INSURANCE INVESTMENT EXCHANGE

Covid-19: Cutting through the Noise

Weekly Summary and Update

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COVID-19: CUTTING THROUGH THE NOISE

KEY FACTS AND ACCOMPANYING ANALYSIS AS OF 08-10th MAY

Some words of wisdom for this week

People can foresee the future only when it coincides with their own wishes, and the most grossly obvious facts can be ignored when they are unwelcome.

George Orwell

The escalator doesn’t work, and you’d think they’d still be used as stairs, but in this economic depression, even the stairs are unemployed.

Jarod Kintz

What some call health, if purchased by perpetual anxiety about diet, isn't much better than tedious disease.

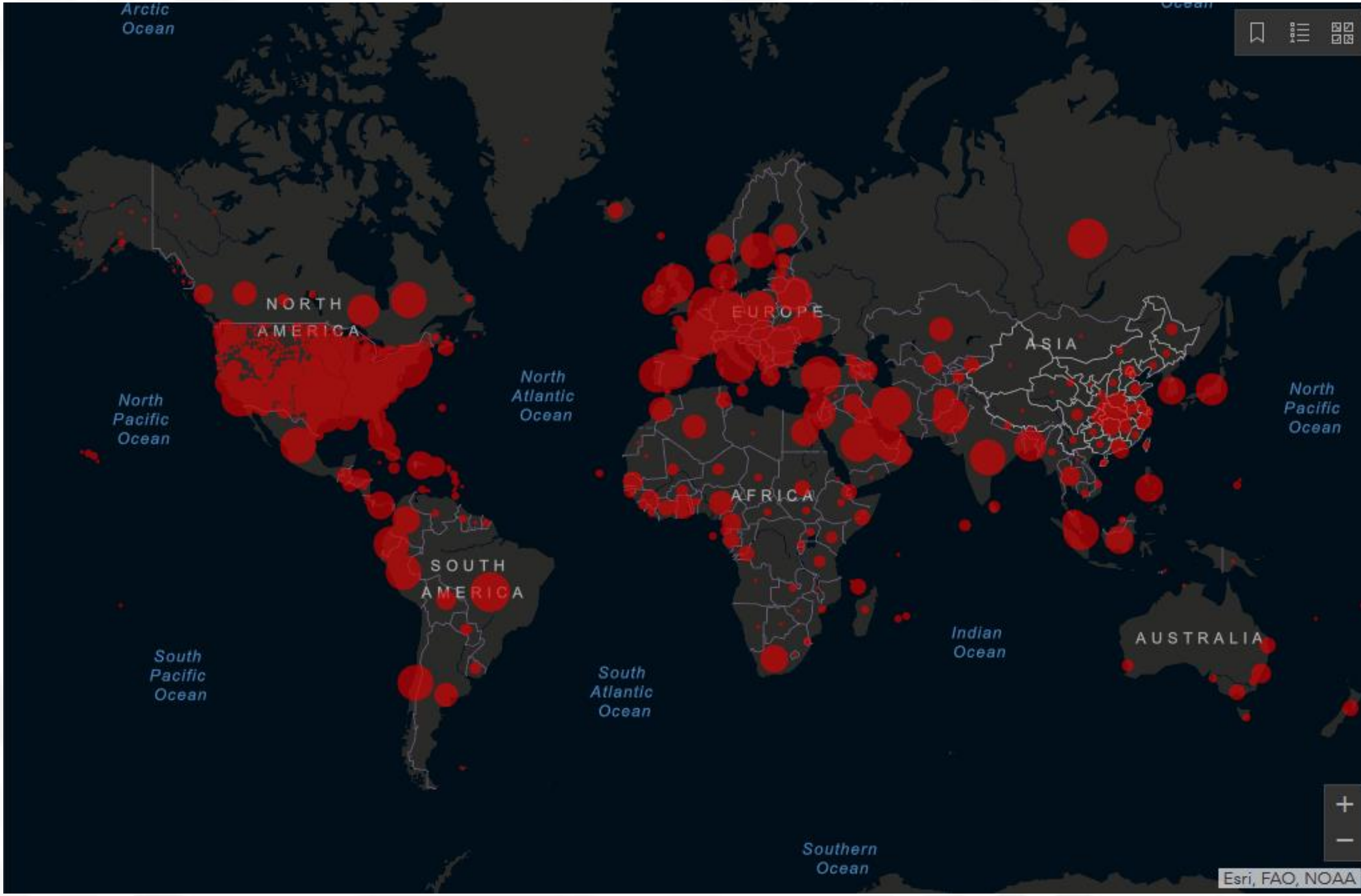
George Dennison Prentice

What's new this week

- Updated data through to end 8th May in the main.
- Updated analysis on UK fatality rates and data lags (slides 15-16)
- Updated PMI analysis and further ONS survey data (slides 23-27)
- Updated analysis on employer actions re jobs in the UK (slide 36)
- Analysis on global labour impact in terms of hours lost and across different income bands (slides 37-38)
- Estimates of fiscal stimulus globally as % of GDP (slide 51)

COVID-19: KEY EPIDEMIOLOGICAL TRENDS

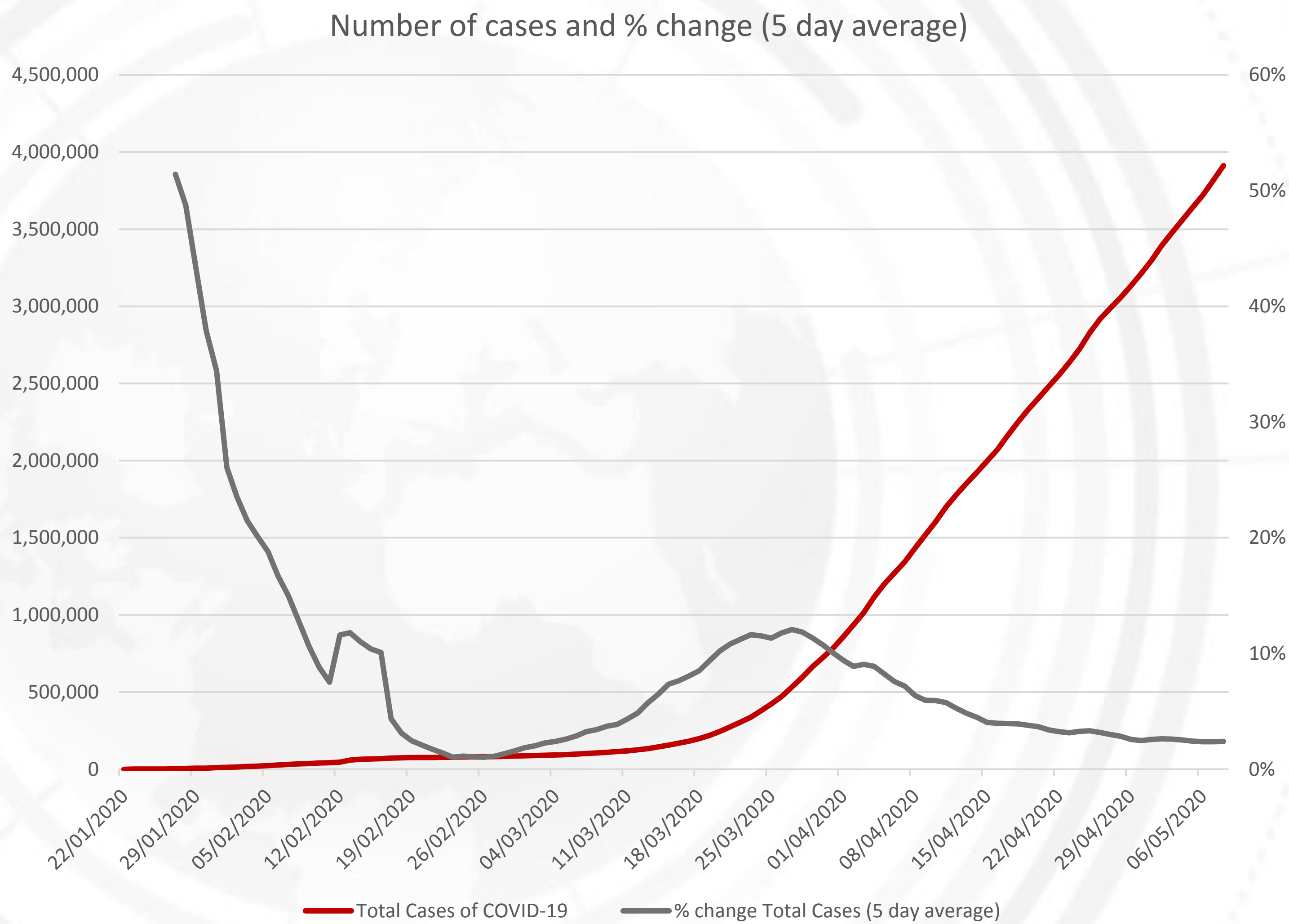
A truly global pandemic (yes, even Greenland)



Source: JHU CSSE

Now beginning to spread past the developed world and data remains patchy…

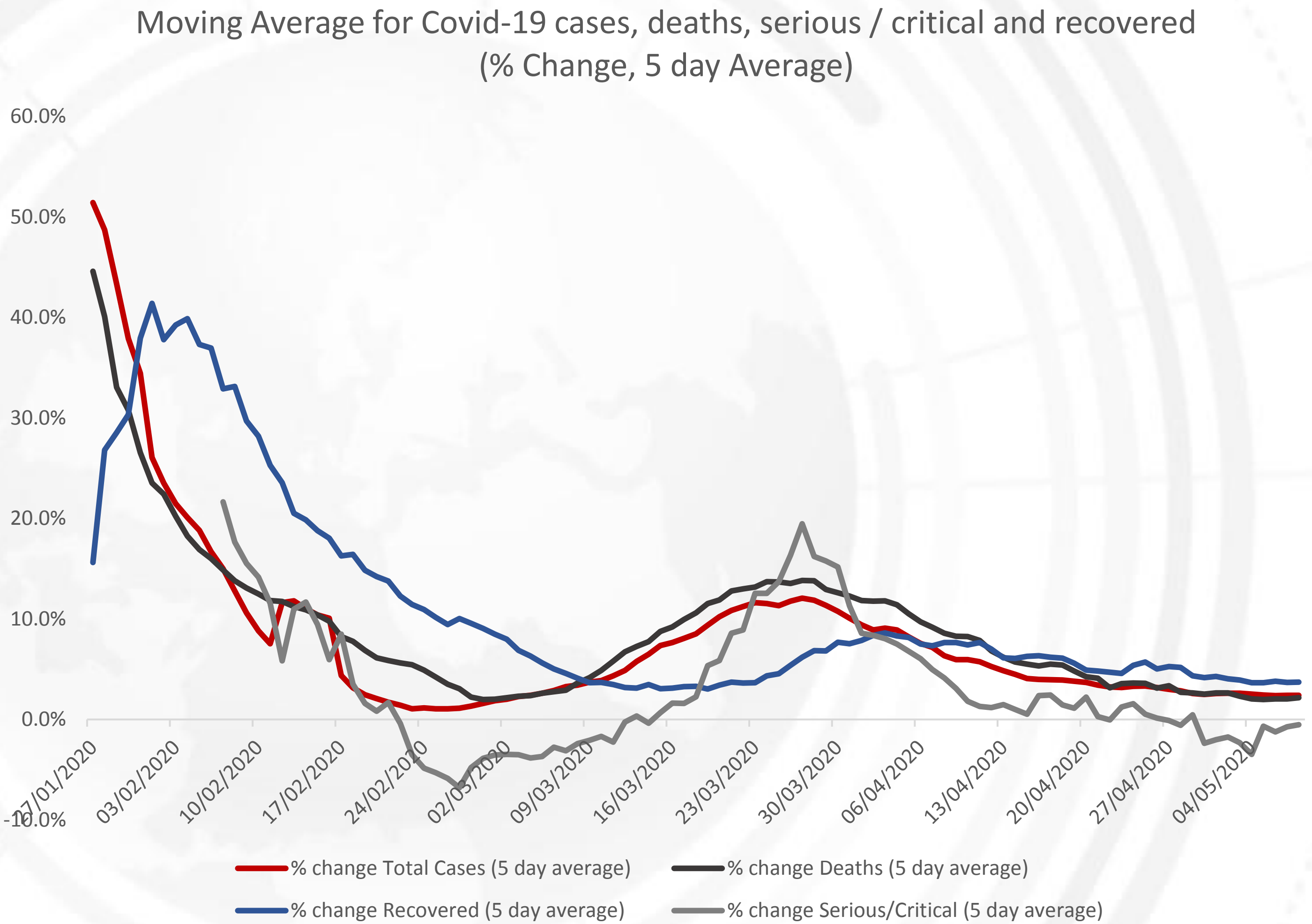
Cases still growing but rate has declined…



Source: WHO, Camdor Global

…to about 2.5% per day in recent weeks, with the 5 day moving average indicating peak growth at the end of March

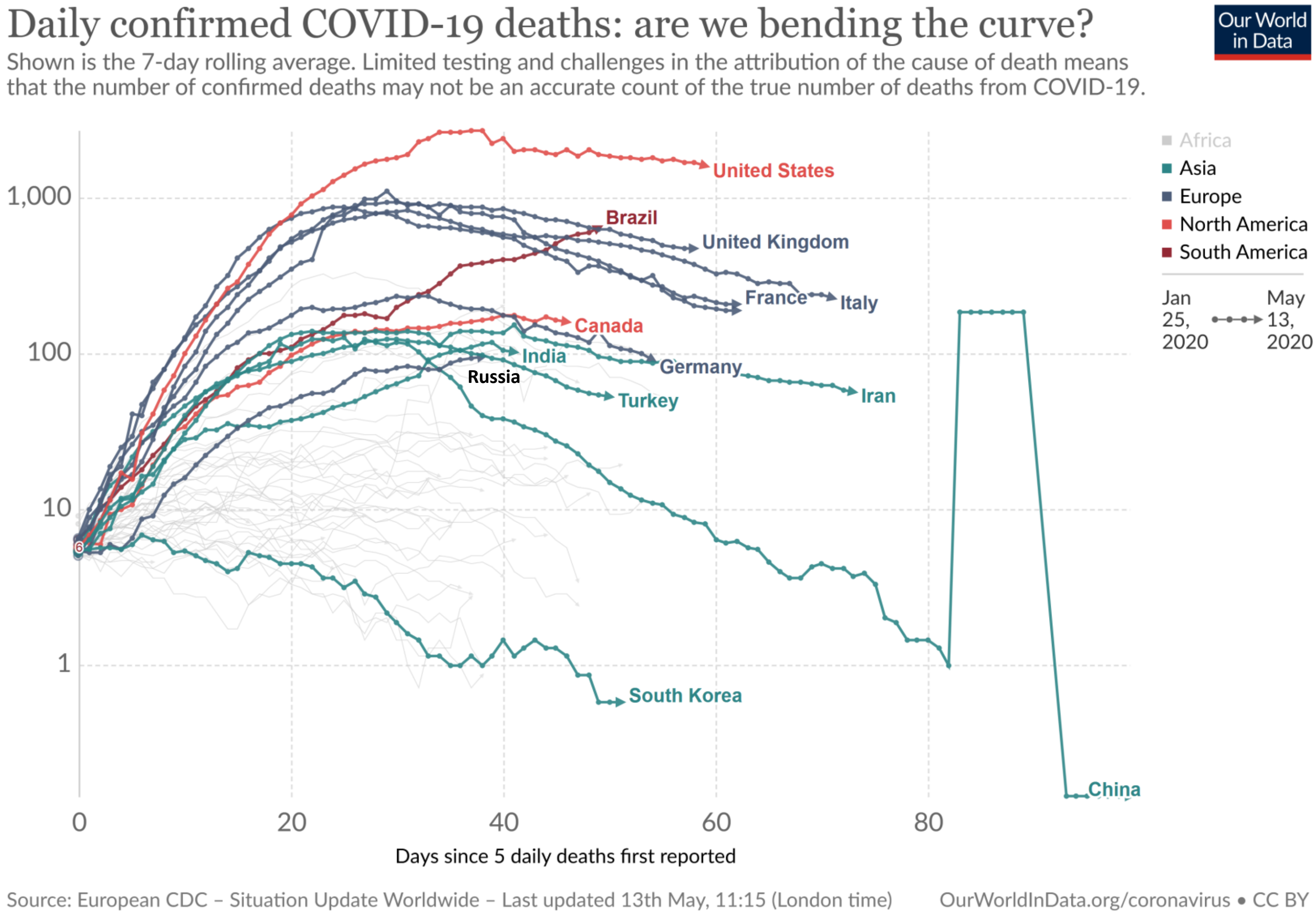
A deceleration trend is now evident…



Source: WHO, Camdor Global

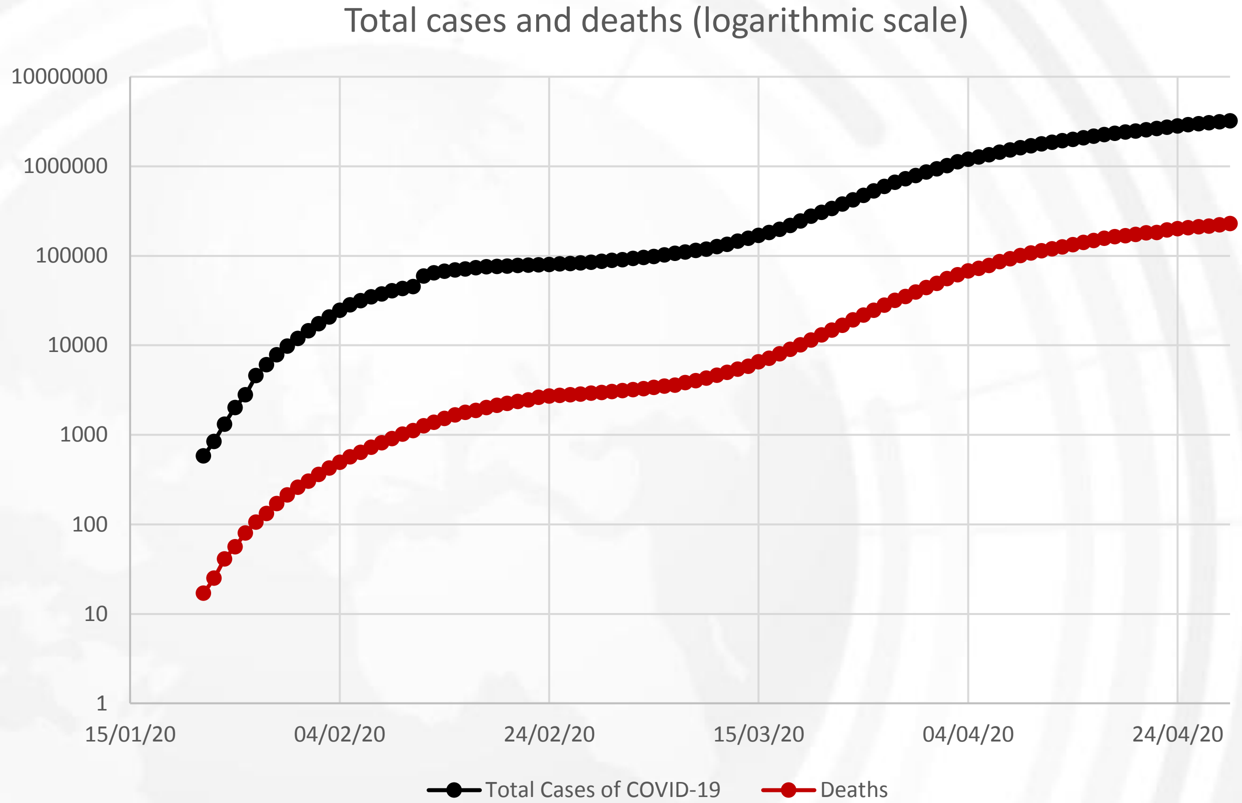
Acceleration in serious cases peaked c. 27th March, with a tapering in deaths since. Importantly, the moving average in serious cases has turned negative, though this may also be impacted by availability of relevant data in developed vs emerging markets.

As deaths slow, are countries bending the curve?



- Yes and no. The US is plateauing while Brazil is still accelerating.
- Some are recognising lagged deaths and China shows these can be significant.

Is the trend growth finally done?



Source: WHO, Camdor Global

- Slope of logarithmic plot indicates tapering off, but this may only be a lull
- Previous levelling off was broken by a second wave of new infections and deaths, as new geographic clusters emerged.
- Significant underreporting of cases/deaths outside hospitals coupled with lags in scaling up testing and new hotspots mean a new surge cannot be ruled out.
- Where are the next hotspots or are we truly getting a handle on this?

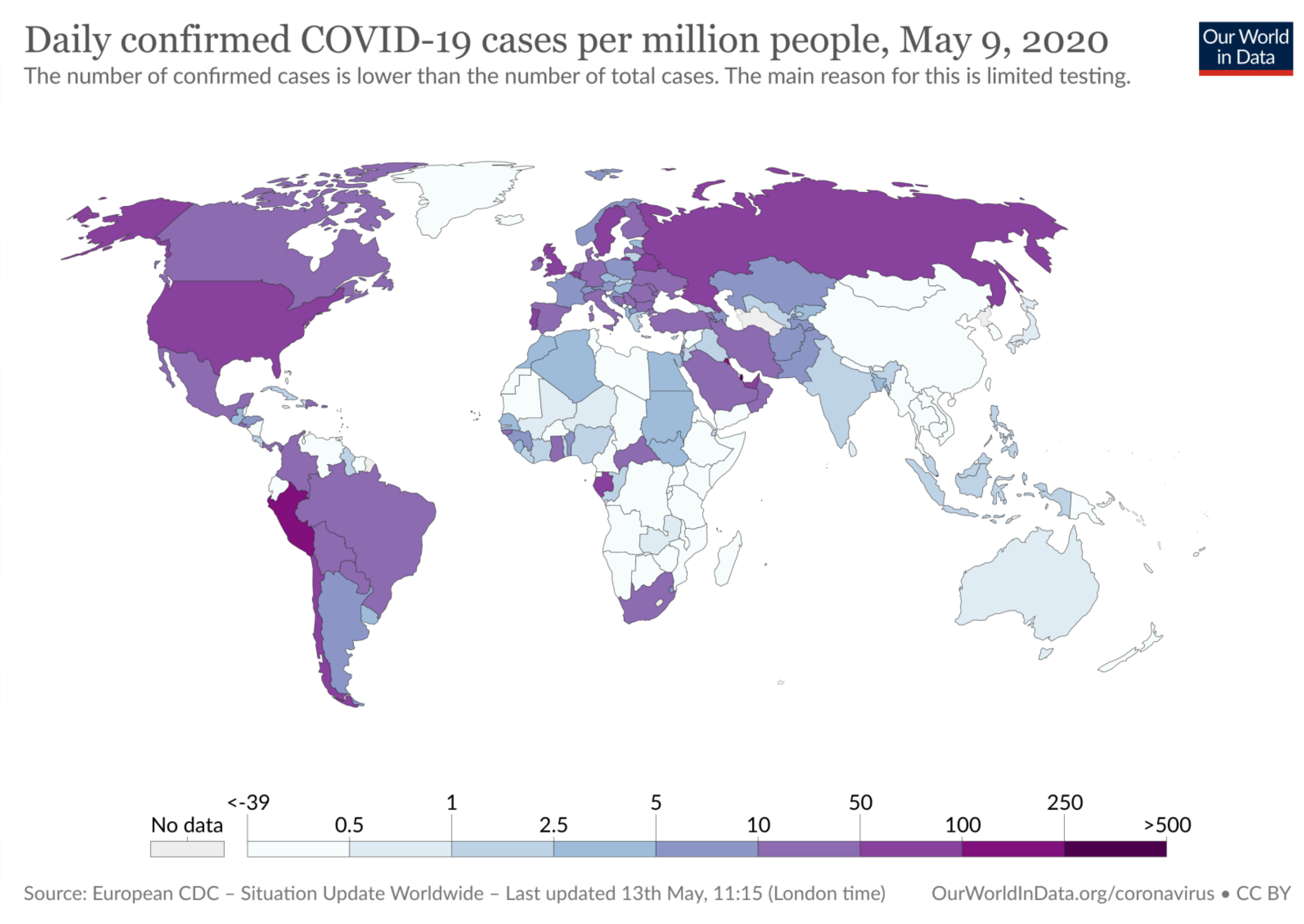
The US is the epicentre, with Europe tapering

Country	Cases	Deaths	Region	Case per mn	Deaths per mn
USA	**1,367,963**	**80,787**	**North America**	**4,133**	**244**
UK	**219,183**	**31,855**	**Europe**	**3,229**	**469**
Italy	**219,070**	**30,560**	**Europe**	**3,623**	**505**
Spain	**268,143**	**26,744**	**Europe**	**5,735**	**572**
France	**176,970**	**26,380**	**Europe**	**2,711**	**404**
Brazil	163,427	11,168	South America	769	53
Belgium	**53,449**	**8,707**	**Europe**	**4,612**	**751**
Germany	**171,879**	**7,569**	**Europe**	**2,051**	**90**
Iran	109,286	6,685	Asia	1,301	80
Netherlands	**42,788**	**5,456**	**Europe**	**2,497**	**318**
Global	**4,207,560**	**284,351**		**540**	**36.5**

Source: Worldometers

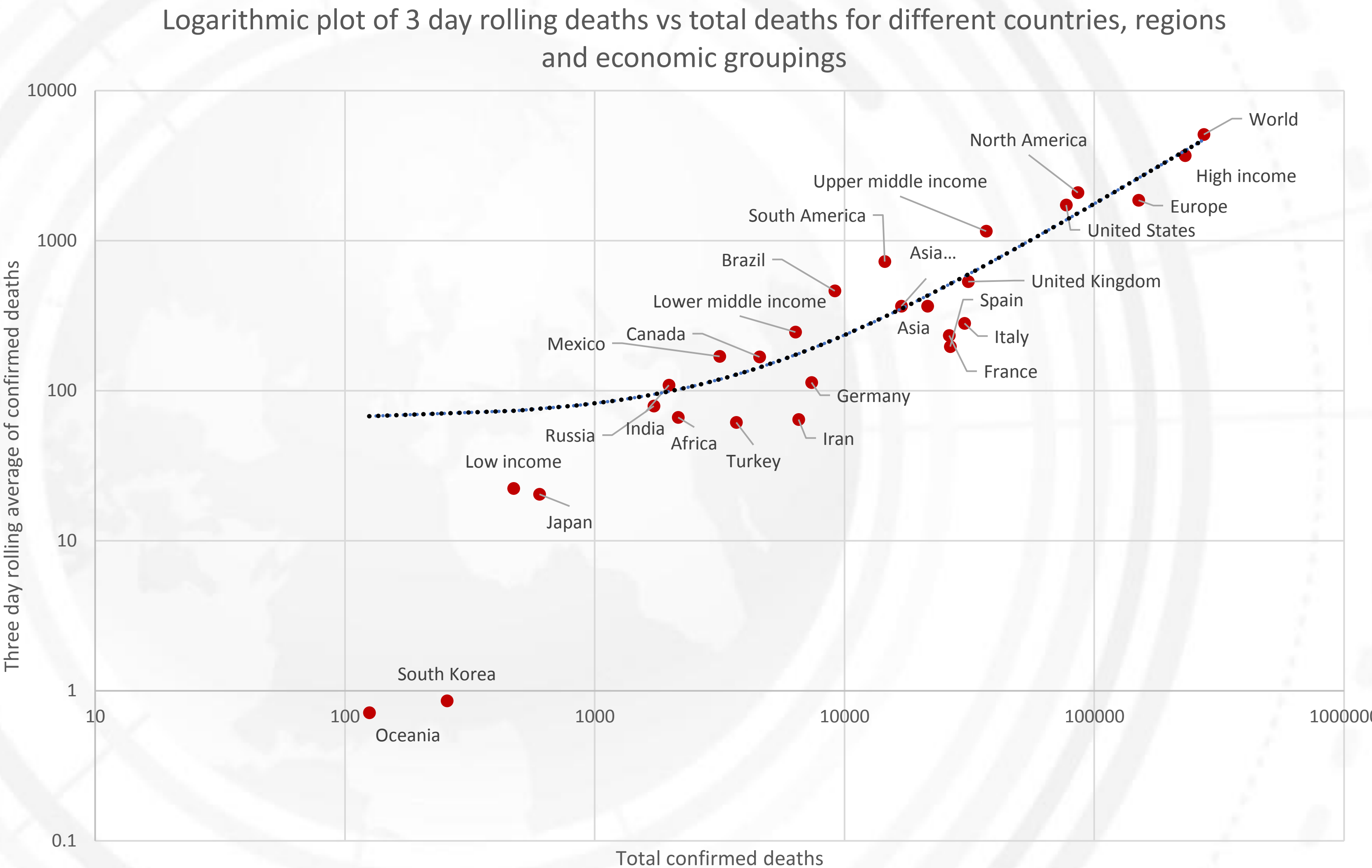
Brazil is rapidly rising up the death tables, showing signs of a new cluster emerging. Global metrics per mn are still muted, indicating we have some way to go still.

Growth in new cases no longer a Europe/US story



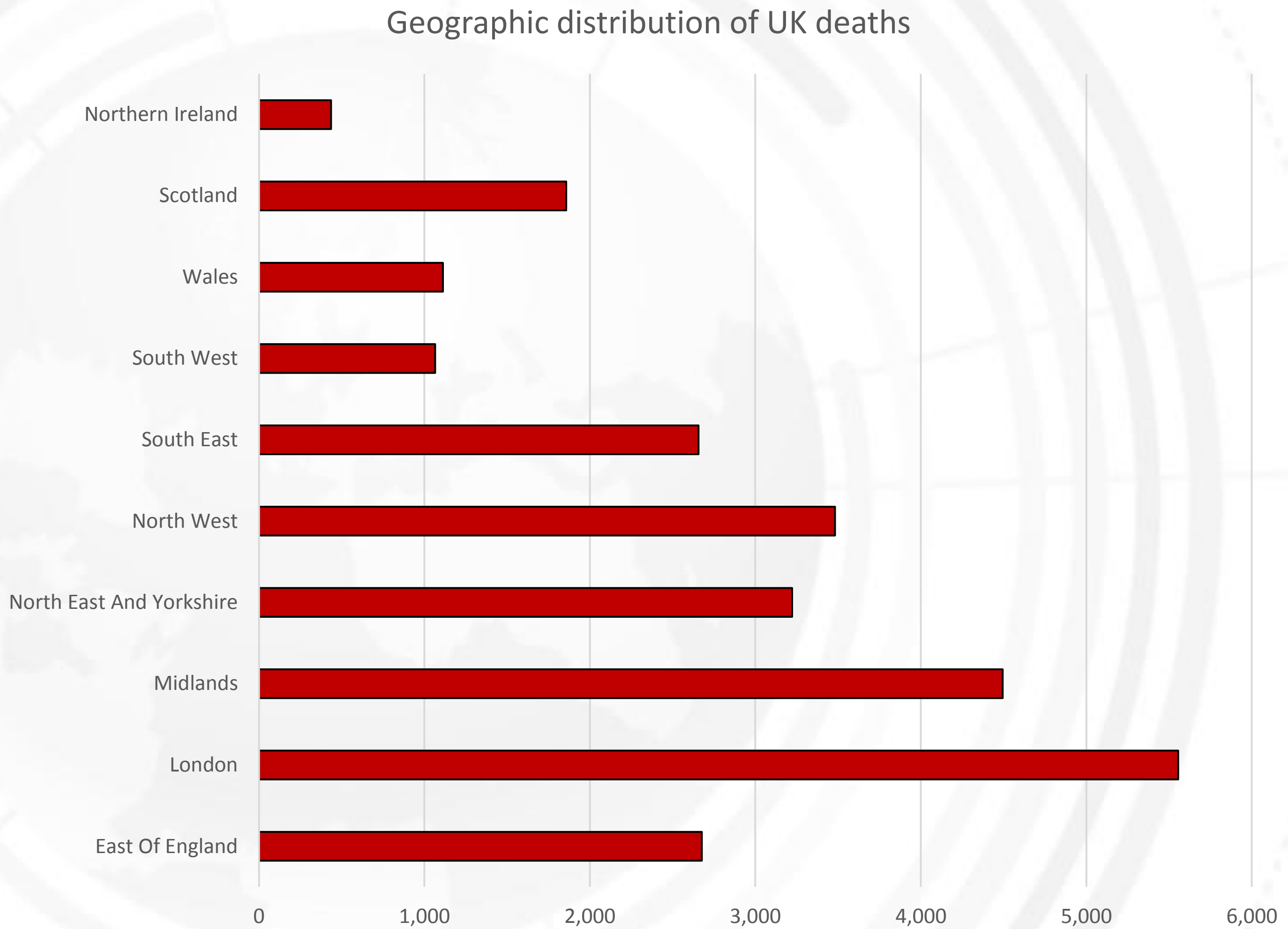
- South America and Russia are emerging new clusters.
- More worryingly, more signs of acceleration in Africa.

Where are the potential problem cases?



- Brazil, S. America, N. America and middle income countries are above trend.
- Europe is now below trend, with the UK declining to be on trend.
- This is a developed world problem now spreading down the income spectrum.

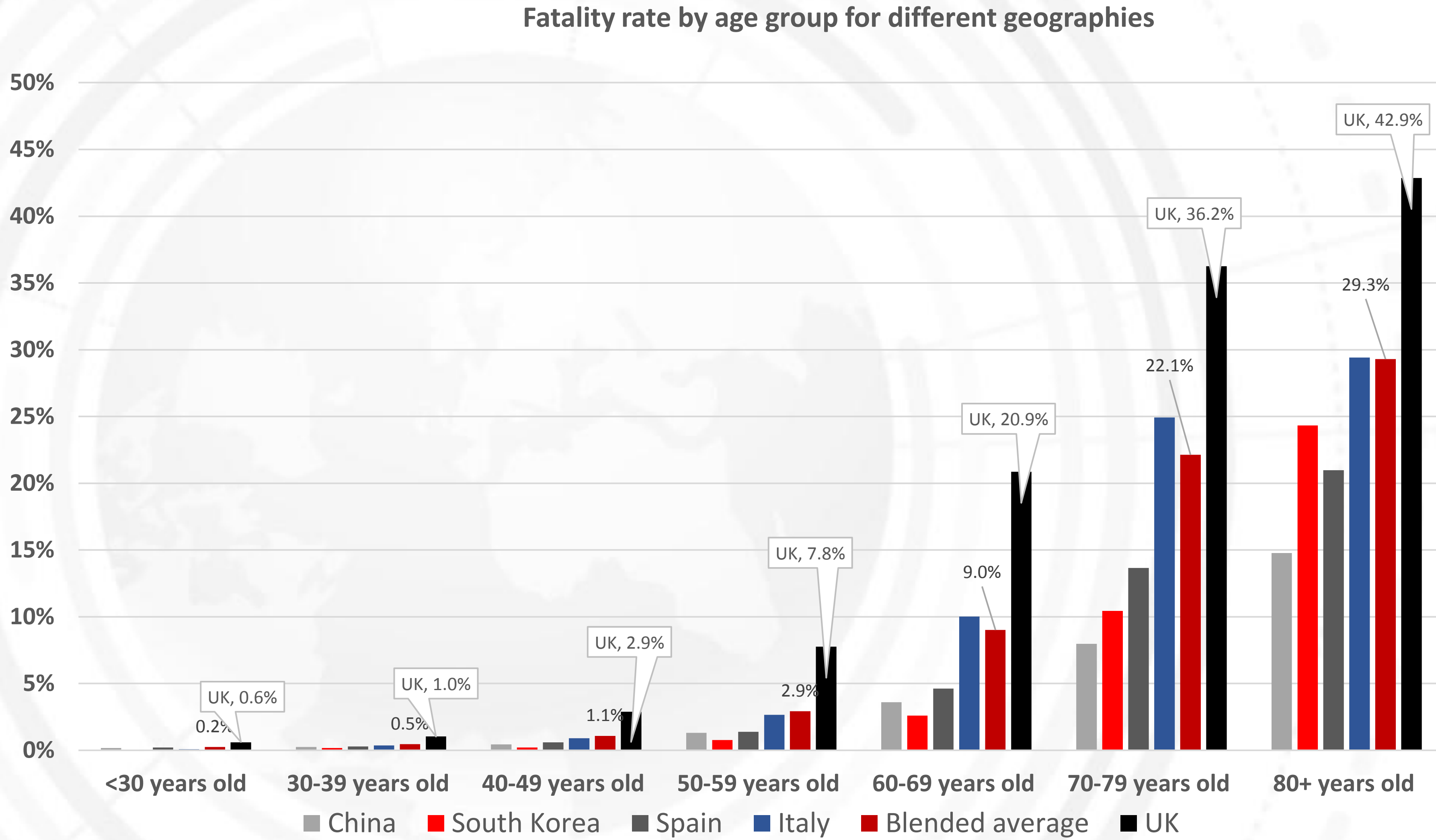
What is the geographic distribution for the UK?



Source: Camdor Global (based on various government sources)

London and the Midlands have been particularly badly hit to date. Not surprising given population densities and deeper global links. Also important to note that many deaths are only now emerging, e.g. care homes.

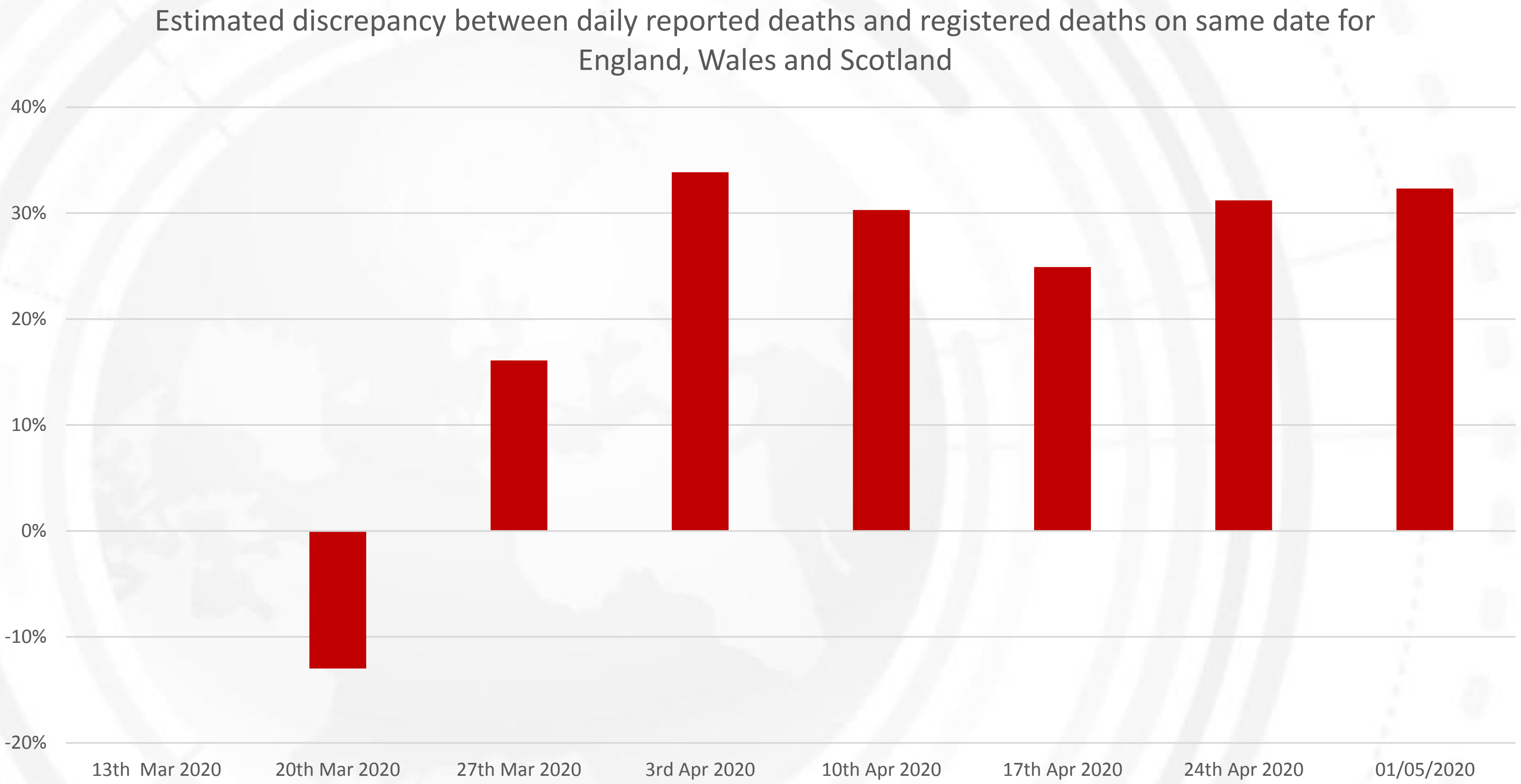
What about fatality rates?



Source: Camdor Global (based on various government sources)

Emerging data indicates the UK is particularly badly hit, though testing has been limited. Countries with significant old age populations are at risk. The Chinese data also appears to be an outlier.

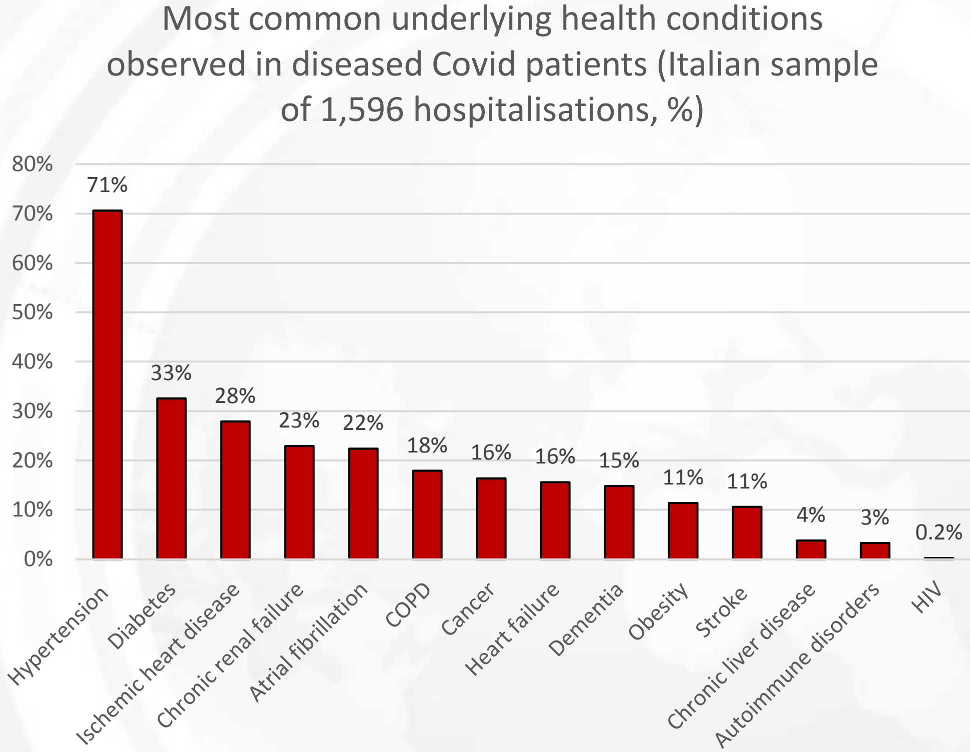
What is the true number of deaths?

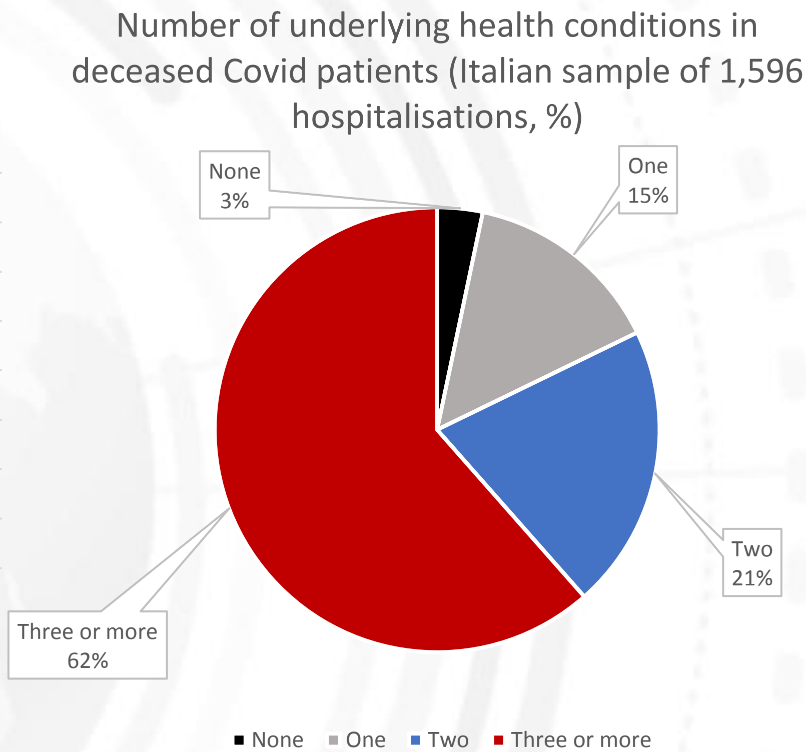


Source: Camdor Global (based on various government sources)

- Government numbers are estimates and till recently, covered only hospital deaths, while public register data captures all deaths albeit with a lag.
- Data indicates a discrepancy of a third on average. Allowing for data lags and despite the government now including care homes, the true number of deaths today is likely to be closer to 42-45,000 deaths, not 31,600 as reported.

Understanding what contributes to deaths…





Source: Camdor Global based on Italian govt data

- We examine recent Italian analysis, which indicates that for hospitalised patients, cardiovascular diseases and diabetes in particular stand out as significant risk factors.
- Having multiple underlying conditions significantly increases risk as well.
- But 3% had no underlying conditions, which indicates an aggressive viral disease

COVID-19: REAL ECONOMY IMPACT

The impact on global travel remains dramatic

Global Scheduled Flights Change year-over-year

Week compared with equivalent week in previous year i.e.
Monday 6 January 2020 vs. Monday 7 January 2019.

OAG

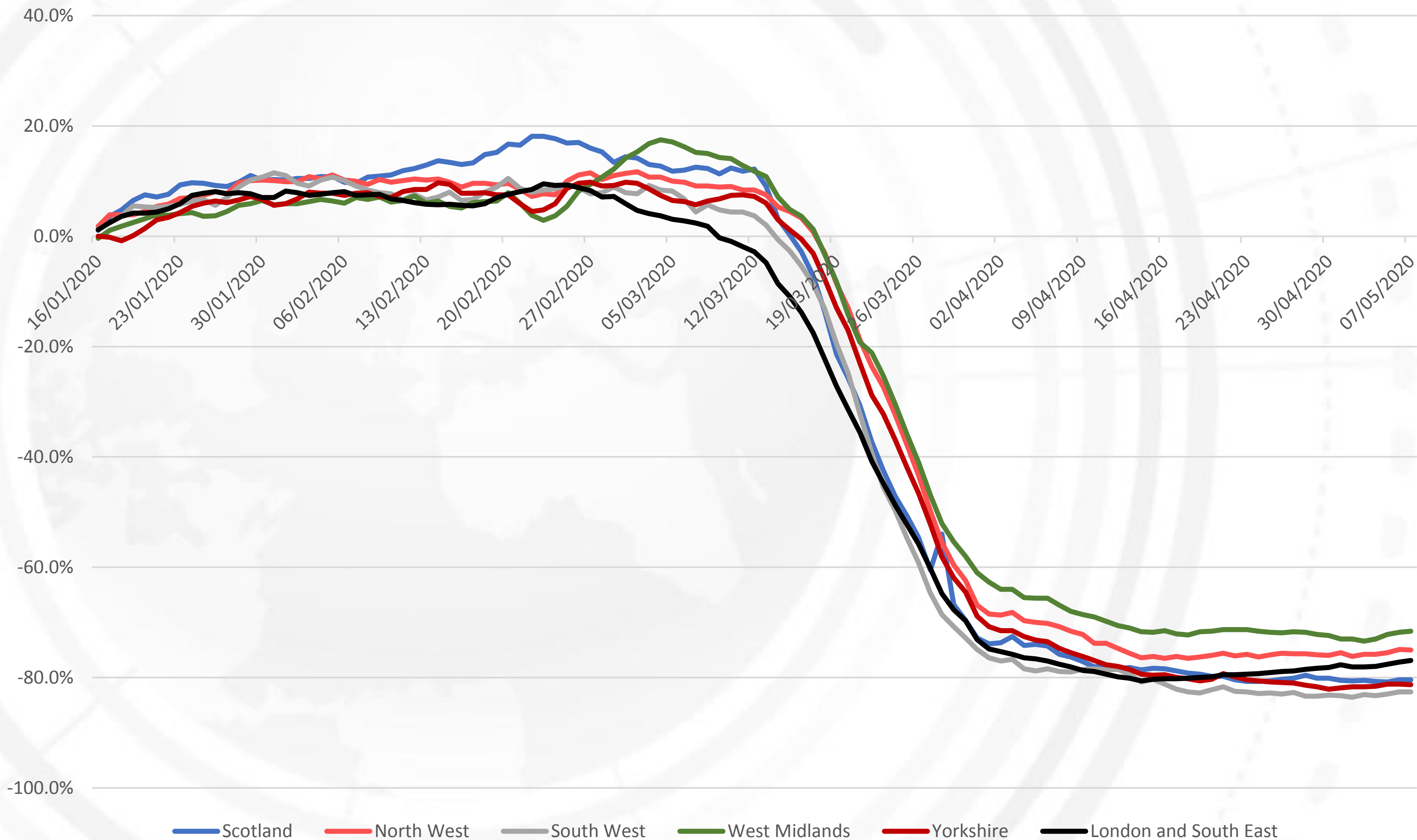
Region	Jan	Feb	Mar	6 Apr	13 Apr	20 Apr	27 Apr	4 May	11 May
ALL	0.8%	-8.6%	-14.8%	-59.2%	-64.9%	-67.2%	-66.8%	-69.9%	-68.4%
Spain	-3.7%	-1.8%	-23.2%	-92.6%	-94.2%	-95.1%	-94.1%	-92.3%	-92.1%
Hong Kong	-9.7%	-46.5%	-77.6%	-92.3%	-94.2%	-94.5%	-93.2%	-93.6%	-89.7%
Germany	-8.5%	-6.9%	-30.7%	-92.6%	-92.5%	-93.7%	-92.9%	-90.5%	-91.2%
Singapore	-0.1%	-16.1%	-43.1%	-89.9%	-92.5%	-97.1%	-95.9%	-97.0%	-96.9%
Italy	-3.3%	-4.2%	-48.0%	-89.0%	-92.2%	-81.2%	-80.2%	-78.1%	-78.3%
France	-0.8%	0.4%	-15.3%	-87.0%	-92.1%	-91.7%	-91.8%	-91.9%	-91.1%
UK	-3.8%	-3.3%	-22.8%	-90.7%	-92.0%	-93.2%	-93.5%	-92.5%	-92.3%
Australia	-3.5%	-3.2%	-5.7%	-78.1%	-84.6%	-83.7%	-84.4%	-83.0%	-83.6%
Sweden	-9.2%	-5.6%	-22.7%	-84.2%	-84.4%	-90.0%	-89.8%	-88.5%	-88.5%
UAE	-1.9%	-3.0%	-23.1%	-84.4%	-78.5%	-79.7%	-81.4%	-78.1%	-77.4%
South Korea	2.2%	-11.6%	-49.5%	-59.3%	-60.5%	-58.8%	-48.5%	-49.5%	-50.7%
USA	1.7%	1.2%	-2.2%	-45.2%	-58.0%	-60.8%	-63.5%	-74.5%	-74.7%
India	2.1%	6.3%	7.6%	-71.1%	-79.9%	-88.5%	-93.6%	-90.9%	-66.8%
China	4.3%	-55.1%	-40.2%	-46.2%	-42.6%	-42.4%	-39.2%	-32.0%	-27.4%
Japan	2.4%	-3.5%	-16.5%	-32.0%	-40.1%	-44.4%	-44.6%	-47.0%	-47.9%

Source: Schedules Analyser

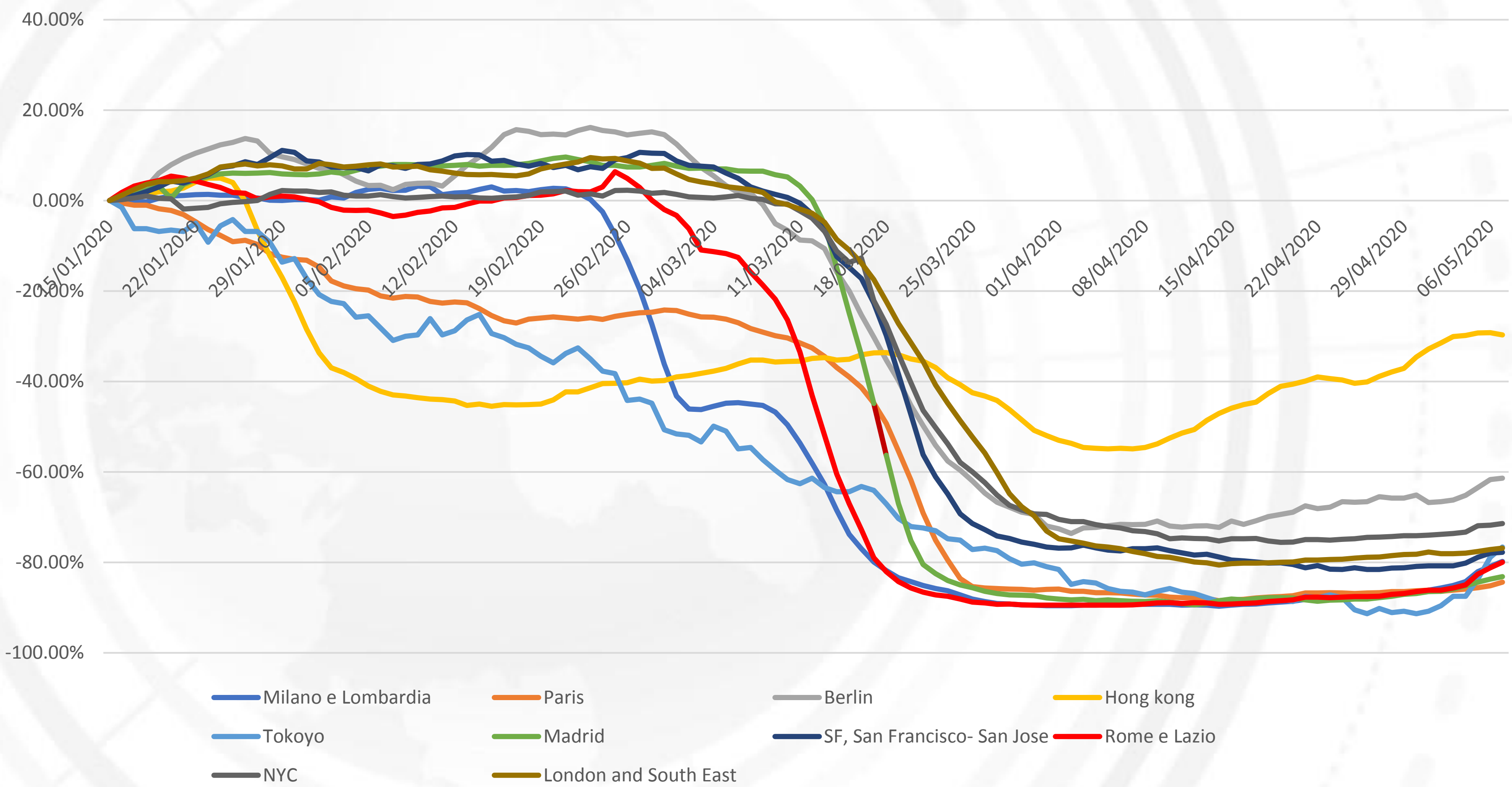
Source: OAG Aviation Worldwide

- Scheduled flights globally down by 68% yoy, with US down 75% and UK down 92%.
- Lockdowns, restrictions and worries about imported (re-)infections continue to weigh.
- China is easing, but largely domestic flights and likely aided by government subsidies to encourage travel – a likely direction of travel for many. Sicily, for example, recently mooted an idea to pay half the air fare for tourists.

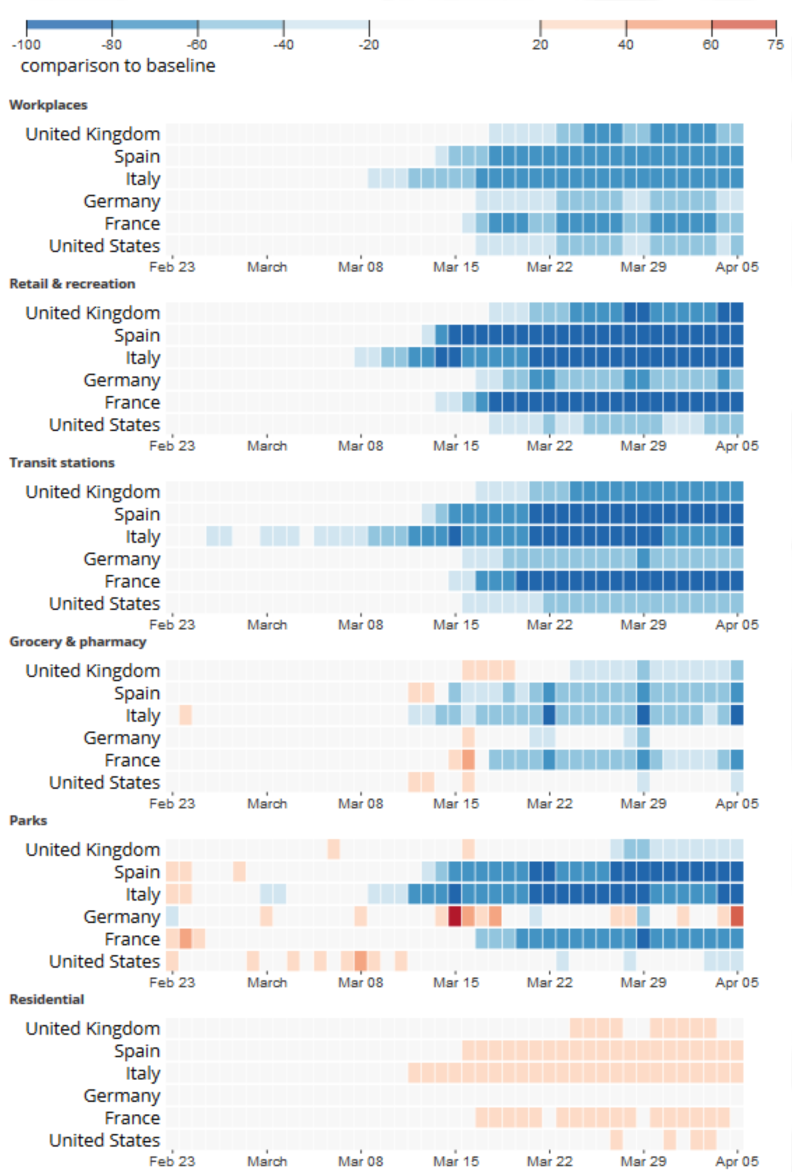
Public transit usage down sharply across the UK…



…but some emerging signs of normalization



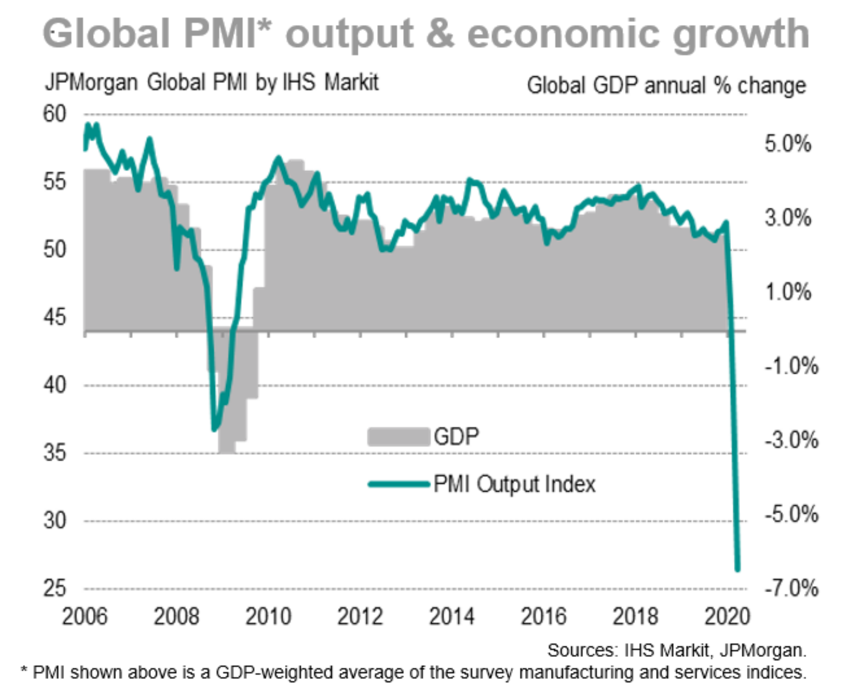
Mobility has fallen across the board

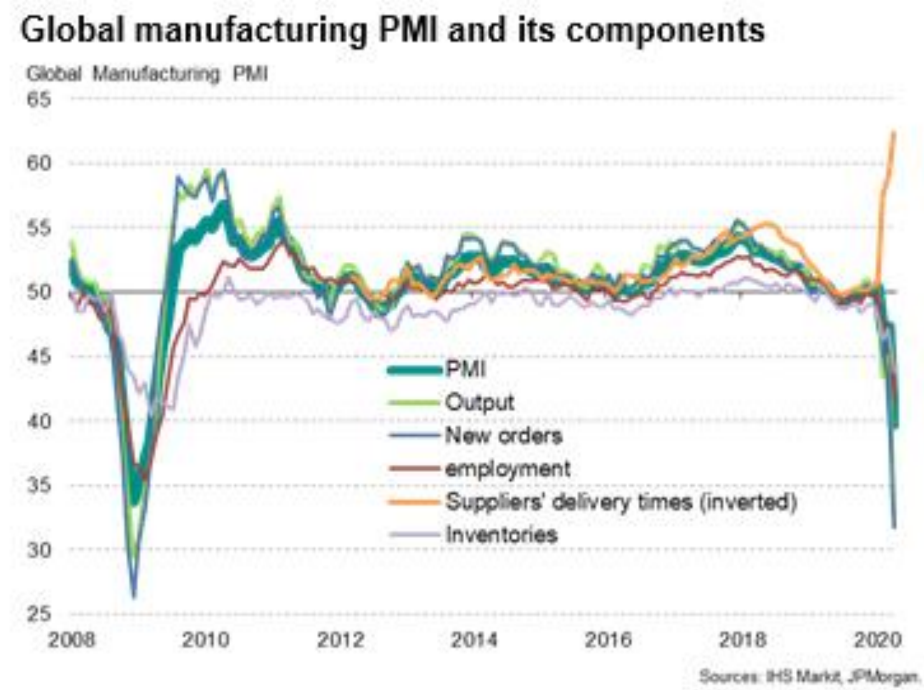


Source: Office for National Statistics, Google Community Mobility Reports

- The data examines a range of G20 countries over the last 6 weeks.
- Lockdowns are pervasive and hitting across the economic ecosystem
- Even grocery and pharmacy stores are down from their baseline generally, after initial spates of panic buying.
- The US has a lower reduction across the board, which speaks to both conflicting attitudes across the country and differing state policies
- Both the US and UK were slower to cut mobility than central Europe.
- This is an economic system, whose arteries have stopped flowing.

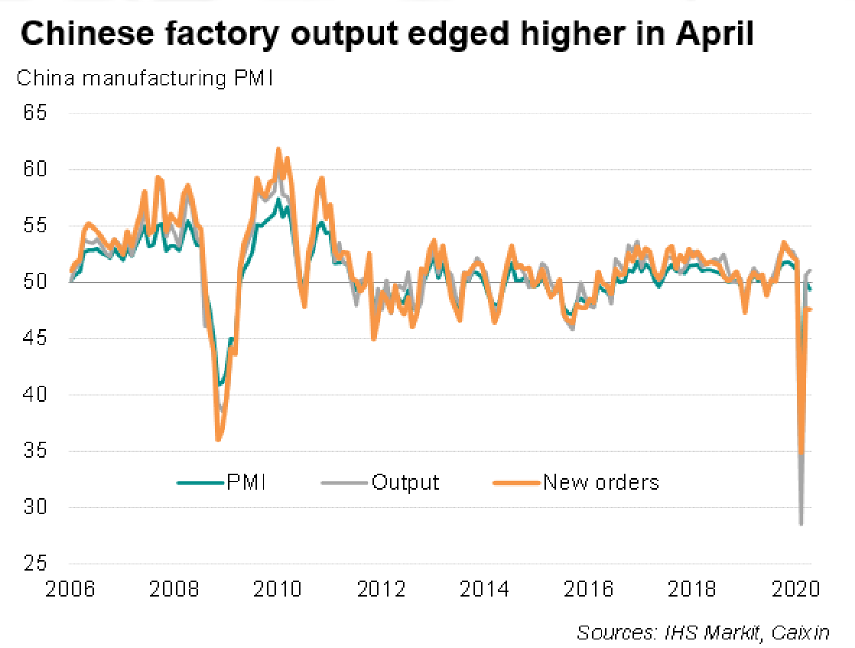
Global PMI shows significant deterioration…

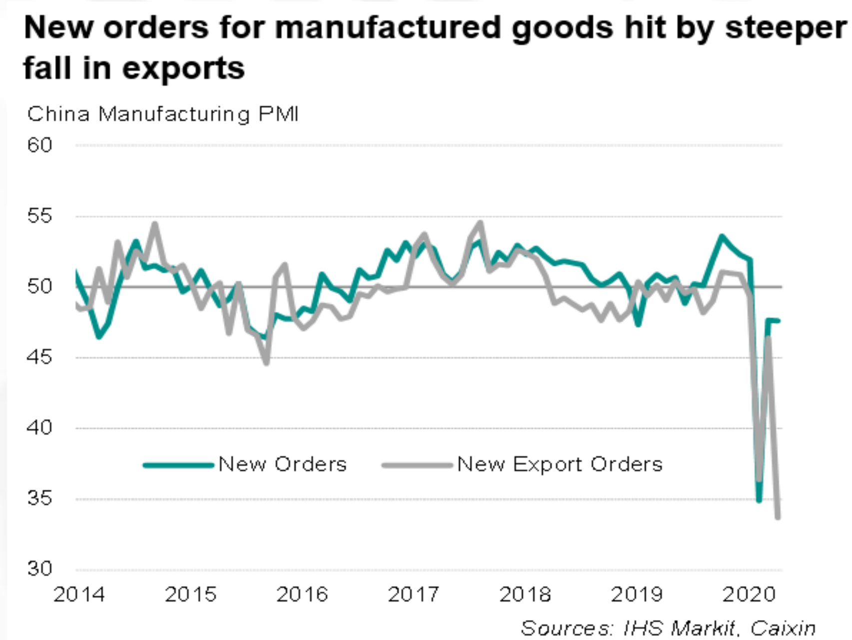




- Worst set of readings since the financial crisis, and indicating a worsening economic contraction, with implied global GDP contraction of 6% annualised.
- Steepest decline in services in survey’s history and manufacturing getting close to 2009 lows.
- But results also masked by most substantial delivery delays on record.
- Under PMI methodology, delays are a positive contributor as they imply increased demand and a backlog of orders. But here, delays indicate stress in the supply chain - factory closures, Covid related restrictions, input shortages etc.
- In other words, a supply shock and not a positive sign. Real PMI worse than headline suggests.

…But China's bouncing back?

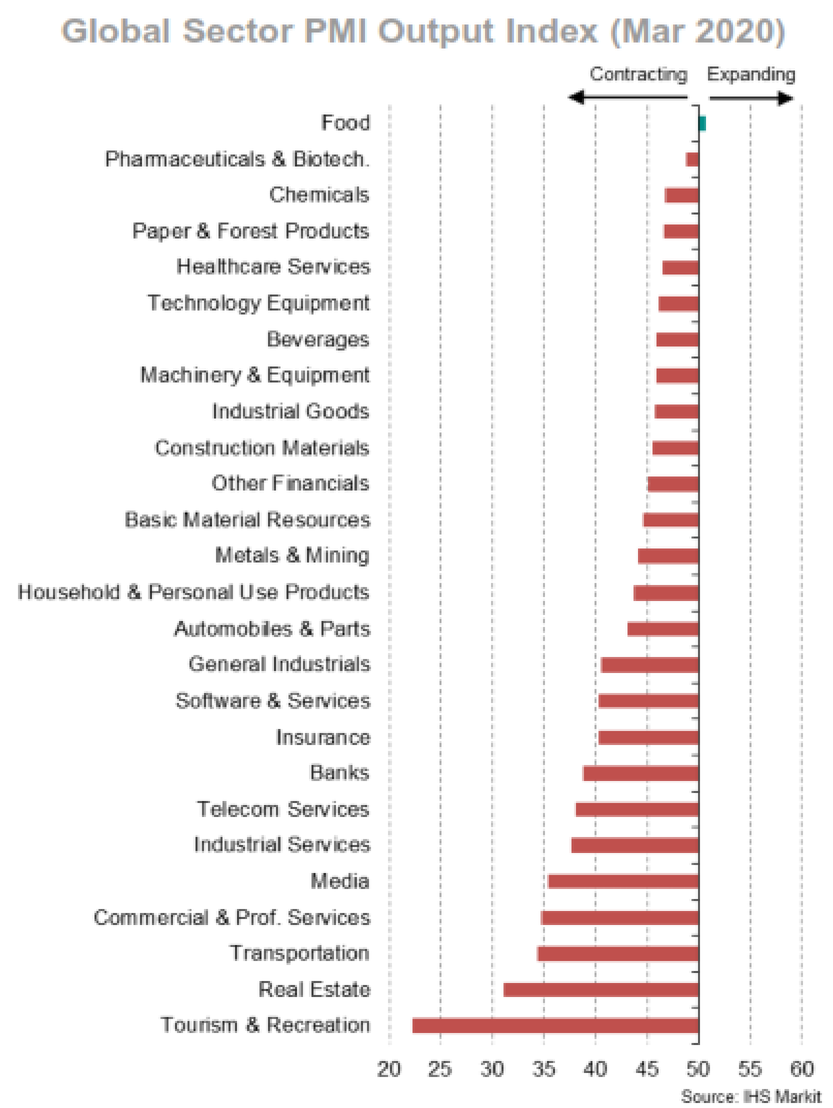




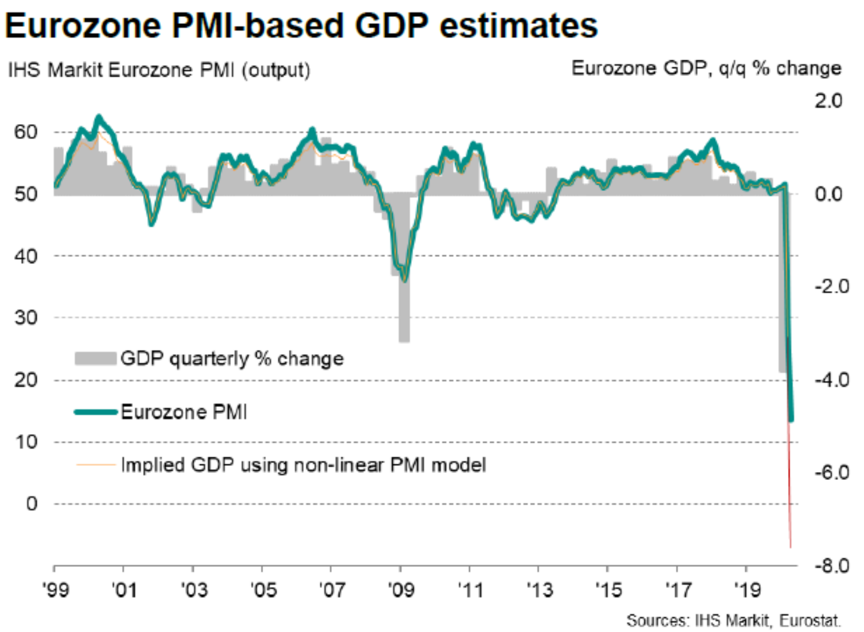
- China factory output in April only edged slightly higher while the headline PMI fell slightly.
- This indicates further deterioration and at best a reaffirmation of the new lower normal we argued before, which does not bode well for a V shaped recovery.
- Largest monthly drop in new export orders since Dec 2008 and reversal of stabilisation is another negative omen. A reflection of current global demand (or lack thereof).
- Fourth straight month of job losses and third straight month of falling prices.
- Yes, inputs like oil are going down, but so is demand with manufacturers resorting to price discounting and layoffs to rescue cashflow and rebuild margins.

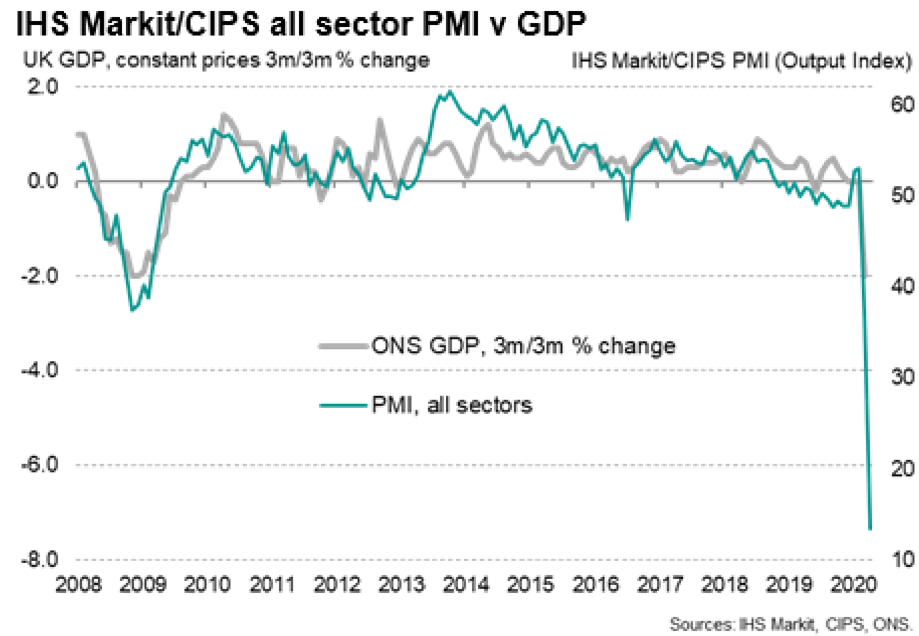
Where is the hit?

- Tourism, not surprisingly, but also real estate
- A broad based decline, implying a widespread shutdown. But also importantly some of the worst hit areas are not ones where you would expect to see a rapid recovery to pre-pandemic levels - particularly if behavioural confidence is impacted in the longer run, as people worry about re-infection and further waves.
- That does not bode well for the V-shaped recovery some are hoping for.
- It is also important to note that from the data, orders have collapsed and demand taken a cliff-edge plunge.
- The result has also been rapid cuts in employment (the largest fixed cost for most businesses) and discounting to salvage sales and margins.
- That implies lost demand and lost capacity, which will take time to rebuild, rather than instantly coming back on.



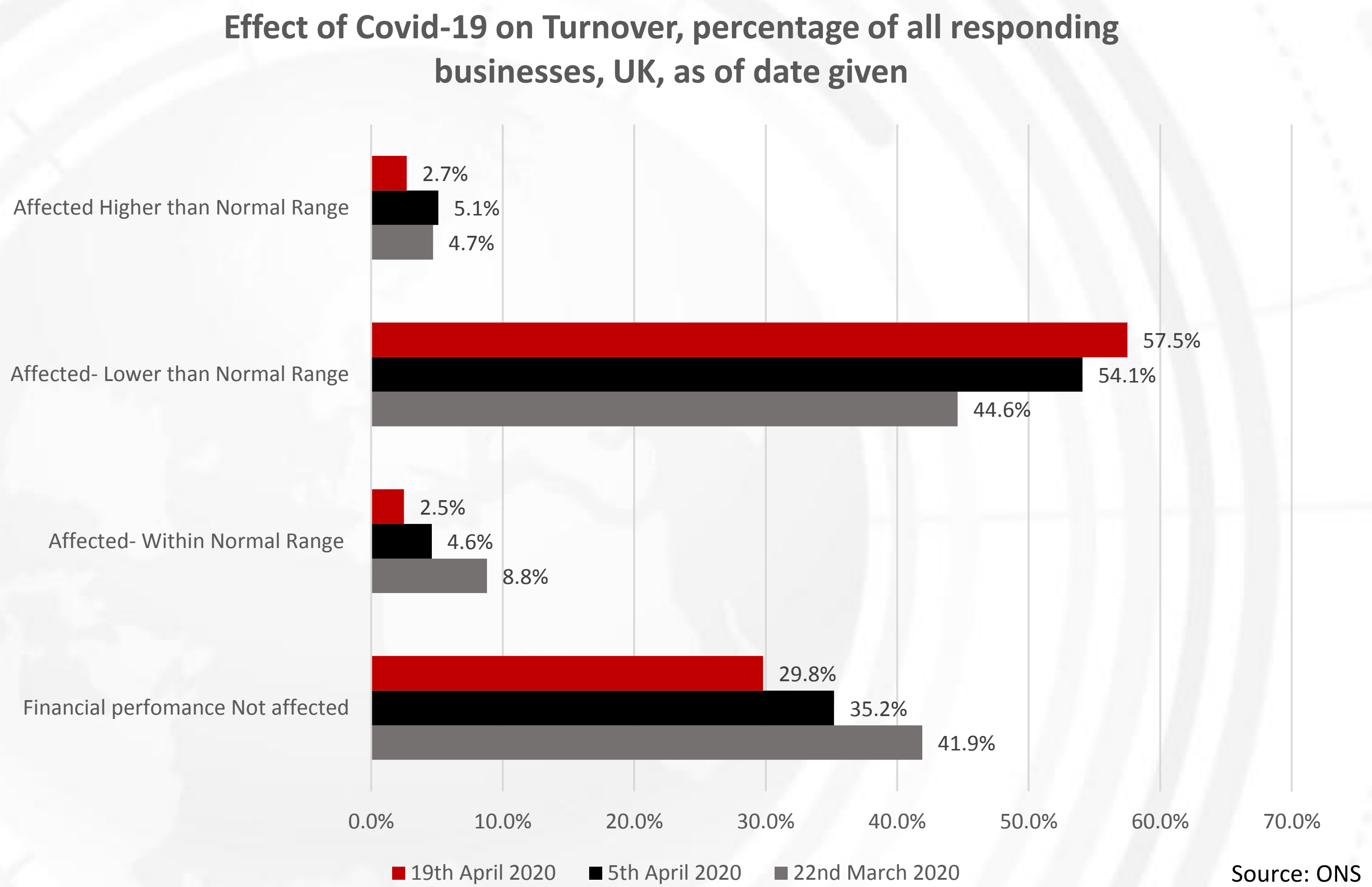
Major economies are suffering





- PMI shows steep declines in business activity significantly in excess of the last financial crisis, with the Eurozone and UK both faring worse than the US or Japan, though it's all relative.
- UK data indicates the annualised of contraction will increase further. Estimates from our non-linear model indicate 8-9% of GDP contraction in April on an annualised basis.
- Lags in survey gathering and continued uncertainty in May leave room for more pain.
- Services faring worse than manufacturing is a common theme across the board.
- Jobs and price cutting the norm, coupled with significant supply chain stress.

The signs going forward for the UK are not positive

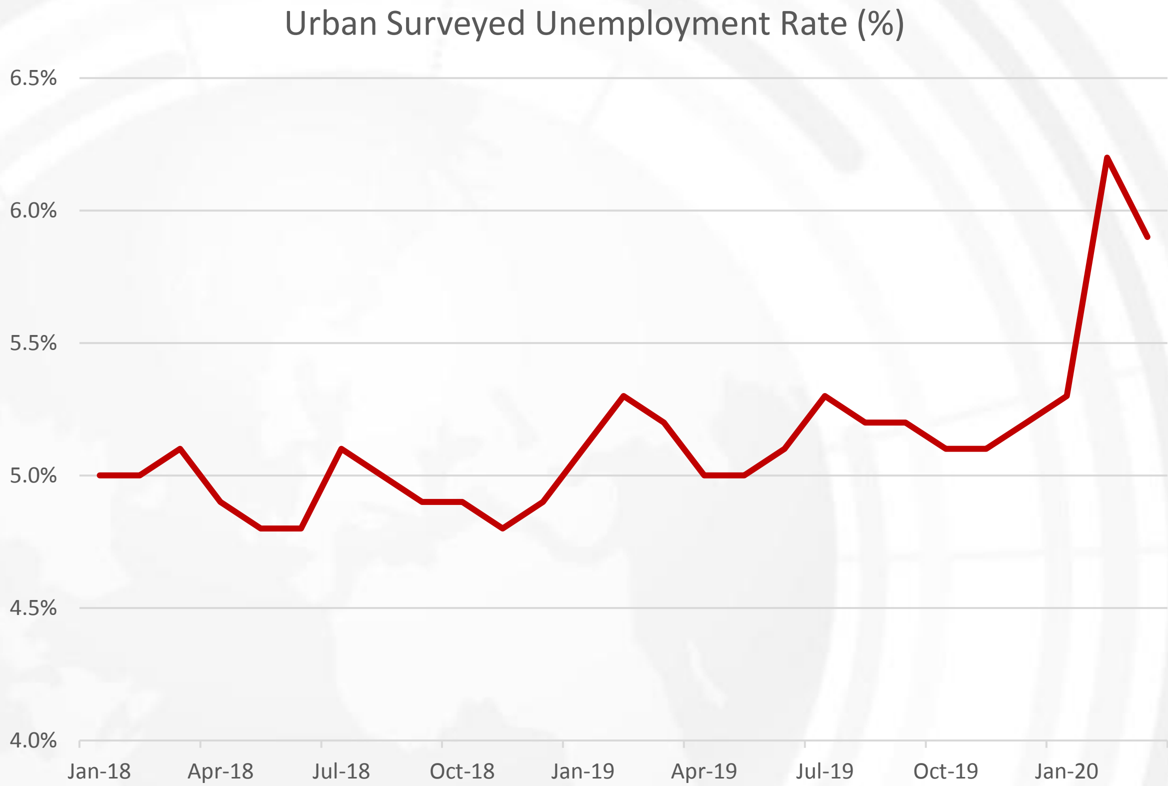


Source: ONS

- Rapid fortnightly surveys as of 22nd March, 5th April and 19th April show a worsening picture with over 57% of businesses showing lower turnover outside normal ranges
- This also ignores the selection bias the above survey has of excluding those that have ceased or paused trading during the period. Including those would have significantly worsened numbers, e.g. 23% of respondents had paused trading.

COVID-19: WHAT ABOUT JOBS?

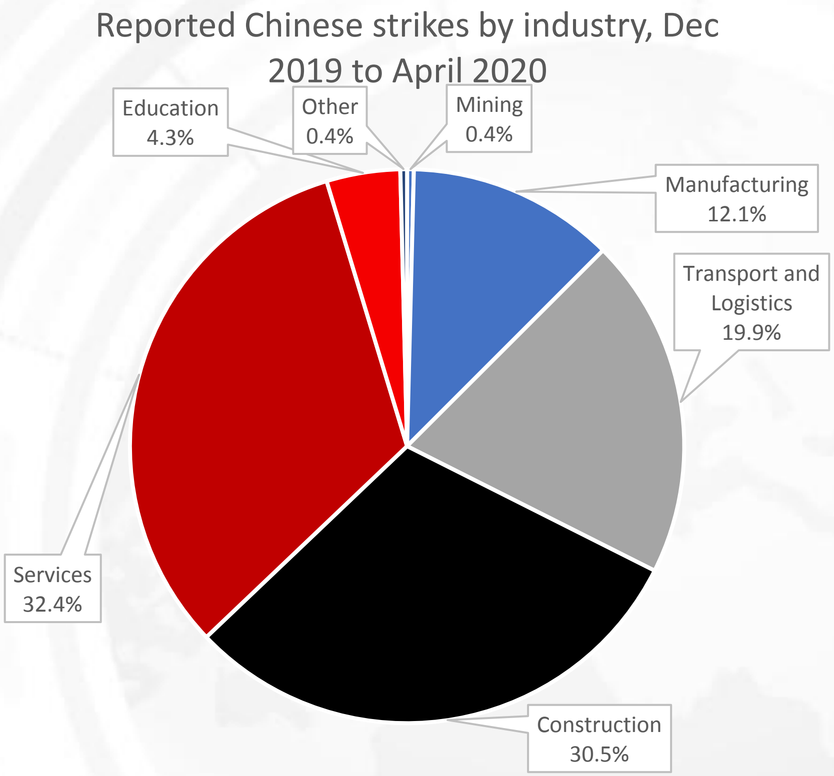
Reading Chinese tea leaves: How many job losses?

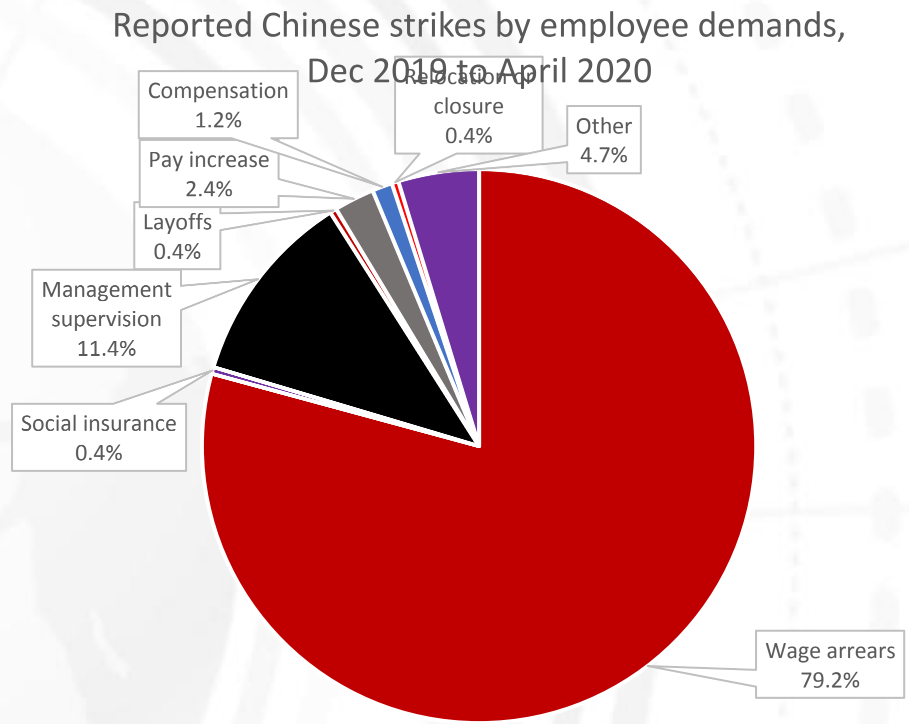


Source: NBS China

- Chinese urban unemployment fell slightly in Mar, but masks true unemployment.
- It captures only circa 60% of labour force and does not include rural workers and workers in part-time or casual work. These are likely to be far more sensitive to the current uncertainty and impacted harder.
- Worth also noting that real Chinese unemployment in 2002-09 was estimated to be 10.9% vs an official average of only 4.2%.
- A similar spread today implies a real unemployment rate of 13% and given the shock, may even be north of 20%.

Reading Chinese tea leaves: Labour tensions

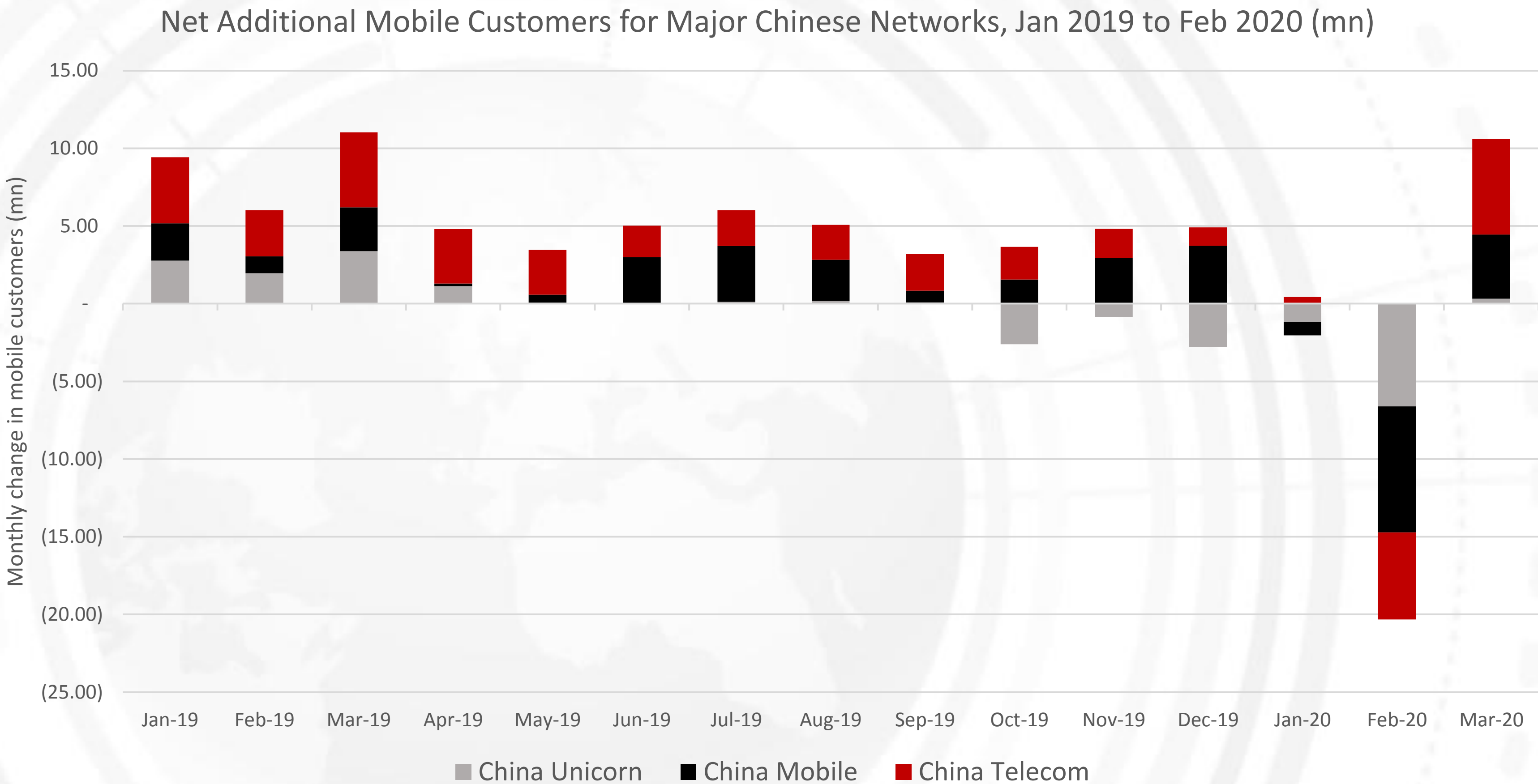




Source: China Labour Bulletin

- Strikes have been muted in China in recent months, likely due to the lockdown and increased policing presence, but data hints at emerging tensions.
- Strikes spread across industry, rather than focused in the construction sector as usual.
- Over 80% were focused on wage arrears, but more recently, there are emerging strikes demanding rent cuts and protesting fee increases (e.g. amongst taxi drivers).

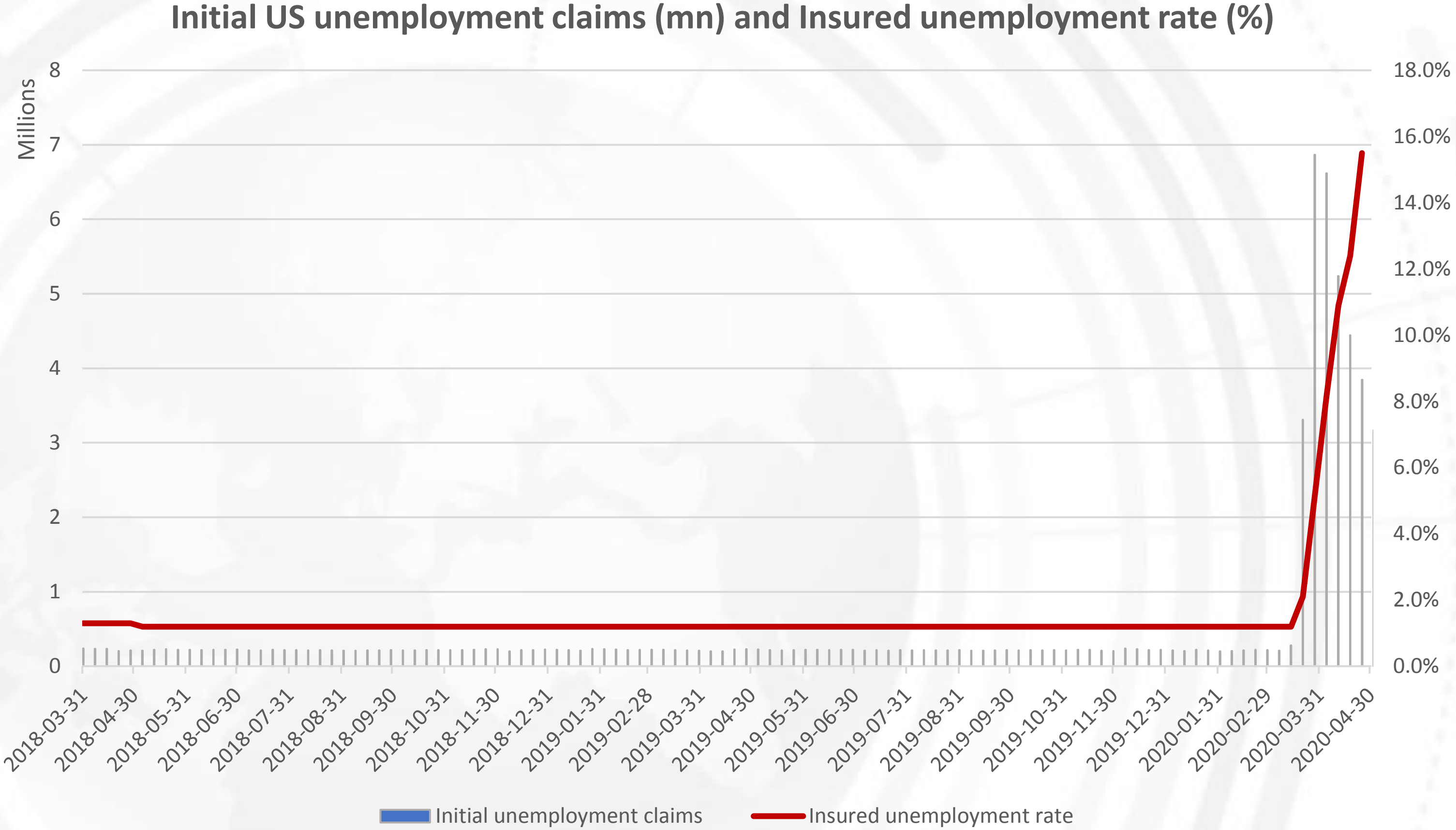
Reading Chinese tea leaves: Mobile phones



Source: Camdor Global, based on company data

- Mobile phones are essential items in China, much more so than in the West, and fundamental to much economic activity.
- After sustained growth as per normal, customer numbers collapsed by almost 22 million in Jan and Feb 2020 across all networks, before bouncing back some.
- Not a business effect, but socio-economic. Points to deeper pain than official data implies. Recovery also aided by sharp cuts in phone prices and aggressive tariffs.

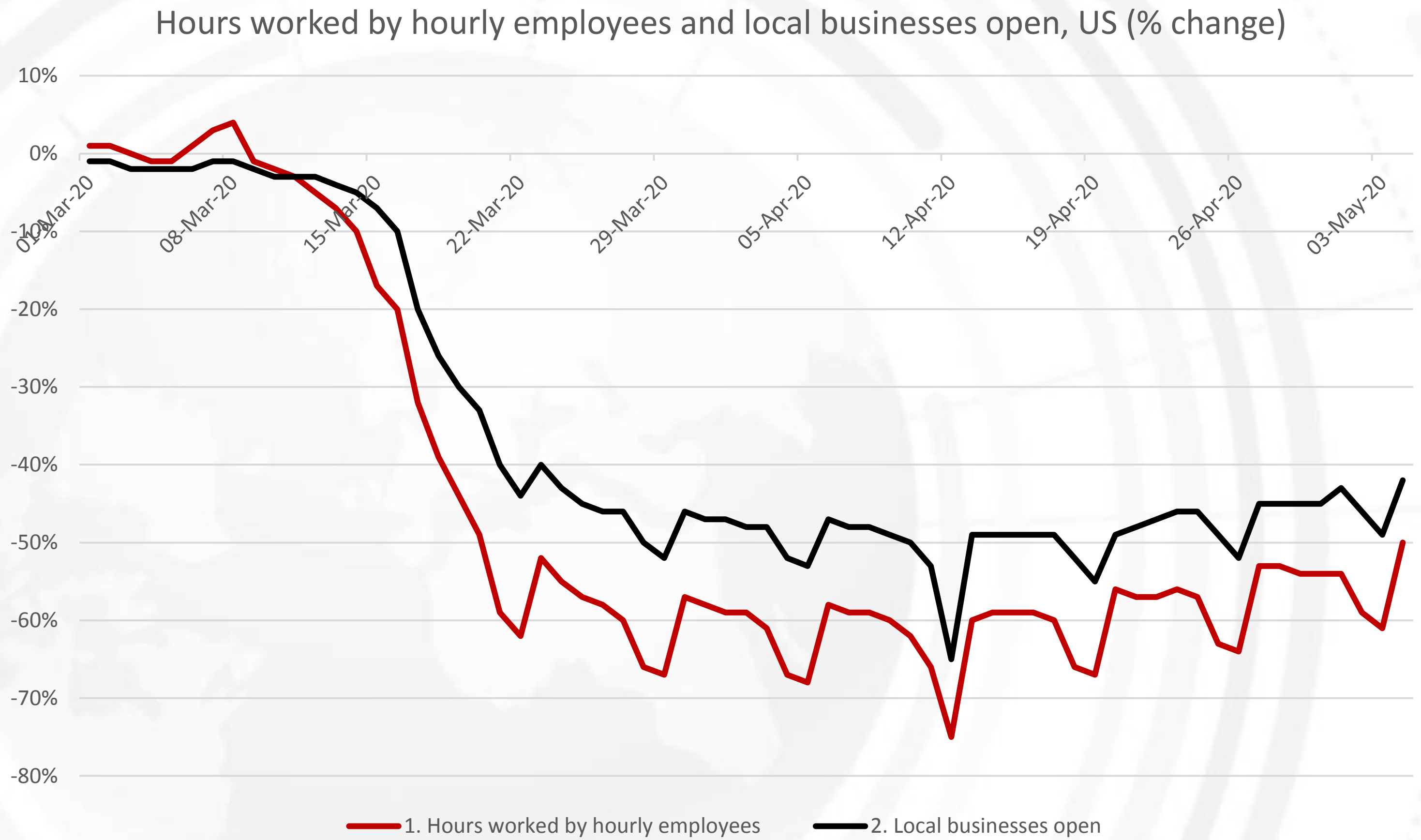
Post-Covid: Job losses are the new export



Source: U.S. Employment and Training Administration

- US initial claims spiked over March and April from a baseline of circa 220,000 per month historically to 33.5 million for the 7 weeks ending 2nd May.
- The insured unemployment rate has risen to 15.5%. Not a direct proxy for the unemployment rate but shows the likely continued dramatic direction of travel.
- Expansion of benefits through stimulus packages will have contributed, but also reflects significant labour market stress thanks to demand collapse.

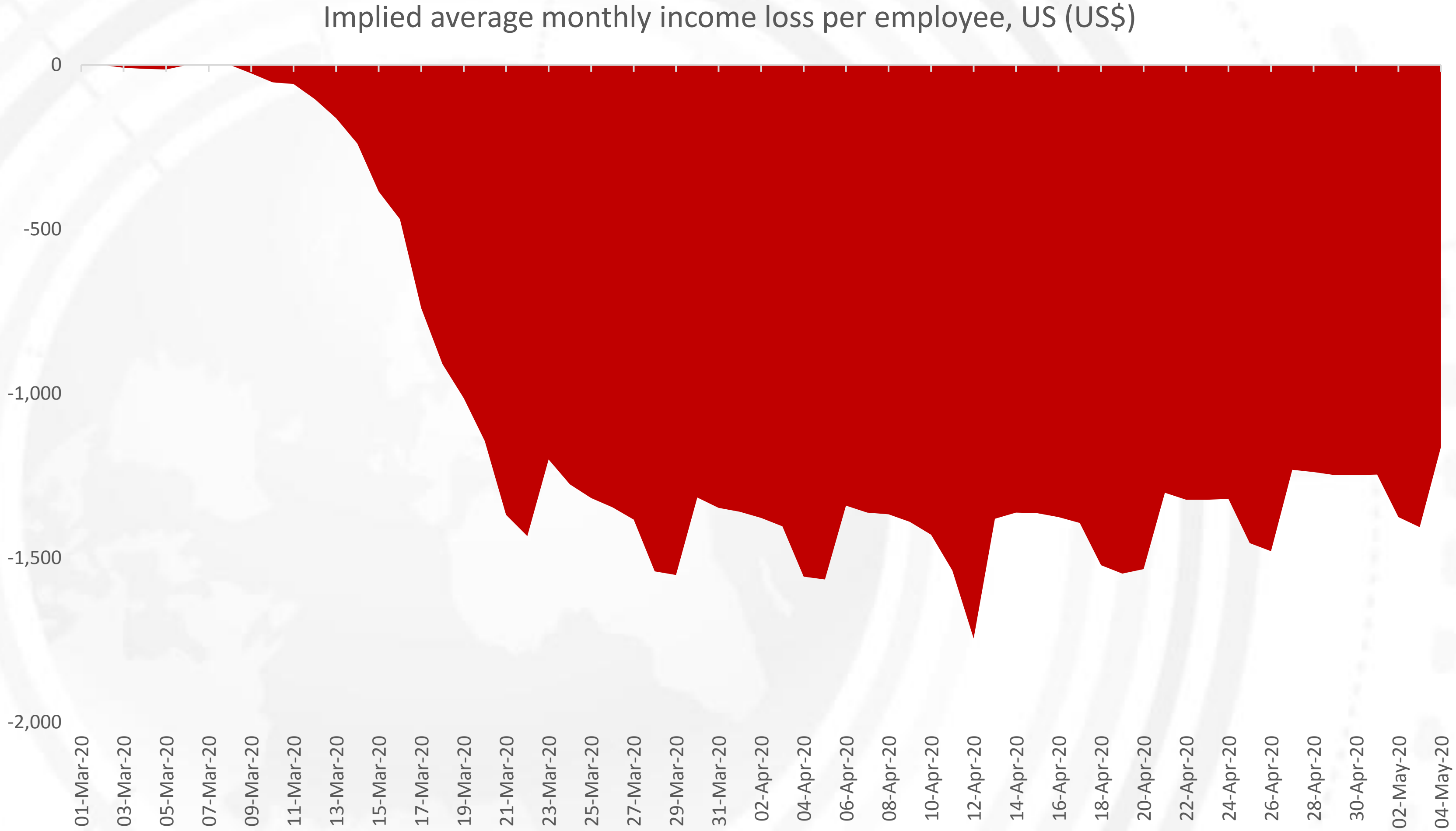
But it's not just jobs but also hours lost



Source: Homebase data

- Homebase is a real time tracking tool covering over 60,000 businesses and 1 million hourly employees in US metropolitan areas. Largely SMEs, so a much clearer picture of life in the real economy.
- Significant closures coupled with some reductions in hours has led to a precipitous decline across all industries, though some easing in recent days as some states ease lockdowns.

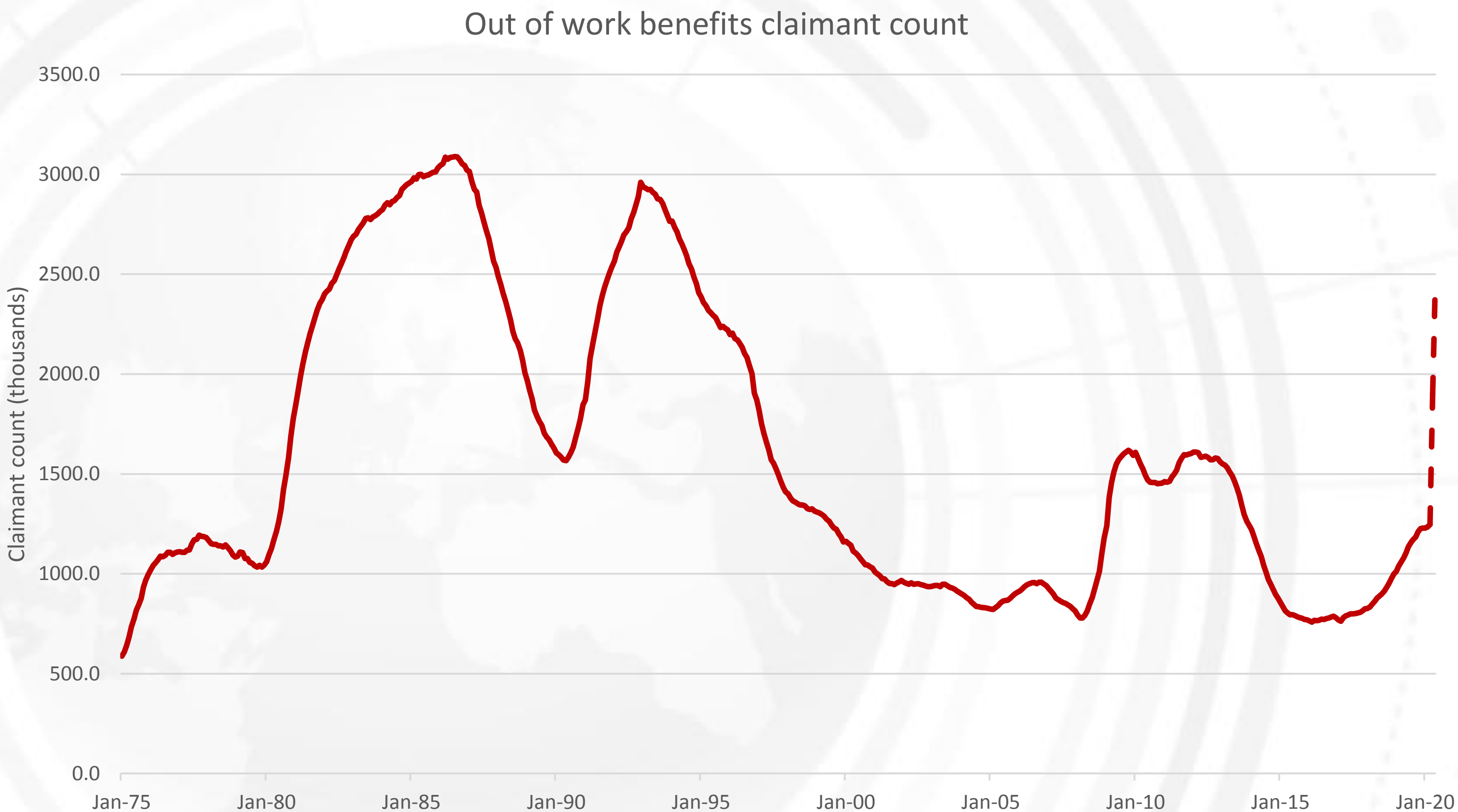
The economic impact on individuals is significant



Source: Homebase, U.S. Bureau of Labor Statistics data

- The implied monthly income loss has reduced to about $1,160 on average.
- But given the socio-economic composition of these workers, that remains a significant drop in income. Importantly, the ability to sustain a period of attrition and meet typical debt servicing needs is limited, given low savings rates.
- And what about the longer-term behavioural impact?

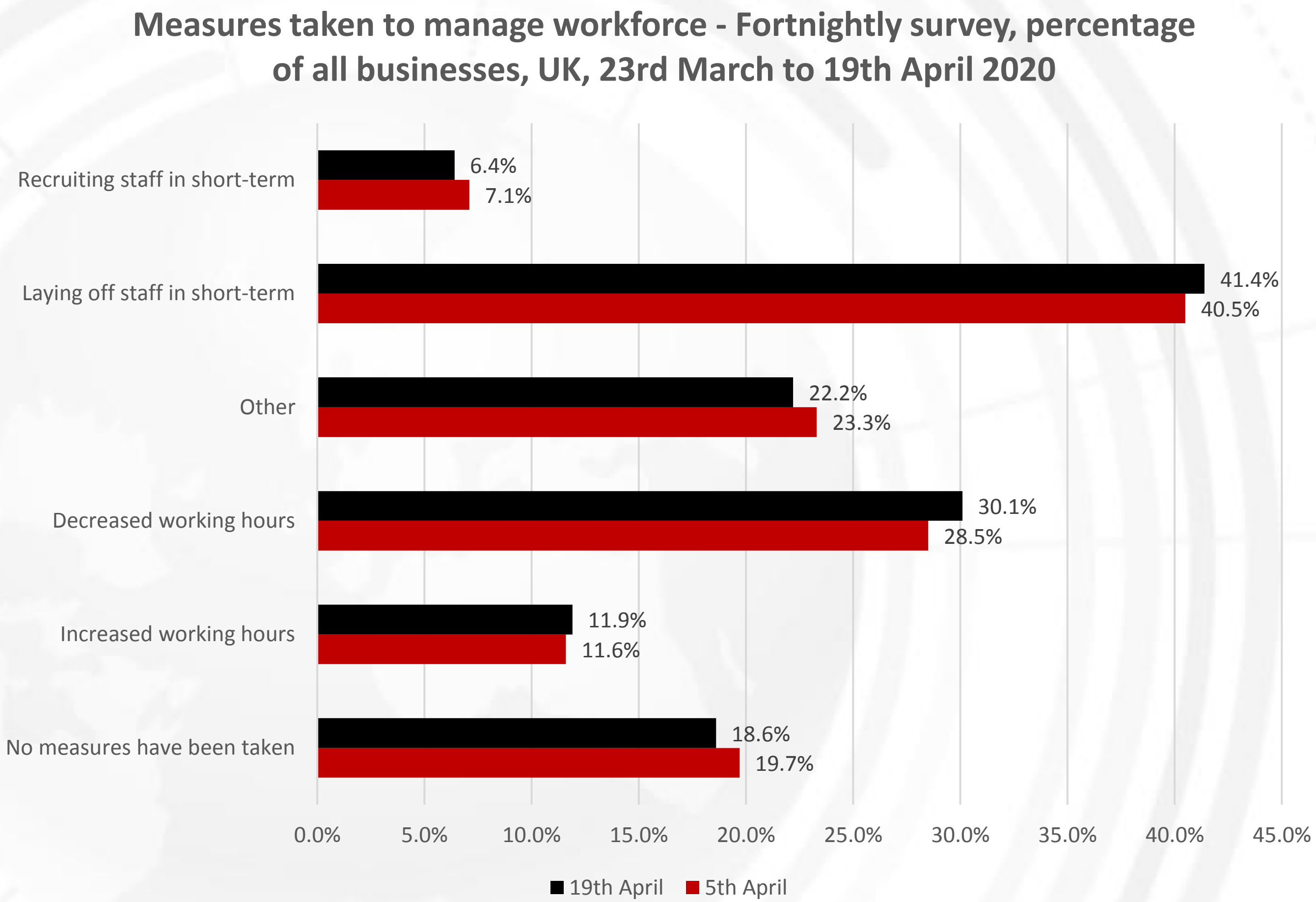
UK out of work claims reflect this global trend



Source: ONS, Camdor Global estimates

- UK claims were rising already, but indications are 1.8 million new claims were filed for universal credit since the start of March.
- The process means there is a lag before these show up in data. Assuming most are approved, there could be a sharp rise to 2.4mn claims in coming months – levels last seen in the early 1990s.
- Even a rapid reduction thereafter is a question of years, not months.

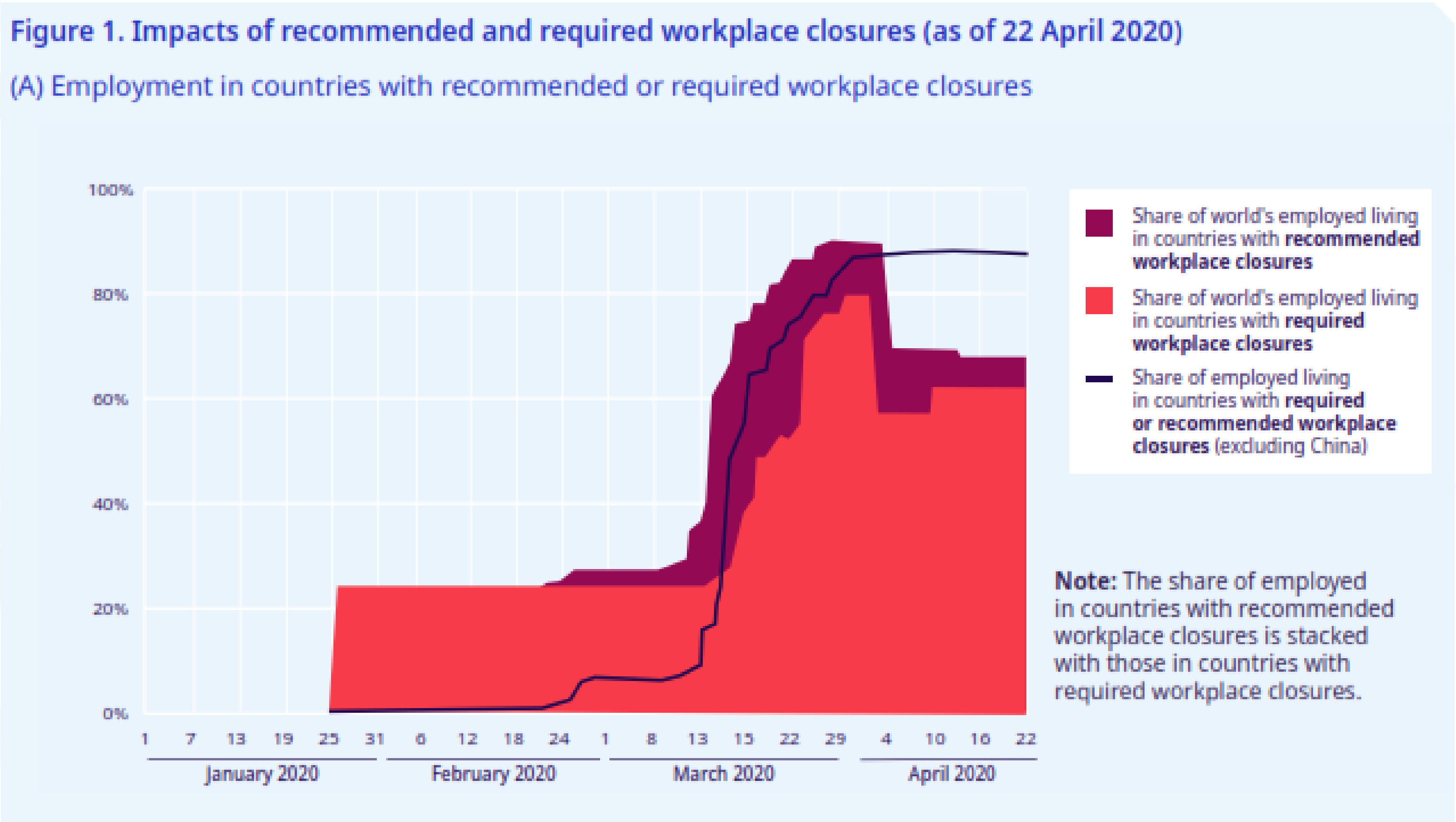
Returns to labour are under pressure



Source: ONS

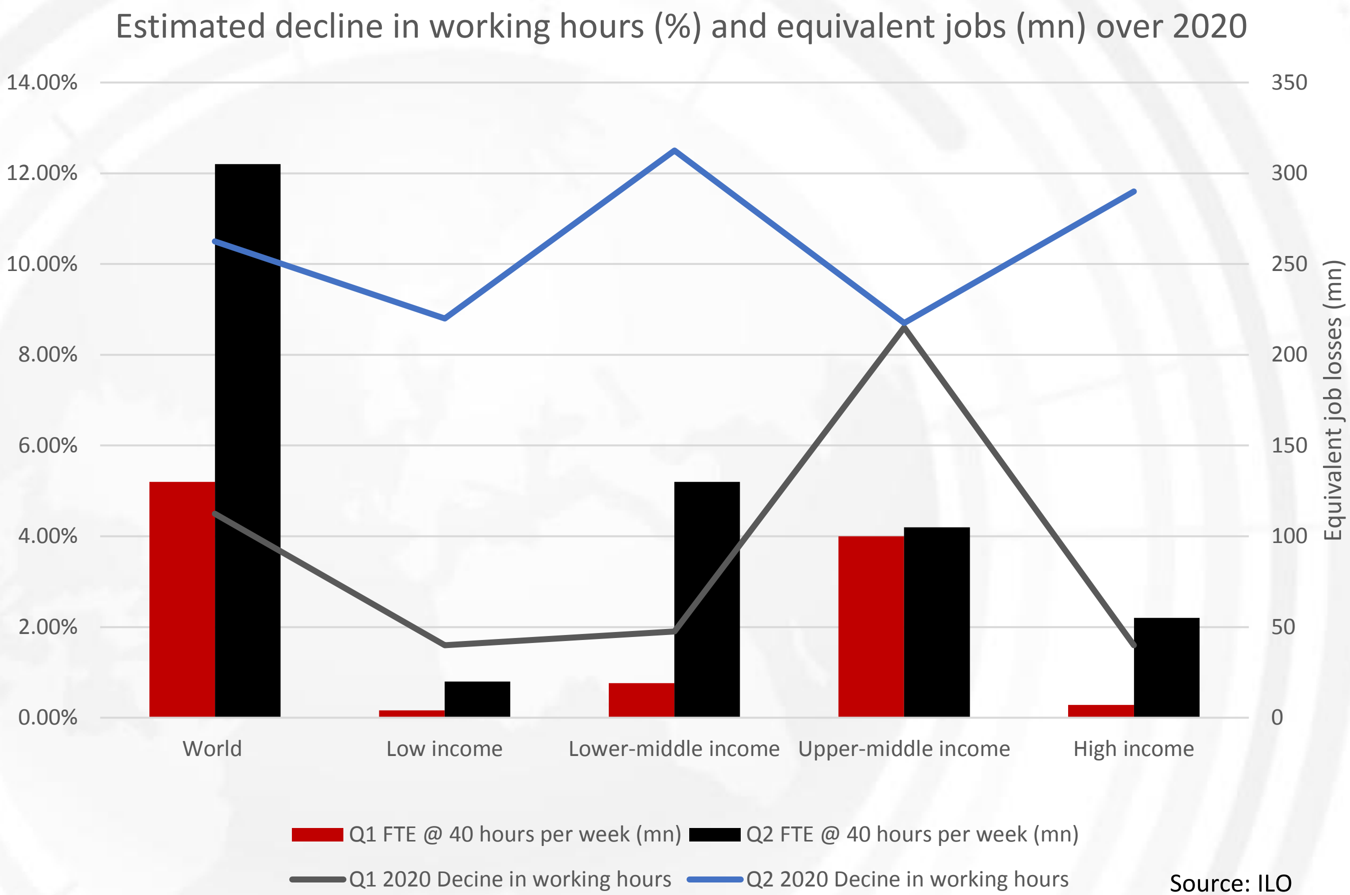
- Over 41% of businesses had laid off staff by mid-April.
- **BUT** 30.1% were reducing hours instead of cutting head count.
- These are the hidden underemployed, who are taking earning hits.
- What the survey also does not capture is the anecdotal and other evidence emerging of pay cuts to allow businesses to survive.
- This all adds up to a toxic picture for future reversion of demand to ‘normal’.

Globally, the pressure still is relentless



- Significant countries have required or recommended work closures.
- If China is taken out, then almost 90% of the world's employed faces impediments to work as usual

The real pain is lower earnings for the middle class

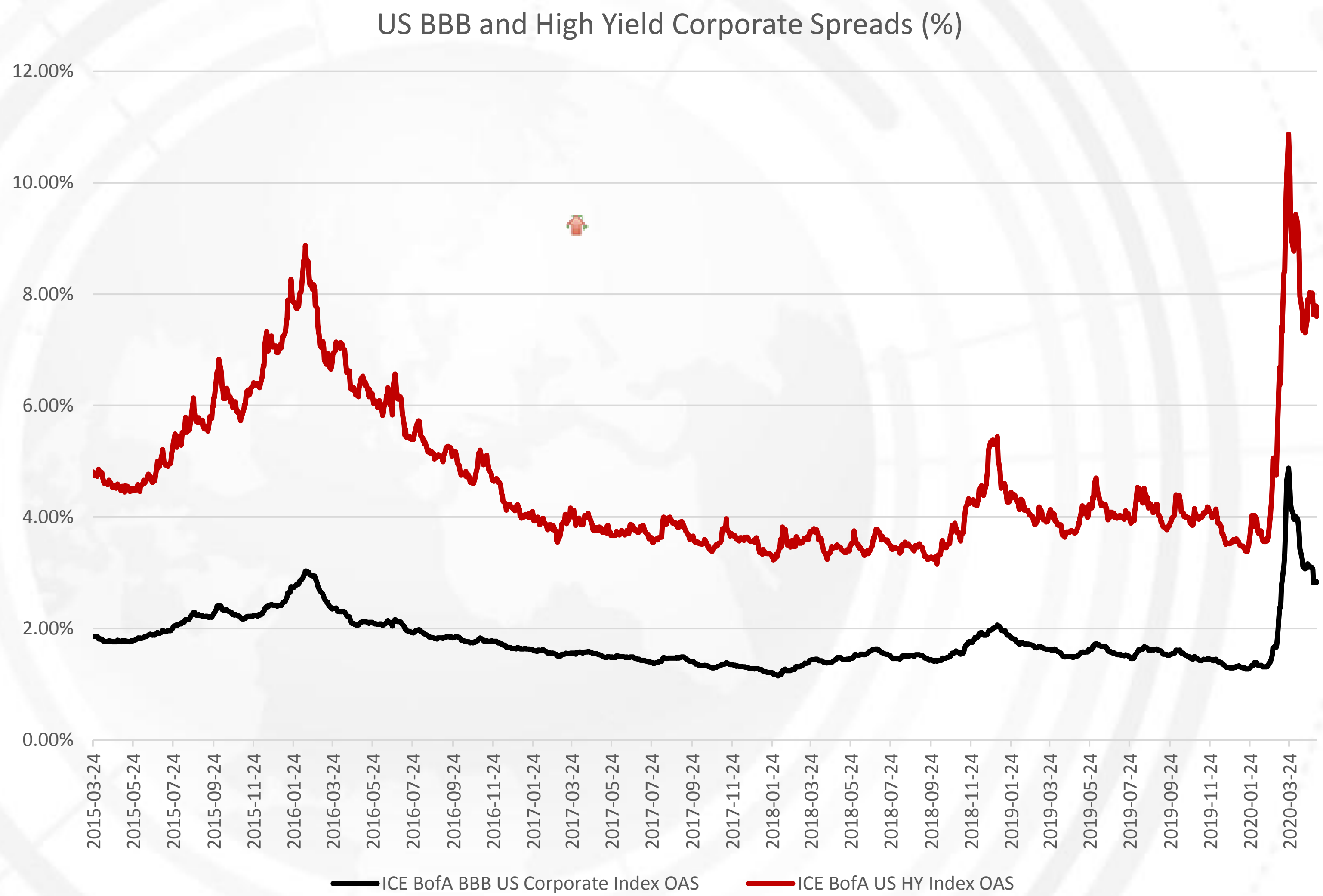


Source: ILO

- Working hours decline accelerating in Q2 2020 and now cutting across all incomes – less lost jobs, and more a case of fewer hours, particularly for middle and high bands.
- Equivalent to north of 300mn job losses globally, and more worryingly, concentrated in the middle class, where the bulk of discretionary demand sits.
- Evidence indicates a labour contagion effect. Important to note that Asia is worst hit here, which limits its role in leading any quick recovery.

COVID-19: THE FINANCIAL FALLOUT

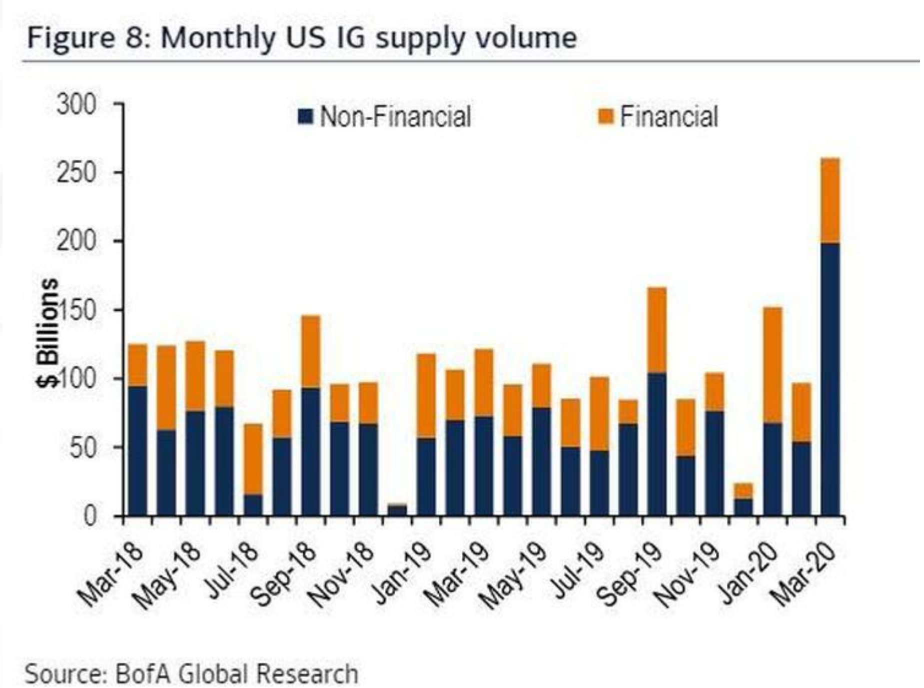
Markets paint a very different picture…



Source: Federal Bank of St Louis

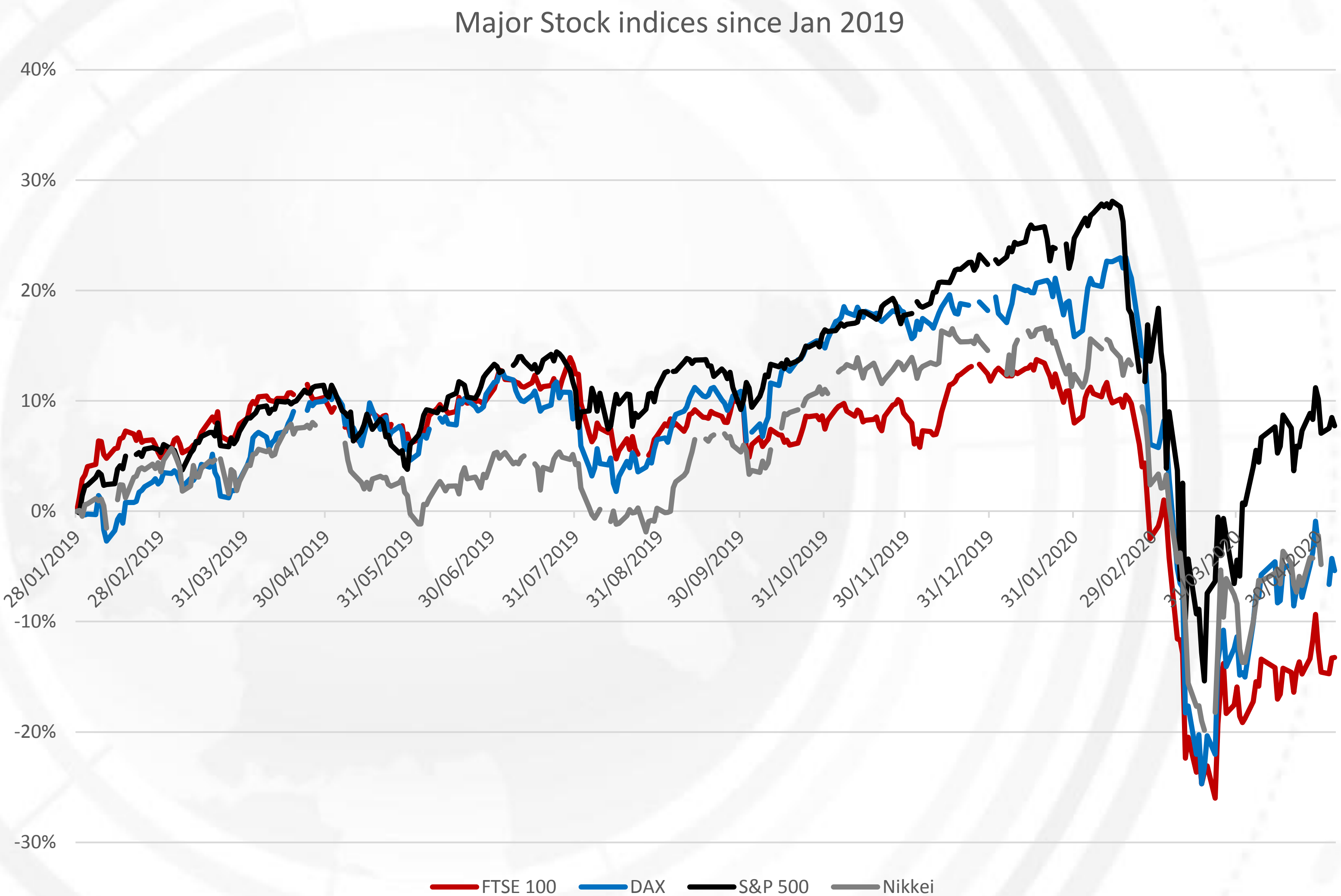
Bond spreads are recovering across IG and HY, thanks to central bank support in the main, though elevated yields still create some opportunities.

Not a liquidity or debt crisis a la 2008



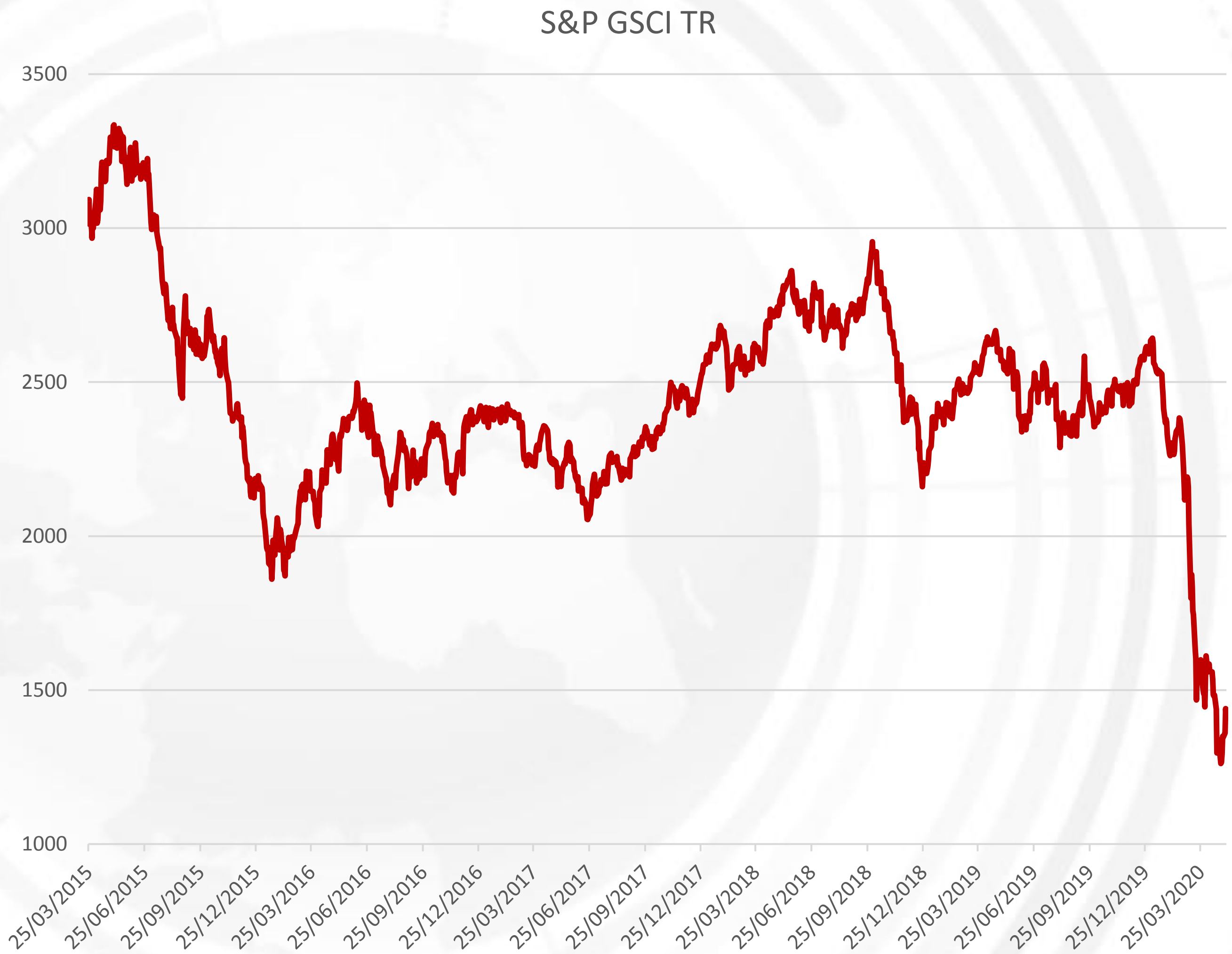
- Bond issuance is hitting record highs, as markets take advantage of the Fed's guarantee
- Significant increase on 2019
- Importantly, completely opposite to what happened in 2007-09, when issuance dried up
- Currently corporates are looking to extend (and perhaps pretend) when it comes to refinancing
- Does not bode well for leverage or for longer-term debt outcomes

Stock markets have rebounded



After giving up all their 2019 gains, major indices have recovered ground sharply as people begin to price in government support and a short sharp recession.

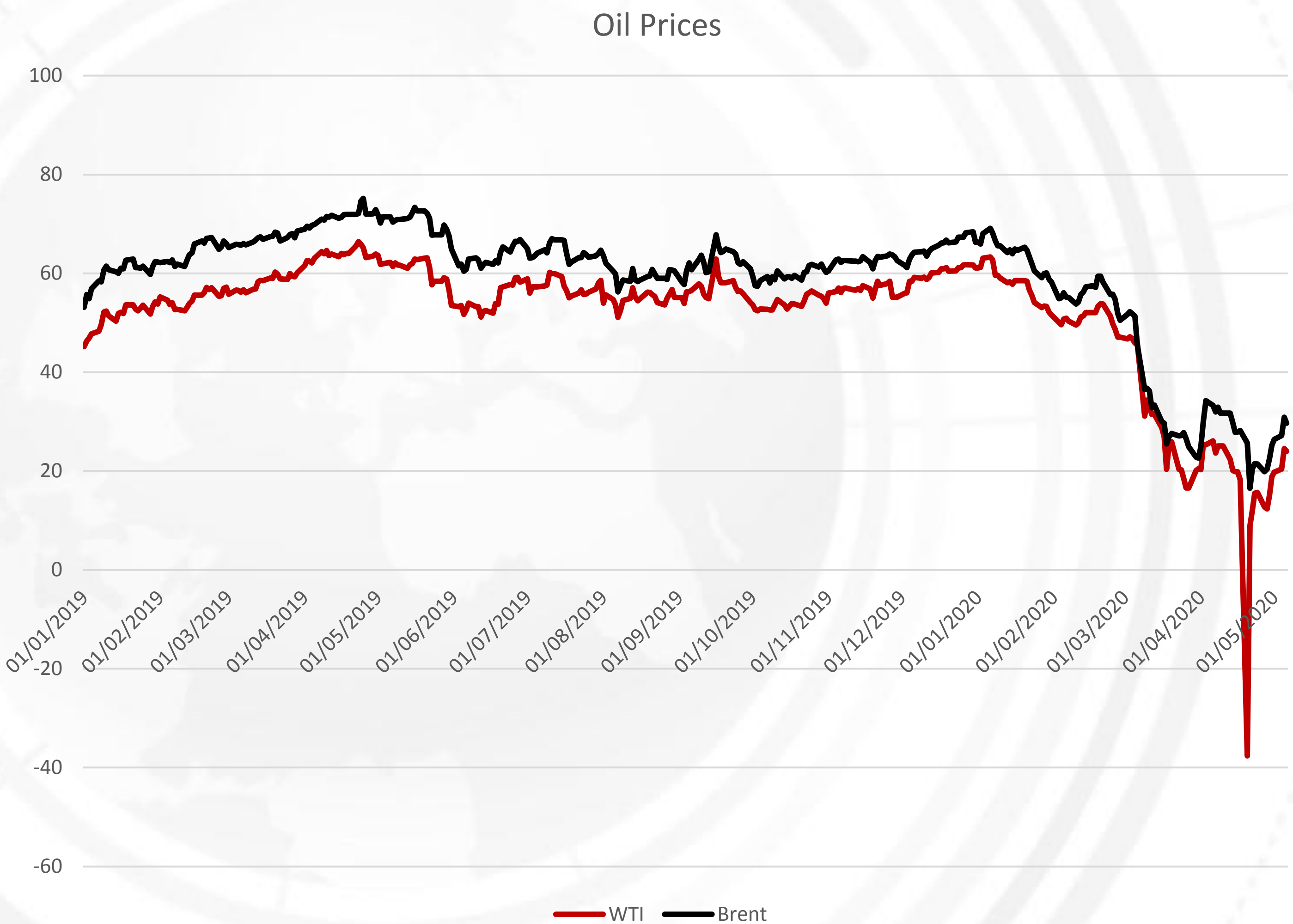
Commodities are down – after all, who's working?



Source: S&P Dow Jones Indices

A reflection of falling demand, most recently the rout in oil, but also leading to lower input costs and growing deflationary pressures

Oil captures global demand in a single picture

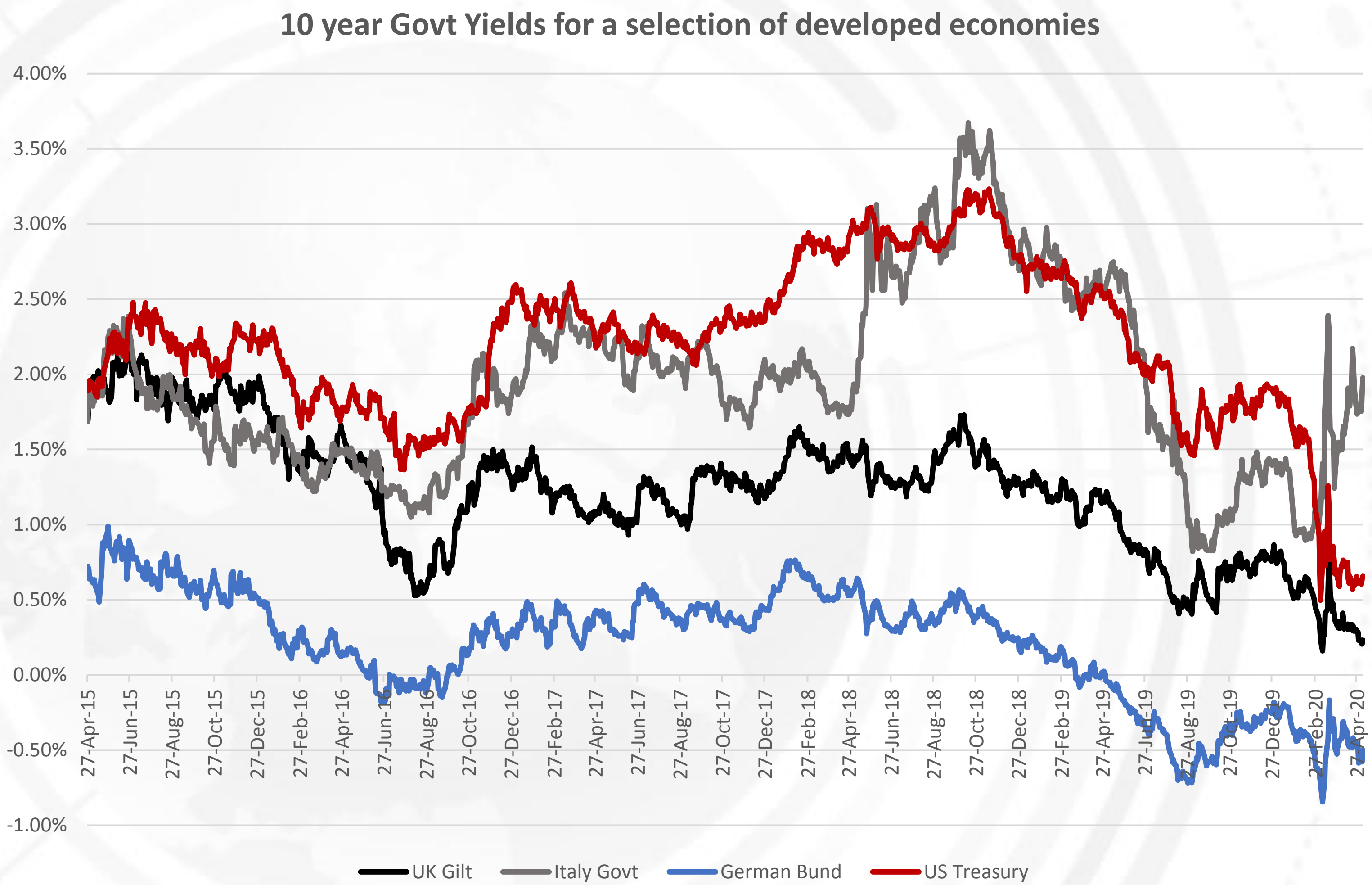


Despite bargain hunting and supply cuts, with demand evaporating, the pressure remains downwards for now.

The Baltic Dry Index is realigning with reality

- Significant fall of -84% in late 2019 thanks to US-China and other trade jitters.
- Recent bullish rally driven by demand for ships for oil storage has now faded, and now reflecting disruptions in supply chains and drops in global trade.

A general flight to quality despite all the stimulus



- A re-emphasising of lower for longer, with bunds in negative territory and UK/US both well below 1%.
- But also some emerging jitters about sovereign balance sheets (e.g. Italy).

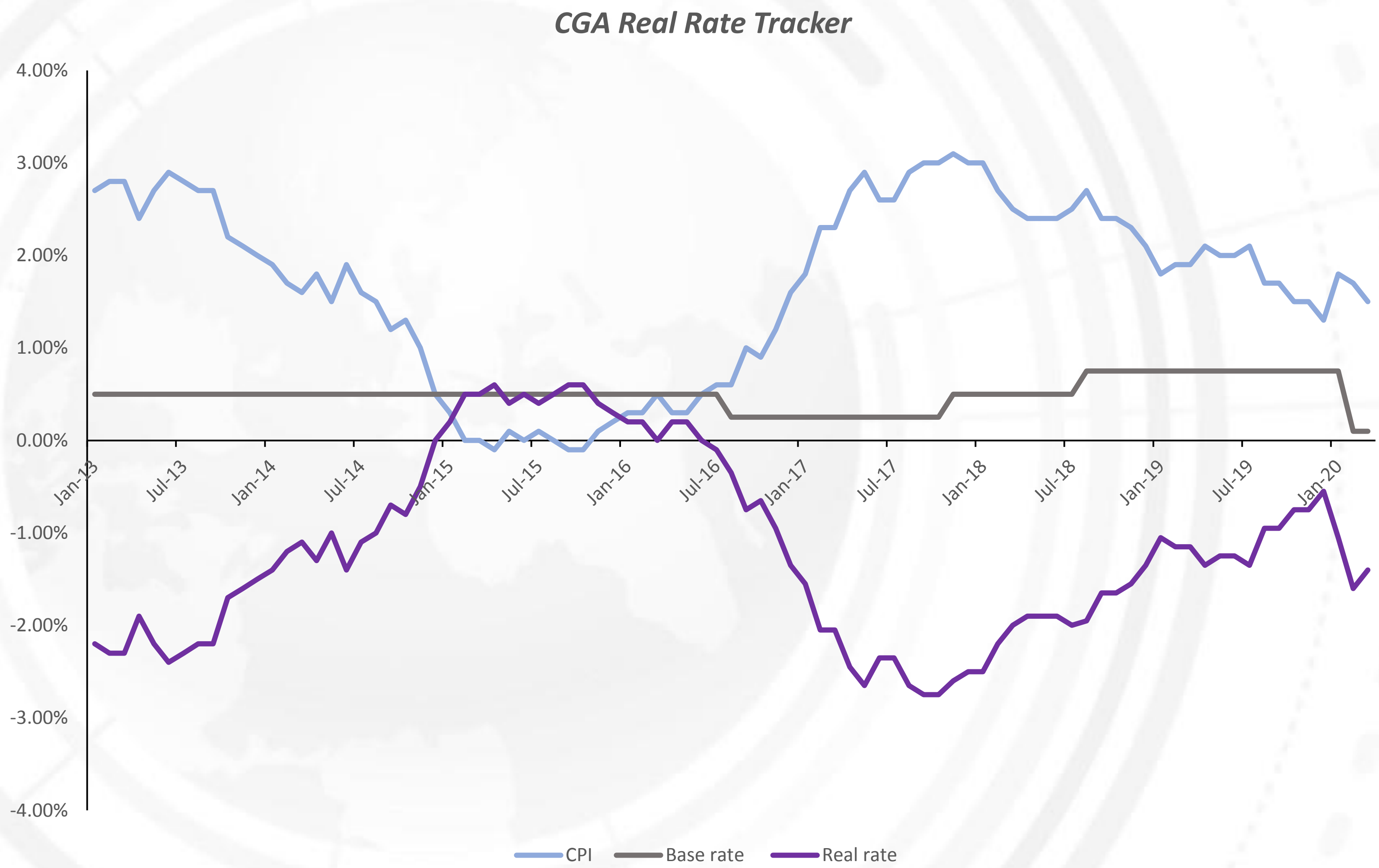
COVID-19: THE PORTFOLIO IMPACT

Central banks have responded with rate cuts

Name of interest rate	country/region	current rate	direction	previous rate	change
United States (Fed)	**United States**	**0.00-0.25 %**	↓	**1.250 %**	**03-15-2020**
Australia (RBA)	**Australia**	**0.25 %**	↓	**0.500 %**	**03-19-2020**
UK (BoE)	**Great Britain**	**0.10 %**	↓	**0.250 %**	**03-19-2020**
China (PBC)	**China**	**4.05 %**	↓	**4.150 %**	**02-20-2020**
Eurozone (ECB)	Europe	0.000 %		0.050 %	03-10-2016
Japan (BoJ)	Japan	-0.100 %		0.000 %	02-01-2016
Sweden (Riksbank)	Sweden	0.000 %		-0.250 %	12-19-2019
Switzerland (SNB)	Switzerland	-0.750 %		-0.500 %	01-15-2015

129 rate cuts now in 2020 globally, only 4 rate rises (Kazakhstan, Kyrgyzstan, Tajikistan, Czech Republic repo rate)

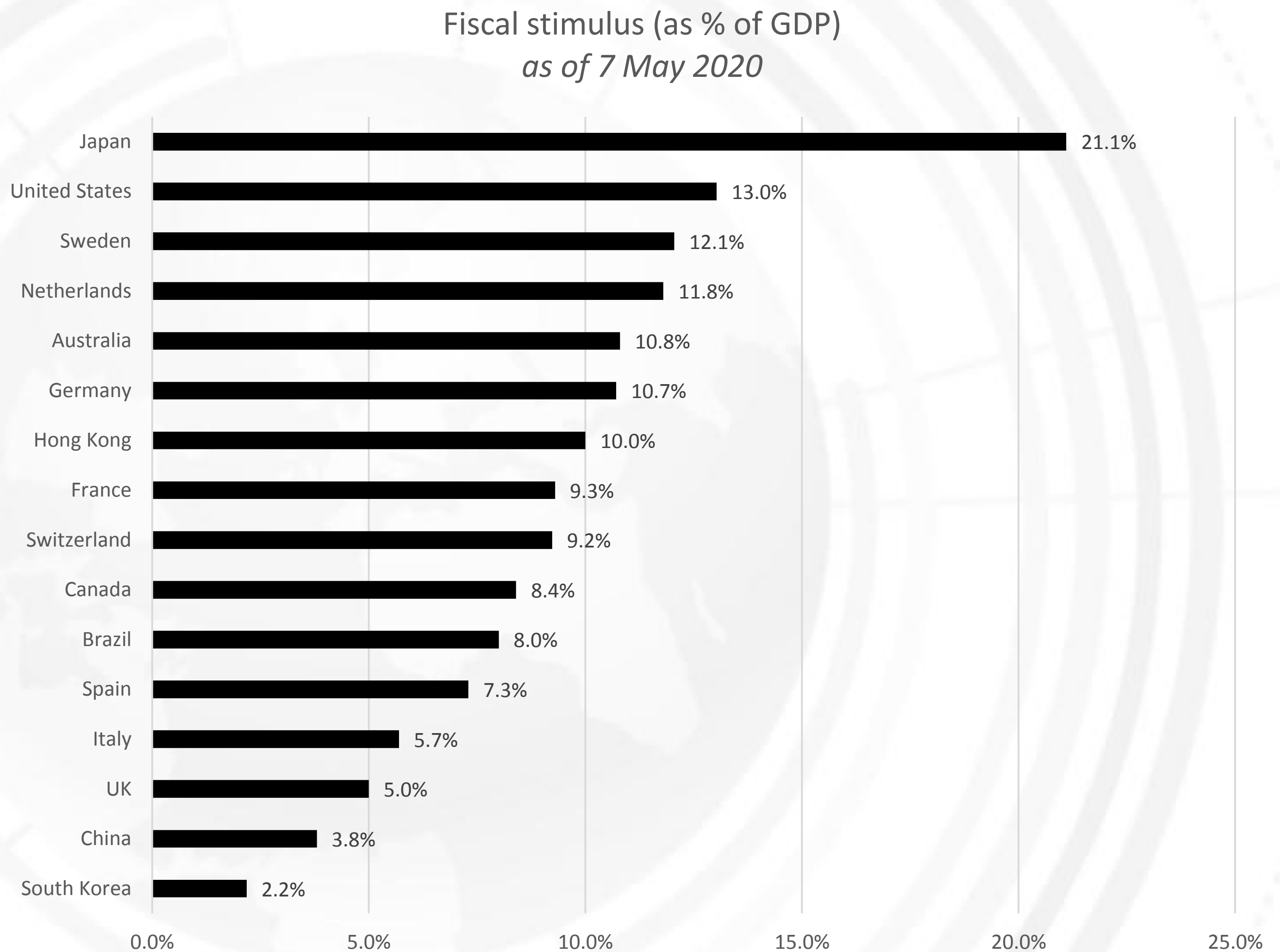
UK real rates improve to being a little less negative



Source: Camdor Global, ONS

Are those hints of falling inflation in coming months?

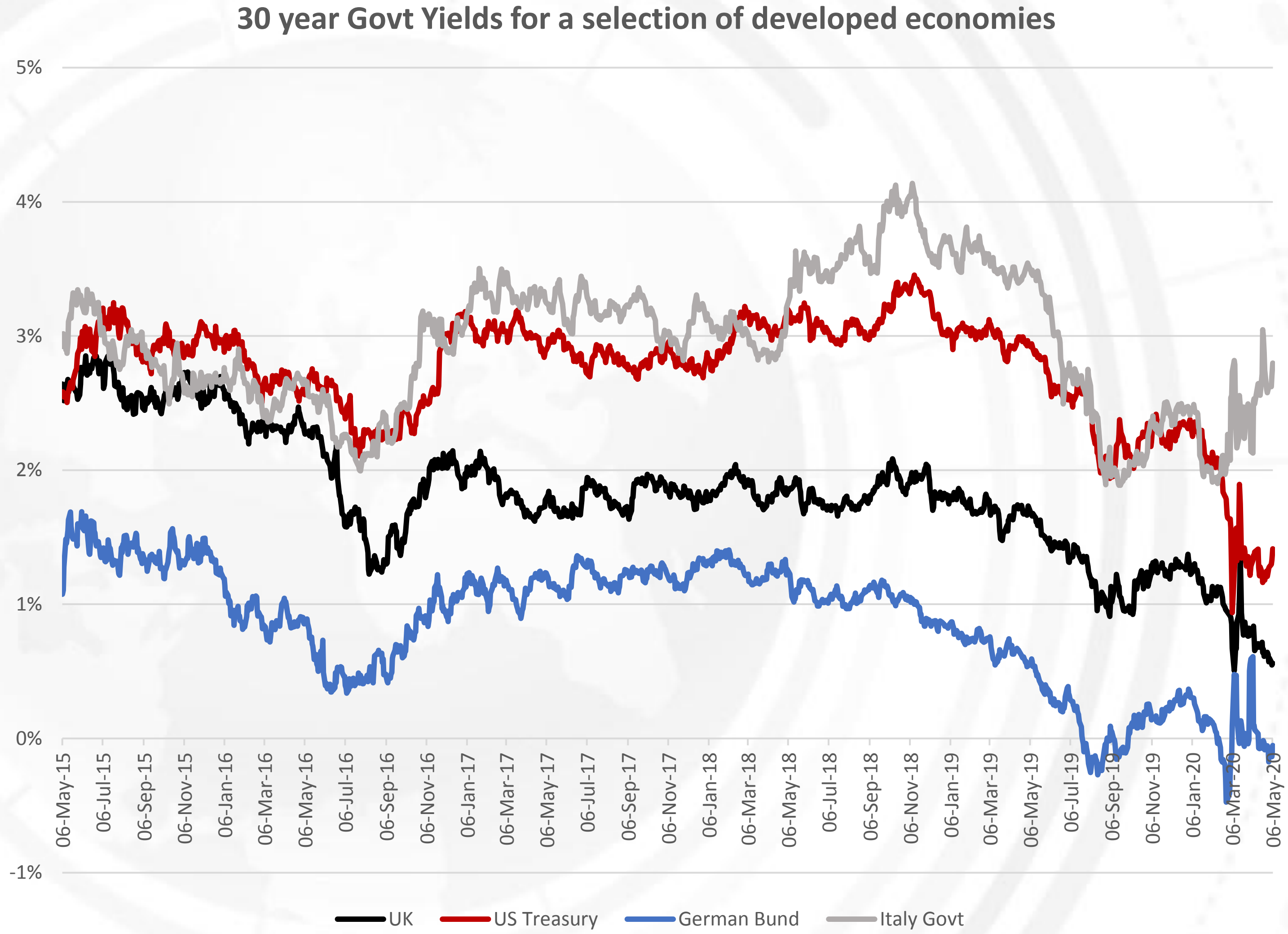
Globally, stimulus is now flowing



Source: Based on Elgun, Basbug and Yalaman (2020)

- Fiscal stimulus approaching a significant proportion if GDP in many countries, before we even consider other areas such as monetary support and rate cuts.

30 year government bonds are bearish



- German bunds are flirting with negative yields, while UK yields are now below 1% and US yields are approaching that line in the sand.

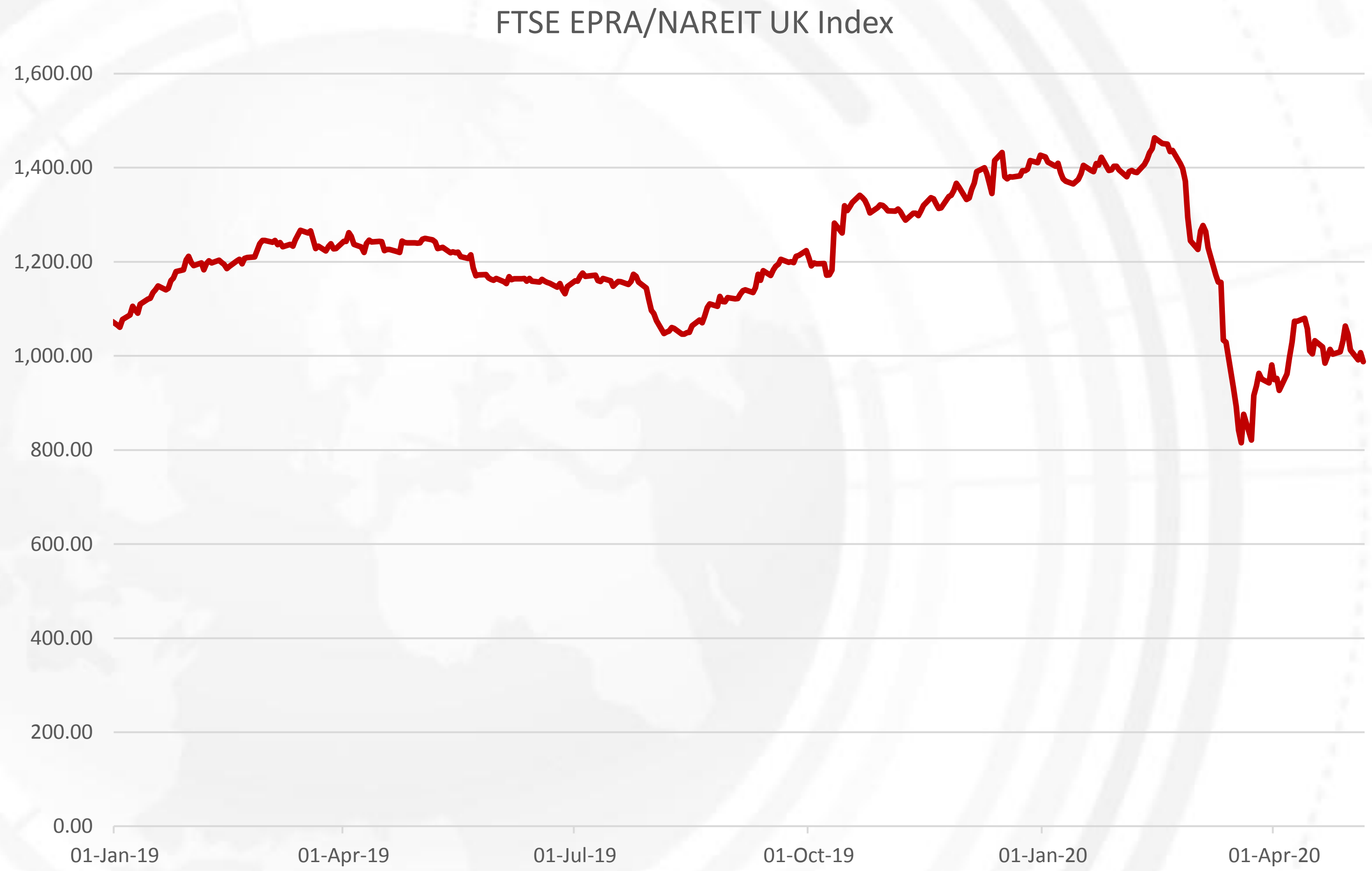
What is the impact on portfolios?

- Decrease in real interest rates will hit real returns and reduce risk-adjusted yields.
- For investment pools, the frictional drag is greater now at currently -1.4%.
- Over time, this will accentuate the demand for yield if unchanged, and we note there are significant pressures going forward, notably demand deflation.
- Lack of economic activity will impact credit ratings, leading to potential downgrades, and may also cause defaults in some sectors.
  - We note, for example, that Fitch has already placed several companies on negative watch, including Lloyd's of London, due to the insurance fallout.
- On the equity side, there will be pain from recent falls, though recoveries have helped.
  - That is still likely to drive a further move to ETFs as recoveries also remain indiscriminate
  - More broadly, a growing move towards portfolio hedging strategies and private assets for most investors as they look to remove volatility in both their assets and their balance sheets.

What about private or illiquid assets?

- Private assets have been silent for now, but are still trading on stale NAVs. 31st March NAVs are now flowing, with anecdotal evidence of circa -10% reductions on the PE side. Investors are not really prepared for further and larger reductions due end June.
- In particular, private debt funds are more at risk, as their lending profile is broadly high yield from an internal ratings perspective, companies are mid-market or smaller, less asset-based and more cashflow based, and covenants tend to be sterner. Investors also are not prepared for losses here unlike PE. Workout skills will come to the fore and could be the differentiator if there is a sustained economic hiatus.
- Hedge funds finally have volatility, so despite closet longs taking hits, there is more to play with now and dispersion of returns is returning to the sector after a long gap of grinding returns. But government policy creates a dampening effect and restrictions such as short selling bans will limit the opportunity set.
- UK commercial property market at risk in some sectors, which will impact voids. Tenants may also look to prefer shorter leases and postpone any increase in space while they assess the economic impact. Some areas such as logistics will benefit.
- For distressed, after a seeming eternity, there is finally a growing opportunity set. However, we caution against any free-for-all. Loan guarantees and the opening of liquidity windows create a get-out clause for larger problem companies, and opportunities are more likely to arise steadily and in areas with secular trends.
    - Overall, we see this as accelerating the move towards real assets / private assets (with some renewed interest in macro and trading strategies), as investors look to compensate for the negative real rate and for volatility by extending their horizons

A bellwether of things to come?



- REITs show significant price falls and significant discounts to NAV
- Indicate concerns about leverage, future yields and most importantly, cashflow
- Intu, for example, noted that it only received 29% of the rent due for Q2 2020, down from 77% for the same period last year. The company also has over £4.5bn of debt – the excess of previous times.

And the bigger picture?

- A recession will be painful and increase government borrowing significantly, given the recent fiscal support. That has knock-on implications for the UK's ability to manage the uncertainty of Brexit that has dropped off the front pages for now.
- We should note the sheer quantum of stimulus means that we expect a financial markets rally in the nearer-term as people seek buying opportunities and buy into unlimited government support, but this is not a brief pullback before we resume BAU.
- The longer-term picture is bleak as the underlying economy continues to become more fragile and tail risks grow.
- The pandemic accentuates existing trends, notably much lower for much longer rates, a reliance on policy and monetary/fiscal support, a weakening of consumer demand, a continued rise in debt and leverage, a move from physical to online, further fractures progressing deglobalisation. We will explore these in further updates.
- Longer-term, in the UK, retail will continue to come under pressure and the balance sheets on the high street are set to become more strained.
- Transaction volumes across the economy will fall in coming two quarters across industry, retail and real estate, due to uncertainty and differences of opinion on price discovery, so this needs to be factored into strategies linked to these.
    - On the other hand, debt financing needs from sovereigns, supranationals and other public sector entities will rise strongly as they take on the role of being the primary source of support and investment for economies in the near-term, but yields are likely to remain tight, potentially even tightening further if insurers seek the safer trade of financing government.

APPENDIX

The Insurance Investment Exchange

- An award winning independent and credible forum, driven by feedback from the industry
- Since 2013, providing thoughtful exchange and debate on key investment related issues and trends of relevance to the insurance industry
- Events throughout the year, including:
  - A series of quarterly half-day events, comprising panels and breakout sessions
  - Intimate breakfast and lunch roundtables to dive into and debate key topics of interest in detail
  - Our pioneering annual IIE Investment Awards, recognising talent across insurers, asset managers and service providers
  - CIO dinners to hear from key thought leaders and debate broader strategic and macro issues

Author Bio

Dr Bob Swarup is co-Founder of the Insurance Investment Exchange, the leading forum for knowledge sharing in the insurance industry. He is a respected international expert on macro, financial markets, investment strategy and regulation. He is also Director of the CIO Network for the Geneva Association, the leading international think tank of the insurance industry gloablly.

Bob was formerly a partner at Pension Corporation, a leading UK-based pension buyout firm, where he ran alternative investments, was Chief Risk Officer and oversaw thought leadership. He also served as Senior Investment Advisor to the Pensions Regulator, advising them on the development of the new regulatory framework for DB schemes from an investment, risk and governance perspective.

Bob has served on numerous industry, fund and fintech boards, including the Advisory Board of Adveq, a leading $6bn Swiss PE firm; the Board of CatCo, a $2bn reinsurance hedge fund that he helped seed in 2011; the CRO and Solvency II committees of the ABI; and the Exam Council of the Chartered Alternative Investment Analyst Association.

Bob is a Fellow of the Institute of Economic Affairs and on the Advisory Council of the Columbia Committee for Global Thought. He was previously a Senior Visiting Fellow at Cass Business School, Visiting Fellow at the London School of Economics and on the Editorial Board of the *Journal of Alternative Investments*. He holds a PhD in cosmology from Imperial College London and an MA (Hons) in Natural Sciences from the University of Cambridge.

Bob has written extensively on diverse topics, with his work being featured across major publications and media. He is also the author of the internationally acclaimed bestseller *Money Mania* on 25 centuries of financial crises and the lessons to learn (Bloomsbury, 2014).

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