LIVERPOOL INVESTMENT LETTER

April 2020

Cardiff Business School
Ysgol Busnes Caerdydd

Julian Hodge Institute of Applied Macroeconomics

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LIVERPOOL RESEARCH GROUP IN MACROECONOMICS

LIVERPOOL RESEARCH GROUP IN MACROECONOMICS

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The Julian Hodge Institute was launched in autumn 1999 in a new collaboration between the Cardiff Business School of Cardiff University and Hodge. The aim of the Institute is to carry out research into the behaviour of the UK economy, and to study in particular its relationship with the other economies of Europe. The research has been particularly germane in recent years and has proved to be of significant social and political relevance as Europe has navigated the difficulties of the global financial crash, the Eurozone crisis and most recently the UK referendum on EU membership. The Liverpool Investment Letter is written by Patrick Minford, with the assistance of other members of the Group; in particular the emerging markets section is written by Anupam Rastogi, and the focus on Japan is written by Francesco Perugini. The Investment Letter is published monthly.

The Liverpool Research Group in Economics is pursuing a research programme involving the estimation and use of macroeconomic models for forecasting and policy analysis. The Group is now mainly based in Cardiff Business School, Cardiff University, and is indebted to the School and to the Hodge Foundation for their support. The Group's activities contribute to the programmes being pursued by the Julian Hodge Institute of Applied Macroeconomics. This Liverpool Investment Letter is typeset by David Meenagh and published on behalf of the group by Liverpool Macroeconomic Research Limited, which holds the copyright

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THE LOGISTIC PROGRESS OF THE CORONAVIRUS MEANS WE SHOULD END LOCKDOWN

When expert epidemiologists disagree so much about the progress of the coronavirus, why should a mere economist suggest a new way to forecast the virus' progress? Two reasons. The first is that economists are familiar with the way the whole family of 'epidemic' processes will show up in the data, so that its likely progress can be directly estimated; this is the 'logistic' S-shaped descriptive model I will explain shortly. The second is that the economic damage of the main medical intervention so far, lockdown, is so massive that this debate just cannot be left to the disputes of medical experts; it is far from just a medical matter. Likely virus progress must be reliably juxtaposed against likely economic cost, to get the resulting policy judgement right.

The charts of the progress of infections shown opposite — plotted on a log (i.e. proportional) scale — show a common and coherent pattern, which comes from an underlying 'logistic stock-flow' model of the virus; such a model is widely used to project how innovations spread through a population — whether it is new ideas, new technologies, or as here infections. Imagine that you have a population free of the virus, ranged from those with easy infectability at the one end to some at the other with great immunity. Enter the virus, with a mechanism of transmission from person to person via coughing, touching etc. In the initial slow stage, the virus will take time to infect a substantial group. In the second rapid stage, there will be a high speed of infection as the susceptible will quickly catch it and pass it on to other susceptible people of whom many are available. At this point the virus' reproductive rate (R) will be high, with each infection leading to several others in a short time. The progress will look 'exponential' (an exponential curve grows without limit) but it is not, because there is a further stage.

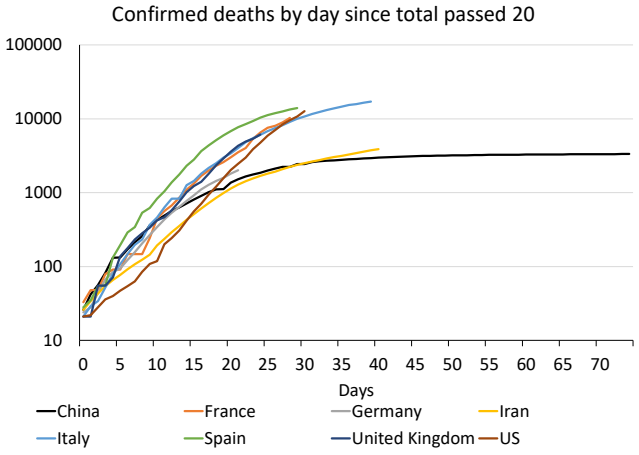
As the stock of infected people accumulates, the virus needs to spread to people with greater natural immunity. The rate of infection (the flow of new infections) and that R rate will slow. As the stock of infected people reaches the last tranche of people with the highest immunity, the rate will gradually fall to a stop. In the end the whole infectable population will have the virus or have had it.

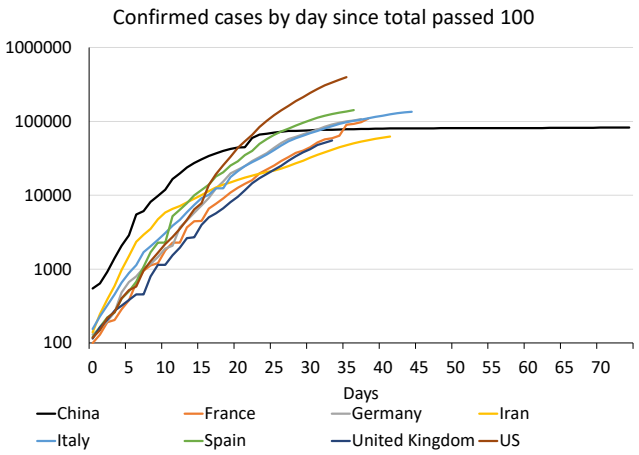
These three stages — initial infection, rapid spread through widely available cases, and finally slowing in the face of saturation — must occur regardless of the epidemiological details. These details show up in the estimated parameters of the describing logistic curve: the maximum penetration, the rate of infection and the point of inflection where saturation starts to set in. The problem for epidemiological models is that so little is known about this virus. But with the logistic curve we can observe for many countries what these estimated parameters, that reflect this unknown virus' character, are. From this diverse experience we can estimate the likely progression here in the UK, and also the effects of lockdown, the policy now being fiercely debated.

Table 1: Summary of Forecast

	2017	2018	2019	2020	2021	2022	2023
GDP Growth[1]	1.8	1.4	1.4	-6.4	6.0	2.7	3.0
Inflation CPI	2.6	2.5	1.8	1.7	2.1	2.1	2.0
Wage Growth	2.8	3.1	3.7	3.0	3.2	3.1	3.2
Unemployment (Mill.)[2]	0.8	0.9	0.9	0.8	0.7	0.7	0.7
Exchange Rate[3]	77.4	78.6	77.9	78.3	78.1	77.9	77.7
3 Month Interest Rate	0.4	0.7	0.8	0.6	1.9	4.5	5.0
5 Year Interest Rate	0.6	1.0	0.8	0.9	3.0	5.0	5.0
Current Balance (£bn)	-68.3	-81.3	-93.8	-42.8	-31.5	-22.4	-16.6
PSBR (£bn)	53.7	40.8	43.3	89.9	8.9	4.6	0.3

[1]Expenditure estimate at factor cost
[2]U.K. Wholly unemployed excluding school leavers (new basis)
[3]Sterling effective exchange rate, Bank of England Index (2005 = 100)





Source of data: Johns Hopkins University Center for Systems Science and Engineering; data plotted on a log scale.

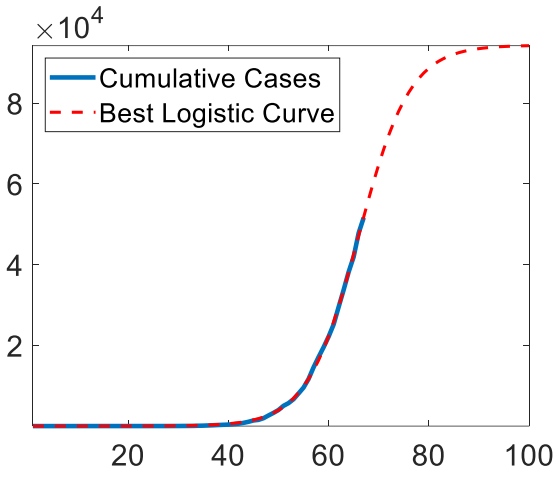
This account of the virus' progress is not meant to replace the careful modelling of all the detailed causal processes included in a full epidemiological model. Such a 'structural' model can guide us on medical interventions, such as drugs and vaccines, as well as on lockdown effects. But with the coronavirus so little is known that different detailed modelling produces widely different projections. Also, the only medical intervention has been intensive care, as drugs are untested and vaccines unavailable. Governments have only intervened in two main ways: first by attempted denial of entry of the virus into uninfected populations, through testing, tracing and quarantining and second by lockdown of infected populations. The first has been used by Singapore and South Korea rather effectively. Other countries tried it for a time, the UK among them, but ineffectively, with general popular interaction releasing the virus into general circulation in spite of their efforts. With no medical interventions the virus has been free to progress according to its natural logistic motion. The second intervention of lockdown then has a plainly visible impact, namely in slowing the early rate of infection and delaying the point of inflection in time. Against this background logistic estimates can give us practical guidance on what will happen from what has happened so far.

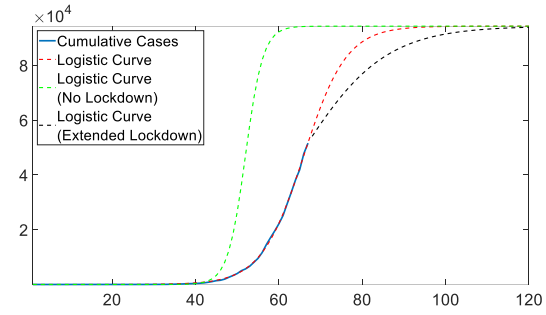
A further thing we can do from this data is to relate the number of deaths to the number of cases. Here we expect to see the death rate go up sharply if the number of new cases exceeds some level representing hospital treatment capacity. In what follows I discuss what my colleague David Meenagh and I have found from logistic modelling of data from around the world (useful charts can be found on https://www.worldometers.info/coronavirus/#countries)

In this model, which can be seen to fit extremely well — see the logistic curve fitted to UK data opposite, now on an ordinary scale — what would be the role of lockdowns? The aim of a lockdown is to slow the transmission rate by putting up the barrier of reduced person interaction; the reason for slowing is to enable the health system to have the capacity to treat those who get bad symptoms and are at risk of dying. This should hold down the death rate from the virus. Where health systems are overwhelmed, quite large numbers — usually those most vulnerable, due to triage — are not treated and are likely to die.

The first chart opposite includes the effect of lockdown. The second chart investigates what would have happened in the UK without lockdown (green), what is projected with the current lockdown (red) and what happens if the lockdown is extended (black).

More critical is the question of deaths with and without lockdown. What we find is that the death rate responds sharply to new cases above a certain level given by hospital capacity. We can see this in the Italian data clearly where we find a strong relationship between the death rate and the number of new cases.



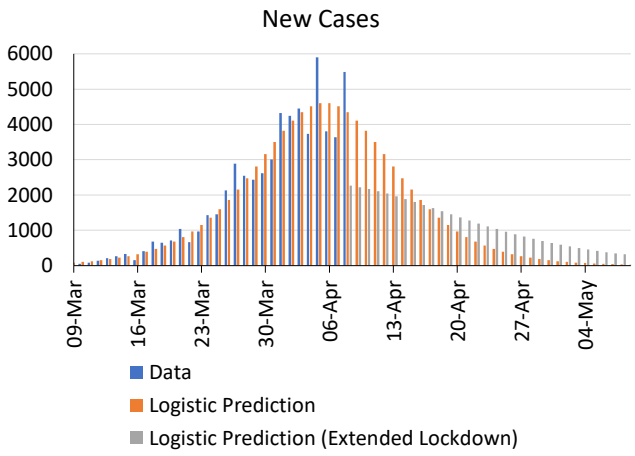


As our UK figures show, lockdown has slowed the arrival of new cases and so will have reduced the death rate (our estimates suggest deaths will have been reduced by about 2000). However, it can be seen from the two curves that these effects diminish over time; effectively lockdown is a largely a one-shot revolver; it delays the logistic progress but having done so, the progress is not greatly altered by extending it. As the stock of infected people converges on the maximum, new cases fall to a low rate of flow, not much affected by lockdown as the barriers to transmission are already high. The risk of the health system being overwhelmed is low, so there is no effect on the death rate from extending the lockdown. Furthermore, by this point the most vulnerable people will mostly have caught the virus, since they will have been among the first to get it.

What are the uncertainties as we now approach the later stage of the logistic progress? At this point it is natural to think that the population is moving to 'herd immunity'. However, of course the virus can mutate and come back round for another go, and reinfection. No-one knows how likely this is; if it truly happened, then we would just have to go round the course once more. However, based on other diseases' behaviour, this mutation would probably take time, so that by the time of another attack from a mutated virus, further defences such as vaccines could be brought into action. Another unpleasant possibility is that there exists a further pool of the so far uninfected, into which the virus can be released if barriers such as lockdown are removed. In closely integrated societies, such an untouched pool is highly

unlikely, as in the UK. But it will be likely if, as in China, regions have been effectively kept apart; hence China's rigorous quarantining and testing as it lifts the lockdown. For the UK there is no good reason at this stage to assume these pessimistic scenarios of immediate repetition or an untouched new pool; and so far the evidence from the logistical fitted models contradicts them for the UK.

Now turn to the economics. From the economic point of view the damage of lockdown to the economy is at least directly proportional to the length of lockdown, so that for example 3months of total lockdown reduces GDP in the year by 25%, while 6 months reduces it by 50%. One could reasonably argue that the damage is more than proportional as the longer it goes on, the more business and human capital will be permanently destroyed. It follows that a lockdown should be short and temporary, occurring only at the point in the logistic curve where there is danger of overwhelming the health system; after this point has been reached, that danger has probably gone. In the curve this point is about half way through when the number of new cases (the slope of the curve) is at its biggest. After this point the number of new cases will slow naturally and the lockdown effect will disappear. It should be possible to keep health capacity above the flow of bad new cases requiring treatment. This should keep the death rate down. From our estimates it seems likely we have now reached this stage of natural slowing. The chart below shows the number of new cases projected from now on by our logistic estimates with the current lockdown (red). It also shows the effect of extending the lockdown by a further 3 weeks (grey); it is small, for reasons that by now should be apparent.



Some medical experts, such as at Imperial College London, may well attack these logistic model estimates, saying that infections could go much higher than the model maxima estimated: the following paragraph shows the massive Imperial projections of likely deaths. However, our estimates are fitted to reported cases, which probably underestimate true case numbers by a very large factor; this is the view taken by the Oxford Centre for Evidence-based Medicine, which has stressed the data on the wide virus spread, including to many with weak or no symptoms. The latest data reported in the BMJ on infections from China where testing has been done on new arrivals suggest that four fifths of infections are asymptomatic (see https://www.bmj.com/content/369/bmj.m1375). These will typically not be reported, suggesting understatement by a factor of 5. However, add to the asymptomatic those who when self-isolating get weak symptoms and so will also not be reported, and the factor could be many times higher. This asymptomatic percentage was backed up by evidence in Italy found by Prof. Romagnani of the University of Florence https://www.theguardian.com/world/2020/mar/18/scientists-say-mass-tests-in-italian-town-have-halted-covid-19). This is why we think that what we are now seeing in reported cases in country after country is fitting the implied logistic model, whether there has been lockdown or not. Our fitting to reported cases is a broad and rough guide to what is happening to actual, unknown, total cases.

Covid projections — UK schools of thought:

1. Imperial College, London (Report no.9, Prof. Neil Ferguson: https://www.imperial.ac.uk/media/imperial-college/medicine/mrc-gida/2020-03-16-COVID19-Report-9.pdf): Projected total deaths, no action: 510,000. With Max lockdown: 48000. Advice: Max lockdown
2. Oxford (Covid blog, Prof. Carl Heneghan; and report led by Prof. Sunetra Gupta: https://www.medrxiv.org/content/10.1101/2020.03.24.20042291v1) Evidence of wide spread of virus, with largescale under-reporting due to no/weak symptoms among infected. Advice: allow virus progress to herd immunity. Wide testing to establish infection/immunity rate. No projections.
3. Logistic data-based (shown here): Projected total deaths if no action had been taken: 10000; Projected after existing lockdown, with lifting end-April: 8000. Advice: lift lockdown soon (e.g. end-April), with ad hoc targeted restrictions based on testing.

It may well be sensible still to advise remaining vulnerable groups who have not yet caught the virus to minimise social contact, simply to reduce the flow of bad new cases which will be concentrated among these groups. Such tightly targeted lockdown may be feasible with little economic damage. However, if testing can be brought into the mix, so that vulnerable groups can be tested for having the virus, even this targeted locking down can be limited to those who have not had it, and there may not be many of them. Needless to say, testing and gathering data on the actual distribution of the virus can only strengthen our grip on likely future cases, as the lockdown is eased.

Nothing policymakers do in the present crisis is free of risk. Lockdown looks like 'playing safe' medically, given we know so little about this virus; also we know (as I explained in a recent Telegraph piece — https://www.telegraph.co.uk/politics/2020/04/07/public-finances-can-still-emerge-coronavirus-broadly-intact/) that the government is in a strong position to help people and

businesses with temporary bailouts. But lockdown is itself a deadly policy, threatening the economy with permanent damage; bail out is inefficient and complex to deliver. All this is bad for health too. The logistic model gives us a good handle on what the virus will do, following what it is already doing; yes, there are risks. It could possibly be that there are untouched pools of the non-infected lying in wait for the virus to be let out of lockdown; and yes, even if not, it could mutate and start over though there will surely be a lag in which we can put other defences in place. But we simply cannot tolerate the economic damage of prolonged lockdown. We have to move out of it, while doing what we can to mitigate possible reinfections. The logistic model's strong grip on the facts should strengthen our resolve.

Managing the Economics of the Coronavirus

The coronavirus has caused a policy reaction- lockdown- that is itself causing a deep recession, effectively government-mandated by closure of whole sectors. This has public support because it obeys the logic set out by medical scientists that it is necessary to prevent the overwhelming of the NHS ability to provide intensive care treatment for those who get badly sick from the virus. Health systems that are overwhelmed produce a large rise in the death rate from the virus.

The difficult question yet to be confronted is how do we escape from this lockdown over time and so get the economy into recovery mode. While the government can palliate the recession, it cannot totally avoid the damage because accessing government help is full of administrative delay and simple chaos. Many small and medium-sized businesses will be unable to survive.

We can hope for a widely-distributed antigen test that can allow people to return to the economy at low risk of infecting others or getting the virus again. Failing that, we may have to reopen parts of the economy as in China and put back the full panoply of quarantining new cases and their contacts in those parts, to minimise new waves of infection and always keep them below that critical 'overwhelm level'. Amid all this uncertainty, one thing is certain: everything we do carries mostly unknown risk, including ongoing lockdown, which probably carries the most risk.

The projection made above suggests that new cases will stabilise over time along the projected logistic curve if lockdown stops because so many have already had the disease, the vast majority with either no or weak symptoms. Officials' fears are that without lockdown many more will be infected. To assuage those fears, they need the evidence of tests. We must hope that these tests confirm what the logistic curve projects, namely that there are not many left to infect. Somehow we must get the lockdown lifted with a combination of try-out and testing.

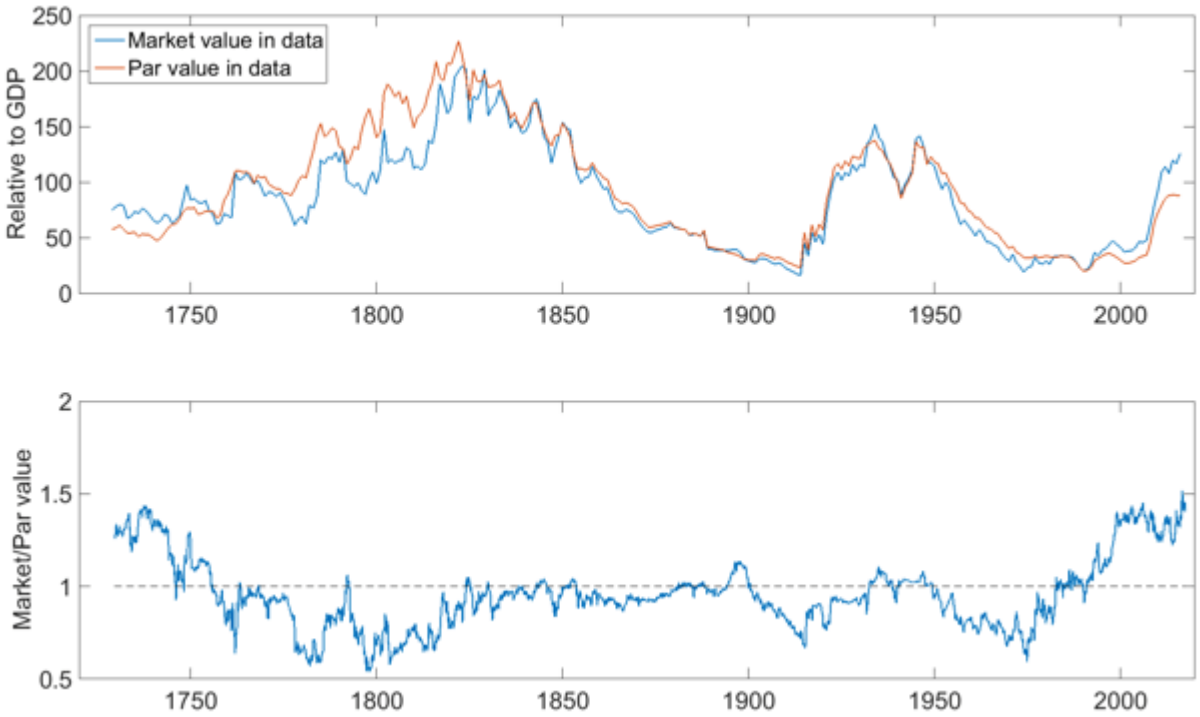
But some length of lockdown we cannot avoid. The government has pledged to support people and businesses to an unprecedented extent, as in truth it must, if only because the people demand it. The question some are asking is whether it can afford it. Here at least we can bring some better news.

How Fiscal Policy Copes with Wars and Other Crises — and Now the Coronavirus

To get an understanding of how far the public finances can stretch to cope with national crises, it is helpful to look at UK debt history. The two charts in the figure below come from Martin Ellison and Andrew Scott's VoxEU article chronicling UK debt history — https://voxeu.org/article/323-years-uk-national-debt

One can see that twice in UK history has the market value of debt/GDP spiked: once in 1830 after the Napoleonic wars, and once in 1945 after the Second World War. The first spike was to 200% of GDP, the second to about 150% of GDP. The chart below it is also instructive. It shows the ratio of market/par value of debt. When this is high, interest rates are low, a sign that the government is in a strong position to borrow, probably because the private sector is struggling.

Market Value of Debt in the UK Since 1694



Now look at how the bond market developed as Britain borrowed in the second half of the 18th century. The Market/par ratio remained at or above unity, as the government built up debt. By the early 1800s the market/par ratio had fallen sharply. The private economy was resurgent and interest rates rose, devaluing the public debt.

One can see a rather similar pattern over WWII debt. As it was accumulated during the war, the market/par ratio remained a bit below unity. By 1950, the ratio had fallen sharply; interest rates had risen as the economy recovered, devaluing the debt.

How were these huge debt ratios paid off? After Napoleon, income tax was introduced for the first time. After WWII, inflation devalued debt while also taxes were raised.

Application to the coronavirus crisis

Apply this to the coronavirus situation. With lockdown threatening a recession lasting three months or more, the government support package has been put at £400 billion as a rough round number, about 20% of GDP. If lockdown goes on for longer, as we must pray it does not due to some strategy as set out above, that number will spiral upwards. To understand how high the number could go, we need to do some basic arithmetic on the government accounts. National income or GDP breaks down into tax(40%) and disposable income (60%: assume that 50% accrues to non-taxpayers). Imagine now that GDP falls by 10%. This reduces tax takings by 4% of GDP, and also reduces disposable income. But as disposable income falls, the government pays tax credits (benefits) to the 50% not paying tax: assume their 50% of income falls by 5% of GDP and the tax credit rate is 80% as now promised in the government package. Then government benefits rise by 4% of GDP. The total rise in the fiscal deficit is thus 8% of GDP when GDP falls by 10%. Now consider a lockdown lasting six months: that is half a year's GDP, a 50% fall on the year 2020 say. The resulting fiscal deficit would be 40% of GDP. On top of the UK's existing public debt/GDP ratio of around 80%, this would take the UK ratio to over 100% of GDP, much on a par with the situation post WWII.

However, the government is greatly assisted by two interlocking factors. Interest rates today are nearly zero, with the yield on ten-year gilts around 0.4%. At the same time central banks are bound to help out during the crisis by buying gilts and printing money, keeping interest rates at this zero floor.

This implies that the government can borrow for next to nothing during the crisis and for very long maturities. But afterwards interest rates will rise as the economy recovers, and this rise will lower the repayment burden sharply. To give an arithmetical example, with the UK government's current average debt maturity of 16 years, if the government borrowed £100 billion at today's rates of 0.4% pa, its market value at post-crisis interest rates of say 5% pa would be only £14 billion. This implies that future taxpayers are faced with a much reduced burden of debt to pay off: one can calculate the tax rate needed to pay the debt off as £14 billion times the new interest rate of 5%.

The longer the maturity at which the government borrows, the more favourable this arithmetic, which explains why the UK debt office has typically favoured long-maturity gilts. If we translate this into the need to pay off 100% debt to GDP contracted by the end of the virus crisis, it turns out the necessary tax rise is just 0.7% of GDP. This could be raised quite easily- just 2.3 pence on the standard rate of income tax.

Another way of explaining this favourable arithmetic is to focus on the interest cost of all this debt after the crisis. The 100% of GDP in debt that would have been raised and rolled over before and during the crisis would have required an interest rate of around 0.4% pa. So the interest on it that must be paid by future taxpayers is very low.

One can see from this the powers governments have as monopoly raisers of taxes and printers of money. During crises when people have nowhere else to put their savings, governments can borrow easily as the only safe deposit show in town- the taxpayer sits at their back as repayment guarantee. Meanwhile the central bank can print money, driving down rates of return on all assets, cheapening the cost of public borrowing.

What all this implies is that a sovereign government with a reliable taxpaying public is in a powerful position to cope with the financial fall out from wars and other fiscal crises.

Nevertheless one must remember that to have a reliable taxpaying public one must have a functioning economy. That is why, as we all well understand, the most urgent need in this crisis is to find a way to get people back to work, so the economy can revive.

How to handle fiscal and monetary policy after the crisis

Now turn to the moment the economy is released from the virus lockdown and starts to recover. Some commentators have argued for continued monetary and fiscal stimulus, to push the economy all the faster to normal. They have suggested that this would run no risks with inflation.

However, this is bad advice. It is true that inflation has been quiescent for a decade while there have been substantial fiscal deficits in spite of austerity programmes while money has been printed on a massive scale by central banks through their QE programmes. Essentially highly expansionary monetary policy has failed to prevent a world of moderate deflation. Yet it was a series of mistakes made by central banks that led to this outcome. First, they fed a credit boom in the 2000s; then as bank balance sheets weakened with rising non-performing loans, they allowed Lehman to go bankrupt, precipitating the banking crisis. After the huge consequential bailouts, when bank credit needed to expand rapidly to create recovery, central banks brought in draconian new rules for banks that stopped them lending. The ensuing programme of massive money printing (Quantitative Easing) duly failed to trigger the upsurge in bank credit and broad money that was intended. Instead it drove interest rates down to zero and drove up other asset prices.

In the aftermath of the coronavirus crisis it is vital these mistakes are not repeated.

Coming out of the crisis, the Bank of England will hold a mass of government debt, while banks will hold large portfolios of credit in private firms that have survived the crisis. In practice the draconian regulations restraining bank credit creation will have been lifted. To prevent a huge surge in money and credit growth, the Bank must steadily sell off their massive holdings of government bonds to contract the money supply and tighten credit conditions. This is necessary to prevent a serious inflation from taking hold. Siren voices will say there is no risk of inflation in the general uncertainty of the post-lockdown crisis. They said the same during the Weimar Republic in the 1920s and the result after a short lag was a terrible hyperinflation. Those voices must be firmly ignored.

With the government still running fiscal deficits until the economy recovers, there will continue to be substantial fiscal stimulus. With demand surging relative to a supply still getting going, prices will rise. Provided money is kept under control, interest rates will rise as well, and we will gradually return to a normal monetary environment, with interest rates around 5% and inflation controlled at around 2-3% in line with the targets that the Bank of England is committed to.

The final question to be answered is: how should fiscal policy progress after the crisis?

Some illustrative figures can help us with our thinking. Plainly the UK government will emerge with a large debt/GDP ratio after the crisis package has been rolled out. Suppose it costs £500 billion, on top of existing debt of around 80% of GDP (around £1600 billion), which we can assume is being refinanced at current low interest rates as far as possible. That would together imply a total debt of £2100 billion at par having been issued by the end of 2020, some 100% of GDP. Let us assume as above that by 2022 interest rates have risen to about 5%, with gradually tightening monetary conditions. This would imply that at market value this debt would only be 14% of GDP. What we are seeing here is that debt interest being so low on the debt that was issued, its being discounted at interest rates some ten times higher than at issue, its market value is greatly reduced.

The implication is, as we have seen, that the debt could be paid off at a fairly modest cost in higher tax rates, as noted above about 2.3 pence on the standard rate. For those puzzled by this arithmetic and worried there is sleight of hand, a transparent way of doing all this would be to issue new debt worth 14% of GDP to pay off the existing debt at market value; and to create a sinking fund sufficient to pay off this newly issued debt. This sinking fund would be funded in turn by a tax rise, whose proceeds would go entirely to paying off this debt. The necessary tax rise is as we have seen 0.7% 0f GDP, about 2.3 pence on the standard

rate: the present value of this tax stream discounted at 5% is exactly the 14% of GDP required.

These figures reveal that 'fiscal re-entry' is reasonably manageable after the crisis. There will be those that will focus on the post-lockdown high nominal debt/GDP ratio and urge austerity to bring it down. But they will be missing the point, again imposing short-run fiscal rules that make no long run sense in the light of the very low long run interest rates at which the public debt will have been issued.

If we consider the steady state spend and tax situation post-crisis, it looks like this:

- Ongoing public spending, ex-debt: 40% of GDP
- Ongoing required tax revenue to pay for ongoing spending and pay off the inherited debt: 40.7% of GDP
- Fiscal adjustment required via higher taxes to raise current tax/GDP ratio from around 40% to 40.7%.

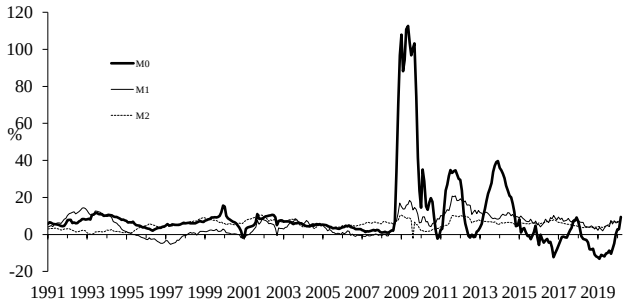
From this new starting point, we can continue to focus on the reforms that need doing in the post-Brexit economy. The issues remain the same. How to get to free trade and better post-EU regulation. And how to reform the tax and spending programmes of government to favour a more dynamic economy.

So while the coronavirus crisis is a terrible episode in so many ways, we can emerge from it with our public finances still broadly intact and in a fit state to tackle our many post-Brexit policy choices intelligently.

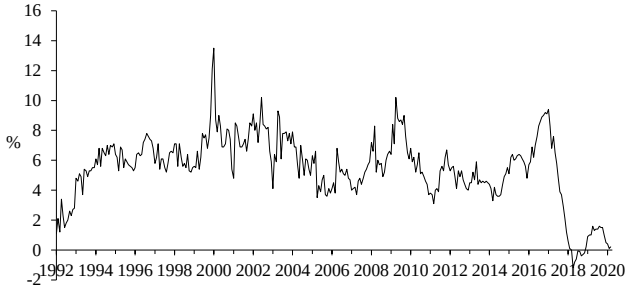
Our Current Forecast

With the length of lockdown so uncertain, we are forced to make some working assumption s which we base on our argument above that the lockdown can come off quite soon without danger from a renewed acceleration in cases. On this basis we assume the lockdown which came in during March comes off at the end of May. This closes down large parts of the economy for two months of 2020. Accordingly GDP falls in Q1 and further in Q2. But in Q3 it recovers. The fiscal support needed is projected using the rough arithmetic set out above. Then in late 2020 we assume that money starts to be tightened to prevent a rising inflation from the large bailout programme plus the printing of money and responding surge in credit with banks increasingly deregulated. So interest rates rise during late 2020 and into 2021. The collapse of GDP in 2020 is reversed therefore in 2021; a modest rise in general taxes is needed that year to pay off the inherited crisis debt, as set out above. Fiscal expansion will continue until interest rates have normalised at around 5%. From this point long term fiscal arithmetic is used to pursue the post-Brexit programme we have called Fiscal-reform-plus.

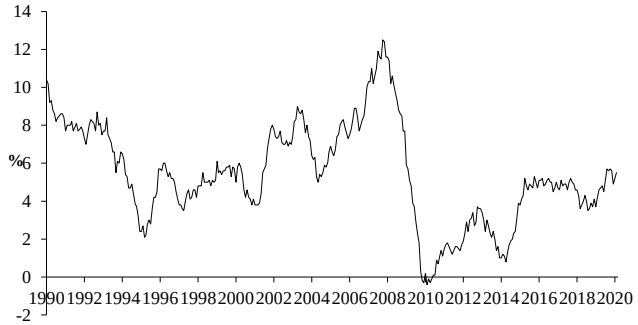
U.S.: Growth in Monetary Aggregates (Yr - on - Yr)



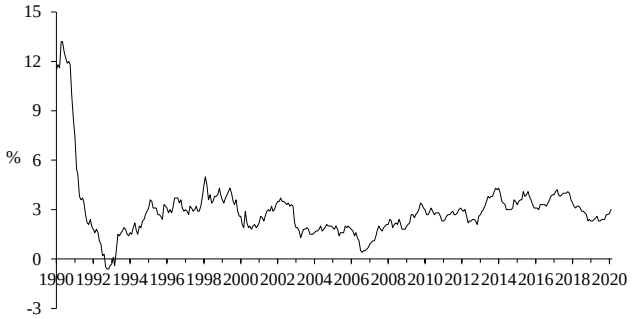
UK: Notes and Coins in Circulation Growth



Eurozone M3 Growth



Japan: Growth of M2+CD's



FOCUS ON JAPAN

Francesco Perugini

Japan's economy in 'severe situation' due to COVID-19

The Japanese economy has fallen into a "severe situation" and is "extremely depressed" from the coronavirus, the government warned recently, bringing down the curtain on years of optimism and the Abenomics-driven recovery since 2013. The bleak assessment in its monthly report for March is in line with the view of many private-sector economists that a contraction had already begun under the weight of Japan's recent consumption tax hike, even before the virus began to take its toll. "An economy that had been recovering moderately has clearly taken a different direction and entered a declining phase," said Economic and Fiscal Policy Minister Yasutoshi Nishimura, who is in charge of the government's monthly reports, at a news conference.

Until last month, the government had maintained that the economy was "recovering at a moderate pace" in its monthly reports for roughly two years since January 2018. It used the word "recovery" in its report for July 2013 — about half a year after Shinzo Abe began his second run as prime minister — when the economy was described as showing "some movements on the way to recovery" following the devastation of the March 2011 earthquake and tsunami.

Even with four downgrades in its assessment last year, the government maintained a tone of the economy rebounding mildly. But the school closings and event cancellations caused by the virus delivered a body blow to the underlying economy, leading to the gloomy language of the March report. Moreover, the Tokyo Games have now been postponed to 2021, a first in the 124-year modern history of the event. The Tokyo Metropolitan government estimated that from the winning of the bid in 2013 to a decade after the games in 2030 the event would have given a ¥32 trillion boost to the national economy. And for Shinzo Abe, Japan's longest-serving prime minister, the games would have offered a potent symbol of national recovery from the 2011 Tohoku earthquake and of his "Abenomics" policies of revitalisation and reform.

Private-sector economists say the economy is already in recession, with many estimating that the recovery peaked in October 2018 or the spring to autumn of 2019, right before the tax hike. "Negative growth is certain to continue for three quarters, until the April–June term," predicted Yoshiki Shinke, chief economist at the Dai-ichi Life Research Institute, saying the rebound peaked in October 2018. "Employment will be affected in the service industry, where many people work as part-timers or temps". Nomura Research Institute economist Takahide Kiuchi said that the cancelled Olympics would likely result in Japan's economy shrinking for the longest stretch since the global financial crisis. "I think it's almost certain that the economy will contract in the first and second quarters. So now the question for everyone is whether it also shrinks in the July–September quarter," he said.

In the meanwhile, with the budget for the year starting April 1 out of the way, the government looks ready to put together more spending measures to counter the sharp deterioration in the economy as the virus halts assembly lines, empties hotels and restaurants, and keeps shoppers and tourists at home. Recently Prime Minister Shinzo Abe wrapped up a series of hearings with experts and business representatives looking at the impact and what can be done to ease the pain for businesses and households. Abe told reporters he will draft policies to lead Japan into a v-shaped recovery.

Among the ideas being floated are the boosting of loan programs and other assistance for companies, cash and coupon handouts for consumers and even a temporary reduction of the sales tax. "We must think about who is going to be hardest hit," said Atsushi Takeda, chief economist at Itochu Research Institute. "For now, it appears the service industry is going to get hit hard. That's why the government must implement measures to shore up consumer spending." Takeda said that industry-targeted measures such as those supporting tourism would be effective, as would supporting households with children and lower incomes. Economists' estimates for the scale of the package range from around the ¥26 trillion size of the December package to an eventual total that is double that. Whatever the headline figure, probably less than half would amount to real fiscal measures.

Some lawmakers in Abe's Liberal Democratic Party have called for much larger amounts. "I think if we passed the equivalent of two years' budget in a year, that would put people's minds at rest. So, if the budget for a year is ¥100 trillion, we should double it to ¥200 trillion," said Lower House lawmaker Yasuhide Nakayama. Still, even if the package is similar in scale to the December spread of measures, together they would represent about 10% of GDP, said economist Mari Iwashita at Daiwa Securities. Some economists say additional spending can only do so much. "Unless the spread of the virus itself is halted things won't return to normal," said Yasunari Ueno, chief market economist at Mizuho Securities Co.

As for the monetary policy measures, Bank of Japan (BOJ) Governor Haruhiko Kuroda warned at last week's emergency monetary policy meeting that the coronavirus pandemic could plunge Japan into deep economic stagnation. The BOJ expanded monetary stimulus in an unscheduled policy meeting on March 16 to ease corporate funding strains and calm financial markets jolted by the health crisis. It also decided to expand its asset purchase program in a bid to stabilize financial markets through

increased accumulation of exchange-traded fund securities and corporate bonds. It also decided to employ a new operation to provide loans against corporate debt of about ¥8 trillion as of the end of February as collateral with an interest rate of zero percent and maturity of up to one year.

MARKET DEVELOPMENTS

Equity markets have fallen sharply as the coronavirus lockdown has hit the global economy, with no one knowing when it will be safe to lift it. Nevertheless, as our analysis shows, governments have the fiscal firepower to fund massive bailouts during the lockdown and still emerge totally solvent. This is because the interest rates at which they will borrow, held down by continued central bank money printing, are so low. This puts a firm lid on the necessary tax rises to pay off this debt.

Table 1: Market Developments

	Market Levels		Prediction for Mar/Apr 2021	
	Mar 4	Apr 6	Previous Letter	Current View
Share Indices				
UK (FT 100)	6816	5582	8717	6280
US (S&P 500)	3130	2664	3503	2570
Germany (DAX 30)	12128	10075	18276	14629
Japan (Tokyo New)	1503	1376	1961	1675
Bond Yields (government)				
UK	0.64	0.66	2.30	2.30
US	0.98	0.75	2.80	2.80
Germany	–0.63	–0.36	–0.20	–0.20
Japan	–0.10	0.01	–0.00	–0.00
UK Index Linked	–2.13	–2.07	1.00	1.00
Exchange Rates				
UK ($ per £)	1.28	1.23	1.32	1.32
UK (trade weighted)	78.89	77.67	79.4	79.4
US (trade weighted)	102.78	107.79	102.5	102.5
Euro per $	0.90	0.93	0.85	0.85
Euro per £	1.15	1.14	1.12	1.12
Japan (Yen per $)	107.29	109.13	112.5	112.5
Short Term Interest Rates (3-month deposits)				
UK	0.83	0.83	1.80	1.80
US	1.19	1.09	1.80	1.80
Euro	–0.46	–0.40	–0.50	–0.50
Japan	–0.15	0.00	–0.10	–0.10

Table 2: Prospective Yields [1]

Equities: Contribution to £ yield of:

	Dividend Yield	Real Growth	Inflation	Changing Dividend Yield	Currency	Total
UK	3.60	0.5	2.0	10.00		16.10
US	1.99	0.5	2.1	–6.10	–7.70	–9.21
Germany	3.30	0.5	1.7	43.00	1.28	49.78
Japan	1.90	–0.5	1.2	21.00	–11.03	12.57
UK indexed[2]	–2.07		2.0	8.00		7.94
Hong Kong[3]	2.60	3.0	2.1	–41.00	–7.70	–41.00
Malaysia	3.30	2.0	2.1	15.00	–7.70	14.70
Singapore	3.50	1.0	2.1	–7.00	–7.70	–8.10
India	1.40	4.0	2.1	–17.00	–7.70	–17.20
Korea	1.10	1.0	2.1	–40.00	–7.70	–43.50
Indonesia	2.20	3.0	2.1	2.00	–7.70	1.60
Taiwan	2.80	2.0	2.1	8.00	–7.70	7.20
Thailand	3.20	1.5	2.1	4.00	–7.70	3.10

Bonds: Contribution to £ yield of: –

	Redemption Yield	Changing Nominal Rates	Currency	Total
UK	0.66	–16.42		–15.76
US	0.75	–20.51	–7.70	–27.47
Germany	–0.36	–1.61	1.28	–0.70
Japan	0.01	0.09	–11.03	–10.93

Deposits: Contribution to £ yield of:

	Deposit Yield	Currency	Total
UK	0.83		0.83
US	1.09	–7.70	–6.61
Euro	–0.40	1.28	0.88
Japan	0.00	–11.03	–11.03

[1] Yields in terms of €s or $s can be computed by adjusting the £-based yields for the expected currency change.
[2] UK index linked bonds All Stocks
[3] Output based on China.

Table 3: Portfolio(%)

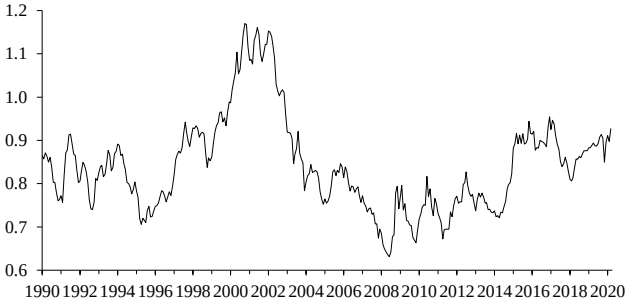
	Sterling Based Investor		Dollar Based Investor		Euro Based Investor	
	March Letter	**Current View**	**March Letter**	**Current View**	**March Letter**	**Current View**
UK Deposits (Cash)	5	5	5	5	1	1
US Deposits	-	-	-	-	-	-
Euro Deposits	-	-	-	-	-	-
Japanese Deposits	-	-	-	-	-	-
UK Bonds	-	-	-	-	-	-
US Bonds	-	-	-	-	-	-
German Bonds	-	-	-	-	-	-
Japanese Bonds	-	-	-	-	-	-
UK Shares	19	19	14	14	17	17
US Shares	14	14	19	19	16	16
German Shares	14	14	14	14	21	21
Japanese Shares	9	9	9	9	11	11
Hong Kong/Chinese Shares	4	4	4	4	4	4
Singaporean Shares	4	4	4	4	4	4
Indian Shares	4	4	4	4	4	4
Thai Shares	3	3	3	3	3	3
South Korean Shares	4	4	4	4	4	4
Taiwanese Shares	4	4	4	4	3	3
Brazilian Shares	4	4	4	4	3	3
Chilean Shares	4	4	4	4	3	3
Mexican Shares	4	4	4	4	3	3
Peruvian shares	4	4	4	4	3	3
Other:						
Index-linked bonds (UK)	-	-	-	-	-	-

INDICATORS AND MARKET ANALYSIS
FOREIGN EXCHANGE MARKETS

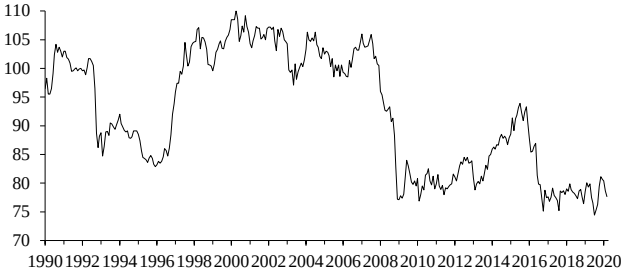
US : Trade Weighted Index
(Bank of England 1990 = 100)

UK: Dollars Per Pound Sterling

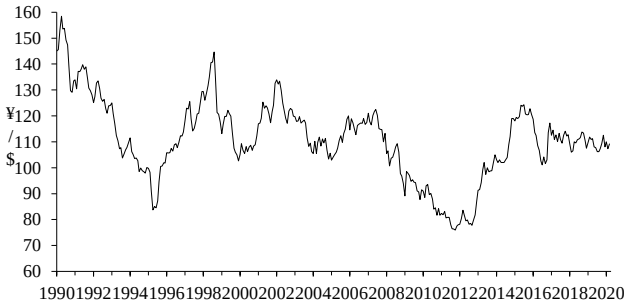
Euro per US dollar



UK: Trade-Weighted Index
(Bank of England 1990 = 100)



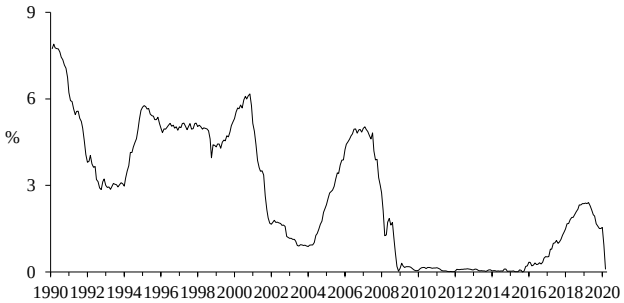
Japan : Yen Per U.S. Dollar



GOVERNMENT BOND MARKETS

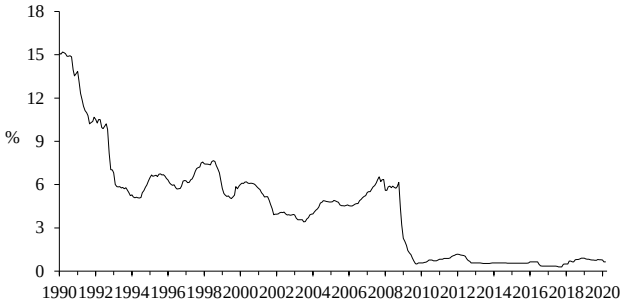
U.S.: Yield on Long-Term Government Bonds

U.S. : 3-Month Treasury Bill

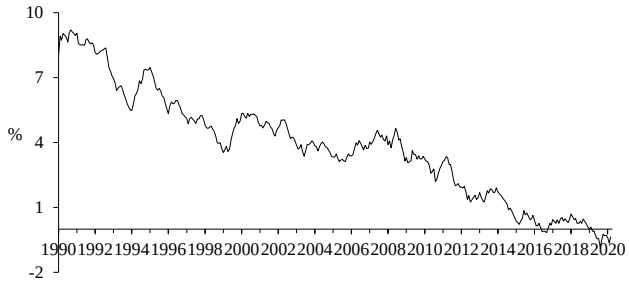


U.K.: Yield on Long-Term Government Bonds

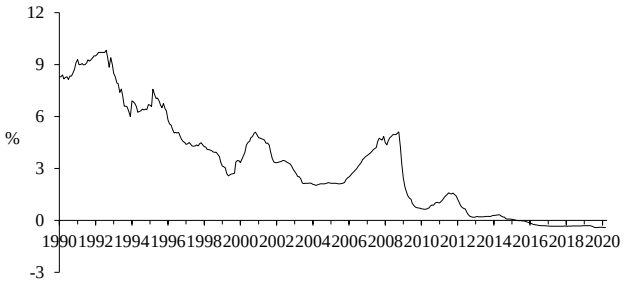
U.K. : 3-Month Certificate LIBOR Rate



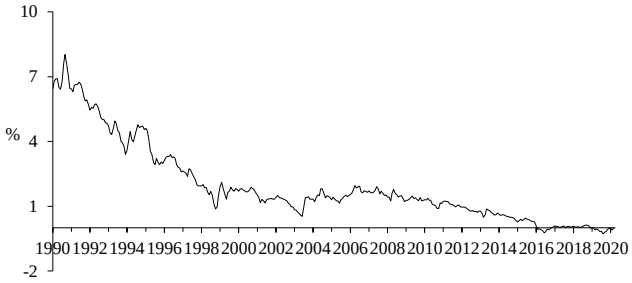
Germany: Yield on Public Authority Bonds



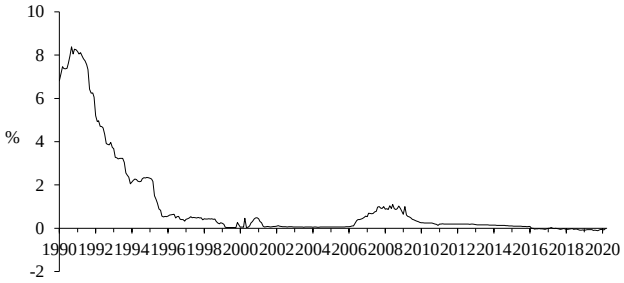
Germany : 3-Month Interbank Deposit Rate



Japan: Yield on Long-Term Government Bonds

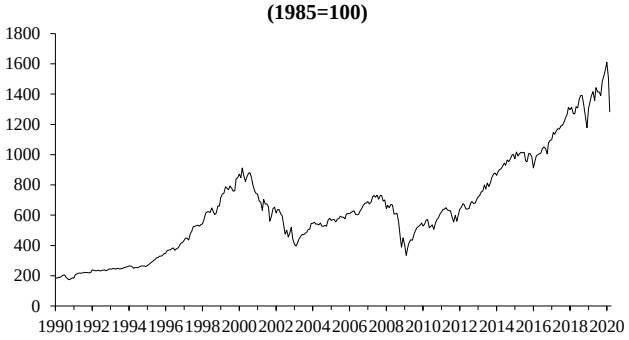


Japan : 3-Month Money Market Rate

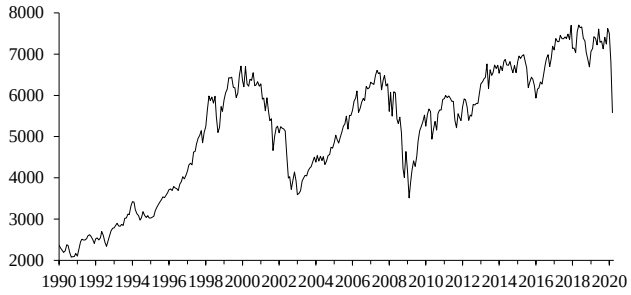


MAJOR EQUITY MARKETS

U.S. : S & P 400 Industrial
(1985=100)



U.K. : FTSE-100 Index
(10 April 1962=100)



Germany : DAX 30

Japan : Tokyo S.E. New
(1985=100)

EMERGING MARKETS

Anupam Rastogi

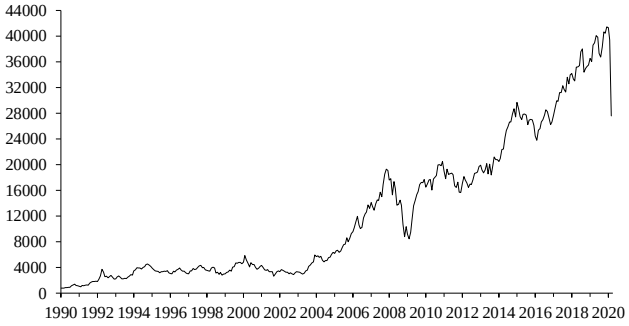
In the March Liverpool Investment Letter, we had alerted of novel coronavirus (Covid-19) and the pandemic in the offing. Our optimism that it will be under control in six months as vaccination will be ready within a few months has turned out to be over optimistic as we are roughly twelve to eighteen months away from a commercially available vaccination of this virus. The response of various countries has been to lock down their countries which implies that economic activities have come to standstill. The response of governments all over the world is to provide 'helicopter money' to their citizens in order to keep economic system alive. No economist is talking of fiscal deficit or debt to GDP ratio as this printing of money is not a stimulus package but a survival package. This package is as much as 10% of GDP in case of the US and as little as 1% of GDP in India which is following a very conservative fiscal path.

In our letter we cover five countries. All of them have taken different path to deal with this epidemic. The impact of their government's action on the economy is unknown without making certain assumptions. Our write-up of all the countries is based on the following assumptions:

1. The pandemic caused by Covid-19 will come under control in 12-18 months' time hoping that one of the labs is able to make a vaccine for it and it becomes available in large quantity.
2. In the meantime, countries would go through waves of opening and selectively shutting down of affected areas in various parts of the world. Its impact on supply chain remains uncertain.
3. Food and medicine to survive remains available to all countries.
4. Globally we are experiencing a disinflationary shock as hotels, restaurants, transport sector etc. have come to a standstill and prices of commodities such as crude oil and copper are tumbling.
5. As of now build-up of government debt to pay for measures to fight the virus would not spike the prices. The global consumer price index will fall below its year-ago level sometime around the middle of 2020. Decline in prices is caused by plunging in oil prices as well. New normal for crude oil prices will be $20 to $30 per barrel.
6. The biggest source of deflation is coming from China, where producer prices registered a 0.4% decline in February compared with a year ago after rising 0.1% in January. As Chinese goods would have little demand, they would not be in a position even to maintain prices of last year.

A lack of reliable data from every nation makes it harder to predict the speed of infection or the effectiveness of measures like social distancing. The moral here has nothing to do with political systems: Authoritarian states and democracies alike have, to different degrees failed their people, through lack of transparency, wilful ignorance, and legal and bureaucratic rigidity. Rather, what determines success or failure in the struggle against Covid-19's rampage, is "the state's capacity and, above all, trust in government."

India: BSE Sensitive



The coronavirus is guaranteed to throw the world into recession, and hope of a strong V shape recovery in growth is retreating. The base case is that a mild recovery gets under way in the second half of 2020. But caveats to that call are piling up. The trajectory of the disease itself is the biggest question mark. There is no certainty that the virus will be gone by the end of the second quarter and economic recovery is locked by discovery of a vaccine of Covid-19.

India

India has taken the biggest gamble ever with its 1.3 billion population as the country was locked down for 21 days at a short notice of 4 hours from March 25th onwards. The people were informed through social media, TV and mobile phones and cajoled to maintain social distancing and wash hands with soap again and again. So far, by the first week of April, its strategy has paid off, in terms of very few confirmed cases and less than hundred deaths. Though, it had taken precaution of banning flights from China and Italy earlier as well as sealing its border before the lock down was ordered.

As of now, in the first week of April, it seems that for a vibrant and noisy democratic country there was no other choice to prepare the people, to accept the hardship and to trust the government. During the lock down, the area where a confirmed case is found, complete isolation is enforced. People below the poverty line have been given some money and in parts of metropolitan cities, government has depended on socio-religious groups to provide food for the homeless and needy people. The country has used this time to stock up on sanitizers, ventilators and medical supplies for health care providers. The real success of its strategy would be known

only when the lock down is selectively opened on April 15th. The trust among people is extremely high and the government feels that the community transmission of Covid-19 would largely get stunted using social distancing.

The economic growth in the fiscal year ending March 2020 will be below the previous year. In the next financial year, which shall see the impact of lock down, GDP will grow by three percent as rolling lockdowns and partial lock outs could last until September 2021. Economic growth is going to be sacrificed for the sake of survival of large number of people. Monsoon is expected to be normal, which shall keep the agricultural sector humming. With restriction on movement of food lifted, the sector would continue to grow and keep hunger away as well. However, time is needed by closed firms to start up again and consumption to restart as household budgets reflect lay-offs and pay cuts. Private sector investment will dry up and only the investment will be from the public sector. Fiscal deficit will not sky rocket and India may have current account surplus because of low crude oil consumption at a very low price in dollar terms. However, heavy corporate debt would lead to stressed assets for the financial sector and would strain the banking sector for a long time.

India saw one of the worst years in terms of foreign investment. About $15 billion left the country's stocks and bonds in March, the most in emerging Asia, according to Bloomberg. India's rupee slid 5.5% in the first quarter, contributing to a 33% loss for the benchmark stock index in dollar terms.

The Nikkei India Manufacturing Purchasing Managers' Index (PMI) stood at 51.8 in March compared to February's 54.5. Business sentiments are under pressure, due to uncertainty over recovery in domestic demand.

The government's relief package, which is less than one percent of GDP, may not be enough for survival. The government is likely to come out with another relief package soon.

A day after, Finance Minister Nirmala Sitharaman announced a Rs 1.7 trillion food-security and income-transfer package for the urban and rural poor affected by the coronavirus outbreak, the Reserve Bank of India (RBI) lowered the policy repo rate by 75 basis points to 4.4%.

The effective rate cut is closer to 100 basis points because abundant liquidity will ensure overnight rates trade below the bottom of the policy corridor, which was cut by 90 basis points. Second, a three-month moratorium on repaying interest and capital was allowed, providing the much-needed forbearance to borrowers. Third, with credit spreads widening sharply, the central bank will provide term liquidity to banks to buy investment-grade corporate bonds. Credit spreads of highly rated companies immediately compressed by 50-100 basis points.

In addition, multiple open market operations and targeted long-term repo operations will inject critical liquidity into the economic system. The central bank's actions are in alignment with the International Monetary Fund's (IMF) policy recommendations to central banks for dealing with the economic crisis. In a paper on "Policy Steps to address the Corona Crisis" released by the IMF on March 16, 2020, they recommended that central banks should provide liquidity to support market functioning and ease stresses in key funding markets, through open market operations, and other measures such as outright purchases and repo facilities. The IMF also specifically recommended that monetary easing will support demand and confidence while reducing borrowing costs for households and firms.

The Consumer Price Index-based inflation stood at 6.6% in February compared with 7.6% in January. In the next fiscal year, inflation will be below four percent.

The country's current account deficit (CAD) narrowed sharply to $1.4 billion, or 0.2% of GDP, for the December 2019 quarter. The sharp contraction in the deficit was mainly due to a lower trade deficit of $34.6 billion, and a rise in net services receipts. For the first nine months of the financial year, the CAD has narrowed to 1%.

A massive rate cut announced by the central bank casts darker clouds over the domestic currency. The Indian rupee reached new lows of 76 to a USD over the past one week. The currency fall may impact corporate's balance sheets who borrowed in foreign currency earlier.

The rupee has depreciated about 5.5% so far in 2020, with the bulk of its losses, a 4.3% slide, having occurred in March alone. The rupee hit a new low of 76.32 to the dollar on March 24.

	18–19	**19–20**	**20–21**	**21–22**	**22–23**
GDP (%p.a.)	6.8	5.0	3.0	6.5	6.5
WPI (%p.a.)	3.9	3.6	3.8	4.5	5.0
Current A/c(US$ bill.)	-70.0	-22.0	0.0	-35.0	-35.0
Rs./$(nom.)	79.5	73.0	76.0	78.0	80.0

China

China used all its powers first to downplay and to suppress the information on Covid-19 and later isolated Hubei province from the country and the world for more than two months.

China's GDP growth in 2020 is likely to be 2% in 2020 compared to 6.1% in 2019 due to the Covid-19 pandemic. Chinese authorities are wary of fully lifting restrictions on business activities because they don't know if Covid-19 will come roaring back, a concern of governments around the world. Partial lock down of Singapore suggests that their fear is not misplaced. Wuhan is set to end its lockdown on April 8.

China is keen to restart its economic growth. Early indicators point to a recovery in economic activity from February's nadir, though gauges of demand remained slack and market sentiment weak. China's manufacturing purchasing managers' index bounced to 52.0 in March, up from a record-low of 35.7 in February, holding out the hope of a rebound in activity. The State Council has indicated further easing is coming to stabilize demand. Offsetting the full impact of almost zero external demand will be a tall order. China's consumption levels are faltering as the country struggles to get its shoppers out and about. China's consumers are shopping online again. But their purchases signal they plan to stay indoors for the foreseeable future, dashing hopes for a spending recovery as the nation contemplates its post-virus world.

China's experience may prove an important indicator for how the rest of the world recovers. Even after outbreaks are contained, lingering fear is likely to change consumer behaviour for longer than expected.

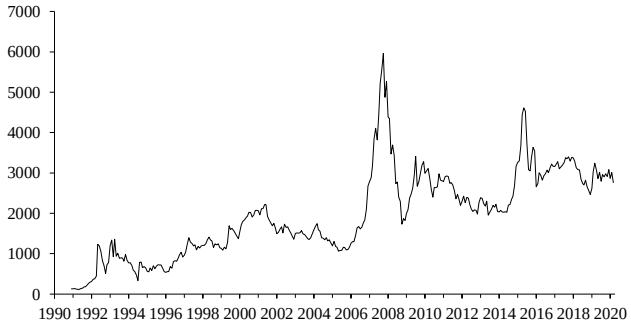
China's consumer price index (CPI) rose 5.2% in February from a year earlier but down from a 5.4% gain in January, with pork prices jumping 135.2%.

China's exports contracted sharply in the first two months of the year, and imports declined, as the health crisis triggered by the coronavirus outbreak caused massive disruptions to business operations, global supply chains and economic activity. Imports sank 4% from a year earlier but were better than market expectations of a 15% drop.

The supply and demand shocks in China are likely to reverberate through global supply chains for months, and the rising number of virus cases and business disruptions in other countries is raising fears of a prolonged global slowdown or even recession.

Beijing has already stepped up support measures, including offering cheap loans to affected businesses. More steps are expected as authorities try to cushion the epidemic's impact on the economy. The People's Bank of China unexpectedly cut its reverse repo rate by the most in almost five years to relieve pressure on the economy. China cut a key interest rate and injected more cash into the banking system.

China: SSE Composite Index



The PBOC lowered the rate it charges on 7-day repos with banks and pumped 50 billion yuan ($7.1 billion) into the system, in line with a Communist Party pledge to support the economy by selling more debt.

China's trade deficit in the first two months was US$7.1 billion, the first since March 2018, which could hit recovery hopes. The worst is to come later, as other countries' demand for Chinese exports sags. The bigger than expected fall in exports — minus 17.2% for January–February — came even before foreign markets became mired in the supply chain fallout of the virus, with its now-rapid spread around the world set to hit demand for Chinese goods for months to come.

China's yuan held steady even after a key survey showed manufacturing returned to growth in March, but investors remain sceptical of the uptick given many businesses are still struggling to resume operations from coronavirus disruptions

China has continued offering aid to Europe, extending its influence through a mixture of soft power and propaganda. China is targeting, in particular, the EU's worst-hit countries: Italy, Spain and Greece. They may find it impossible to resist Beijing's help in their hour of greatest need. Beijing has seized the opportunity to offer assistance. Beijing has sent face masks, test kits and ventilators to Greece, Spain and Italy — some as donations, others as sales — as all countries face shortages of medical supplies.

China — which has been assiduously courting foreign investors for years and overhauling its market regulations to address their concerns — by contrast has outperformed the rest of the world during the coronavirus crisis. China saw almost $30 billion of inflows in January and February, though March is likely to have seen an outflow.

Post Covid-19 crisis, yuan would not replace USD as the reserve currency but certain to acquire importance as one of the important currencies in international trade.

	18	**19**	**20**	**21**	**22**
GDP (%p.a.)	6.6	6.1	2.0	5.5	5.5
Inflation (%p.a.)	2.2	2.3	2.3	2.0	1.8
Trade Balance(US$ bill.)	50.0	40.0	20.0	40.0	40.0
Rmb/$(nom.)	6.8	7.1	7.2	7.2	7.2

South Korea

Unlike India and China, South Korea developed a quick test for Covid-19, used it to identify infected people, isolated them, and traced those who have had contact with. Using information technology and mobile phone data it could trace the infected people who are from a sect whose Church is in Wuhan, China.

South Korea is most likely to see contraction of its GDP in 2020. Its quarter-on-quarter economic growth rate is estimated at negative 0.9 percent and negative 0.7 percent in the first and second quarters of this year. February industrial output dropped 4.5% month-on-month. The government had unveiled a special budget in mid-March and another is being planned to provide payments to families soon.

According to the credit rating agency, Standard & Poor's (S&P), South Korea's inflation rate, unemployment rate and benchmark rate at the end of this year are estimated at negative 0.4%, 4.2% and 0.5%, respectively

Due to a collapse in international trade, there is a breakdown in trade activity of South Korea. As China is restarting its manufacturing activities, exports from South Korea to China — a big supplier to China — may gain 1.6% year-on-year, slowing from 4.5% in February. In the health care industries producing gloves, medicated masks and ventilators, China has 75–80% world capacity.

South Korea's mom-and-pop investors, who dominate in the nation's stock market, are pumping money into shares in the benchmark Kospi Index at the fastest pace since at least 1997, according to Bloomberg. Retail investors added a net 20 trillion won ($16 billion) of shares in the first quarter, while foreign buyers and local institutional investors offloaded a combined 22.7 trillion won. Korean regulators have cautioned retail investors to refrain from "reckless buying" of local stocks, especially with borrowed money.

	18	**19**	**20**	**21**	**22**
GDP (%p.a.)	2.7	1.8	-0.5	2.0	2.2
Inflation (%p.a.)	1.5	0.4	-0.5	0.2	1.2
Current A/c(US$ bill.)	86.0	80.0	68.0	70.0	70.0
Won/$(nom.)	1130	1200	1230	1260	1260

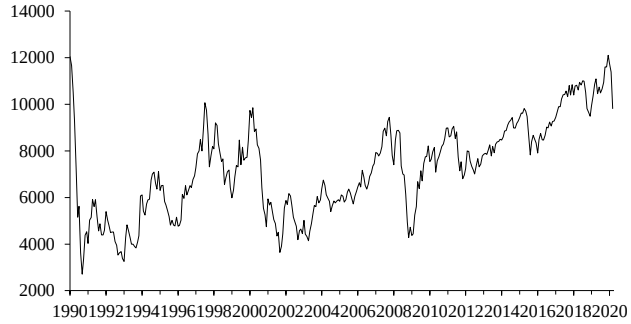
Taiwan

A key element in Taiwan's preparedness was the lessons learned from its devastating experience with the SARS epidemic in 2003, which caused 71 deaths on the island of 23 million people. Taiwan has won widespread recognition for its impressive performance in dealing with the crisis. It relied on a combination of preparedness, technology, and transparency. Taiwan managed to limit the number of reported cases and deaths — at numbers far fewer than the neighbouring countries.

However, in terms of economic growth, it would not be lucky but would do better than many other countries.

Korea: Composite Index

Taiwan: Weighted TAIEX Price Index



Taiwan's gross domestic product (GDP) growth for 2020 would slide to 1.5% due to the Covid-19 coronavirus pandemic.

Taiwan's Consumer Price Index and Wholesale Price Index were both negative on a yearly basis. This reflects the hit to consumers and manufacturers from the coronavirus. We don't expect a policy rate cut by the central bank. The CPI was -2.1% year-on-year in February while the WPI was -4.47 YoY. It is quite rare for Taiwan to see negative CPI inflation, though the WPI measure has been in negative territory since May 2019.

We do not expect Taiwan's central bank to cut the policy interest rate, which is now at 1.375% and has not moved since June 2016. The main reason is that an interest rate cut will do nothing to combat the actual health emergency. The government has already planned to deliver consumption coupons to consumers and tourists after the epidemic ends. This may help struggling retailers a little, but could also make the central bank comfortable in its current policy position.

Taiwan's exports surged 24.9% year on year while imports were even better at 44.7% in February. This is because of strong trade in electronics and also the low base effect in the same month last year. Due to the strong import growth, the trade balance was reduced to $3.3bn in February, lower than $3.46bn in January. However, the future is not as rosy as was the last three months as its two largest export markets, China and the U.S., head for recession, and domestic spending is curtailed by a self-isolating public.

There have been inflows of capital to Taiwan, which is another reason that a rate cut is likely to inject more money in the system. As inflows continue, USD/TWD has strengthened to around 30 TWD to a USD.

	18	19	20	21	22
GDP (%p.a.)	2.6	2.0	1.5	2.4	2.2
Inflation (%p.a.)	1.2	1.0	-1.0	1.0	1.0
Current A/c(US$ bill.)	68.0	70.0	71.0	70.0	60.0
NT$/$(nom.)	29.8	31.0	30.0	30.5	31.0

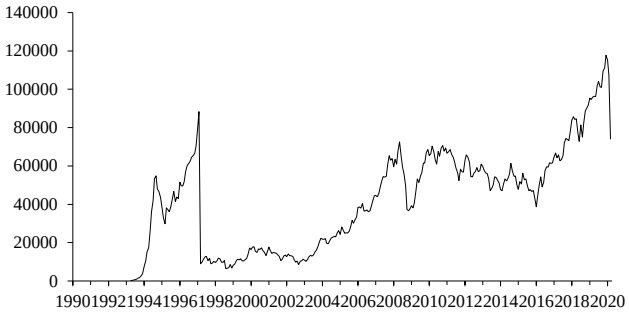
Brazil

Brazil's President Jair Bolsonaro has handled the Covid-19 pandemic in a cavalier manner. He initially described coronavirus as just "a little flu". After repeated tests, he refused to make the results public, claiming they are a state secret. His country is home to 13.5 million urban settlers living in favelas, the equivalent of slums. Despite being politically isolated, he is hanging on. "God is Brazilian," he says. "The cure is right there." Burials have increased by 30% at Vila Formosa, Latin America's largest cemetery in Sao Paulo, where dozens of graves have already been dug to prepare for an influx of dead bodies from Brazil's outbreak in coming weeks. Infections are about to explode in the slums of Brazil, where President Jair Bolsonaro dismisses the new coronavirus as the "sniffles." Brazil's favelas are a "ticking time-bomb.

Brazil's government slashed its 2020 economic growth forecast to zero as it factored in the expected hit from the global coronavirus outbreak, but insisted there will be no fiscal largesse to cushion the blow. We expect the year 2020 to be one of Brazil's most painful years on record. Brazil is heading for recession and contraction of GDP to the extent of 2% in 2020.

The central bank has lowered its inflation outlook for this year to 3.0% from 3.5%, based on market projections for interest rates and a stable exchange rate of 4.75 reais per dollar. The inflation would be a full percentage point below its official 2020 target of 4.0%.

Brazil: Bovespa



The central bank has taken a range of measures to pump liquidity into Brazil's banking system and financial markets to mitigate the impact of the crisis, while the government is also providing support for people and businesses hardest hit by the sudden shutdown. The Selic rate is now below the most recent inflation rate. A country, that for generations has been preoccupied by inflation, and can easily remember hyperinflation, has joined the club of nations worried about stagnation.

Its 2020 trade surplus forecast to $33.5 billion and current account deficit is estimated to shrink to $41 billion from the earlier estimate of $58 billion. The current account deficit will be financed by estimated foreign direct investment inflows this year of $60 billion.

Investors pulled more than $3 billion out of Brazilian investment funds, highlighting the country's deteriorating financial position even before any impact from the coronavirus outbreak had been felt.

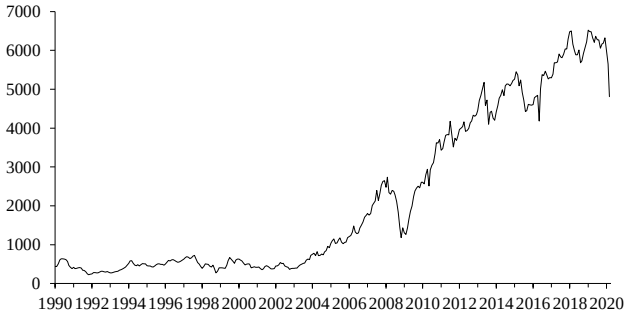
The Brazilian real, the world's worst performer this year, weakened 2% to a record 4.72 per dollar even as the central bank stepped in to support the currency.

	18	19	20	21	22
GDP (%p.a.)	1.1	0.8	-1.0	2.5	2.5
Inflation (%p.a.)	3.8	4.3	3.2	3.6	4.0
Current A/c(US$ bill.)	-14.6	-36.0	-40.0	-40.0	-36.0
Real/$(nom.)	3.8	4.2	4.8	4.8	4.8

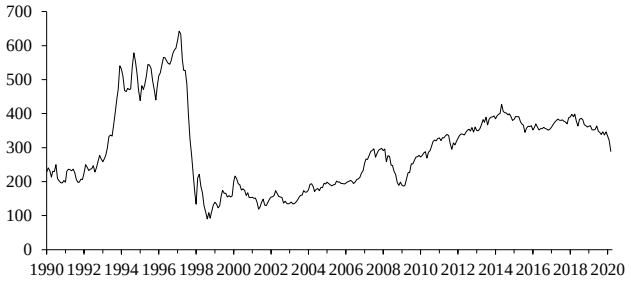
Other Emerging Markets

Hong Kong: FT-Actuaries

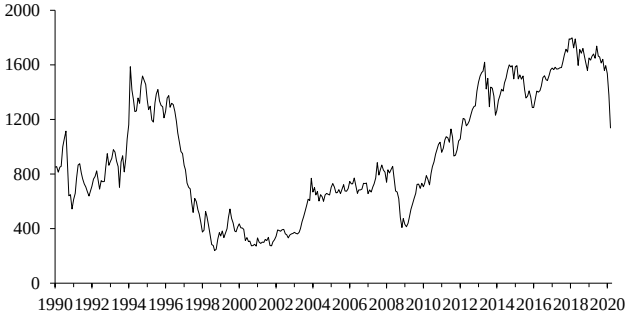
Indonesia: Jakarta Composite



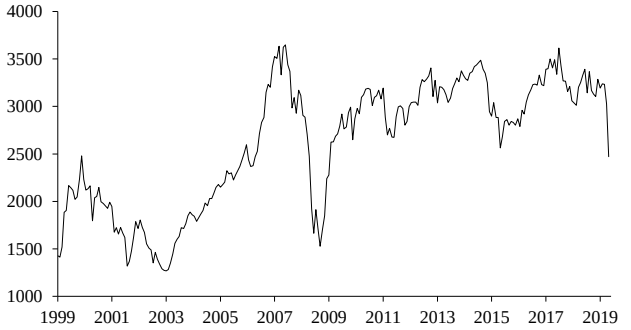
Malaysia: FT-Actuaries (US$ Index)



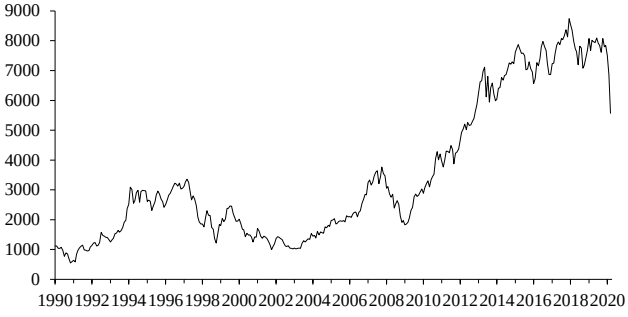
Thailand: Composite Index



Singapore: Straits Times Index

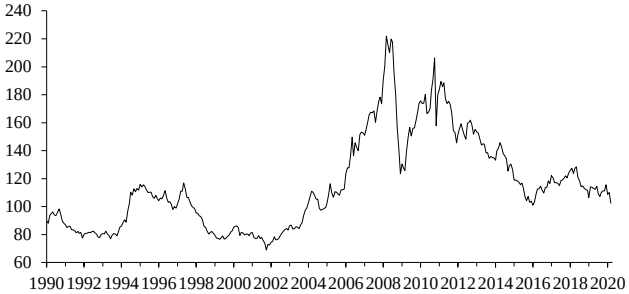


Philippines: Manila Composite



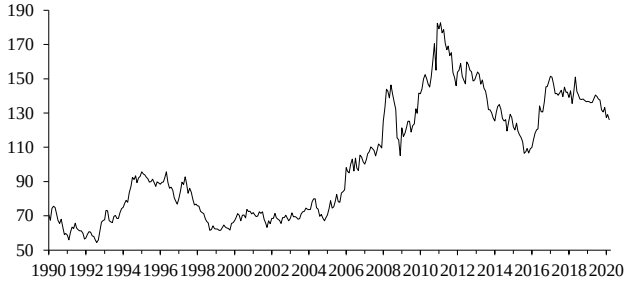
COMMODITY MARKETS

Commodity Price Index (Dollar)
(Economist, 2015 = 100)

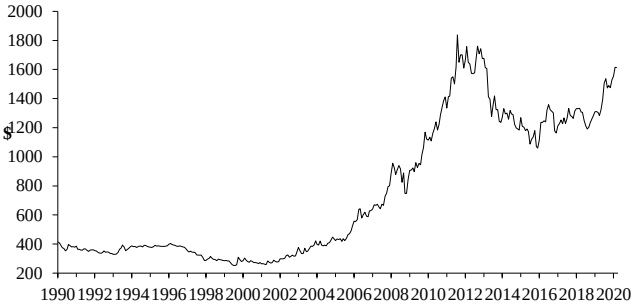


Oil Price: North Sea Brent (in Dollars)

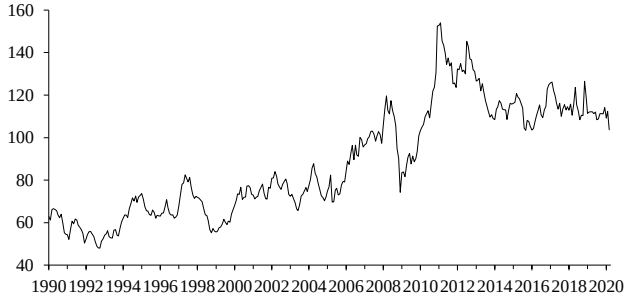
Commodity Price Index (Sterling)
(Economist, 2015 = 100)



Gold Price (in Dollars)



Commodity Price Index (Euro)
(Economist, 2015 = 100)



UK FORECAST DETAIL

Prices, Wages, Interest Rates and Exchange Rate Forecast (Seasonally Adjusted)

	Inflation %[1] (CPI)	Short Dated (5 Year) Interest Rates	3 Month Int. Rates	Nominal Exchange Rate (2005=100)[2]	Real Exchange Rate[3]	Real 3 Month Int. Rates %[4]	Inflation (RPIX)	Real Short Dated Rate of Interest[5]
2018	2.5	1.0	0.7	78.6	76.9	-1.3	3.3	-1.0
2019	1.8	0.8	0.8	77.9	75.4	-0.9	2.5	-0.9
2020	1.7	0.9	0.6	78.3	76.0	-1.7	2.2	-1.0
2021	2.1	3.0	1.9	78.1	76.3	-1.0	2.8	1.0
2022	2.1	5.0	4.5	77.9	76.6	2.2	2.8	3.0
2023	2.0	5.0	5.0	77.7	76.8	2.9	2.7	3.0
2019:1	1.8	0.9	0.9	79.0	77.4	-0.5	2.4	-0.9
2019:2	2.0	0.7	0.8	78.6	76.0	-0.5	3.0	-1.1
2019:3	1.8	0.4	0.8	76.0	72.7	-1.4	3.0	-1.4
2019:4	1.5	1.1	0.8	77.9	75.5	-1.3	1.9	-0.8
2020:1	1.8	1.0	0.7	77.8	75.5	-1.3	2.4	-0.8
2020:2	1.5	0.5	0.3	78.8	76.3	-1.9	1.8	-1.4
2020:3	1.7	1.0	0.5	78.5	76.2	-1.6	2.2	-1.0
2020:4	1.8	1.2	0.8	78.2	76.1	-1.9	2.4	-0.8
2021:1	2.1	1.8	1.5	77.6	76.0	-1.1	2.9	-0.2
2021:2	2.0	3.0	1.7	78.6	76.5	-1.1	2.8	1.0
2021:3	2.1	3.0	2.0	78.3	76.5	-1.2	2.7	1.0
2021:4	2.1	4.2	2.5	77.9	76.3	-0.5	2.8	2.2

1 Consumer's Expenditure Deflator
2 Sterling Effective Exchange Rate Bank of England
3 Ratio of UK to other OECD consumer prices adjusted for nominal exchange rate
4 Treasury Bill Rate less one year forecast of inflation
5 Short Dated 5 Year Interest Rate less average of predicted 5 year ahead inflation rate

Labour Market and Supply Factors (Seasonally Adjusted)

	Average Earnings (1990=100)[1]	Wage Growth[2]	Unemployment (New Basis) Percent[3]	Millions	Real Wage Rate[4] (1990=100)
2018	266.6	3.1	4.1	0.9	142.8
2019	275.7	3.7	3.9	0.9	145.2
2020	284.4	3.0	3.4	0.8	146.7
2021	293.2	3.2	3.3	0.7	148.4
2022	302.3	3.1	3.1	0.7	150.0
2023	302.3	3.2	2.9	0.7	150.0
2019:1	273.4	3.6	4.1	1.0	145.1
2019:2	273.5	4.4	4.2	1.1	144.9
2019:3	275.5	3.8	4.1	1.1	146.2
2019:4	277.8	2.8	3.4	0.8	145.9
2020:1	281.4	2.9	3.4	0.8	146.7
2020:2	281.7	3.0	3.4	0.8	146.5
2020:3	284.1	3.1	3.5	0.9	147.8
2020:4	286.4	3.1	3.4	0.8	147.5
2021:1	290.4	3.2	3.3	0.8	148.4
2021:2	290.8	3.2	3.3	0.8	148.3
2021:3	293.2	3.2	3.2	0.8	149.5
2021:4	295.1	3.0	3.2	0.8	149.0

1 Whole Economy
2 Average Earnings\
3 Wholly unemployed excluding school leavers as a percentage of employed and unemployed, self employed and HM Forces
4 Wage rate deflated by CPI

Estimates and Projections of the Gross Domestic Product[1] (£ Million 1990 Prices)

	Expenditure Index	£ Million '90 prices	Non-Durable Consumption[2]	Private Sector Gross Investment Expenditure[3]	Public Authority Expenditure[4]	Net Exports[5]	AFC
2018	165.5	792730.9	445721.1	307723.0	201029.6	-41308.9	120433.9
2019	167.8	803532.0	449022.2	304728.8	205398.3	-62992.2	92625.1
2020	157.1	752296.3	421831.1	242700.1	206623.8	-38566.7	80292.0
2021	166.3	796499.5	445807.6	259902.5	207875.1	-32871.7	84214.0
2022	170.8	817788.6	452277.2	271676.1	209119.9	-29139.7	86144.9
2023	175.9	842463.0	459061.5	288464.6	210372.4	-26816.4	88619.1
2018/17	1.4		1.0	2.3	0.2		-4.6
2019/18	1.4		0.7	-0.5	2.2		-12.4
2020/19	-6.4		-6.0	-19.8	0.6		-4.3
2021/20	6.0		5.8	7.6	0.6		5.9
2022/21	2.7		1.5	4.6	0.6		2.4
2023/22	3.0		1.5	6.2	0.6		2.9
2019:1	167.5	200581.1	111589.5	83278.3	52683.0	-28452.8	18516.9
2019:2	167.1	200109.6	112220.4	81082.1	50775.9	-13738.5	30230.3
2019:3	168.2	201343.7	113062.0	72473.6	51076.1	-12057.3	23210.7
2019:4	168.3	201497.5	112150.2	67894.7	50863.3	-8743.5	20667.2
2020:1	160.6	192311.9	108240.7	67988.1	52991.4	-16195.0	20713.3
2020:2	148.6	177965.4	99579.7	52806.3	51083.1	-6522.5	18981.2
2020:3	154.1	184471.5	103527.2	59658.8	51380.8	-10262.1	19833.2
2020:4	165.0	197547.5	110483.5	62246.8	51168.6	-5587.1	20764.3
2021:1	165.5	198201.1	111013.4	70457.3	53316.8	-15597.0	20989.4
2021:2	165.9	198658.6	111096.8	62414.7	51391.3	-5280.0	20964.2
2021:3	166.0	198782.0	111236.0	64708.1	51690.8	-7856.1	20996.8
2021:4	167.8	200857.8	112461.4	62322.3	51476.2	-4138.6	21263.5

[1] GDP at factor cost. Expenditure measure; seasonally adjusted
[2] Consumers expenditure less expenditure on durables and housing
[3] Private gross domestic capital formation plus household expenditure on durables and clothing plus private sector stock building
[4] General government current and capital expenditure including stock building
[5] Exports of goods and services less imports of goods and services

Financial Forecast

	PSBR/GDP %[1]	GDP[1] (£bn)	PSBR (£bn) Financial Year	Debt Interest (£bn)	Current Account (£ bn)
2018	1.9	2092.4	40.8	23.4	-81.3
2019	2.0	2114.2	43.3	25.3	-93.8
2020	4.6	2047.9	89.9	26.0	-42.8
2021	0.4	2206.1	8.9	33.8	-31.5
2022	0.2	2318.1	4.6	42.4	-22.4
2023	0.0	2436.9	0.3	44.0	-16.6
2019:1	-3.6	520.1	-18.8	6.3	-33.8
2019:2	5.5	532.3	29.4	6.3	-26.8
2019:3	2.0	531.3	10.9	6.3	-15.3
2019:4	3.9	537.3	21.1	6.4	-17.9
2020:1	-3.5	513.4	-18.0	6.3	-8.6
2020:2	11.1	476.6	53.0	5.9	-11.9
2020:3	7.1	495.2	35.3	6.2	-10.9
2020:4	3.9	535.1	21.0	6.6	-11.3
2021:1	-3.6	541.0	-19.5	7.3	-7.4
2021:2	3.2	542.0	17.3	7.6	-9.8
2021:3	-1.3	545.9	-6.9	7.9	-5.9
2021:4	3.3	555.5	18.4	8.5	-8.3

[1] GDP at market prices (Financial Year)

WORLD FORECAST DETAIL

Growth Of Real GNP

	2017	2018	2019	2020	2021	2022
U.S.A.	2.2	2.9	2.3	-6.5	1.9	2.0
U.K.	1.8	1.4	1.4	–6.4	6.0	2.7
Japan	2.2	0.3	1.0	–7.9	0.8	1.0
Germany	2.5	1.5	0.5	–4.5	1.1	1.2
France	2.4	1.7	1.3	–7.0	1.3	1.4
Italy	1.7	0.8	0.2	–7.4	0.5	0.6

Growth Of Consumer Prices

	2017	2018	2019	2020	2021	2022
U.S.A.	2.1	2.4	1.8	2.0	2.0	2.0
U.K.	2.6	2.5	1.8	1.7	2.1	2.1
Japan	0.5	1.0	0.6	0.7	0.5	0.5
Germany	1.5	1.8	1.4	1.4	1.5	1.7
France	1.0	1.9	1.2	1.2	1.3	1.5
Italy	1.2	1.2	0.7	0.9	1.0	1.3

Real Short-Term Interest Rates

	2017	2018	2019	2020	2021	2022
U.S.A.	–1.5	0.1	0.1	–0.3	0.0	0.0
U.K.	–1.7	–1.3	–0.9	–1.7	–1.0	2.2
Japan	–1.0	–0.7	–0.8	–0.5	–0.4	–0.4
Germany	–2.1	–1.7	–1.8	–1.9	–2.0	–2.0
France	–2.2	–1.5	–1.7	–1.7	–1.8	–1.9
Italy	–1.5	–1.0	–1.4	–1.4	–1.6	–1.7

Nominal Short-Term Interest Rates

	2017	2018	2019	2020	2021	2022
U.S.A.	0.9	1.9	2.1	1.7	2.0	2.0
U.K.	0.4	0.7	0.8	0.6	1.9	4.5
Japan	0.0	–0.1	–0.1	0.0	0.1	0.1
Germany	–0.3	–0.3	–0.4	–0.4	–0.3	–0.1
France	–0.3	–0.3	–0.5	–0.4	–0.3	–0.1
Italy	–0.3	–0.3	–0.5	–0.4	–0.3	–0.1

Real Long-Term Interest Rates

	2017	2018	2019	2020	2021	2022
U.S.A.	0.4	0.9	0.1	0.3	0.8	1.0
U.K.	–1.5	–1.0	–0.9	–1.0	1.0	3.0
Japan	–0.6	–0.5	–0.6	–0.6	–0.5	–0.4
Germany	–1.3	–1.1	–1.9	–2.1	–1.9	–1.7
France	–0.6	–0.5	–1.2	–1.5	–1.4	–1.3
Italy	1.1	1.6	0.9	0.1	0.1	0.2

Nominal Long-Term Interest Rates

	2017	2018	2019	2020	2021	2022
U.S.A.	2.4	2.9	2.1	2.3	2.8	3.0
U.K.	0.6	1.0	0.8	0.9	3.0	5.0
Japan	0.1	0.1	–0.1	–0.1	0.0	0.1
Germany	0.3	0.4	–0.3	–0.4	–0.2	0.0
France	0.8	0.8	0.2	0.0	0.1	0.2
Italy	2.1	2.6	2.1	1.3	1.4	1.5

Index Of Real Exchange Rate(2000=100)[1]

	2017	2018	2019	2020	2021	2022
U.S.A.	94.5	93.5	96.3	96.2	95.5	94.9
U.K.	75.5	76.9	75.4	76.0	76.3	76.6
Japan	58.3	57.8	56.3	54.2	51.4	48.0
Germany	94.3	96.5	95.6	94.1	92.2	90.0
France	95.3	97.4	96.3	94.5	92.1	89.4
Italy	101.2	102.8	104.5	105.2	103.8	101.7

[1] The real exchange rate is the domestic price level relative to the foreign price level converted into domestic currency. A rise in the index implies an appreciation in the real exchange rate.

Nominal Exchange Rate (Number of Units of Local Currency To $1)

	2017	2018	2019	2020	2021	2022
U.S.A.[1]	101.68	10.96	104.31	106.53	105.84	104.43
U.K.	1.29	1.34	1.28	1.26	1.28	1.30
Japan	112.10	110.40	109.02	108.90	109.50	109.30
Eurozone	0.89	0.85	0.89	0.92	0.91	0.90

[1] The series for the USA is a trade weighted index (1990=100); the series for the UK is $ per £

* Forecasts based on the Liverpool World Model