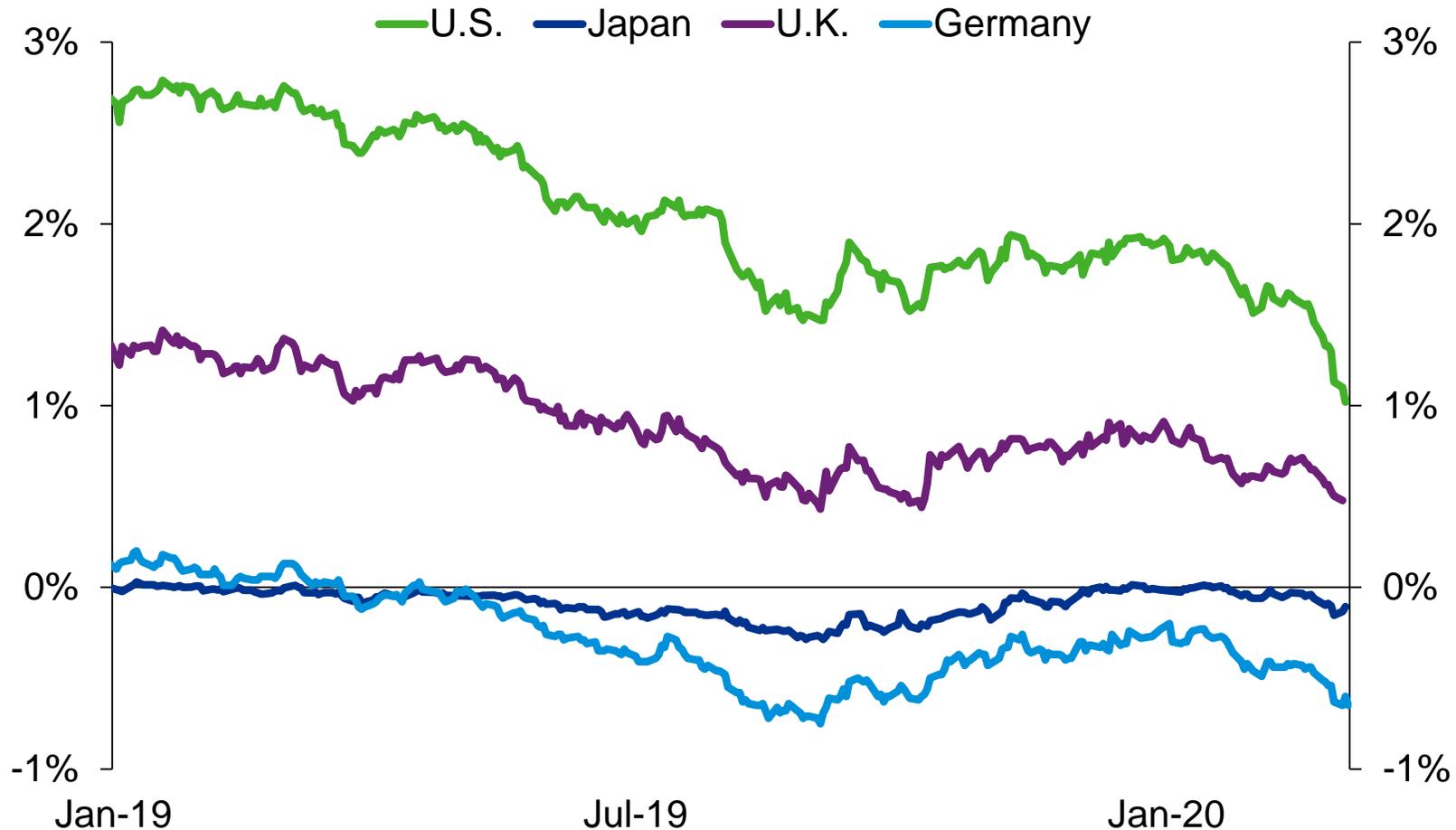
Note: The Purchasing Managers Index(PMI) is a monthly survey of industry that is a real-time snapshot of economic conditions. It is a diffusion index and a reading greater than 50 indicates expansion while a reading below 50 indicates contraction.



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Flight to safe haven bond assets takes yields lower

10-Year Government Bond Yield



Source: KPMG Economics, MoF, Bundesbank, US Treasury, BoE, Haver Analytics (March 2, 2020)

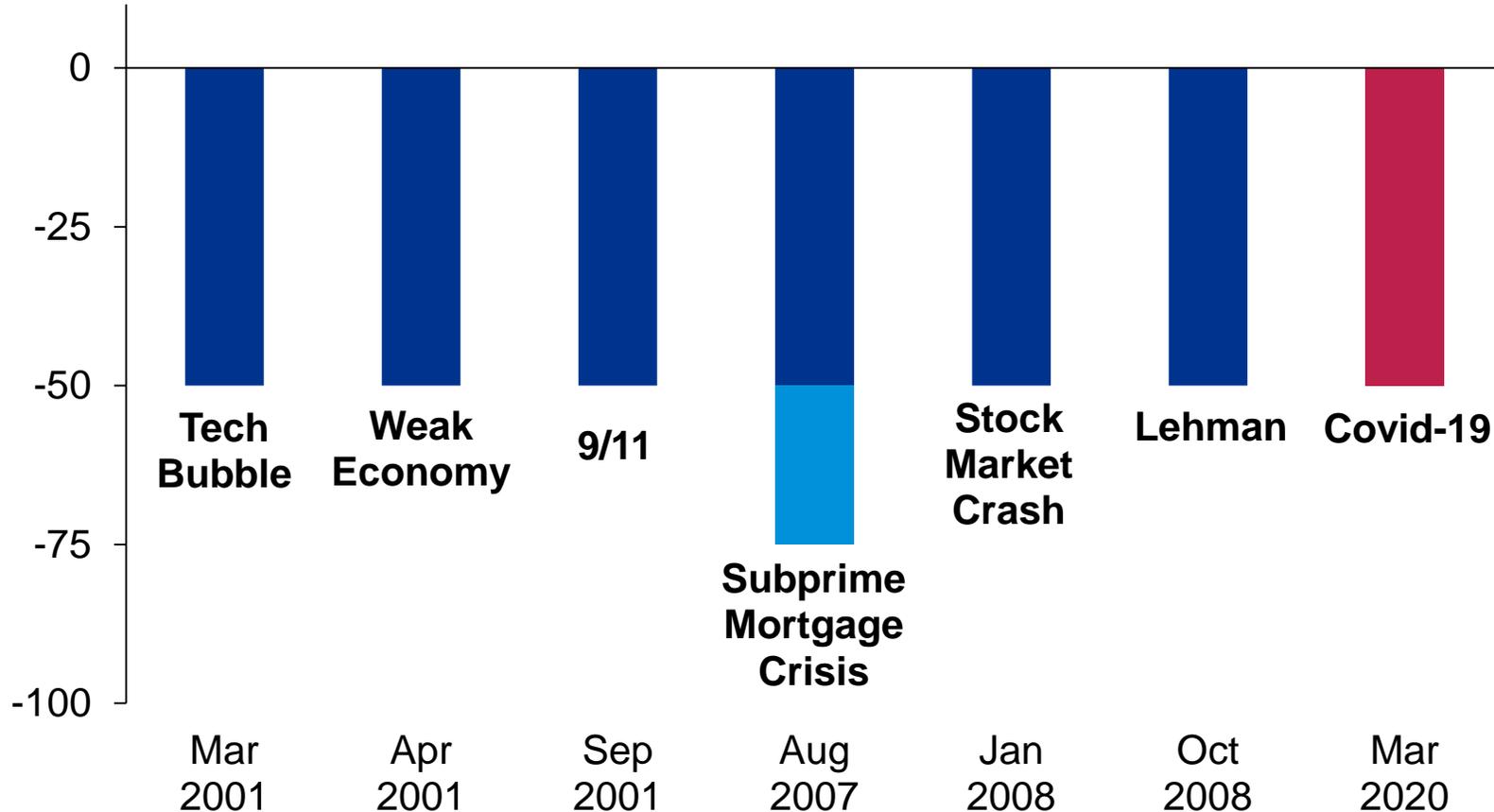
- Capital markets are reflecting worry that the virus continues to spread, slowing consumption and investment and causing a negative demand shock in addition to causing supply disruptions which would also raise prices and curtail economic activity.
- Policy responses are likely to be a **combination of fiscal and monetary** as lowering interest rates has limited impact in this type of situation.
- Policies that provide a liquidity buffer for cash strapped firms, provide access to capital to small- and mid-sized enterprises (SMEs), and provide cash to households adversely impacted due to lack of employment are all on the table to be implemented.



Fed cut delivers its first inter-meeting rate cut since 2008

United States: Emergency Fed Rate Cuts

Basis points (bps)



- On March 3, the Federal Open Market Committee (FOMC) voted unanimously to cut rates by 50 bps in an emergency move to support economic activity “in the face of new risks to the economic outlook.”
- The week prior to the rate cut there were no U.S. corporate bonds issued and liquidity conditions had tightened. The rate cut has eased liquidity conditions and firms have returned to the bond market for now.
- The Fed acknowledged that this is one of many actions that are needed to stem the economic impact. Chair Powell cited the work of health professionals, the Federal government and State and Local governments as well as coordinated G-7 policy actions.

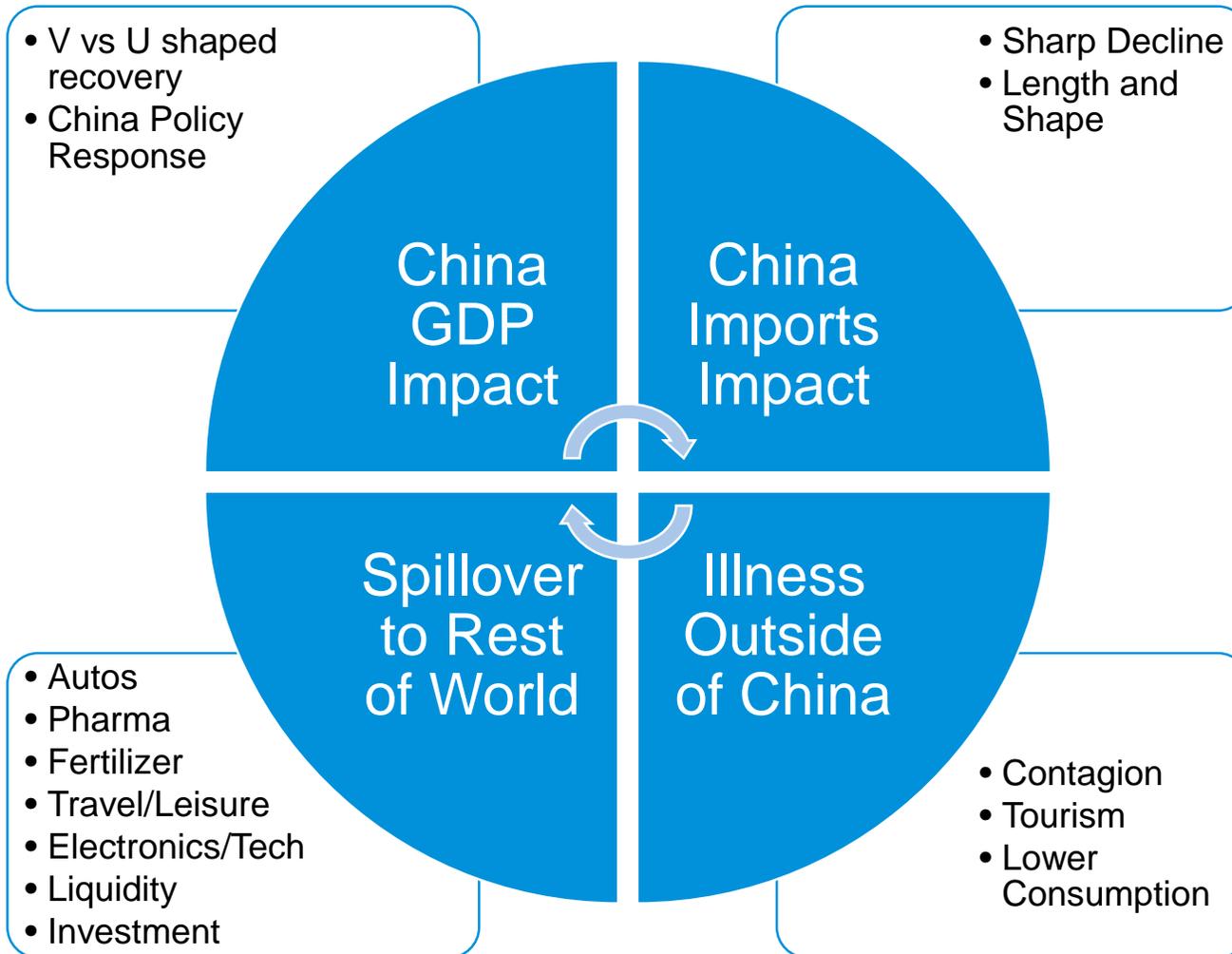
Source: KPMG Economics, Oxford Economics, Federal Reserve Board



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Economic spillovers to the rest of the world from China

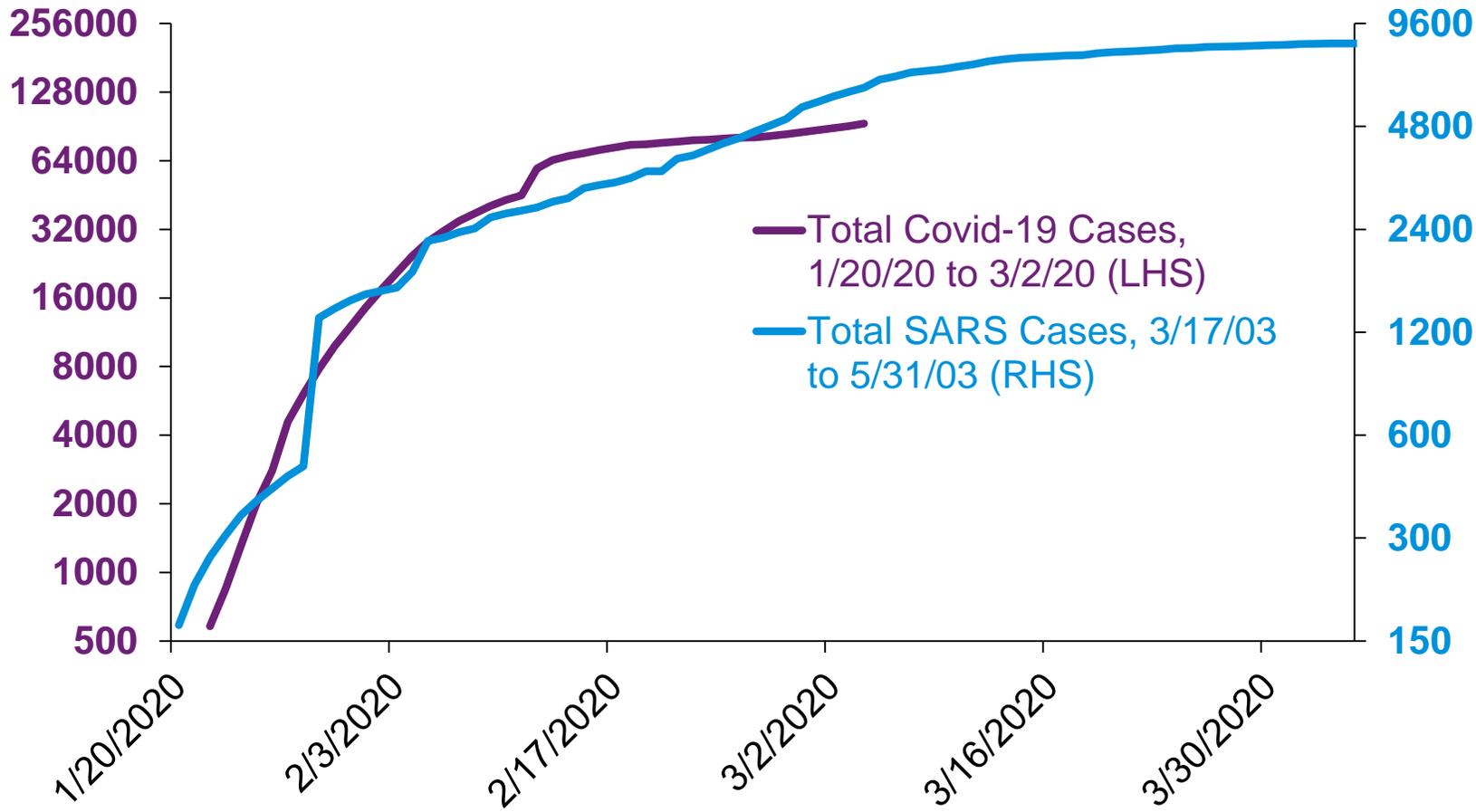


- Common disaster response is fall in output with “V” shaped recovery.
- Case for “U” shaped recovery given debt complications.
- Now China makes up 16% of global GDP (was only 4% during SARS) with the possibility to exert material influence on U.S. domestic economic conditions.
- China will aim to ease liquidity constraints but this will add debt onto an already heavily indebted economy and could have adverse economic effects down the road.

Medical professionals are working virus analysis

Total Confirmed Cases as of March 4, 2020

Logarithmic Scale



Source: KPMG Economics, World Health Organization, Covid-19 on the left-hand side, SARS on the right-hand side

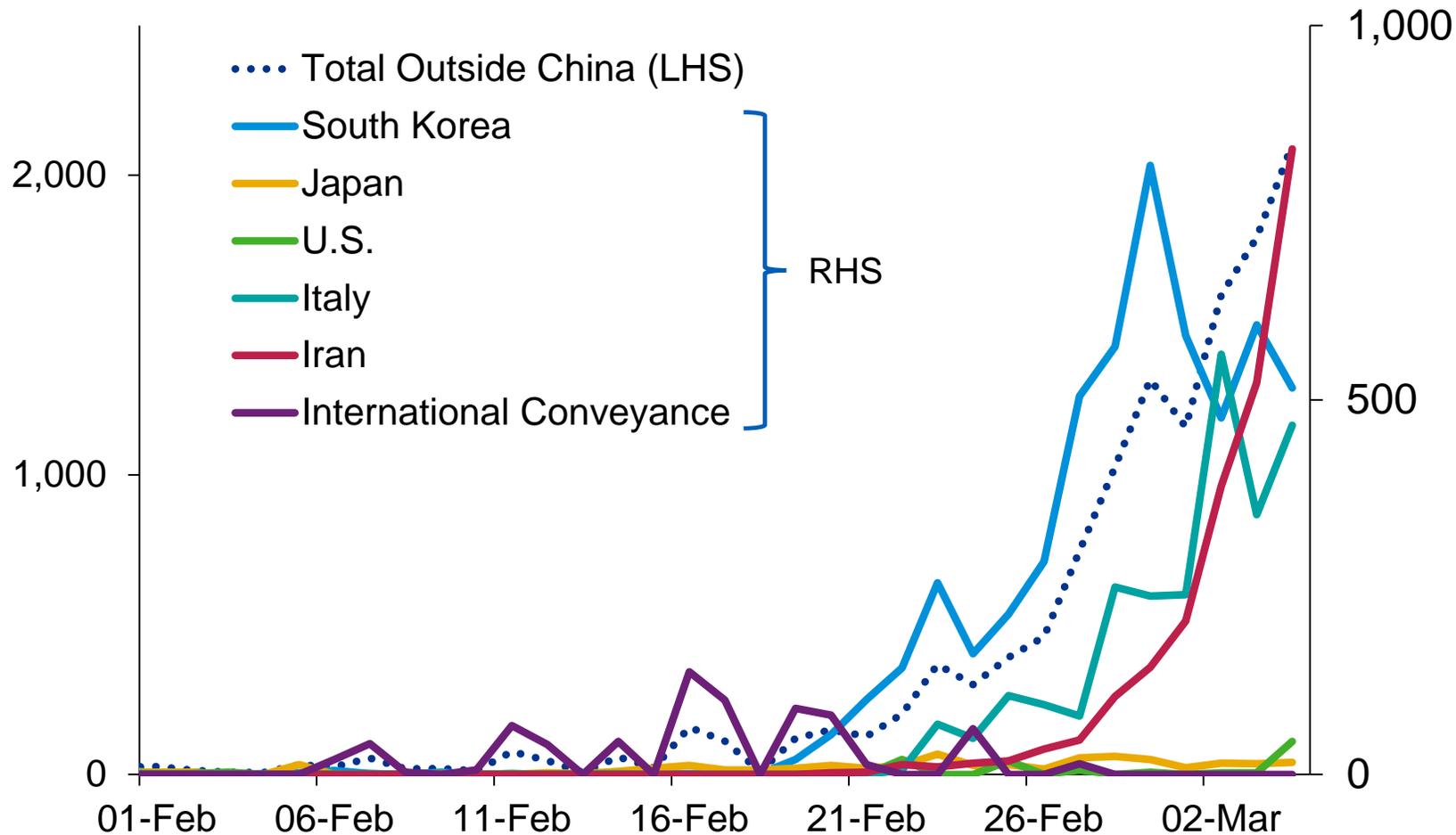
- 13.6% of cases are now outside of China.
- Many analysts are highlighting the similar path of the outbreak to SARS. While the absolute numbers are larger with Covid-19, the pattern of infection is similar, so far.
- To stay abreast of developments, we encourage people follow the WHO, New England Journal of Medicine, and The Lancet to name a few.
- On January 31, 2020, 94 academic journals, societies, institutes, and companies signed a commitment to making research and data on the disease freely available, at least for the duration of the outbreak.



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Large percentage increases seen in Korea, Italy, and Iran

Daily New Confirmed Covid-19 Cases, March 4



Source: KPMG Economics, World Health Organization

- Non-Chinese cases of Covid-19 are growing, sparking fears the economic impact will be more widespread.
- Governments are taking measures to stop the spread of the virus and to mitigate the economic impact.
- Japan announced the closure of its school system until April.
- South Korea has closed schools and is asking people to self-quarantine in Daegu, the epicenter of the country's outbreak.

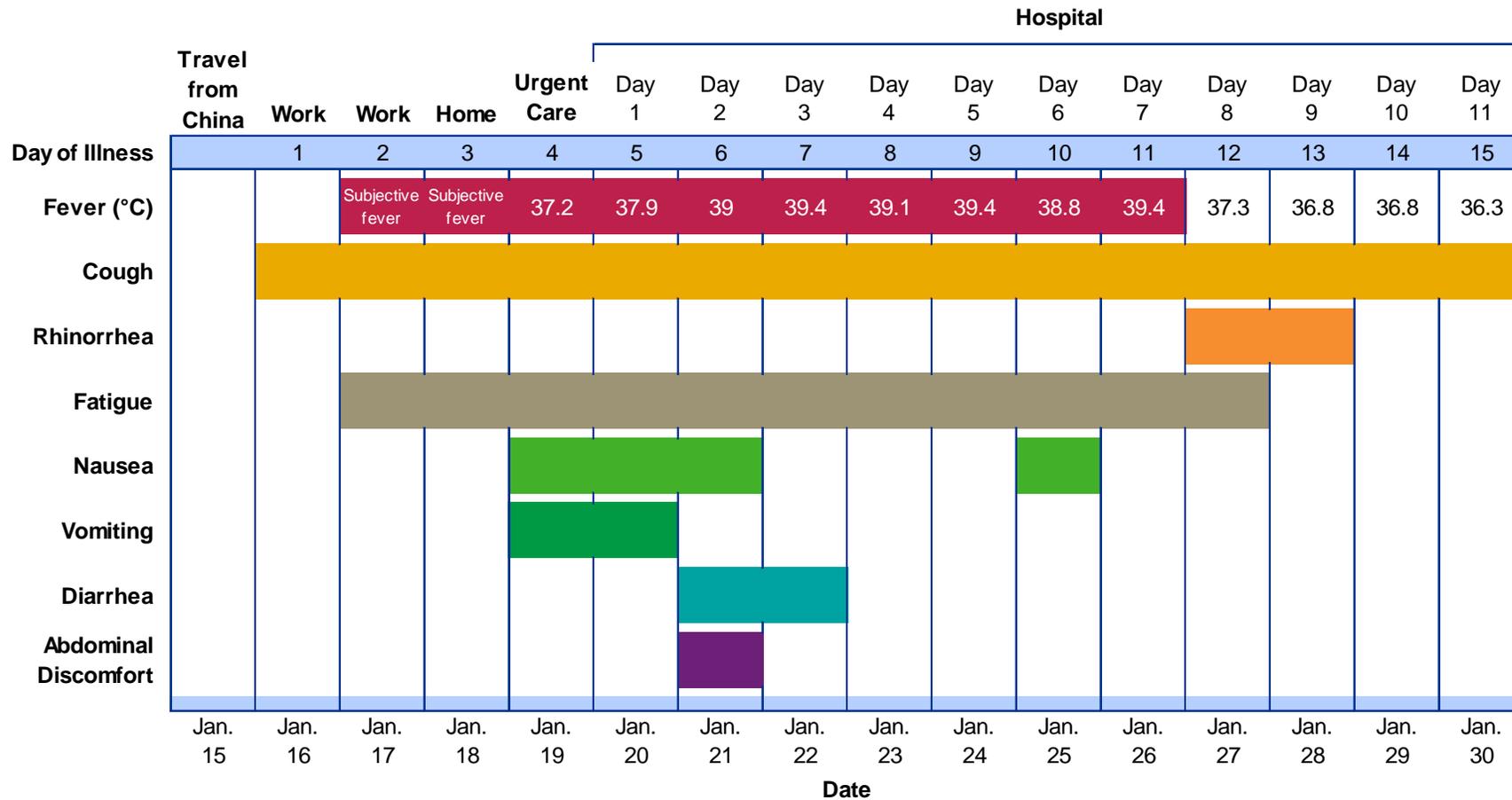


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Illness can be severe and lengthy, even with treatment

Symptom Timeline of First U.S. Covid-19 Patient



- Covid-19 infection begins with up to a 21-day incubation period before symptoms arise followed by severe flu-like symptoms.
- For those with severe cases illness can last for ~2 weeks.
- Work disruptions could have a major impact on individual company operations, particularly for small- to medium-size enterprises.

Source: KPMG Economics, New England Journal of Medicine, World Health Organization

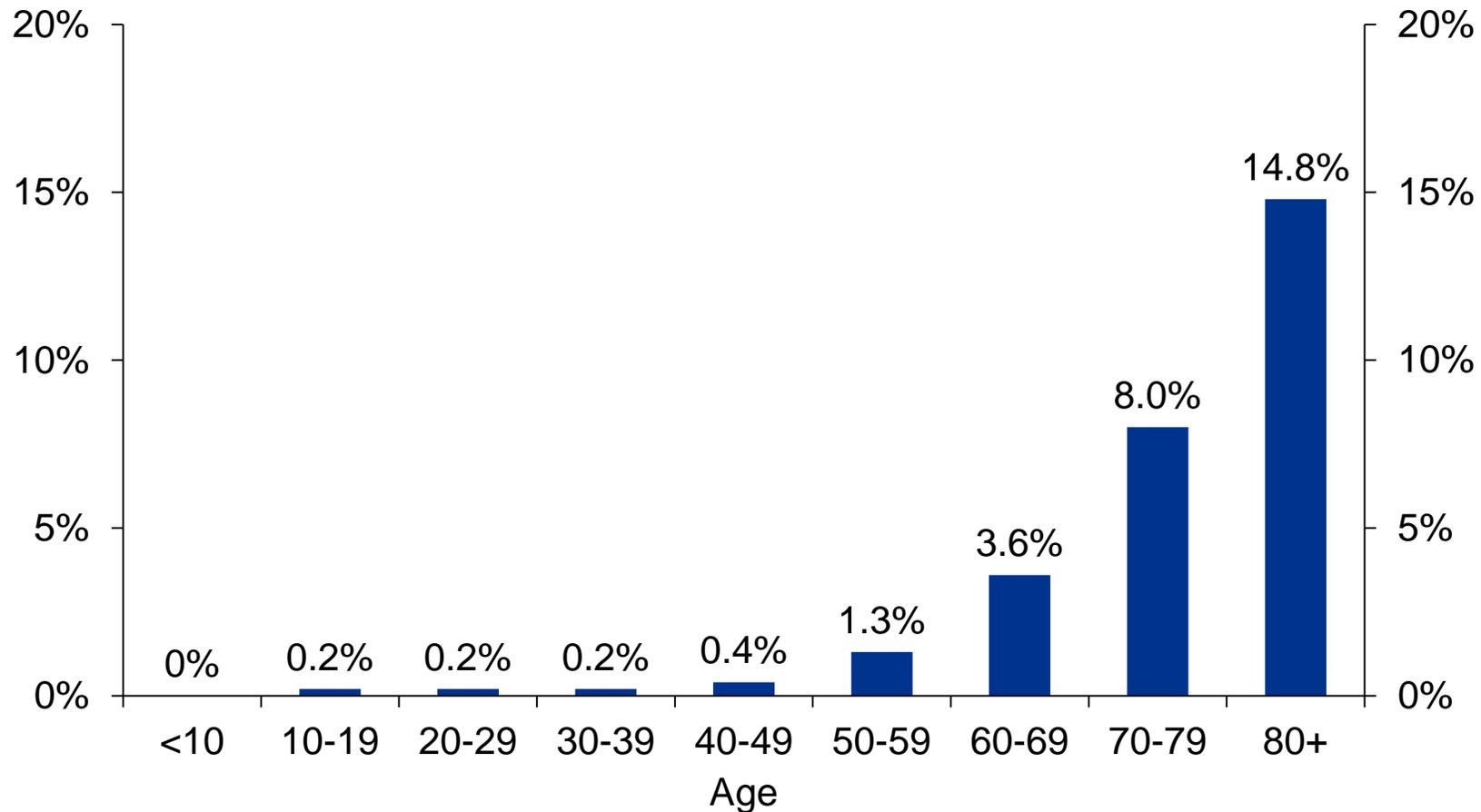


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Data based mostly on Chinese experience so far

Covid-19 Mortality Rate by Age

Based on 72,314 cases in China as of February 11, 2020



Source: KPMG Economics, World Health Organization

- The countries with the greatest number of people over the age of 70 are the most at risk in terms of death rate and strain on medical resources.

Share of the population >70

- Japan – 21%
- Italy – 17%
- Germany – 16%
- Sweden – 15%
- Spain – 15%
- U.K. – 13%
- U.S. – 11%
- South Korea – 10%
- Singapore – 7%
- China – 6.5%
- Iran – 4%



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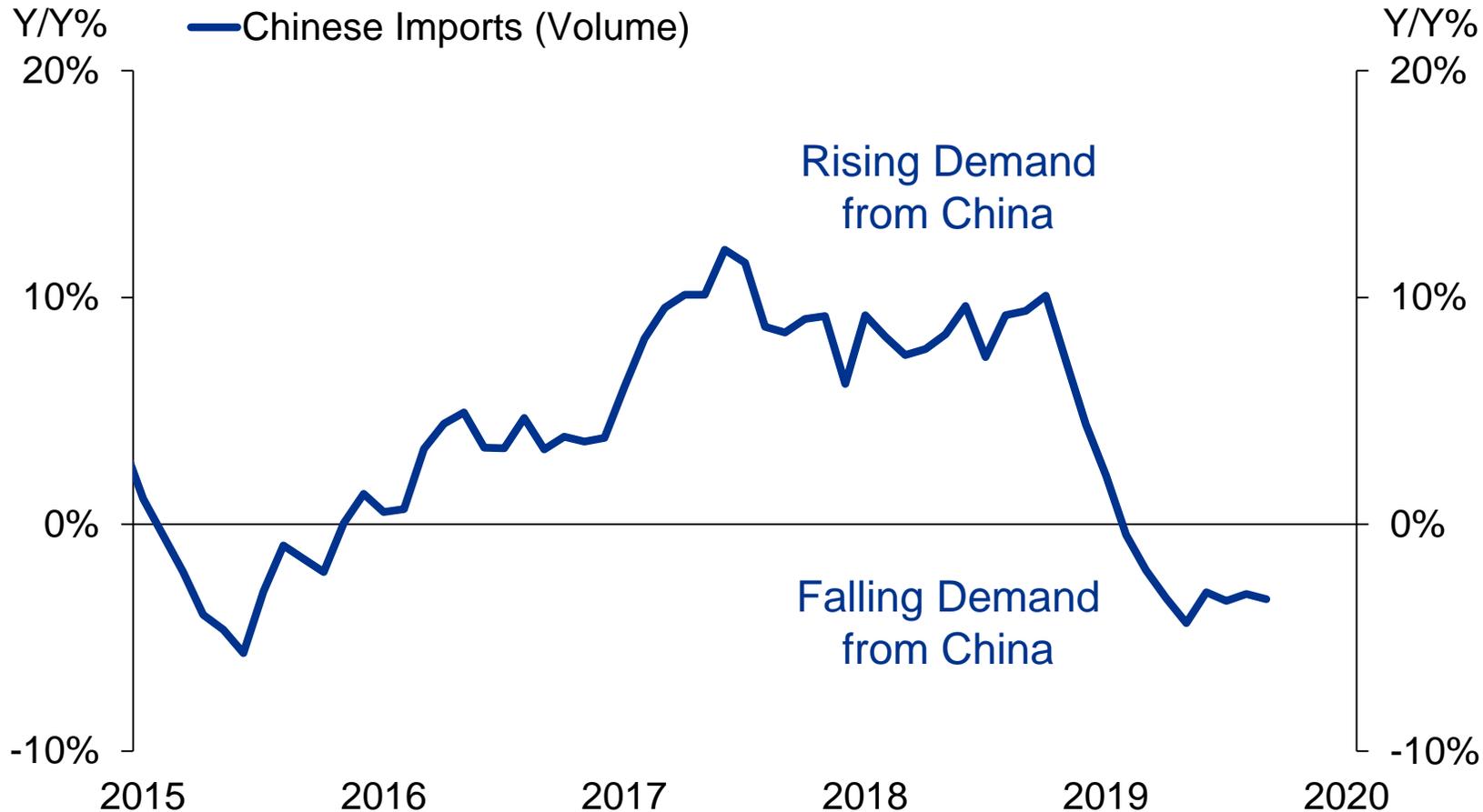
China Economic Backdrop

- **China is a highly leveraged economy. This leverage amplifies the shock of coronavirus, creating more pressure for firms that do not have the cash flow to repay debt. A solution that increases debt loads may temporarily mitigate the immediate negative economic consequences but it will also limit future growth potential as firms become more indebted.**
- **Household consumption was coming off of the worst 2019 lows before Covid-19 hit demand. Housing will be one of the sectors most impacted by reduced economic activity related to the virus.**
- **China's manufacturing slowdown appeared to be bottoming in late 2019 but the pullback in economic activity due to the virus has shuttered production, causing supply chain disruption and reduced activity that is likely to strain cash flows at many firms.**
- **Effectiveness of assistance will be critical to mitigating knock on damage from debt defaults.**



China faced GDP challenges before Covid-19 outbreak

Chinese Imports Bellwether for Underlying Weakness



- Because Chinese GDP statistics are subject to biases, most economists look for proxy statistics to interpret conditions in the Chinese economy.
- Import volume is a reliable proxy as it is verifiable with trading partners and it is a good barometer of Chinese domestic demand.
- The current slowdown is household rather than business led.
- But due to large levels of corporate debt, businesses are vulnerable to a slowdown in consumption.

Source: KPMG Economics, China Customs (September 2019), Haver Analytics

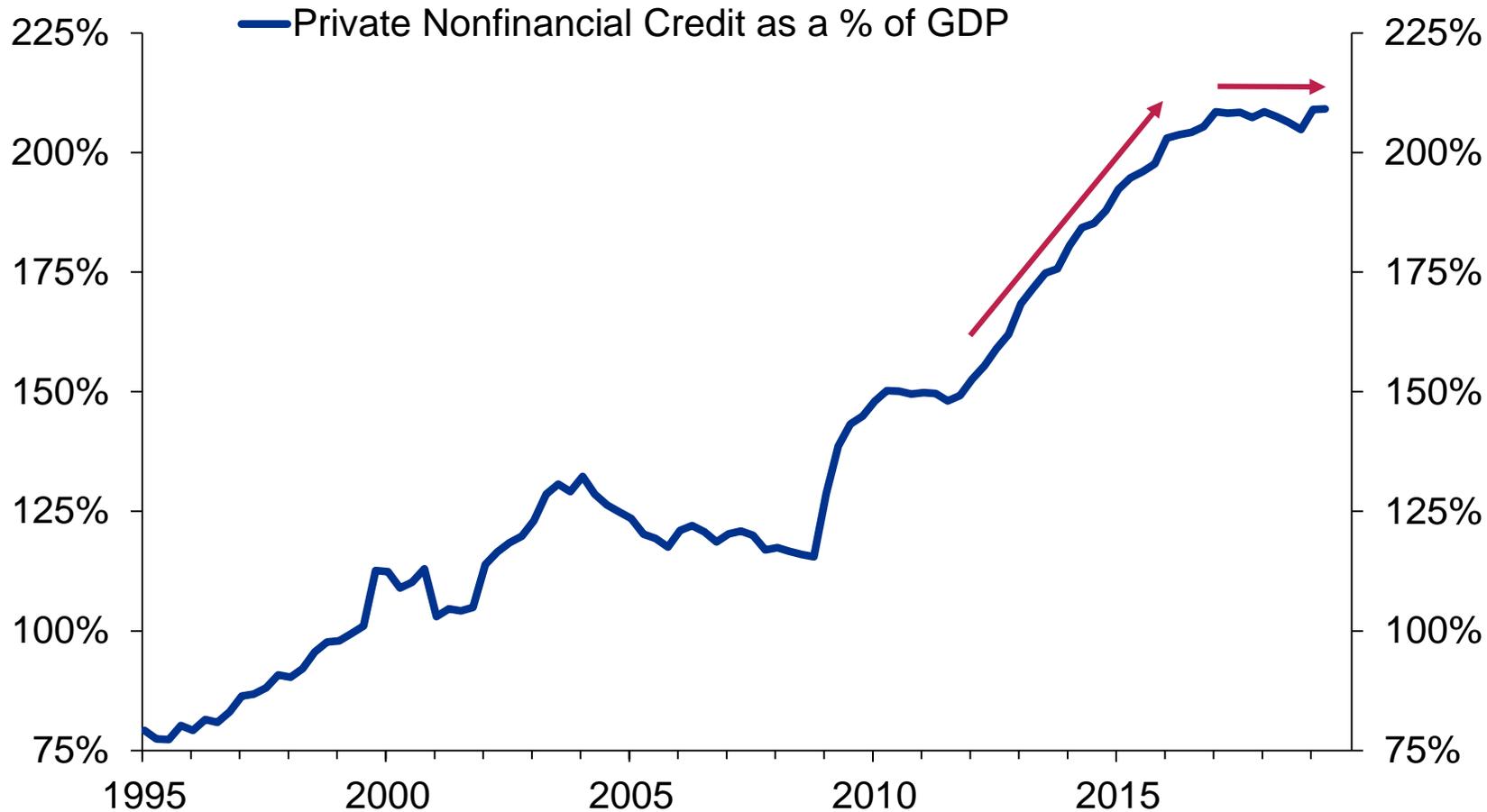


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China struggles to balance deleveraging against growth

China: Credit to the Nonfinancial Sector



Source: KPMG Economics, BIS (Q2 2019), Haver Analytics

- The Covid-19 outbreak will strain China's deleveraging efforts and lead to increased borrowing in the short- and medium-term to support economic activity.
- Over the past two years, China has cracked down on the shadow banking sector in an effort to help slow down alarming debt growth amongst nonfinancial corporations.



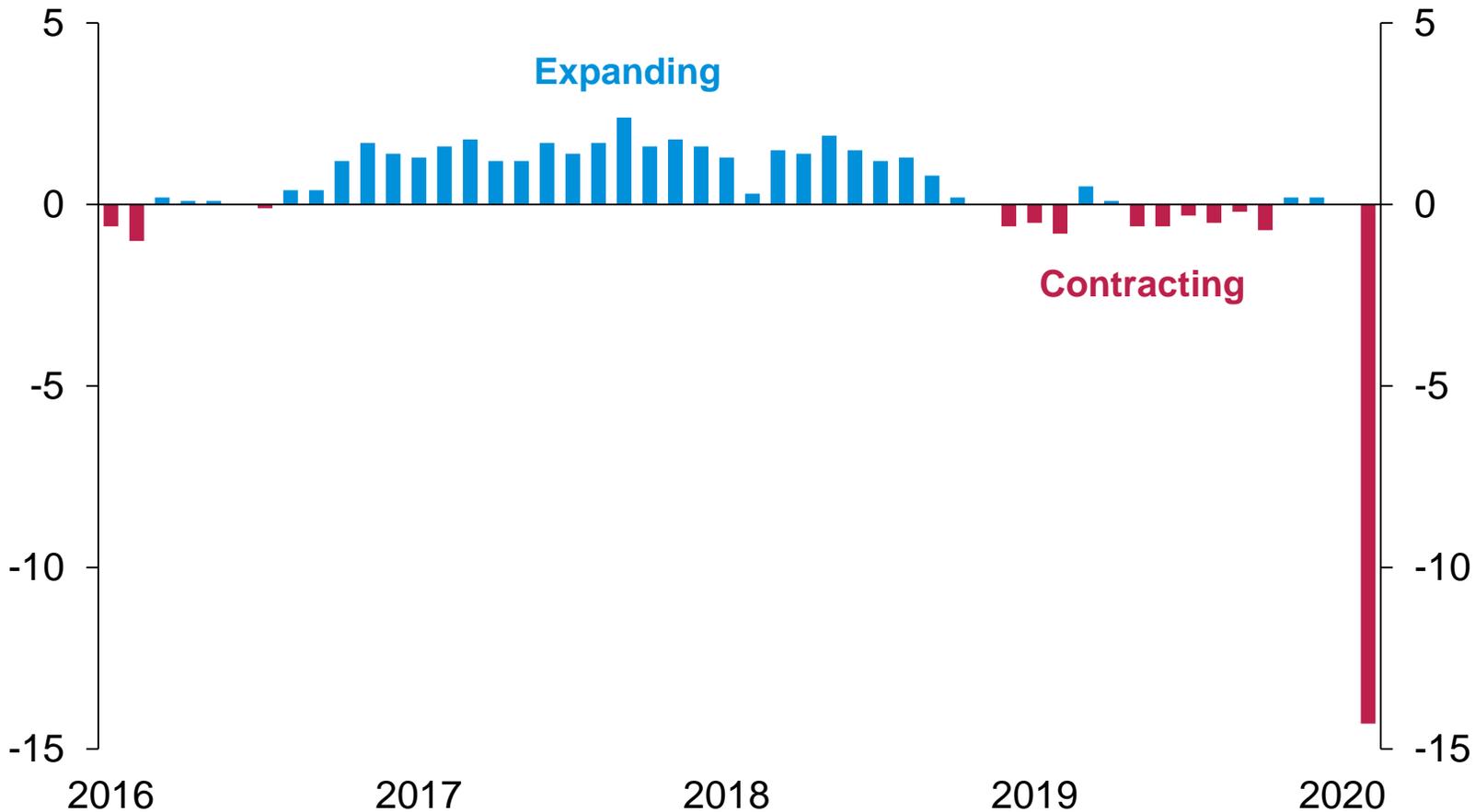
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Manufacturing growth challenged without leverage increases

China: Manufacturing PMI

Deviation from 50, SA



- Manufacturing firms remained largely closed in February which is reflected in the PMI data.
- Government financial tightening had a negative impact on the manufacturing sector before the coronavirus outbreak.
- As firms reopen, we expect a rebound but not necessarily a return to expansionary levels without significant government stimulus.

Source: KPMG Economics, China Federation of Logistics & Purchasing (Feb 2020), Haver Analytics

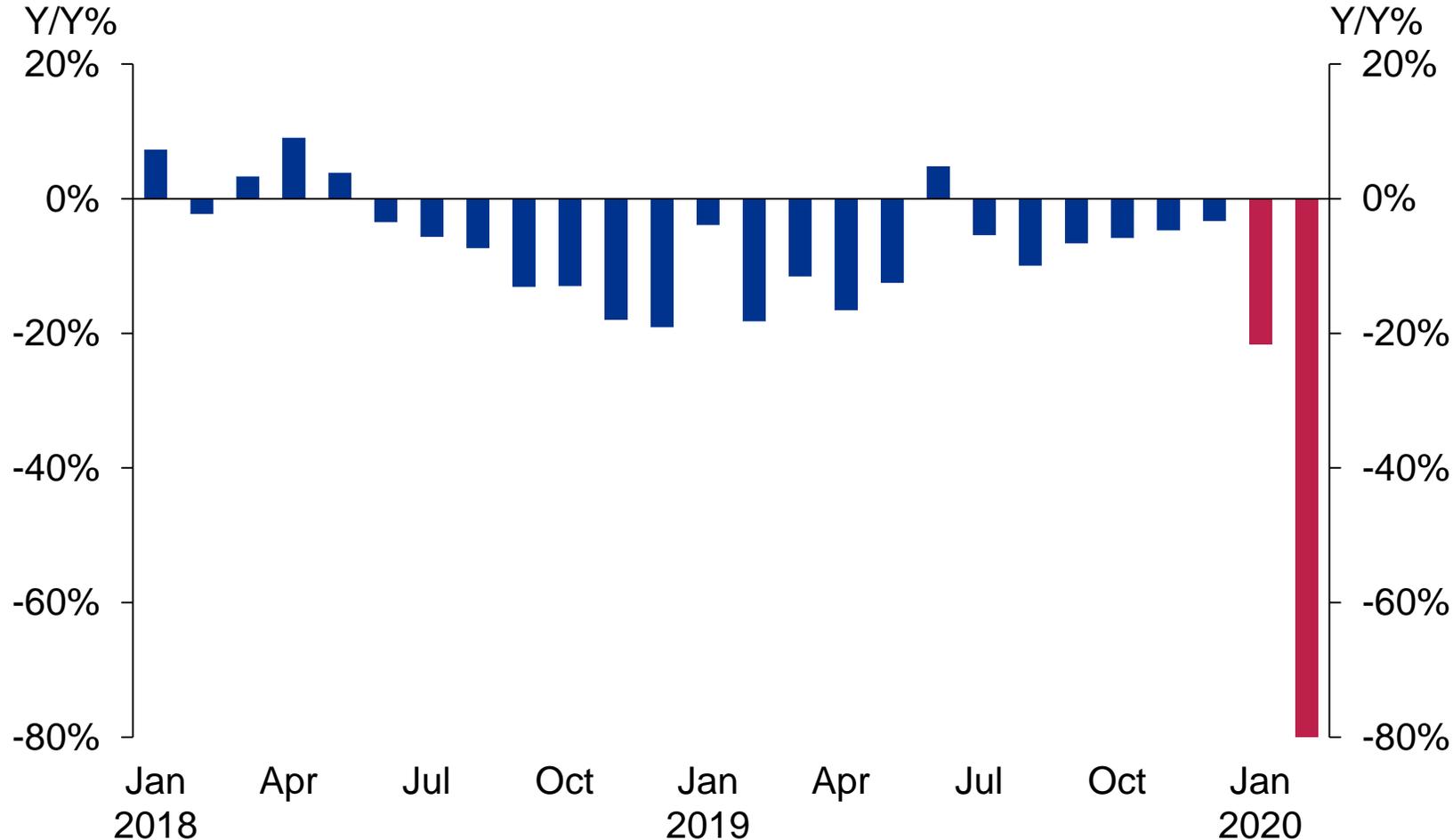


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Chinese auto sales fell dramatically in January and February

China: Passenger Car Sales Plummet in 2020



- Vehicle purchases provide a look into the strength of Chinese consumers and industry.
- After seeming to trough in 2019, car sales suffered a dramatic slump in January and February as the outbreak of Covid-19 halted most economic activity.
- As an auto manufacturing hub, Hubei province's shutdown will negatively impact the global auto industry.
- We anticipate Germany and South Korea will head into another economic slump even before the virus reaches their shores due to high connectivity in the manufacturing economy.

Source: KPMG Economics, China Association of Automobile Manufacturers (Feb 2020), Haver Analytics



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Wuhan is a significant producer of high value added goods

2018 Output	Share of National Output
Sulfuric Acid	13.7%
Yarn (2017)	12.2%
Industrial Products, Hydropower Electricity	12.1%
Chemical Fertilizers	11.8%
Plain Glass	10.8%
Air Conditioners	9.3%
Cloth	8.9%
Motor Vehicles	8.9%
Cars	8.6%
Chemical Pesticides	8.2%
Salt	7.4%
Home Refrigerators	6.2%
Cigarettes	5.6%
Soda Ash	5.2%
Cement	5.0%
Ethylene	4.8%
Beer	4.6%
Power Generation	4.1%
Micro Computer Equipment	3.6%
Crude Steel	3.4%
Rolled Steel	3.4%
Pig Iron	3.4%

- Wuhan is a major industrial hub, and an integral part of the global supplying chain.
- Analyzing the impact of the Fukushima earthquake of 2011 (global supplier of metallic paint) or the Thailand flood of October 2011 (global supplier of computer chips) when small geographic and economic areas' loss of production had a magnified impact on the global economy due to critical products produced.
- In the case of Hubei, the percent of output is both significant and magnified due to its critical placement in Chinese and global supply chains.

Source: KPMG Economics, China National Bureau of Statistics



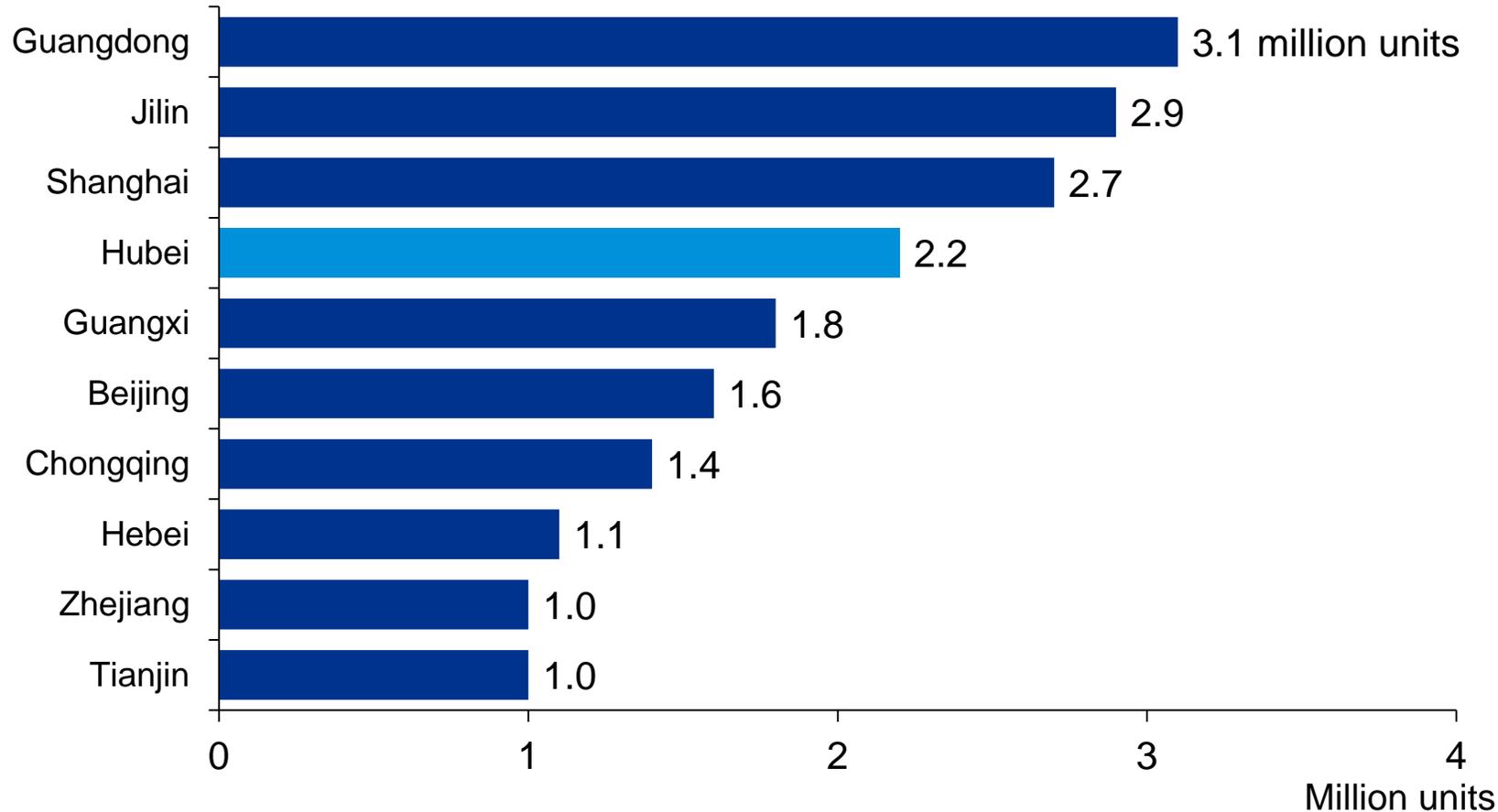
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Hubei province is the fourth largest motor vehicle producer

Largest Motor Vehicle Producers by Province

Million units produced, 2019



Source: Bloomberg, China National Bureau of Statistics



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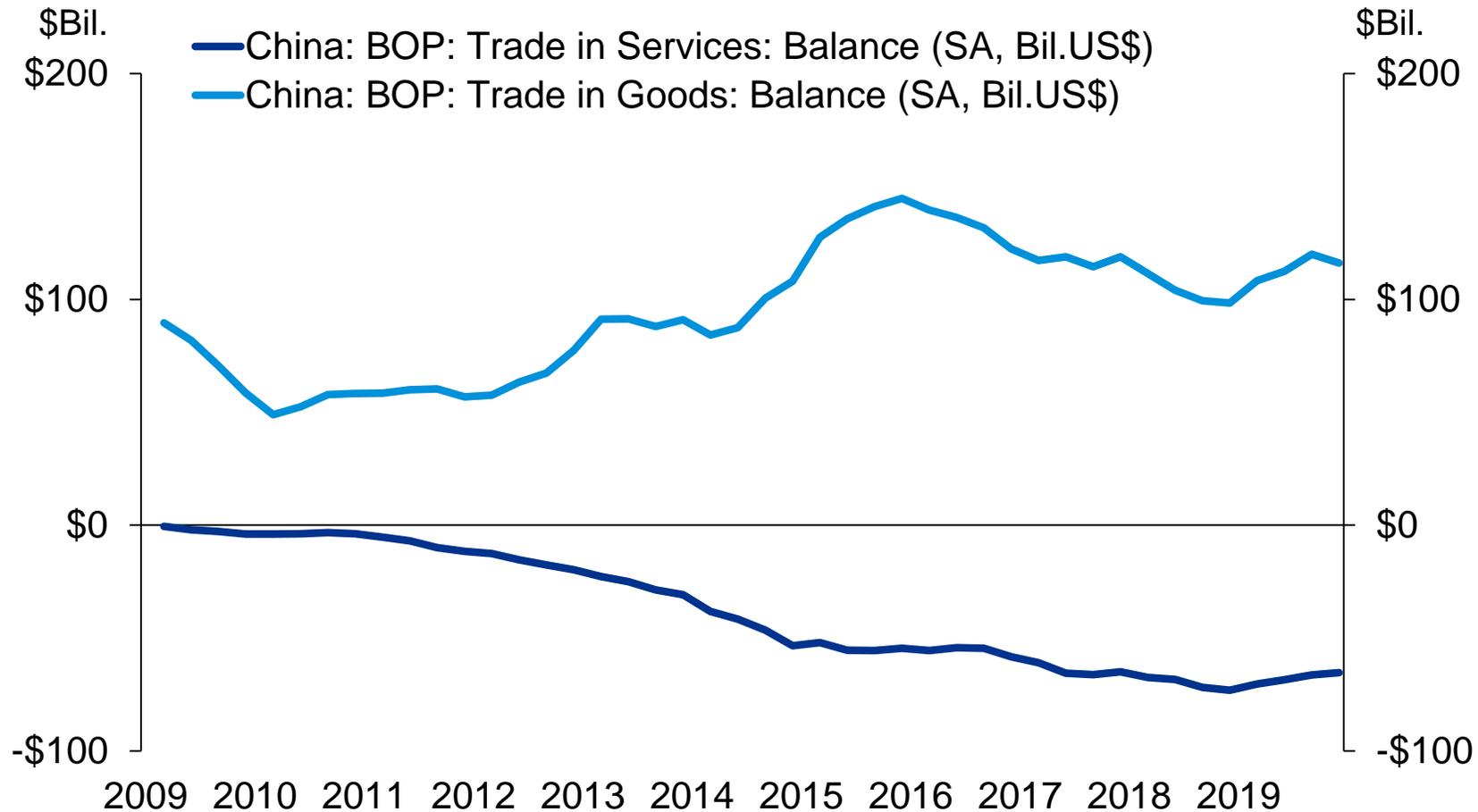
- Hubei province, which contains Wuhan, produced 2.2 million motor vehicles in 2019, the fourth most of any Chinese province.
- Quarantine measures barring most travel in and out of the region are disrupting supply chains and delaying factory re-openings following the New Year holiday.
- More than 57 million people in Hubei's cities remain under travel restrictions.

- **Virus in 84 countries as of March 3rd**
- **Countries with oldest populations most at risk for high death rates and adverse news flows**
- **Countries highly dependent on tourism will feel economic pinch right away**
- **Aversion behavior causes lower consumption levels and contributes to negative GDP impact**
- **Longer-term impact is felt by indebted companies or those with poor cash flows that cannot remain open, cannot employ people or cannot make debt payments**
- **Coordinated government action via the G7 and other intergovernmental agencies working to mitigate negative health and economic impacts**

Source: KPMG Economics, www.worldometers.info, WHO, Johns Hopkins, World Bank

Absence of Chinese tourism will be felt globally

Travel Comprises over 80% of China's Services Imports



- Chinese imports of travel services totaled \$251 billion in 2019.
- This will be a loss of between \$50-70bn to the global economy in Q1.
- Halted flight routes, closed borders and quarantine are all reducing the movement of people from China to the rest of the world.

Note: 4-Quarter moving average

Source: KPMG Economics, State Administration of Foreign Exchange (Q4 2019), Haver Analytics

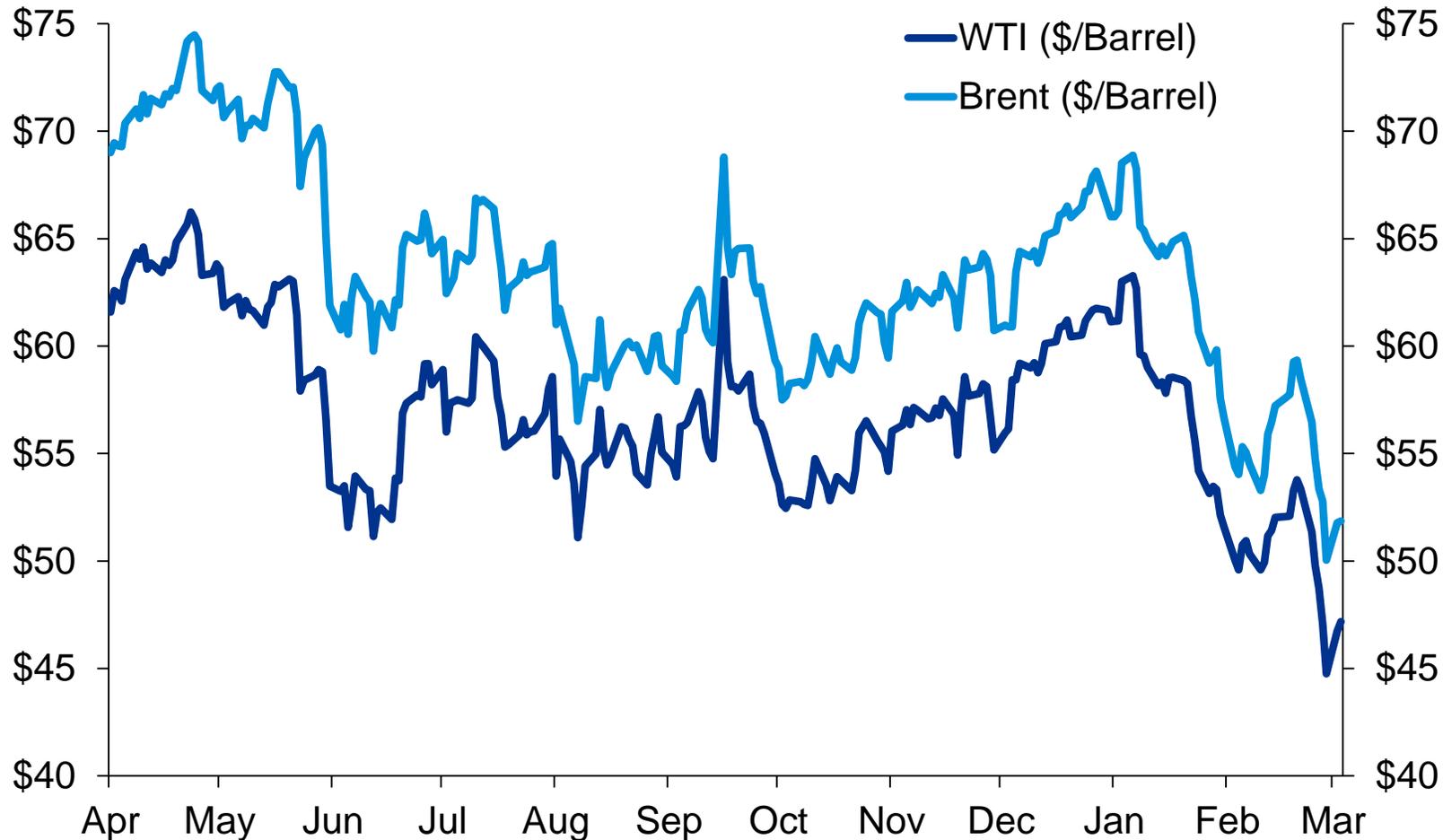


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Oil prices decline, challenging the profitability of some firms

Oil Prices



Source: KPMG Economics, EIA, CME Group, Financial Times, Haver Analytics (Mar 2, 2020)

- Oil prices have fallen 20% from their recent peak in early January.
- WTI has dipped below \$50 per barrel.
- Sustained oil prices below \$50/barrel will impact oil exporters.
- Major oil exporters depend on high oil prices to fund domestic budgets.



Lofty oil price forecasts underpin many producer budgets

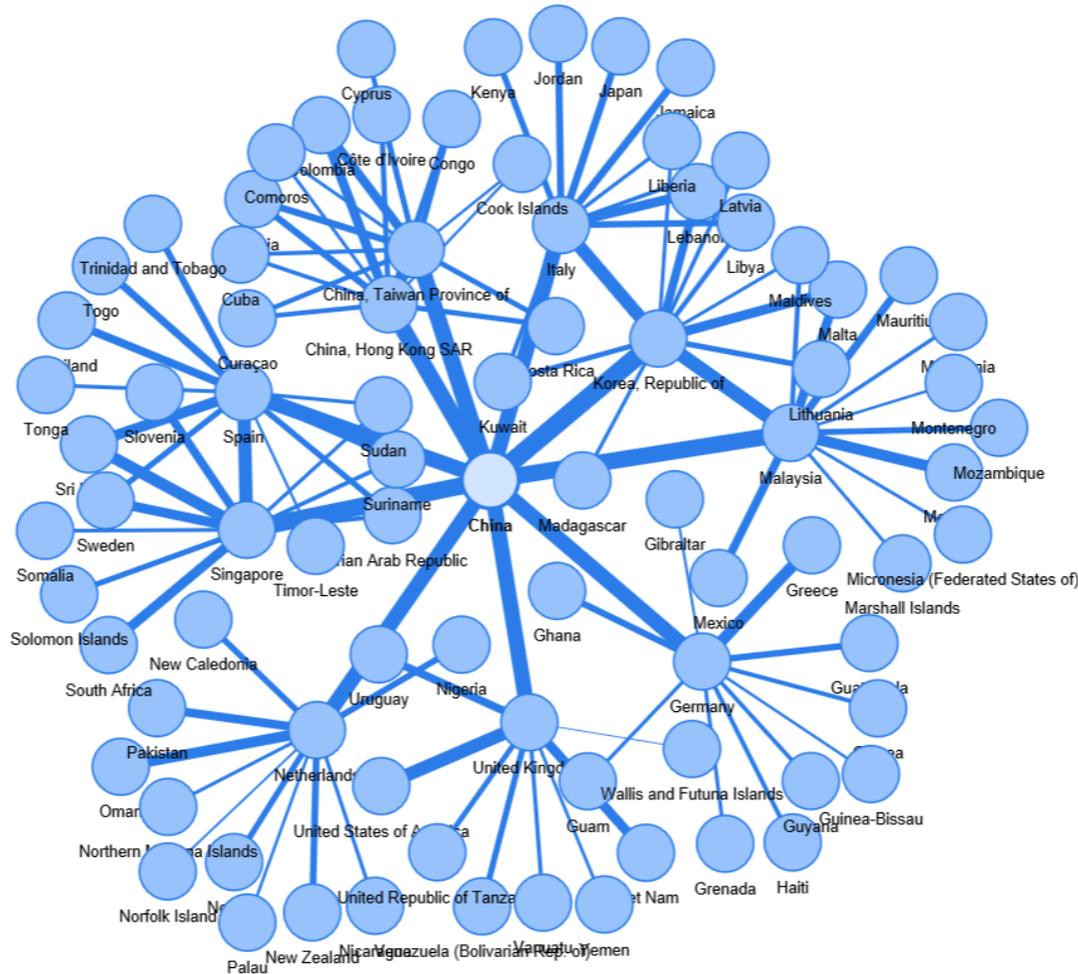
IMF Fiscal Breakeven Oil Prices in \$/bbl			
Country	2018	Projections	
		2019	2020
Iran	\$82	\$156	\$195
Iraq	\$45	\$62	\$60
Kuwait	\$54	\$54	\$55
Russia	\$51	\$49	-
Saudi Arabia	\$89	\$86	\$84
United Arab Emirates	\$67	\$70	\$70

- IMF analysis of federal budgets' assumptions and breakeven prices suggest continued downward pressure on prices could cause the need for reduced spending or increased debt issuance from impacted countries.

Source: KPMG Economics, IMF "Regional Economic Outlook: Middle East and Central Asia", Statistical Appendix Table 6, Economic Expert Group (Russia)



2019 shipping routes illustrate supply chain networks



- China's connectivity to the world can be analyzed by value-added, trade linkages, supply chain linkages, and shipping/transport linkages.
- This map shows the top 10 bi-lateral connections along with connection depth between each country.

Source: KPMG Economics, KPMG Lighthouse, UNCTAD Database



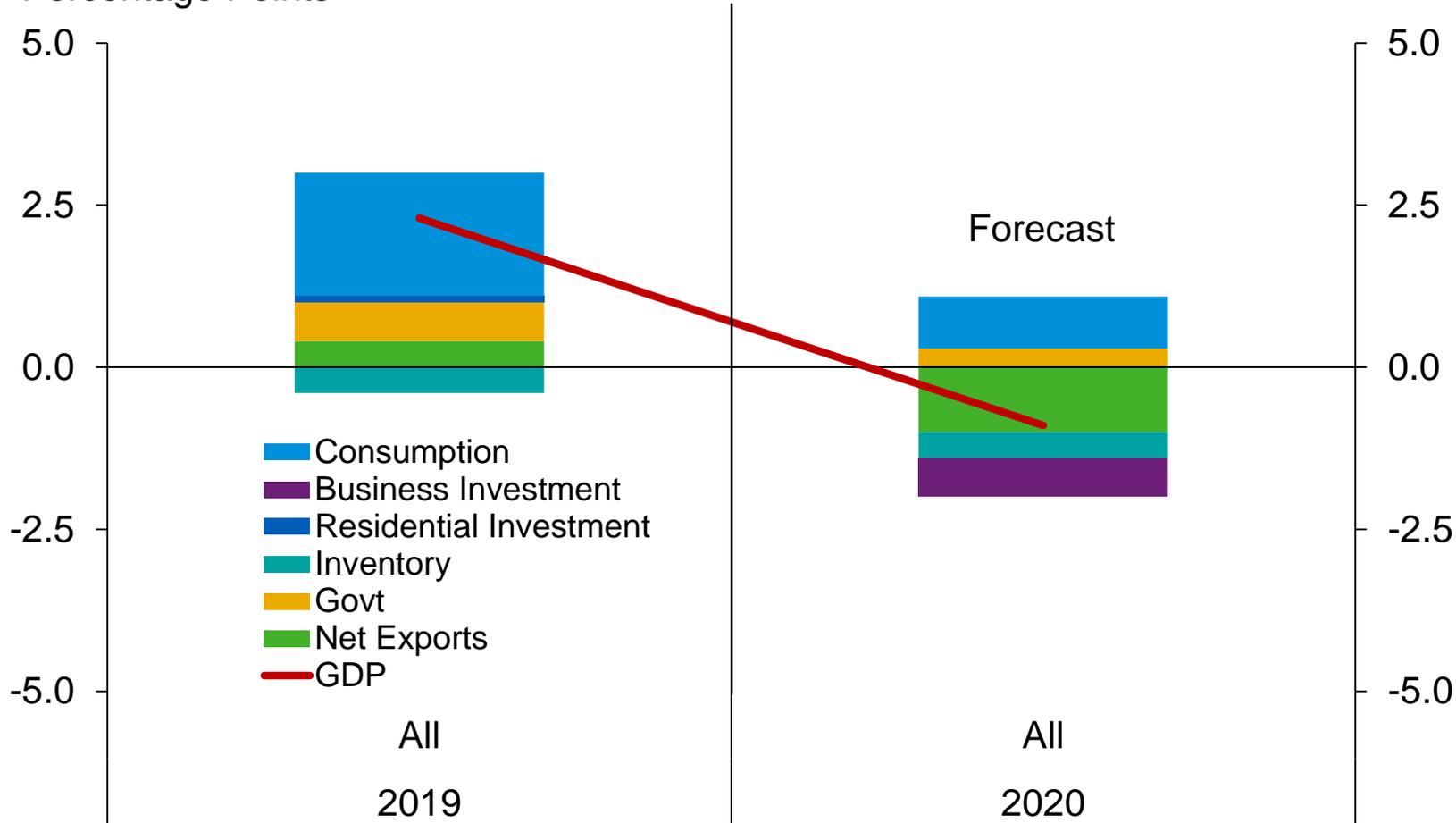
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Preliminary analysis suggests -0.9% growth possible for 2020

Contributions to US GDP Growth

Percentage Points



Source: KPMG Economics, BEA, Haver Analytics

- The biggest impact will be due to a sharp decline in exports (as impacted countries reduce demand) and business investment (as firms engage in precautionary behavior.)
- Consumption will likely slow from 2019 levels but we do not expect it to be negative.
- Government spending should rise if the Federal government is involved in mitigating the economic response.
- Details of any fiscal response have yet to be announced (March 3, 2020.)
- Our analysis assumes the Federal Reserve takes rates to zero in the first half of 2020.

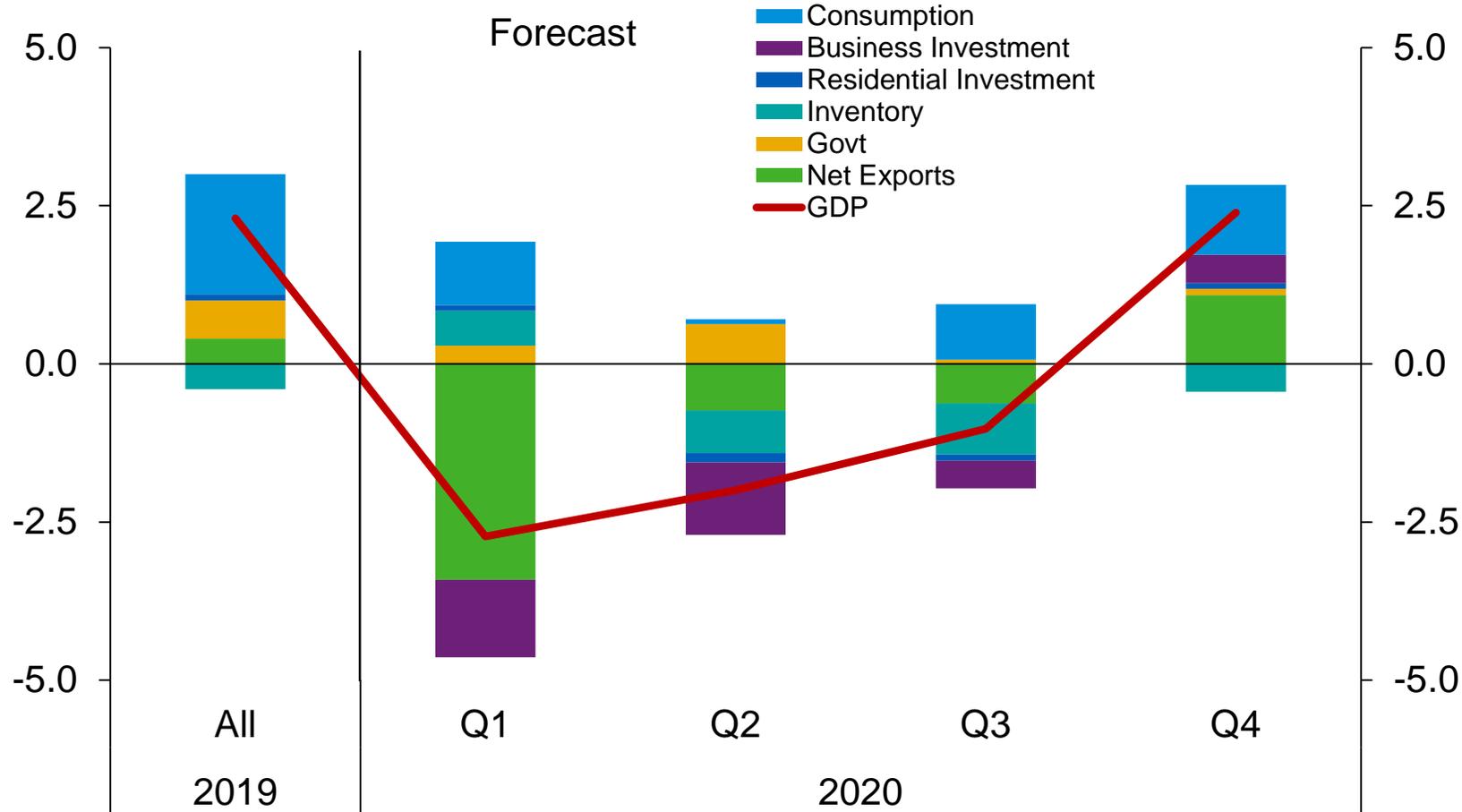


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U.S. impact is assumed to be “V” shaped as of March 2nd

Contributions to US GDP Growth Percentage Points



Source: KPMG Economics, BEA, Haver Analytics

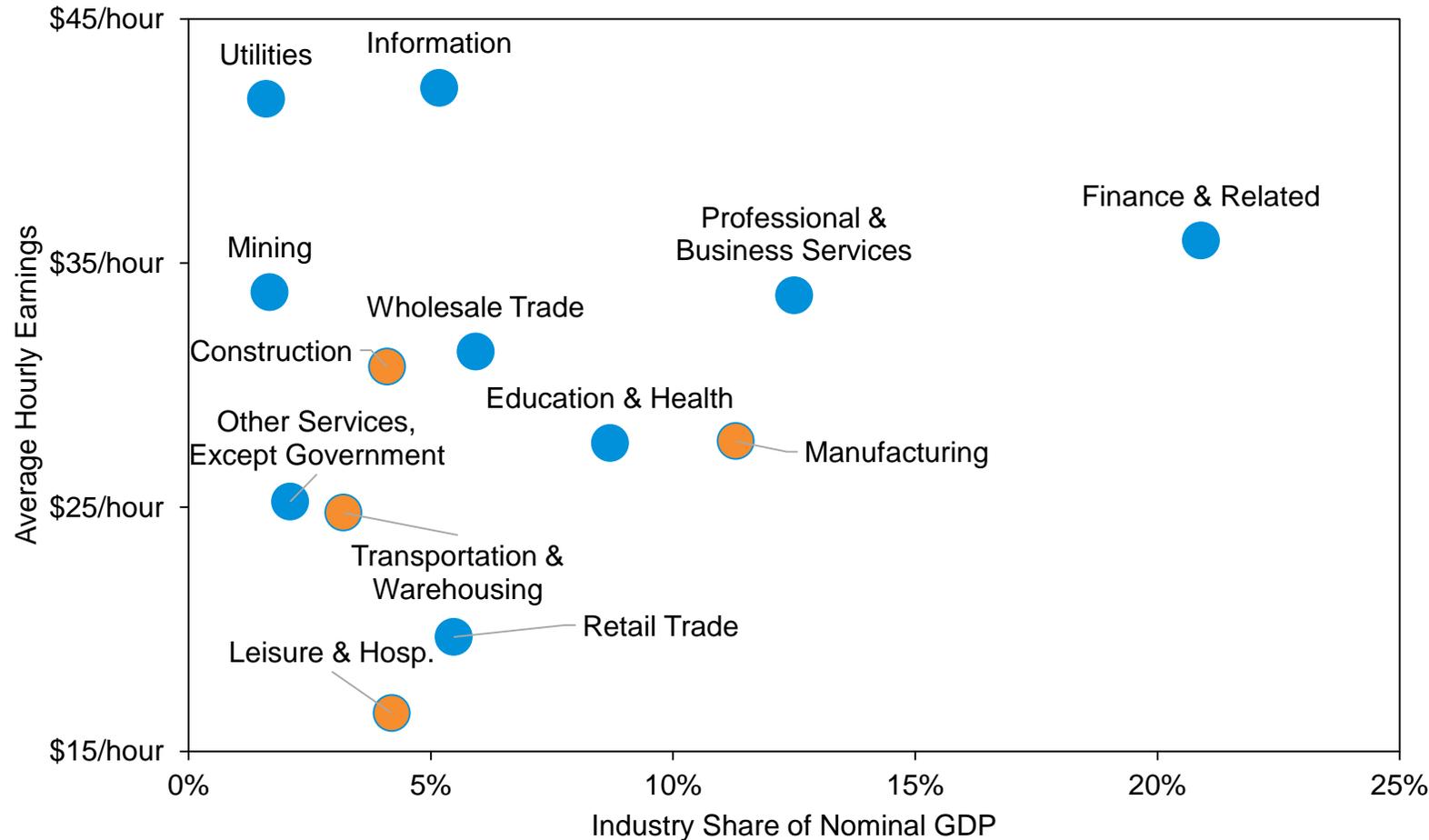
- Q1 GDP will be adversely impacted mostly by falling exports and a decline in business investment.
- In times of an outbreak of a new disease, research shows that consumers engage in “aversion behavior” and reduce consumption.
- Presently firms and households are curtailing travel and some conferences have been cancelled.
- Assuming no virus resurgence, our modeling suggests that most areas of the economy will be in a full rebound by Q4.





Highly impacted industries span the income distribution

Industry Earnings and Share of U.S. GDP



Note: Industries/employees most at risk are denoted with an orange circle

Source: KPMG Economics, BLS, BEA, Haver Analytics

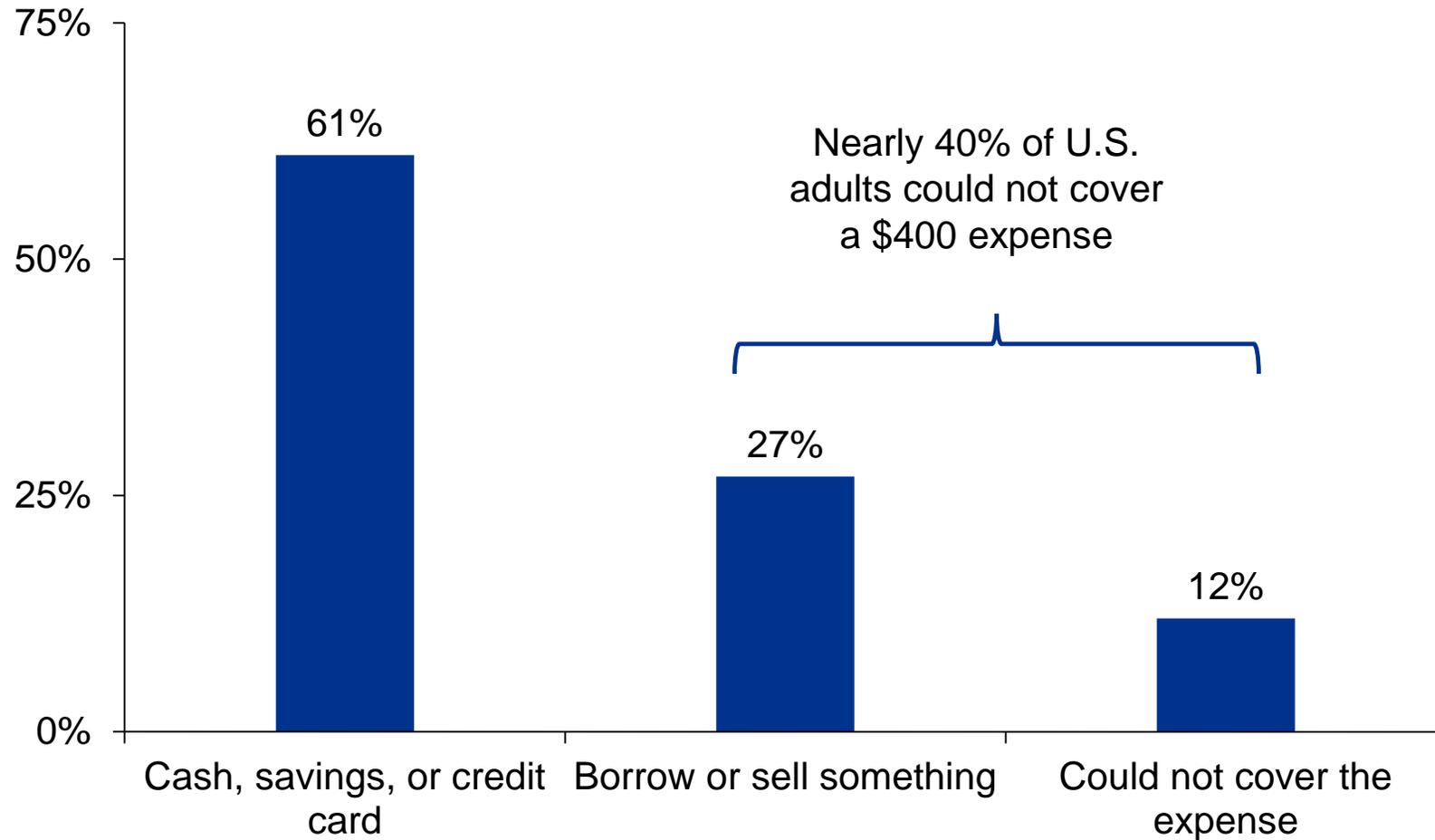
- Should consumption in the U.S. slow, the most impacted service industries are leisure and hospitality services, transportation and warehousing services.
- The most impacted goods industries are construction and manufacturing.
- Slowing employment in affected industries would be a signal that the economic impact from the virus is spreading and having greater impact on GDP growth.
- Industries highlighted in orange are the most vulnerable.





Up to 40% of U.S. households will be financially strapped

How U.S. Adults Cover an Unexpected \$400 Expense



Source: KPMG Economics, Federal Reserve Board (2019)

- Out-of-pocket expenses for Covid-19 testing and treatment can run to well over \$1000, a hardship for 40% of U.S. adults.
- 24% of U.S. workers do not have paid sick leave. This population is likely to be most vulnerable economically should the virus spread.
- 9.4% of Americans do not have healthcare. Not only will this population be adversely impacted but it could hamper efforts to reduce disease spread if ill people do not seek care or get tested.



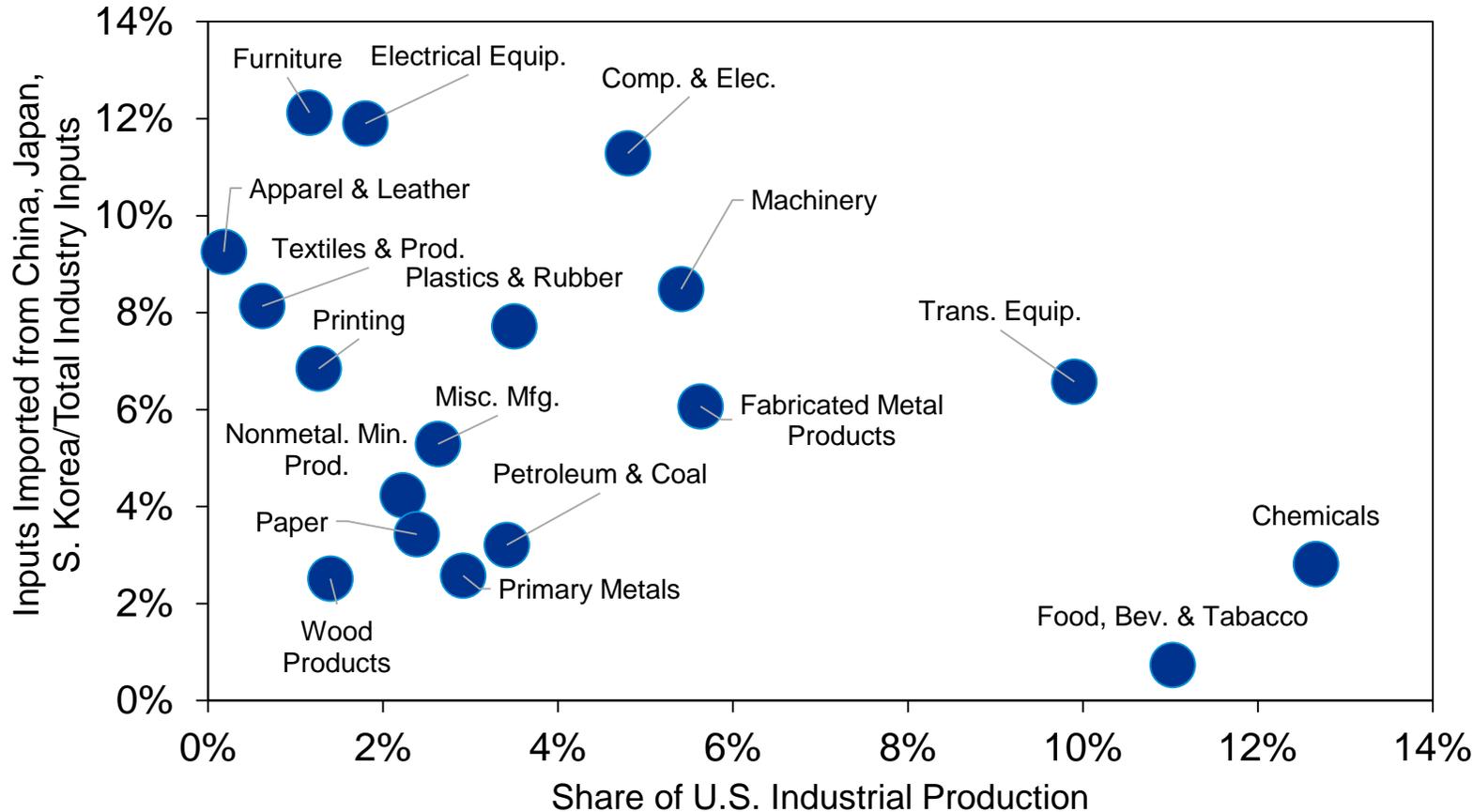
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Wide ranging manufacturing industry impact

Exposed Inputs vs. Share of U.S. Production

2018



- Transportation equipment is the most vulnerable industry; it is the largest share of industrial production and it imports close to 10% of its inputs from China, Korea and Japan.
- It is important to think about not just the share of industrial production, but the impact if a critical import is delayed due to partial factory operation in China.
- For example, the Fukushima earthquake revealed how sourcing of metallic paint was halted, impacting the auto industry and delaying auto production industry-wide.

Source: KPMG Economics, Wells Fargo, Census Bureau, Bureau of Economic Analysis, Federal Reserve Board, Haver Analytics

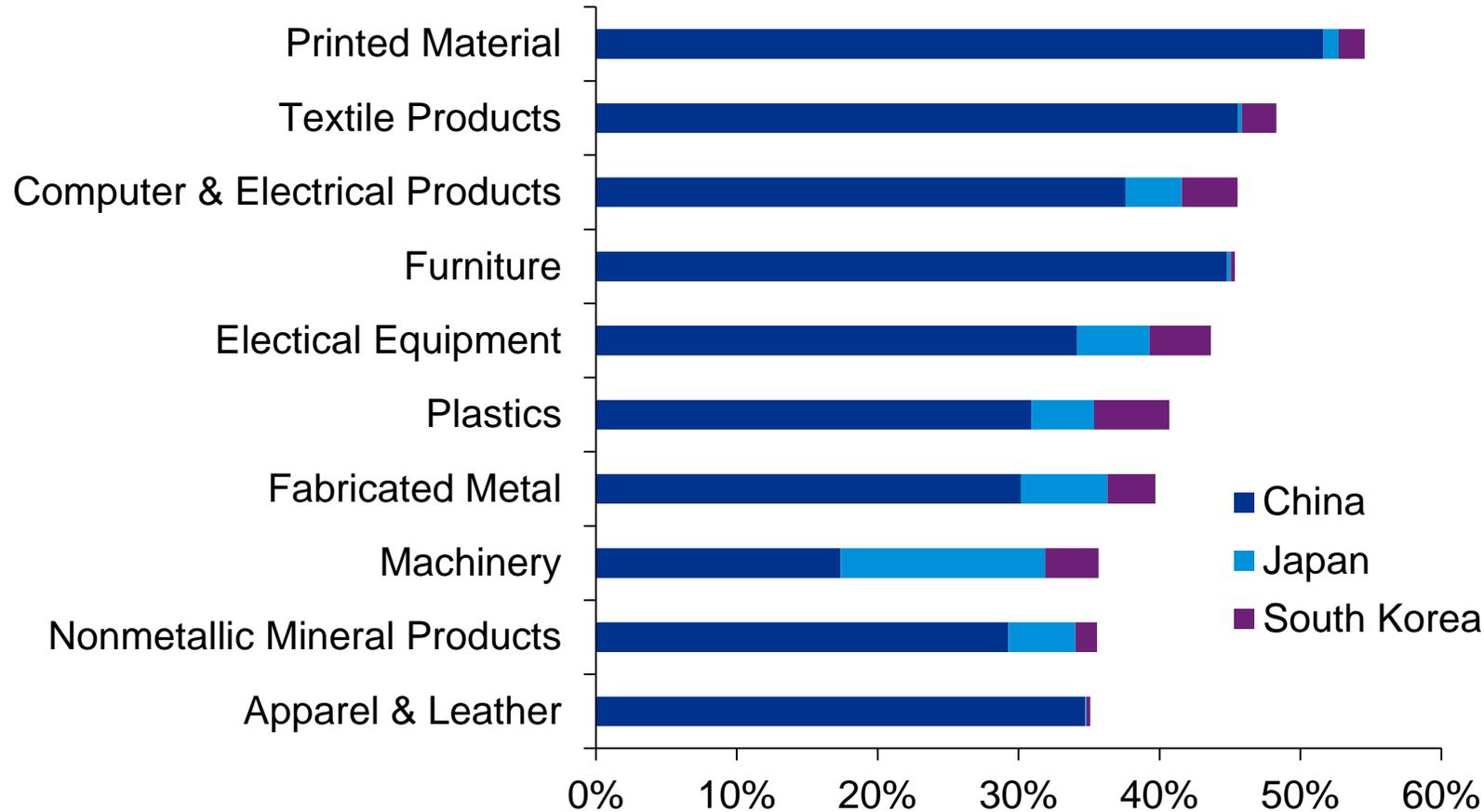


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As Asian factories remain below full capacity, impact is felt

Top U.S. Imports from China, Japan, & South Korea Share of Total U.S. Goods Imports, 2019



- Evidence that the printing industry moved to Asia can be seen in the large percent of printed materials from China.
- Textile products are used in apparel and a larger range of other industries from autos to furniture manufacturing.
- Monitoring these sectors will be important in the weeks/months ahead.

Source: KPMG Economics, Wells Fargo, Census Bureau (2019), Haver Analytics



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Concluding Thoughts

- **Developed OECD countries have the capacity to handle the response in a coordinated and timely manner with better outcomes than Wuhan. G-7 coordination is underway and the response will escalate if the virus is not contained.**
- **All countries are vulnerable to situations of high connectivity and concentration such as the outbreaks within the Korean Shincheonji Church or the cruise ship off the coast of Japan.**
- **In most OECD countries our expectation is for a “V” shaped impact, a fall in output in certain sectors with high connectivity to Asia and then a rebound in the second half of the year.**
- **Most importantly, we urge people to wash their hands frequently and avoid touching their face and greet people with a smile rather than a hand shake.**



Thank you



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