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The Julian Hodge Institute of Applied Macroeconomics

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The Julian Hodge Institute of Applied Macroeconomics was launched in autumn 1999 in a new collaboration between the Cardiff Business School of Cardiff University and Julian Hodge Bank. 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. This research has been given added urgency by the ongoing discussions about the UK's adoption of the Euro in place of the Pound. The new Institute has aimed to develop research relevant to this important debate.

The Institute embraces the original Liverpool Research Group in Macroeconomics, which is now based at Cardiff Business School and is pursuing a research programme involving the estimation and use of macroeconomic models for forecasting and policy analysis. It is grateful for financial support to the Jane Hodge Foundation, the Economic and Social Research Council, Esmee Fairbairn Charitable Trust, the Wincott Foundation and Cardiff Business School.

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THIS BUDGET WAS A MISTAKE AND ITS POLICY DIRECTION NEEDS TO BE REVERSED WHEN LOCKDOWN IS OVER

Patrick Minford

This Budget set out plans to raise marginal tax rates on business entrepreneurship to much higher levels. It does so by freezing tax thresholds on the top rates of income tax, so dragging more entrepreneurs into the higher tax bands; and also by raising the main corporation tax rate to 24% by 2025, though mercifully at least not raising the rate on smaller businesses. This reverses years of free market policy on the supply side aimed at reducing these marginal tax rates because they reduce growth. It was the Tory party that embarked on this policy under Mrs. Thatcher and never gave up on it — until now.

If this were to be a permanent change of direction, it would be a serious tragedy for this country. It would mean that the Brexit opportunity would have been lost, to use our new freedom from the EU's pull towards socialistic policy in order to boost growth. However, I prefer to see it as a temporary piece of rhetoric, to show that this government is determined on solvency post-Covid. Once the public finances have stabilised after lockdown is raised, there will be an opportunity for sensible second thoughts.

Much is being made by the Treasury of the threat of rising interest rates to the finances via the rise in interest payments on existing debt. But this threat is deliberately self-inflicted by the Treasury refusal to raise the debt maturity actively by issuing longer-term bonds, including perpetuities, in place of existing maturities. By doing this it could lock in currently low interest rates so that future interest payments would not rise on current debt until it matured; the longer the current maturity the later would interest payments rise.

The Treasury's approach makes no sense. The debt ratio will come down steadily over time as growth resumes, with some inflation seemingly all set to accompany it. If one corrects the OBR forecasts to a more central trajectory for GDP, such as that of the Bank of England, the improvement in the finances is striking. Rising GDP raises tax revenue and lowers benefit payouts sharply.

Of course we do not know how long exactly it will take to bring the debt ratio down to sustainable levels below 60%. But this does not really matter; the key point for solvency is that the underlying direction should be stable or downwards. After the Napoleonic Wars when the ratio reached 200%, it took almost the whole Victorian century to do so. After WW2 when it was around 150%, it took a half century until 2000. http://users.ox.ac.uk/~exet2581/wp/AEJMacro-2018-0263.R1_Ellison_Scott_manuscript.pdf

The condition for solvency is that the value of the debt must be at least equal to (ie backed by) the present value of future revenues net of non-interest spending, the 'primary surplus'. With a bit of simple maths (see note at end) this can be shown to be equivalent to saying that the primary surplus as a fraction of the debt must be greater than or equal to the real rate of interest minus the growth rate; this in turn means the debt ratio is expected to be stable or fall steadily in the long run. At present with real interest rates negative and growth strong post-Covid the condition for solvency is plainly over-satisfied. But of course real interest rates will rise in the next few years, with inflation threatening; and growth will settle back to its normal rate.

Table 1: Summary of Forecast

	2018	2019	2020	2021	2022	2023	2024
GDP Growth[1]	1.3	1.4	-9.9	5.4	8.5	3.3	3.0
Inflation CPI	2.4	1.8	1.0	1.6	5.0	4.0	3.0
Wage Growth	3.0	3.5	1.5	3.1	6.0	5.3	4.2
Survey Unemployment	4.13.8	4.5	6.1	5.2	3.6	2.8	
Exchange Rate[2]	78.6	78.3	78.0	78.2	76.1	74.7	74.0
3 Month Interest Rate	0.4	0.8	0.2	0.1	1.5	4.5	5.0
5 Year Interest Rate	1.0	0.6	0.3	0.5	1.5	4.7	5.0
Current Balance (£bn)	-82.9	-89.1	-58.4	-51.1	-38.9	-27.8	-21.0
PSBR (£bn)	39.3	49.1	312.3	140.4	96.2	65.3	28.8

[1]Expenditure estimate at factor cost
[2]Sterling effective exchange rate, Bank of England Index (2005 = 100)

Nevertheless two things emerge from present trends. The first is that with our flexible labour market employment is likely to revive sharply with post-Covid recovery, just as it did after the financial crisis. This is likely to deliver 2% trend growth, which happens to also be the pre-Covid average growth rate in the thirty years to 2019; in that figure productivity slowed down, while employment growth compensated. However, there is evidence from around the world suggesting that productivity measurement has been biased downwards by not picking up the effects of new computer-based products such as the mobile phone.

The second is the need for the government to support growth with new policies boosting entrepreneurship and innovation. It is already committed to a new-pro-growth approach to regulation, which is very welcome. But there is ample evidence that growth also depends on tax rates, particularly marginal tax rates on businesses and their owners. It would be tragic if these were put up just as there is maximum need to get the economy going strongly after the Covid episode, not speak of making it maximally attractive to post-Brexit investors. Far from raising taxes soon, this is the right moment for putting forward a bold agenda for cuts in key tax rates and an infrastructure-building programme, especially oriented to the North, which also according to our regional research benefits most strongly from the tax-cutting agenda..

In our latest forecasts below, we have projected the public finances on existing policies (minus the ill-considered tax rise plans) and also with this bold fiscal agenda. Under existing policies, the debt ratio comes down to around 50% by the mid-2030s. With the fiscal package, costing £100 billion a year from 2024, growth is boosted by 1% and the

debt ratio falls to around 45%; in effect the package pays for itself.

In sum, the large Covid debt is no reason to rush around in panic to pay it off with higher taxes. On the contrary, with the UK's strong solvency history, we should take our time and let growth bring it down over time, meanwhile doing what is necessary to ensure the strongest possible growth trajectory in the coming decade.

PROJECTING DEBT AND THE EFFECTS OF A FISCAL REFORM PACKAGE

In this section we discuss the prospects for taxes and debt in the context of the post-Covid economic prospects. We begin with a background note on the key issue of how tax behaves in response to the economy.

A background note on tax behaviour

Taxes and benefits (tax credits) vary greatly with income, since the UK has a highly progressive and redistributive tax system. Usually, i.e. except when it is explicitly suspended the tax bands are indexed to inflation, so that real tax receipts vary only with real income. But as now in fact this indexation has been suspended by the recent budget-, currently inflation too raises taxes.

The average (net of benefit) tax yield is 0.20. This average rate consists about half of income taxes and half of expenditure taxes (mainly VAT). For income taxes, the top 50% of income earners have 75% of income and pay 88.4% of income tax. Their average tax rate is about 14%. For those in the bottom 50%, with 25% of income, they pay negative tax of about 9% of their income. (Source: Table 2.7 of HMRC Income Tax Statistics).

So the average net tax rate on income is (0.75(the share of income of top 50%) x 14%)–(0.25x9%) =8%. The average tax rate on other indirect taxes would then be about 12%, so that the total net tax rate is about 20% = 8 % +12%. This is in line with the calculated average net tax rate. This average net rate, ART, is to be compared with the marginal tax rate. For income tax this is around 0.4 (for some it will be higher and for benefit recipients it is close to 0.7; but for very many it is the top band rate of 0.4, while for minorities it is less or much more) and for indirect taxes around 0.2 (the marginal VAT rate). Hence on £100 of income extra total tax will be £60, a marginal tax rate, MRT, of 60%. The elasticity of tax revenue to income is MRT/ART, which is therefore about 3. This implies that the ART rises by 2% for every 1% rise in GDP — an elasticity of the ART of 2 — while tax receipts net of benefits rise by 3% for every 1% rise in GDP — a tax total elasticity of 3.

These are theoretical calculations of the elasticity to real GDP; but because they are based on the actual UK tax structure, they can be considered strongly based. In the data these changes are mixed up with many policy changes which are hard to identify. For one recent period, 1993-2000, we can get a rough idea of the trend due to GDP. The ART rose 55%, while GDP rose 23%, implying an ART elasticity to GDP elasticity of about 2, in line with our theory. From 2008 to 2019, GDP rose 27% and the ART 20%, a rather smaller ART elasticity of 0.7. Empirically, an ART elasticity must be in the range of 1-2, and most probably around the top of it.

In the tables that follow we show the rising spending (corresponding roughly to Departmental spending limits, DEL, in the OBR report), against rising tax receipts net of tax credits (these are shown as 'welfare spending' by the OBR and included in Total Managed Expenditure, TME, their spending aggregate). We do this both for the Base Run, where current policies continue; in this base case the debt/GDP ratio falls to 52% by 2034/35, illustrating the point that there is no need to rush and pay off a large debt ratio after a crisis such as a war or Covid- it will fall steadily to a safe sustainable level with growth. Then we do the same for the Variant case where we implement the Fiscal-Fund-plus-Reform package of tax cuts and infrastructure spending set out in the table below. According to our models this raises growth by 1% p.a. over the decade to 2034/35; with higher growth of GDP comes a rising ART after the initial drop in revenues from the programme. Again the debt ratio falls with now faster growth to a safe and sustainable 45% by 2034/35. In effect the package pays for itself. This underlines the UK's solid solvency.

Table 2: A fiscal stimulus package costing £100 billion p.a.

Tax Cuts	Amount
Cut corporation tax by 10%	£32 bn
Abolish the very top additional 5% rate	£1bn
Cut the top rate of income tax to 30%	£15bn
Cut the standard rate of income tax by 5%	£28bn
Total Tax Cuts[1]	£76bn
Public Spending[2]	£24bn
Total Package	£100 bn

[1] Representing a weighted average tax cut across all income of about 15%

[2] On public services and infrastructure

Table 3: Basic Forecast

	Nom PSBR	Nom GDP	Nom Pub Spend	Spend/ GDP	PSBR/ GDP	Nom Debt	Debt Interest	Debt/ GDP	Net Taxes	Net Tax Rate
2019/20	49.0	2201.4	473.2	21.5	2.2	1621.0	48.1	73.6	472.3	21.5
2020/21	313.6	1963.6	473.2	24.1	16.1	1934.6	39.8	98.5	199.4	10.2
2021/22	139.8	2233.3	474.5	21.2	6.3	2074.4	42.6	92.9	377.3	16.9
2022/23	58.2	2481.4	544.5	21.9	2.3	2132.6	41.1	85.9	527.3	21.3
2023/24	42.5	2660.8	587.7	22.1	1.6	2175.1	42.9	81.7	588.1	22.1
2024/25	27.8	2814.4	633.6	22.5	1	2202.9	41.1	78.3	646.9	23.0
2025/26	3.7	2931.4	658.0	22.4	0.1	2205.3	44.6	75.2	700.2	23.9
2026/27	0.2	3054.4	712.0	23.3	0	2205.5	47.9	72.2	759.7	24.9
2027/28	0.2	3180.6	771.9	24.3	0	2205.7	51.0	69.3	822.7	25.9
2028/29	0.0	3311.8	836.9	25.3	0	2205.7	53.9	66.6	890.9	26.9
2029/30	0.0	3448.3	907.9	26.3	0	2205.7	56.8	64.0	964.7	28.0
2030/31	0.0	3590.2	985.1	27.4	0	2205.7	59.4	61.4	1044.6	29.1
2031/32	0.0	3736.2	1068.6	28.6	0	2205.7	62.0	59.0	1130.5	30.3
2032/33	0.1	3889.0	1159.5	29.8	0	2205.8	64.4	56.7	1223.8	31.5
2033/34	0.0	4047.7	1258.0	31.1	0	2205.8	66.7	54.5	1324.7	32.7
2034/35	-0.1	4212.2	1364.7	32.4	0	2205.7	68.9	52.4	1433.7	34.0

Note: Net Tax = Nom Pub Spend+ Debt Interest - PSBRM

Table 4: Variant Forecast — Fiscal Stimulus Package

	Nom PSBR	Nom GDP	Nom Pub Spend	Spend/ GDP	PSBR/ GDP	Nom Debt	Debt Interest	Debt/ GDP	Net Taxes	Net Tax Rate
2019/20	49.0	2201.4	473.2	21.5	2.2	1621.0	48.1	73.6	472.3	21.5
2020/21	313.6	1963.6	473.2	24.1	16.0	1934.6	39.8	98.5	199.4	10.2
2021/22	139.8	2233.3	474.5	21.2	6.3	2074.4	42.6	92.9	377.3	16.9
2022/23	58.2	2481.4	544.5	21.9	2.3	2132.6	41.1	85.9	527.3	21.3
2023/24	42.5	2660.8	587.7	22.1	1.6	2175.1	42.9	81.7	588.1	22.1
2024/25	127.0	2816.2	658.6	23.4	4.6	2302.1	41.1	81.7	572.7	20.3
2025/26	89.8	2960.8	683.0	23.1	3.1	2391.9	45.1	80.8	638.3	21.6
2026/27	75.6	3108.8	737.0	23.7	2.5	2467.5	49.0	79.4	710.4	22.9
2027/28	59.1	3264.3	796.9	24.4	2.0	2526.6	52.9	77.4	790.7	24.2
2028/29	38.6	3427.5	861.9	25.1	1.5	2565.1	56.6	74.8	880.0	25.7
2029/30	13.7	3598.9	932.9	25.9	0.9	2578.9	60.2	71.7	979.4	27.2
2030/31	-16.4	3778.8	1010.1	26.7	0.1	2562.5	63.6	67.8	1090.1	28.8
2031/32	-53.0	3967.8	1093.6	27.6	-0.6	2509.5	66.7	63.2	1213.3	30.6
2032/33	-96.4	4166.1	1184.5	28.4	-1.5	2413.1	69.4	57.9	1350.4	32.4
2033/34	-148.3	4374.5	1283.0	29.3	-2.5	2264.7	71.6	51.8	1503.0	34.4
2034/35	-209.9	4593.2	1389.7	30.3	-3.5	2054.8	73.2	44.7	1672.8	36.4

Note: Net Tax = Nom Pub Spend+ Debt Interest - PSBRM

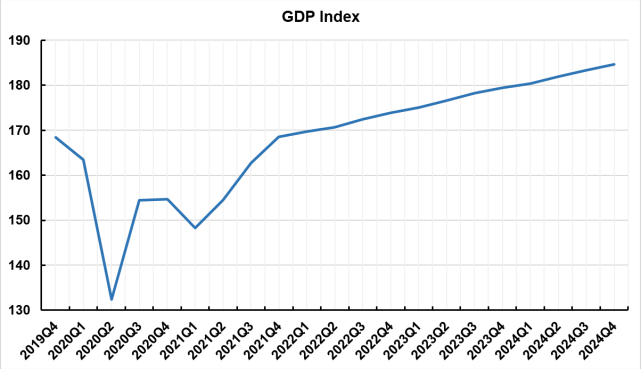
Reconciling our projections with the OBR forecasts to 2024

Our own projections of future debt and public finances are far less dire than the official ones from the Treasury and OBR. The recovery should be very strong and there will be higher inflation until the Bank gets its post-Covid act together and tightens money. If marginal tax rates were held down and cut somewhat, in a future reversal of this gloomy The latest OBR forecast is relatively pessimistic about the recovery path in real GDP; it also forecasts unrealistically low inflation, at a steady 2%. By 2024 its nominal and real GDP projection is well below ours. It assumes a slow recovery and a substantial permanent failure to reach the previous path; the basis for this pessimism is quite unclear and out of line with the Bank's up to date assessment of the outlook, to which our view is much closer. We project a catching-up by end 2024 to the previous pre-Covid growth trend, of 2% p.a. 1989-2019 (see chart below). Furthermore, inflation is already strongly visible in sharply rising raw material prices. If we adjust the OBR tax revenues for our higher GDP forecast, including the effects of our higher inflation forecasts, the OBR's PSBR forecast for 2024–25 becomes a small surplus, against our £27 billion deficit- this makes some allowance for higher spending in response to higher nominal GDP. This suggests that the borrowing outlook is far from the grim picture painted by the OBR.

Table 4: Paths of Forecast Real GDP: 2019=100

	2020	2021	2022	2023	2024	2025
OBR	90.1	93.7	100.5	102.3	103.9	105.7
Bank	90.1	94.6	102.2	103.5	104.8	-
LPL	90.1	95.0	103.0	106.4	110.0	-

Figure 1: The Quarterly Recovery Path to the pre-Covid Trend



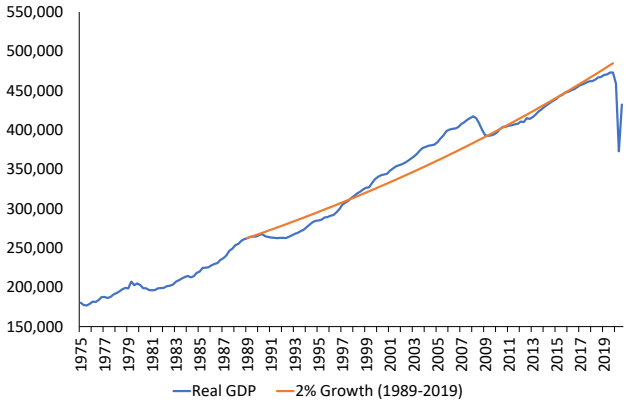


Table 5: OBR projections adjusted for effects of under-forecast of GDP

FY	OBR Spend	OBR Tax+	Nominal GDP under-fcast by %+	OBR Tax Adjusted*	OBR PSBR-adjusted
20	1140	786	-	786	354
21	1053	819	1.4	833	220
22	991	875	5.6	939	52
23	1030	924	9.0	1032	2
24	1068	964	11.9	1113	-45

+ excluding effects of Budget tax measures. Spending includes debt interest.
* Tax raised by % under-forecast x1.3 (tax elasticity)
+Includes higher inflation: 5% 2022, 4% 2023, 3% 2024

The research basis for growth effects of tax and inflation effects of QE

According to the Liverpool Model 2% off the average tax rate gains 1% on GDP in the long run by making the labour market more competitive. Second round effects of Brexit through the Fiscal Fund-plus would therefore boost the economy by a further 7% over the decade from 2020- or another 0.7% pa on growth from 2020-2030. Remaining £24 billion extra spend on public services boost growth by raising private productivity- assume similar boost [another 0.23% per annum] to the growth rate. Hence whole post-Brexit programme from the new Fund boosts growth in the decade from 2025 by 1% per annum.

Recent work has confirmed these effects in recent UK data. Minford and Meenagh (2018) found that tax and regulative costs for entrepreneurs had a powerful causal impact on innovation and so productivity growth. This was further confirmed by Meenagh, Minford and Yang (2019), who also confirmed a link with inequality; and also at the regional level by Gai, Meenagh and Minford (2020).

With regard to the effects of QE on inflation, these are confirmed in Le et al. (2016) for the US and by Le et al. (2021) for the UK.

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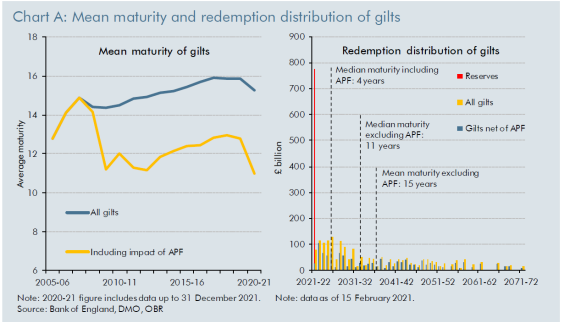
Note on gilt maturity and Bank QE

The OBR has examined the gilt maturity composition with and without QE. As we have explained before, the Bank should rapidly dispose of its gilts in order to make sure the public sector debt held by the private sector is of the longest possible duration. By its QE (Asset Purchase Facility, APF) the Bank issues current deposits with the banks ('reserves') in exchange for long gilts issued by the Treasury DMO (Debt Management Office). This lowers the maturity of the gilts held by the private sector, effectively replacing long gilts with money. This both threatens inflation and exposes the public sector to rising interest rates on gilts held by the Bank/government combined; this does not include bank reserves, which are not public debt, but money on which no interest need be paid. Notice that there is a failure of 'joined-up government' on the maturity of public sector debt since the Bank is free to decide on its APF policy, so cutting across the public sector's current need to protect itself against future interest rate rises. Notice too that bank reserves are not debt but money: the banks have no way of 'selling off' these reserves, which are cash held at the Bank, and the Bank is free to pay no interest on them if it chooses; all the banks can do is swap it at the Bank into interest-free notes and coin. The OBR and ONS treat bank reserves as public debt whereas it is in fact money, like notes and coin.

If the Bank were to dispose of its APF, then debt maturity would be 16 years. In our forecasts we assume the Bank disposes of the APF, and we consider debt as if the APF is zero. In principle this should be the case. But in practice, it may take years for the Bank to liquidate QE. Ironically that puts the public sector at risk, because the Bank's balance sheet is part of the public sector; in effect the debt interest on its gilts is recycled to the Treasury. But the debt interest on bank reserves is in principle zero, as this is money on which no interest needs to be paid; treating it as like gilts, as the OBR and the ONS do, is incorrect. Hence when the Bank is consolidated with the Treasury, two things are implied: public debt is a) lower (by about a third)- becoming only 75% of GDP b) has a somewhat lower maturity, and so is more exposed to higher interest rates.

From a public finance viewpoint, the Bank should sell its portfolio of gilts now while interest rates are low, so ensuring that privately held gilts are at low rates. If it delays until interest rates rise, it will be forced to sell them at high interest rates (lower prices), prospectively costing the taxpayer more- the equivalent of the DMO issuing them in a high interest-rate era. In effect all public sector bond issuers, Bank and DMO, need to be issuing the longest possible maturity bonds now while rates are low.



Solvency and the debt ratio- a short note:

We can write the solvency condition as:

D≤(t-e)Py$\sum_{i=1}^{\infty}\frac{(1+(g+\pi))^i}{(1+R)^i}$ where (t-e)=s are respectively the tax, spending and primary surplus fractions of GDP. Provided R-$\pi - g = r - g$ where r is the real interest rate, is positive, this becomes

$D/Py \leq \frac{s}{r-g}$; or $(r-g)D/Py \leq s$; or $(r-g) \leq sPy/D$

Of course if r-g is negative, then the constraint binds trivially because the present value of future surpluses goes to infinity. We will assume r-g is positive over the long run we are projecting.

Now relate this to the movement of the debt/GDP ratio, D/Py. Note that $\Delta D = RD - sPy$ by definition of the budget constraint.

Now determine the proportional change in the debt ratio as:
$\Delta \ln(D/Py) = \frac{\Delta(D/Py)}{(D/Py)} = \Delta \ln D - \Delta \ln Py = \frac{\Delta D}{D} - (\pi + g) = \frac{RD - sPy}{D} - (\pi + g) = R - sPy/D - (\pi + g) = r - g - sPy/D$

Now note that $\Delta(D/Py) = \Delta \ln(D/Py).D/Py$

Hence $\Delta(D/Py) = (r-g)D/Py - s$

Hence if the solvency constraint holds, ie$(r-g)D/Py \leq s$, then the debt ratio is either constant or falling.

THE UK ECONOMY

Vo Phuong Mai Le

Economic growth moderated to 1.0% in Q4, after a strong recovery of 16.1% in Q3. The COVID-19 Pandemic restrictions had a pronounced negative impact on economic activity as real GDP contracted by 9.9% over the year 2020. The dramatic slowdown was observed across all industries. Industrial production grew 1.8% in Q4 (after 40.7% in Q3). Services sector and construction sector output rose 0.6% (after 14.7% in Q3) and 4.6% (after 40.7% in Q3) respectively.

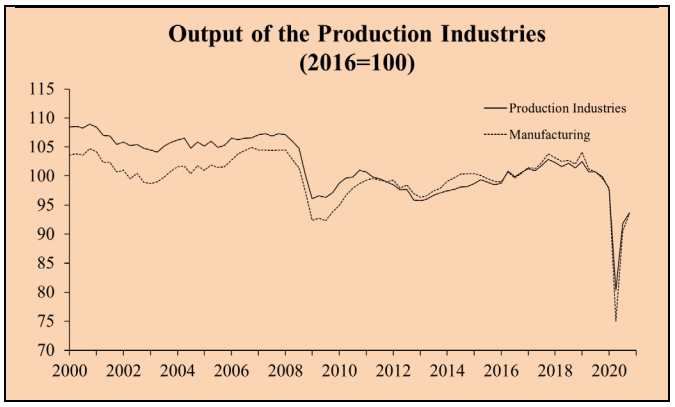
On the expenditure side, the growth in domestic demand moderated in comparison to a sharp rebound in Q3. While government consumption (6.4% compared to 12.9% in Q3) and fixed investment (2.1%, down from 20.3% Q3) expanded, private consumption contracted (-0.2%, down from a rise of 19.3% in Q3). Foreign demand remained weak and weighed on growth. Net trade deducted 2.51 percentage points from Q4's GDP growth (following -4.22 points in Q3), as imports grew (8.9%, down from 13.3% in Q3) faster than exports (0.1%, compared to -1.1% in Q3).

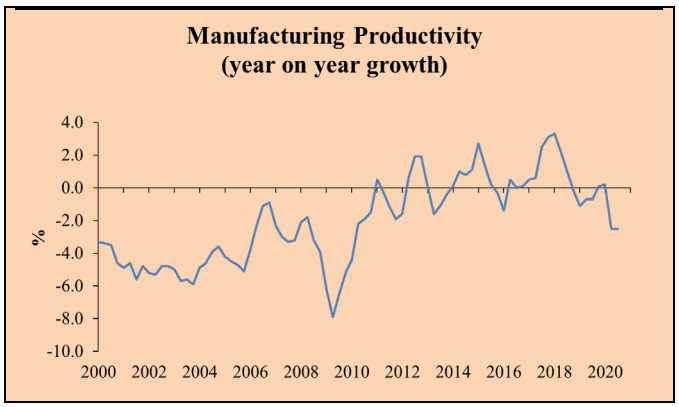
Labour market, costs and prices

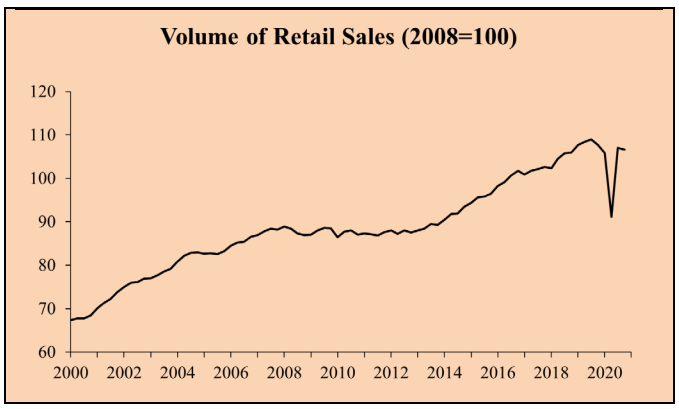
Despite the extension of the government furlough scheme to maintain employment, labour market conditions deteriorated further with the employment rate decreasing continuously (75.0% in Q4, compared to 75.3% in Q3) and the unemployment rate rose steadily (5.1% in Q4, up from 4.7% in Q3). The redundancies rate rose sharply to 12.3% in Q4 and to 11.3% in Q3, from 4.7% in Q2.

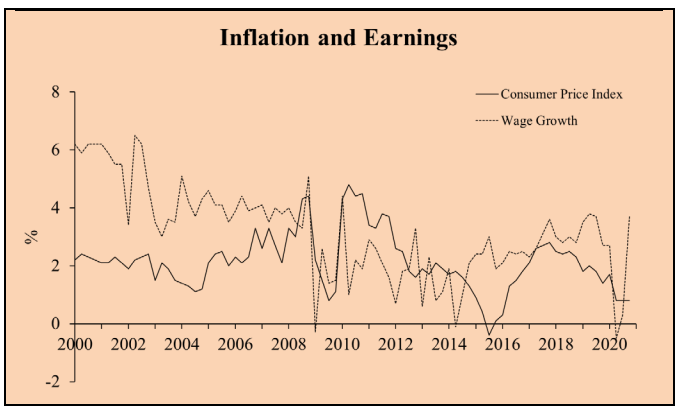
In the light of the new lockdown, the outlook for the first quarter 2021 is not optimistic. According to the Markit/CIPS UK Purchasing Managers' Indices, private sector output contracted for the first two months of 2021 (PMI Composite Output Index of 49.8 in February and 41.2 in January, compared to December's 50.4). The biggest contraction happened in the service sector, but the pace of decline had stabilised in February (the PMI index was 49.5 in February, up from 39.5 in January). There are signs of recovery in output of manufacturing (55.1 up from 54.1 in January) and construction sectors (53.3 up from 49.2 in January). Industrial output fell 1.5% month-on-month in January (after rising 0.2% in December), the sharpest decrease since April 2020. GDP fell in January by 2.9%, with services taking the biggest hit from lockdown (3.5% down)

Annual CPI inflation was 0.7% in January, up from 0.6% in December. Weak inflation reflects the negative effects of Covid-19 on the economy. This rate remained under the target of 2% but is expected to rise rapidly towards the target given the sharp rise in energy and other commodity prices and the end of reduction in VAT for certain services.





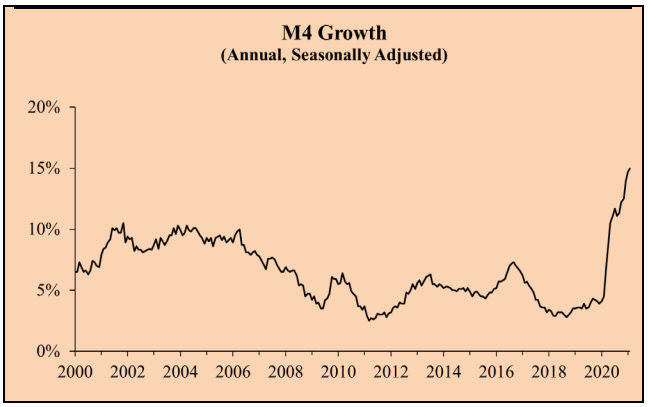


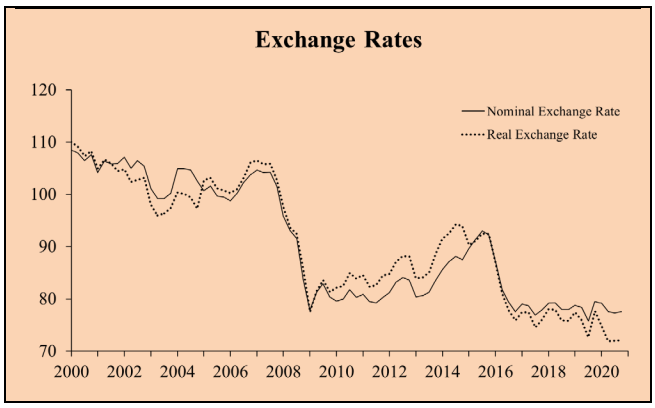


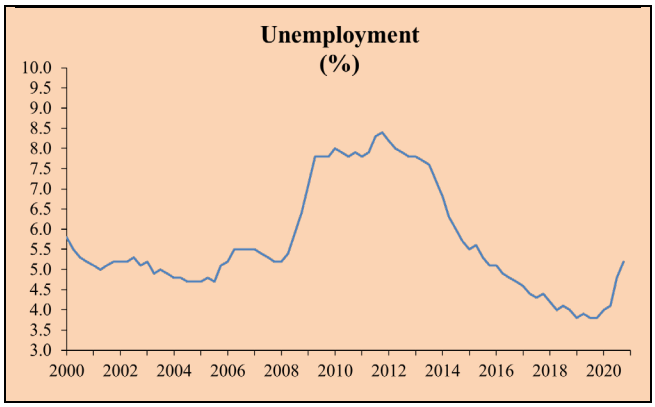
Fiscal and Monetary Developments

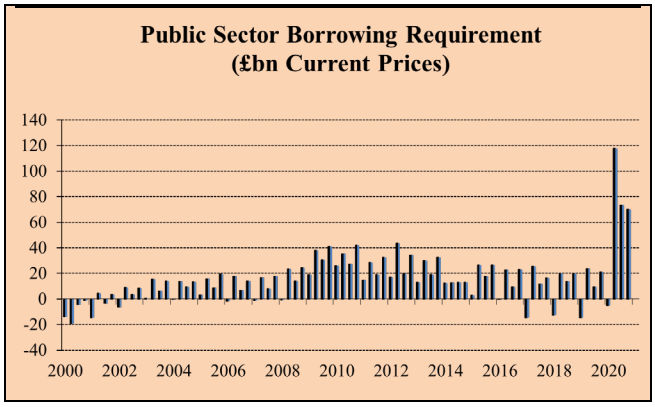
To support the economy through the pandemic, the government continues to borrow. In January 2021, the public sector net borrowing was in deficit of £8.8 billion, compared to the surplus of £9.8 billion in January 2020. The public sector net debt in January is standing at 112.9% of GDP compared to 97.6 % in the previous year. The 2021 budget confirms a further stimulus support for the economy such as the furlough scheme, reduced VAT for the hospitality sector, a stamp duty holiday and generous unemployment benefits. It introduces a 130% tax deduction on business investment to support capital spending. However, it also sets out a plan to reduce debt in the future by raising the main corporation tax rate, cutting departmental spending, and freezing the tax threshold for the top income tax which ultimately levies a higher tax on businesses and entrepreneurship.

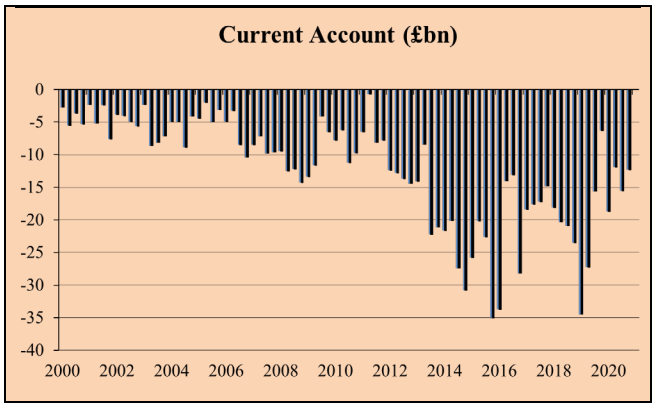
Given the economic and inflation developments and outlook, at the February meeting the Bank of England decided to maintain both conventional and unconventional monetary measures. That is, it keeps its Bank rate at 0.1% and the existing programmes of stock of its corporate bond and government bond purchases at the target of £895 billion.











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]
2019	1.7	0.6	0.8	78.3	73.8	-0.7	2.6	-0.5
2020	1.0	0.3	0.2	78.0	72.7	-0.9	1.6	-1.0
2021	1.6	0.5	0.1	78.2	73.2	-3.3	2.3	-3.7
2022	5.0	1.5	1.5	76.1	73.7	-2.9	6.1	-2.9
2023	4.0	4.7	4.5	74.7	74.3	1.4	5.5	1.1
2024	3.0	5.0	5.0	74.0	74.8	2.6	4.6	2.6
2019:1	1.8	0.9	0.9	79.0	75.4	-0.8	2.4	-0.8
2019:2	2.0	0.7	0.8	78.6	74.0	-0.7	3.0	-0.6
2019:3	1.8	0.4	0.8	76.0	70.7	-0.8	2.7	-0.4
2019:4	1.4	0.5	0.8	79.6	75.0	-0.5	2.2	-0.2
2020:1	1.7	0.4	0.6	79.5	74.9	-0.5	2.7	-0.3
2020:2	0.8	0.0	0.1	77.6	71.9	-1.1	1.3	-1.0
2020:3	0.8	0.4	0.1	77.3	72.0	-0.9	1.1	-1.2
2020:4	0.8	0.4	0.1	77.6	72.1	-1.2	1.1	-1.5
2021:1	1.0	0.5	0.1	77.8	72.7	-2.0	1.1	-2.4
2021:2	1.6	0.5	0.1	78.7	73.4	-2.9	3.0	-3.3
2021:3	1.8	0.6	0.1	78.2	73.4	-3.7	2.5	-4.2
2021:4	2.1	0.6	0.2	78.2	73.3	-4.4	2.6	-4.8
2022:1	4.6	1.0	1.0	76.0	73.3	-3.9	5.4	-3.9
2022:2	5.2	1.5	1.5	76.4	73.9	-3.1	6.5	-3.1
2022:3	5.1	1.6	1.7	76.0	73.9	-2.7	6.3	-2.6
2022:4	5.1	2.0	2.0	76.0	73.9	-2.1	6.3	-2.1
2023:1	4.1	4.0	4.0	74.6	73.8	0.2	5.5	0.2
2023:2	4.1	5.0	4.5	75.0	74.5	1.5	5.5	1.0
2023:3	4.0	5.0	4.5	74.6	74.5	1.8	5.4	1.3
2023:4	4.0	5.0	5.0	74.6	74.4	2.0	5.4	2.0
2024:1	3.0	5.0	5.0	73.9	74.4	2.2	4.6	2.2
2024:2	3.0	5.0	5.0	74.3	75.0	2.5	4.6	2.5
2024:3	3.0	5.0	5.0	74.0	75.0	2.7	4.6	2.7
2024:4	3.1	5.0	5.0	73.9	75.0	3.0	4.7	3.0

[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]	Survey Unemployment Percent	Millions	Real Wage Rate[3] (1990=100)
2019	275.7	3.5	3.8	1.0	148.8
2020	279.3	1.5	4.5	1.3	149.8
2021	288.0	3.1	6.1	1.9	152.1
2022	305.3	6.0	5.2	1.6	153.7
2023	321.5	5.3	3.6	1.0	155.6
2024	335.1	4.2	2.8	0.7	157.5
2019:1	273.4	3.4	3.8	1.0	144.9
2019:2	273.5	4.0	3.9	1.0	144.4
2019:3	275.5	3.7	3.8	1.0	146.0
2019:4	277.6	2.7	3.8	1.0	145.9
2020:1	279.7	2.7	4.0	1.1	150.0
2020:2	270.1	-0.5	4.1	1.2	145.9
2020:3	279.1	0.3	4.8	1.4	149.4
2020:4	288.3	3.7	5.2	1.5	154.1
2021:1	285.4	2.1	5.3	1.6	151.6
2021:2	280.3	3.8	6.1	1.9	149.0
2021:3	288.0	3.2	6.9	2.2	151.4
2021:4	298.3	3.5	6.3	2.0	156.3
2022:1	300.9	5.4	5.8	1.8	152.9
2022:2	298.0	6.3	5.2	1.6	150.7
2022:3	305.5	6.1	5.0	1.5	153.0
2022:4	316.7	6.2	4.7	1.4	158.1
2023:1	316.8	5.3	4.2	1.2	154.7
2023:2	314.4	5.5	3.6	1.0	152.9
2023:3	322.0	5.4	3.4	0.9	155.1
2023:4	333.0	5.1	3.2	0.9	159.8
2024:1	329.6	4.0	2.9	0.8	156.2
2024:2	327.8	4.3	2.8	0.7	154.8
2024:3	336.3	4.4	2.8	0.7	157.3
2024:4	346.8	4.1	2.8	0.7	161.6

[1] Whole Economy
[2] Average Earnings
[3] 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
2019	167.8	803514.3	475369.3	308458.5	209136.4	-70959.7	118490.2
2020	151.2	724216.9	419988.4	260629.6	199161.5	-33375.3	122187.3
2021	158.5	759124.8	447029.8	264798.0	206975.3	-29533.8	130144.5
2022	171.7	822161.7	453561.0	322554.1	208189.3	-23651.1	138491.6
2023	177.4	849343.4	460358.4	339925.1	209439.6	-18608.5	141771.2
2024	182.6	874408.4	467263.5	357381.6	210696.2	-15890.2	145042.7
2019/18	1.4		0.3	3.1	3.0		-0.1
2020/19	-9.9		-11.7	-15.3	-4.8		3.1
2021/20	5.4		7.4	3.7	4.4		6.5
2022/21	8.5		1.5	24.1	0.6		6.4
2023/22	3.3		1.5	5.4	0.6		2.4
2024/23	3.0		1.5	5.2	0.6		2.3
2019:1	167.5	200481.1	119045.5	83717.3	53429.6	-27900.7	27810.6
2019:2	167.1	200009.6	118526.3	74816.9	51617.9	-19203.6	25747.9
2019:3	168.3	201443.7	118808.6	71008.4	51891.0	-12473.8	27790.5
2019:4	168.4	201579.9	118988.8	78916.0	52197.9	-11381.7	37141.1
2020:1	163.4	195632.5	118032.8	72147.1	51656.8	-11632.2	34572.0
2020:2	132.4	158502.4	91565.8	47009.3	43743.5	429.6	24245.8
2020:3	154.4	184828.8	99906.5	75030.8	50861.9	-9722.9	31247.5
2020:4	154.7	185253.2	110483.3	66442.5	52899.3	-12449.8	32122.1
2021:1	148.3	177573.3	112227.8	57424.5	51108.2	-12795.0	30392.2
2021:2	154.4	184909.1	111100.8	57241.2	51381.7	-3100.0	31714.6
2021:3	162.7	194736.5	111235.7	72545.2	51168.9	-6668.9	33544.4
2021:4	168.6	201905.9	112465.6	77587.1	53316.5	-6969.9	34493.4
2022:1	169.7	203207.5	113844.5	83269.0	51388.0	-11003.1	34290.9
2022:2	170.7	204400.2	112659.5	77593.9	51689.0	-2877.7	34664.5
2022:3	172.4	206414.2	112904.4	82009.5	51475.6	-5097.2	34878.1
2022:4	173.9	208139.8	114152.7	79681.7	53636.7	-4673.1	34658.2
2023:1	175.1	209661.5	115552.5	88654.1	51695.7	-11224.4	35016.4
2023:2	176.6	211410.9	114342.7	83038.4	52000.8	-2729.5	35241.5
2023:3	178.3	213439.8	114598.1	84893.2	51784.3	-2249.0	35586.8
2023:4	179.4	214831.2	115865.1	83339.4	53958.7	-2405.7	35926.3
2024:1	180.4	215982.7	117286.0	92131.5	52005.6	-9647.8	35792.6
2024:2	181.9	217802.7	116057.2	87959.9	52313.0	-2453.1	36074.3
2024:3	183.3	219509.2	116317.1	89429.4	52095.0	-1824.1	36508.2
2024:4	184.7	221113.8	117603.2	87860.8	54282.6	-1965.2	36667.6

[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)
2019	2.3	2166.6	49.1	24.1	-89.1
2020	16.4	1947.3	312.3	26.0	-58.4
2021	6.4	2216.9	140.4	27.5	-51.1
2022	3.9	2453.6	96.2	30.5	-38.9
2023	2.5	2632.4	65.3	37.4	-27.8
2024	1.0	2786.2	28.8	42.8	-21.0
2019:1	-2.7	530.5	-14.4	5.9	-38.6
2019:2	4.4	527.2	23.3	5.9	-24.9
2019:3	1.7	537.6	9.2	5.9	-16.4
2019:4	3.9	559.9	21.6	5.8	-9.2
2020:1	-0.9	542.0	-5.0	6.5	-18.7
2020:2	27.3	431.7	118.0	6.4	-11.9
2020:3	14.4	508.7	73.5	6.5	-15.5
2020:4	13.7	510.9	70.2	6.5	-12.3
2021:1	10.2	496.0	50.6	6.6	-21.8
2021:2	8.6	513.6	43.9	6.7	-19.5
2021:3	6.6	544.1	36.1	6.8	-9.1
2021:4	5.7	568.5	32.6	6.9	-0.8
2022:1	4.7	590.7	27.8	7.2	-17.9
2022:2	4.7	595.7	28.3	7.3	-19.7
2022:3	4.3	607.4	26.0	7.5	-5.8
2022:4	3.0	616.5	18.5	7.6	4.5
2023:1	3.7	634.0	23.5	8.1	-18.7
2023:2	3.6	642.3	22.8	8.6	-20.1
2023:3	1.5	655.1	9.9	9.4	0.8
2023:4	2.2	661.7	14.5	9.5	10.2
2024:1	2.7	673.3	18.0	10.0	-15.2
2024:2	0.9	682.3	6.1	10.2	-19.8
2024:3	0.6	694.1	3.8	10.5	2.2
2024:4	1.8	702.1	12.6	10.9	11.8

[1] GDP at market prices (Financial Year)

THE WORLD ECONOMY

US

The pace of economic recovery slowed significantly due to negative effects from stricter lockdown measures in response to a new surge in Covid-19 cases. Real GDP rose by 1% in Q4, compared to 8.3% in the previous quarter. The growth was sustained by domestic demand: private consumption (up 0.6%, after a sharp rise of over 10% in Q3) and fixed investment (up 4.6% compared to almost 8% in Q3) both increased but at slower pace. The negative contribution to GDP growth again came from net trade. It subtracted 0.4 percentage points from the quarterly GDP growth (after -0.8 percentage points in Q3) as imports growth (7.4% after 23.3% in Q3) was higher than that of exports (5.5% after 14.9% in Q3).

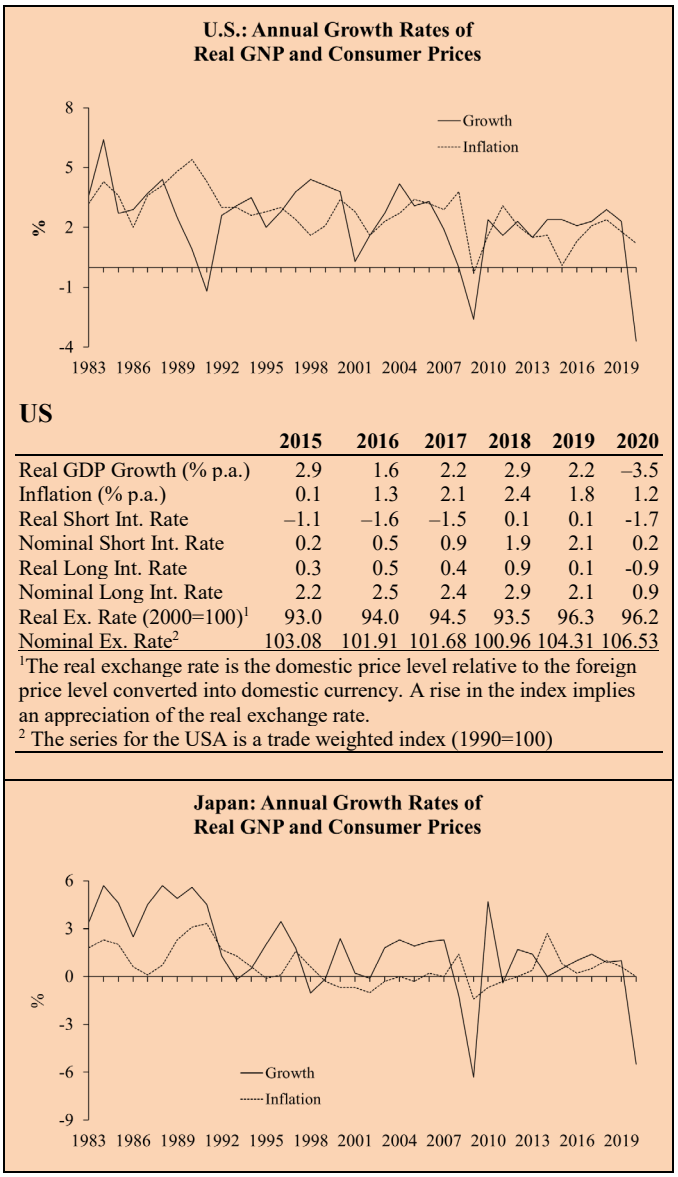
In line with the economic recovery, labour market conditions are continuously improving. Total non-farm payrolls increased by 379,000 in February, following a rise of 166,000 in January. The unemployment rate decreased marginally to 6.2% in February from 6.3% in January.

Recent surveys and data show signs of more improvements in Q1 2021. Businesses expanded at the fastest monthly pace for almost six years in February. The PMI Composite Output Index was at its 71-month high of 58.8, up from 58.7 in January. The growth was driven by robust activity in the service sector (services business activity index of 58.9, up from 58.3 in January) and in the manufacturing sector (with the manufacturing PMI at 58.5, after 59.2 in January). Businesses are optimistic about the outlook. A consumer confidence index of 91.3 in February (up from 88.9 in January) shows signs of improvement, although still indicating pessimism.

After declining due to the pandemic, consumer price inflation rebounded. The annual rate of CPI inflation rose to 1.7% in February, up from 1.4% in January. The increase was driven by a sharp increase in energy price (2.4% from 3.6% in January). The core CPI inflation, all items less food and energy, rose 1.3%, down from 1.4% in January. In August, the Federal Reserve Board revised its Statement on Longer-Run Goals and Monetary Policy Strategy, indicating that it aims to eliminate shortfalls from maximum employment and achieve inflation that averages 2% over time. The latter revision means that when inflation has been persistently below 2%, the Federal Reserves would use appropriate expansionary monetary policy to aim to achieve inflation moderately above 2% for some time. In line with the newly revised aims, given inflation and the economic and labour conditions, at the February meeting the Federal Reserve decided to maintain its accommodative monetary stance, keeping the target range for the federal funds rate at 0-0.25%. It decided to continue the asset purchases to increase the stock of Treasury securities by $80 billion per month and the stock of agency mortgage-backed securities by $40 billion per month. The Federal Reserve expects these unconventional policies to continue at this pace for the foreseeable future.

Japan

The pace of recovery moderated. Real GDP rose 2.9% in Q4, after an expansion of 5.7% in Q3. The growth was driven by a rebound in domestic demand. Private consumption rose 2.25%, after expanding 5.5% in Q3. Investment increased 3.2%, after a decline of 2.7% in Q3. Government spending grew 1.9% following 3.25% in Q3. Strong foreign demand continued to contribute positively (1.1 percentage points to Q4's growth, after 2.8% in Q3) to the economic recovery with a further rise in exports (13.1%, after 8.3% in Q3) and a rebound in imports (4.25%, after a collapse of 7.25% in Q3).



US

	2015	2016	2017	2018	2019	2020
Real GDP Growth (% p.a.)	2.9	1.6	2.2	2.9	2.2	–3.5
Inflation (% p.a.)	0.1	1.3	2.1	2.4	1.8	1.2
Real Short Int. Rate	–1.1	–1.6	–1.5	0.1	0.1	-1.7
Nominal Short Int. Rate	0.2	0.5	0.9	1.9	2.1	0.2
Real Long Int. Rate	0.3	0.5	0.4	0.9	0.1	-0.9
Nominal Long Int. Rate	2.2	2.5	2.4	2.9	2.1	0.9
Real Ex. Rate (2000=100)[1]	93.0	94.0	94.5	93.5	96.3	96.2
Nominal Ex. Rate[2]	103.08	101.91	101.68	100.96	104.31	106.53

[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 of the real exchange rate.
[2] The series for the USA is a trade weighted index (1990=100)

Japan

	2015	2016	2017	2018	2019	2020
Real GDP Growth (% p.a.)	1.3	0.6	2.2	0.3	1.0	-5.5
Inflation (% p.a.)	0.8	–0.1	0.5	1.0	0.5	0.0
Real Short Int. Rate	0.1	–0.4	–0.8	–0.9	–0.8	–0.6
Nominal Short Int. Rate	0.2	0.1	0.1	0.0	-0.1	0.0
Real Long Int. Rate	–0.5	–1.0	–1.1	–0.9	–0.5	–0.7
Nominal Long Int. Rate	0.3	0.0	0.1	0.1	-0.1	-0.1
Real Ex. Rate (2000=100)[1]	56.0	58.4	58.3	57.8	56.3	54.2
Nominal Ex. Rate	121.11	108.61	112.10	110.40	109.02	104.20

[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 of the real exchange rate.

January's state of emergency related to Covid-19 weighed on the economic outlook. Recent data and surveys predict a contraction in Q1. The private sector continued to deteriorate with a further decline in business activity in February (with a PMI Composite Output index of 47.6, following January's 47.1). While the services PMI (at 45.8, down from 46.1 in January) continued to stand below the 50-mark threshold, showing a further contraction, the manufacturing sector shows sign of recovering, with its PMI of 50.6 in February (up from 49.8 in January).

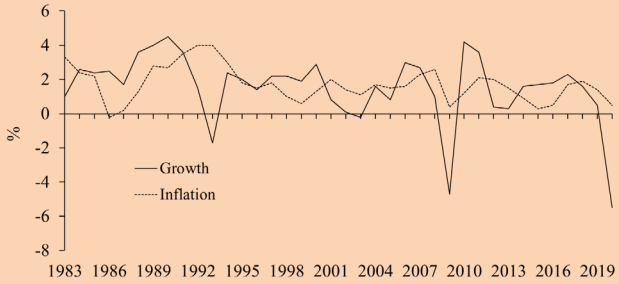
To soften the impact of the pandemic on the economy, policies in Japan have become very accommodative. In December 2020 the Japanese government introduced a 73.6 trillion yen (13.5% of GDP) stimulus package with 40 trillion yen in direct fiscal spending. As for monetary policy, at its last meeting in January, the Bank of Japan decided to keep its negative interest rate of -0.1% on the policy rate. To maintain the long-term interest rate of 10-year government bonds around zero, it would purchase a necessary amount of Japanese government bonds without setting an upper limit, so maintaining its asset purchase programme.

Germany

Despite the lockdown measures to curb the second wave of COVID-19, economic activity expanded. Real GDP rose 0.3% in Q4, after a sharp rebound of 8.5% in Q3. The quarterly growth was driven by external demand. Net trade contributed 0.6 percentage points to Q4's GDP, as imports (up 3.7%, after 9.0% in Q3) grew at a slower pace than exports (4.5% after 18.0% in Q3). Domestic demand however contributed negatively to the quarterly growth. Despite an increase in investment (1.0% after 3.9% in Q3), it was not sufficient to offset a fall in private consumption (-3.3% from +10.8% in Q3) and in public consumption (-0.5% down from 0.6% in Q3).

Despite a fall of 2.5% month-on-month in industrial output in January (after an expansion of 1.9% in December), recent data and surveys shows signs of some recovery in Q1. The Markit PMI Composite Output Index was at 51.3 in February, after 50.8 in January. The expansion was driven by a strong growth in the manufacturing sector (with a PMI of 62.2 compared to 59.0 in January), which compensated for a sharp fall in services output (with a PMI of 45.9, following 46.7 in January). Business managers are less pessimistic about the coming months. The Ifo Business Climate Index rose from 90.3 in January to 92.4 in February.

Germany: Annual Growth Rates of Real GNP and Consumer Prices

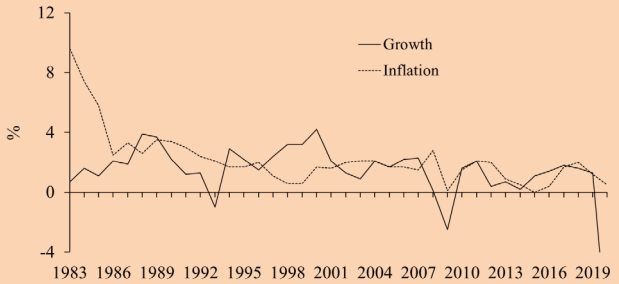


German

	2015	2016	2017	2018	2019	2020
Real GDP Growth (% p.a.)	1.7	1.9	2.5	1.5	0.5	–5.5
Inflation (% p.a.)	0.3	0.5	1.5	1.8	1.4	0.5
Real Short Int. Rate	–0.6	–2.0	–2.1	–1.7	–1.8	–1.9
Nominal Short Int. Rate	–0.1	–0.3	–0.3	–0.3	–0.4	–0.5
Real Long Int. Rate	–0.9	–1.7	–1.3	–1.1	–1.9	–1.9
Nominal Long Int. Rate	0.6	0.1	0.3	0.4	–0.3	–0.5
Real Ex. Rate (2000=100)[1]	94.7	95.0	94.3	96.5	95.6	94.1
Nominal Ex. Rate	0.90	0.90	0.89	0.85	0.84	0.84

[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 of the real exchange rate.

France: Annual Growth Rates of Real GNP and Consumer Prices



France

	2015	2016	2017	2018	2019	2020
Real GDP Growth (% p.a.)	1.0	1.1	2.4	1.7	1.3	–9.5
Inflation (% p.a.)	0.0	0.2	1.0	1.9	1.2	0.5
Real Short Int. Rate	–0.3	–1.3	–2.1	–1.7	–1.8	–1.7
Nominal Short Int. Rate	–0.1	–0.3	–0.3	–0.3	–0.4	–0.5
Real Long Int. Rate	–0.7	–0.9	–0.6	–0.5	–1.2	–1.4
Nominal Long Int. Rate	1.0	0.7	0.8	0.8	0.2	-0.2
Real Ex. Rate (2000=100)[1]	96.2	96.0	95.3	97.4	96.3	94.5
Nominal Ex. Rate[2]	0.90	0.90	0.89	0.85	0.84	0.84

[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 of the real exchange rate.

France

The economic recovery stalled, and economic activity shrank in Q4. Real GDP decreased 1.4% after a sharp recovery in 18.5% in Q3. The contraction was driven by weak domestic demand. Private consumption decreased sharply 5.4% in Q4, after rising 18.1% in Q4. Public spending decreased 0.3%, down from 14.6% in Q3. Investment grew 1.1%, compared to 24.1% in Q3. Net trade added 0.9 percentage points to the Q4's GDP growth (after 0.8 points in Q3) as exports (4.8% after 21.9% in Q3) increased more than imports (1.3% after 16.2% in Q3).

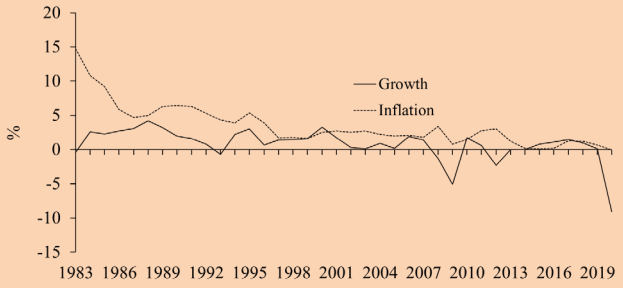
The economic prospects for Q1 have deteriorated due to an extension of COVID-19 restrictions. The Markit Composite PMI Output index fell further, at the quickest rate in three months in February (45.2 compared to 47.7 in January). The index remaining under the 50-threshold means that the private sector continuously contracted. Although business confidence rose to 97 in February from 96 in January, it remained below its long-term average of 100. This shows that businesses were still pessimistic about future months. Consumers were more pessimistic about the current and expected standard of living as consumer confidence index fell to 91 from January's 92.

Italy

The economy strongly contracted in Q4 due to tighter lockdown measures. Real GDP decreased 2.0% in Q4 following a rise of 15.9% in Q3. The contraction was driven by weak and foreign demand. While both private spending (-2.7%, swinging from 13.2% in Q3) and fixed investment (-0.2% from 29.1% in Q3) fell, government spending rose (1.5% in Q4 following 1.6% in Q3). Net trade subtracted 1.0 percentage points from Q4's growth (after adding 4.4 percentage points in Q3) as exports moderated sharply (1.3% after 30.5% in Q3) while imports continued to rise (5.4% after 14.1% in Q3).

Recent data and surveys show some signs of improvement in Q1 2021. Industrial output rose 1.0% (month-on-month) in January, following 0.2% in December. There are encouraging signs across sectors. In February, output expansion was registered in the manufacturing sector (with a PMI of 56.9, up from 55.1 in January) and the construction sector (PMI of 54.8, up from 48.7 in January). The downturn in services went further in February (with a PMI of 48.8, up from 44.7 in January). However, with the newest round of restrictions, a recovery might not be seen in Q1.

Italy: Annual Growth Rates of Real GNP and Consumer Prices



Italy

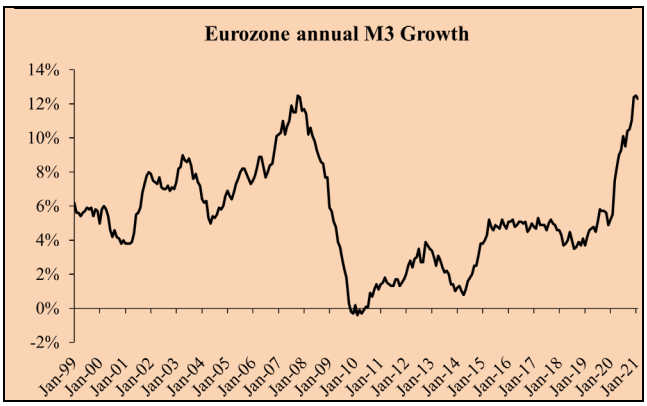
	2015	2016	2017	2018	2019	2020
Real GDP Growth (% p.a.)	1.0	0.9	1.7	0.8	0.2	–9.1
Inflation (% p.a.)	0.1	–0.1	1.2	1.2	0.7	-0.1
Real Short Int. Rate	0.0	–1.5	–1.5	–1.0	–1.4	–1.2
Nominal Short Int. Rate	–0.1	–0.3	–0.3	–0.3	–0.5	–0.5
Real Long Int. Rate	0.4	0.1	1.1	1.6	0.9	0.1
Nominal Long Int. Rate	1.6	1.7	2.1	2.6	2.1	1.1
Real Ex. Rate (2000=100)[1]	102.1	102.0	101.2	102.8	104.5	105.2
Nominal Ex. Rate[2]	0.90	0.90	0.89	0.85	0.84	0.84

[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 of the real exchange rate.

Euro-zone monetary policy

After 4 months in a negative territory, the Harmonized Index of Consumer Price Inflation rate has risen back to above zero in January. It was at 0.9% in both January and February. This was driven by rising prices across almost all categories and a moderate fall in energy prices. The inflation is expected to remain below the target of 2% due to weak demand.

Faced with low inflation and weak economic conditions across the EU, at the last meeting in March the European Central Bank decided to continue its stimulus monetary policy. That is, it keeps the net asset purchases under the pandemic emergency purchase programme of €1850 billion euro until at least the end of March 2022. It is maintaining the interest rates on the main refinancing operations, on the marginal lending facility and the deposit facility at 0.0%, 0.25% and -0.50% respectively. On the unconventional policies (QE), it is carrying on with net purchases under the asset purchase programme at the monthly rate of €20 billion.


Eurozone annual M3 Growth
14%
12%
10%
8%
6%
4%
2%
0%
-2%
Jan-99
Jan-00
Jan-01
Jan-02
Jan-03
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WORLD FORECAST DETAIL

Growth Of Real GNP

	2017	2018	2019	2020	2021	2022
U.S.A.	2.3	3.0	2.2	–3.5	5.7	4.0
U.K.	1.8	1.3	1.4	–9.9	5.4	8.5
Japan	2.2	0.3	1.0	–5.3	2.7	2.3
Germany	2.5	1.5	0.5	–5.4	3.5	3.8
France	2.4	1.7	1.3	–9.3	5.5	3.7
Italy	1.7	0.8	0.2	–9.0	4.1	4.0

Growth Of Consumer Prices

	2017	2018	2019	2020	2021	2022
U.S.A.	2.1	2.4	1.8	1.2	2.4	5.0
U.K.	2.6	2.5	1.8	1.0	1.6	5.0
Japan	0.5	1.0	0.6	0.0	0.0	0.5
Germany	1.5	1.8	1.4	0.5	2.0	1.6
France	1.0	1.9	1.3	0.5	1.0	1.1
Italy	1.2	1.2	0.7	0.0	0.8	0.9

Real Short-Term Interest Rates

	2017	2018	2019	2020	2021	2022
U.S.A.	–1.0	0.6	0.3	–2.0	–4.0	-2.0
U.K.	–2.0	–1.1	–0.2	–1.4	–4.9	–2.5
Japan	–0.9	–0.4	0.1	0.0	–0.4	–0.4
Germany	–2.1	–1.7	–0.9	–2.4	–2.1	–1.7
France	–2.1	–1.4	–0.9	–1.4	–1.6	–1.2
Italy	–1.5	–0.9	–0.4	–1.2	–1.4	–1.0

Nominal Short-Term Interest Rates

	2017	2018	2019	2020	2021	2022
U.S.A.	0.9	1.9	2.1	0.1	0.2	2.0
U.K.	0.4	0.7	0.8	0.2	0.2	1.5
Japan	0.0	–0.1	–0.1	0.0	0.0	0.0
Germany	–0.3	–0.3	–0.4	–0.5	–0.5	–0.1
France	–0.3	–0.3	–0.5	–0.5	–0.5	–0.1
Italy	–0.3	–0.3	–0.5	–0.5	–0.4	-0.1

Real Long-Term Interest Rates

	2017	2018	2019	2020	2021	2022
U.S.A.	0.0	0.9	0.9	-0.1	-2.2	-1.0
U.K.	–1.8	–0.8	–0.4	–1.3	–4.5	–2.5
Japan	–0.9	–0.5	0.0	0.1	–0.4	–0.4
Germany	–1.4	–1.2	–0.7	–2.5	–1.9	–1.6
France	–1.0	–0.4	–0.4	–1.3	–1.7	–0.9
Italy	0.7	2.2	1.4	–0.1	0.0	0.3

Nominal Long-Term Interest Rates

	2017	2018	2019	2020	2021	2022
U.S.A.	2.4	2.9	2.1	0.9	1.2	3.0
U.K.	0.6	1.0	0.6	0.2	0.4	1.8
Japan	0.1	0.1	–0.1	–0.1	0.0	0.1
Germany	0.3	0.4	–0.3	–0.5	–0.3	0.0
France	0.8	0.8	0.2	–0.2	0.0	0.2
Italy	2.1	2.6	2.1	0.8	1.1	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.	77.4	78.6	78.1	78.6	80.1	80.0
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	100.96	104.31	106.41	101.30	100.50
U.K.	1.29	1.34	1.28	1.28	1.36	1.38
Japan	112.10	110.40	109.02	106.80	104.70	103.90
Eurozone	0.89	0.85	0.89	0.88	0.83	0.82

[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

EMERGING MARKETS

Anupam Rastogi

India

India is passing through the second wave of Covid-19 pandemic and in a few states like Maharashtra and Delhi the rebound is strong. Out of 100,000 cases reported in the first week of April, half of them were in Maharashtra. But, India's response is very different from its earlier one where it enforced one of the harshest lock downs in the world. Its present response is based on rapid vaccination of people. The country is seeing three million or so people getting inoculated every day.

Economic growth in the last six months has been robust. High frequency indicators such as direct and indirect tax collections are showing rapid growth after adjusting for the low base of the last year. The corporate sector is in fine fettle, after having deleveraged and cut costs. Banks have used the opportunity to bolster capital and increase provisions for bad debts. That means the twin balance sheet problem weighing down on the Indian economy in the past is not there and the strong balance sheet of corporates is providing room for a cyclical upturn.

We forecast the real GDP growth for FY21/22 to be 11%, assuming that the new restrictions to mobility, in the wake of the second wave, would be short lived, as the country accelerates its vaccination drive. Fitch Ratings expects GDP growth to be 12.8%, based on a stronger statistical effect, a looser fiscal stance and better virus containment.

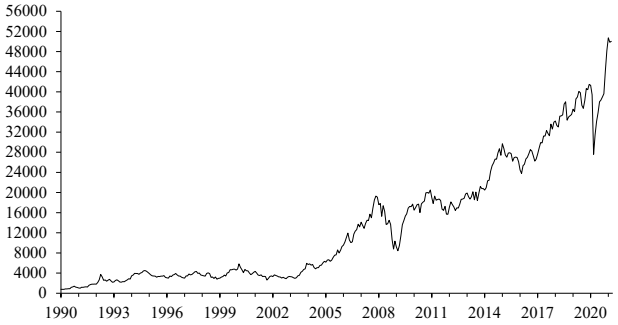
India's consumption demand and business activity looked steady in February. India's manufacturing PMI for March 2021 was 55.4, which is a seven month low but still expanding.

The government's target for inflation is 4% — with an upper tolerance limit of 6% and a lower limit of 2%, measured in terms of consumer price index (CPI) based inflation. We expect inflation to be around 5% in the FY21/22 due to higher commodity prices and elevated inflation expectations in response to a period of high food inflation. The fiscal deficit is expected to remain above 10% of GDP until FY22/23. Public debt is expected to grow almost 90% of GDP before declining gradually thereafter.

Due to high inflationary expectations, the RBI would remain 'accommodative' in 2021 given the nascent economic recovery and no change in policy rates. The RBI's focus would remain on maintaining adequate liquidity in the system to support the ongoing recovery and ensure effective execution of the government's borrowing programme.

India's current account balance slipped back into deficit in Q3FY21 at US$1.7bn or 0.2% of GDP after remaining in

India: BSE Sensitive



surplus for the previous three quarters. This is primarily attributed to a 133% QoQ expansion in merchandise trade deficit as import bill grew 24% QoQ. The full year figure, however, is expected to remain lower than the last year. We expect a current account surplus of 1.1% of GDP in FY21 — the first surplus in 17 years. Alongside, sturdy foreign capital inflows should result in a record-high Balance of Payments surplus in FY21. In FY22, we expect the current account to slip into deficit again to approximately 0.7% of GDP. The continuation of foreign investments on the back of easy global monetary policy will keep the balance of payments in a comfortable surplus position.

India has built the war chest of forex reserves (US$582bn as of March 19th). This has resulted in the rupee being a winner in Asia. It has outperformed the Chinese yuan and the tech-reliant currencies of Taiwan dollar and the Korean won, which had all been forecast to keep gaining as the global economy rebounds. The RBI has no internal target on forex reserves and the central bank aims to keep the rupee stable. The stock market remains firmly pivoted to future growth.

India's Prime Minister Narendra Modi finally appears ready to place the private sector at the heart of his development model. The government has budgeted roughly two trillion rupees ($27.50 billion) over the next five years to boost manufacturing by providing "production-linked incentives" for domestic and foreign firms in 13 sectors, including those producing mobile phones, pharmaceuticals, automobiles and auto components, and solar batteries. In recent years Apple, Samsung and Foxconn have set up manufacturing facilities in India. The government hopes that Cisco and Tesla, among others, will follow. The government's logic is based on China+1 strategy of firms i.e. firms seeking to diversify supply chain away from China will choose India for its large domestic market and deep pool of skilled manpower. The stick of tariffs and the carrot of production-linked incentives will spur this shift. This belated embrace of business is welcomed by industry captains at large. But the path of state-guided capitalism of the East Asian variety has its own pitfalls. The government is keen to privatize many of the state owned entities including bank and the national carrier Air India.

	19–20	20–21	21–22	22–23	23-24
GDP (%p.a.)	4.0	-7.5	11.0	5.5	6.0
WPI (%p.a.)	3.6	5.5	5.0	5.0	4.8
Current A/c(US$ bill.)	-20.0	35.0	-20.0	-10.0	-10.0
Rs./$(nom.)	73.0	75.0	74.0	76.0	78.0

China

After recording a positive growth in GDP of 2.3% in 2020, the Chinese economy is surging ahead in 2021. Manufacturing and non-manufacturing Purchasing Managers' Index (PMI) rose in March from 50.6% in February to 51.9% in March. We maintain our growth forecast of 7.5% for 2021. Surprisingly, the government has put a target of 6% for 2021. Premier Li Keqiang announced at the country's Parliament National People's Congress (NPC) that China aims to expand its Gross Domestic Product by over 6% in 2021 and it will make more efforts on reform, innovation and high-quality development.

The Chinese producer price index rose 1.7% from a year earlier, but consumer prices fell 0.2% in March from a year earlier. The resurgent producer prices in China raise the prospect that it will start exporting inflation globally as factories hike prices for goods sold abroad assuming commodity prices remain buoyant and supply-chain constrained. The weak CPI shows that there's no obvious inflation pressure. The government wants to cut the fiscal-deficit target to 3.2% of China's projected GDP this year, compared with a target of more than 3.6% in 2020. Subdued inflation reduces pressure on the People's Bank of China (PBOC), the country's central bank, to tighten monetary policy. The PBOC has warned about financial risks, such as asset bubbles, suggesting a policy of gradual tightening.

China's exports surged by more than 60% in the first two months of the year from last year's coronavirus-induced lows, as demand in the U.S. and Europe for made-in-China goods continued to rebound. The outbound shipments and imports have surged in February from a year earlier after the last February's momentous plunge in trade. China's trade surplus in January–February turned out to be $103 billion. This is roughly 20% higher than the same period in 2018 and 2019.

Chinese yuan has changed its course after appreciating for eight months against the US dollar. The yuan weakened in February and then dropped more than 1% so far in March. The monetary policy committee of the central bank wants to make the Chinese exchange rate more flexible.

The daily fixing of the yuan-dollar rate is the tool used by the central bank to influence its currency. As the US Treasury yields rise and relationship between the US and China becomes tense, we will witness a volatile yuan. However, over the year, the yuan is expected to appreciate marginally.

Beijing had hoped that President Biden's administration would reset the relationship with America. It has turned out

China: SSE Composite Index

to be very different. If anything, signs of a cold war between the two countries are there for everyone to see. The public spat in Alaska confirms that and the pact between China and Iran, an example of U.S. adversaries uniting to advance their strategic ambitions corroborates it further. Neither side is in mood to blink.

The establishment of a Chinese-Iranian bank with the aim of evading the U.S. dollar dominance in world trade is intended to breaking the dollar's hold on global trade and finance. Many in China believe that U.S. fiscal extravagance would lead to increase in inflationary expectations and depreciation of dollar. This will put the dollar's role as the world's reserve currency at risk, and China wants the yuan to replace it.

China has introduced a digital currency. It will be issued, controlled and monitored by the PBOC. However, the digital yuan will not have anonymity for the user. China intends to use it for international use and try to challenge the US dollar in the global financial system. The digital yuan may be a novelty but not a replacement of a bitcoin as it is not anonymous.

President Biden has avowed that China's dream to become the world's most powerful and the wealthiest country in the world is not going to happen on his watch. He will make the United States continue to grow and expand. China has identified artificial intelligence, quantum computing, integrated circuits, genetic and biotechnology research, neuroscience and aerospace sectors where it will create national laboratories and bolster academic programs to nurture and harness these technologies. At this point, demography is in favour of the US.

China has drawn a red line and anyone who crosses it would be sanctioned. Under this policy, China sanctioned nine British individuals, including members of Parliament, and other four entities in retaliation for U.K. moves over Xinjiang. The individuals and their relatives are banned from entering the country or trading with Chinese citizens and institutions. Biden refused to answer a question about whether he is more likely now than before entering office to keep in place tariffs on Chinese imports, or whether he is

considering banning products that are produced with forced labour in China's Xinjiang region.

China has also sanctioned nearly 30 current or former U.S. government officials in addition to the American human-rights activists, pro-democracy foundations and some U.S. senators last year.

Beijing's message is clear. If you want to do business with China, you have no business to criticize Chinese policies including the international treaty guaranteeing a "high degree of autonomy" for Hong Kong.

	19	20	21	22	23
GDP (%p.a.)	6.1	2.0	7.5	5.2	5.0
Inflation (%p.a.)	2.9	2.5	1.8	2.0	2.0
Trade Balance(US$ bill.)	40.0	60.0	50.0	40.0	42.0
Rmb/$(nom.)	7.1	6.7	6.3	6.2	6.0

South Korea

The central bank maintains that the country's real GDP would expand 3% and consumer inflation by 1.3% in 2021. Real GDP, adjusted for inflation, expanded 1.2% in the fourth quarter from the previous quarter in 2020 Q4.

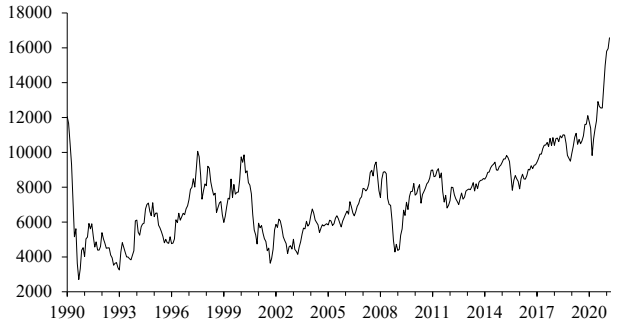
The government expects growth to overshoot the central bank's forecast as the vaccination campaign spreads and fiscal stimulus package feeds into economic growth. Besides this the Korean economy will benefit from the global economic recovery pushed by expansionary fiscal policies of major economies and the growing vaccination campaigns in the world.

South Korea overtook Italy in gross national income per capita in 2020, according to the Bank of Korea. But a demographic implosion is staring at the horizon. South Korea's total fertility rate is the world's lowest, falling to just 0.84 in 2020. Korean population growth has been lower than that of the U.S. for almost all of the last three decades. The country is at risk of falling into a balance-sheet trap of the variety encountered by Japan in the 1990s, which happens when all sectors of the economy try to trim their spending at the same time.

The Bank of Korea expects inflation to average 1.3% for this year, faster than 0.5% in 2020. South Korea's inflation picked up in February as holiday demand drove up food prices while global oil prices remained elevated. There is no possibility for the escalated inflation to continue for long and, therefore, the central bank would not tighten monetary policy. The BOK is expected to continue with its accommodative monetary policy in the near future. The BOK has left its benchmark interest rate unchanged at an all-time low of 0.50% since May last year.

Export, which accounts for about half of the export-driven economy, advanced 5.4% in the fourth quarter of 2020. The surplus on the current account increased year on year for the eighth consecutive month and the surpluses are growing.

Taiwan: Weighted TAIEX Price Index



South Korea's service account deficit decreased US$2.38 billion in one year to US$610 million. This is mainly because the numbers of those entering and leaving the country plummeted and the travel account deficit decreased as a result of COVID-19. Going forward, South Korea is stuck in an untenable position. The semiconductor industry of South Korea has relied on the U.S. for security and on China for trade. This may not continue for more than a couple of years now.

	19	20	21	22	23
GDP (%p.a.)	1.8	-1.0	3.0	2.2	1.5
Inflation (%p.a.)	0.4	0.5	1.0	1.2	1.0
Current A/c(US$ bill.)	60.0	70.0	60.0	40.0	10.0
Won/$(nom.)	1200	1070	1100	1100	950

Taiwan

The manufacturing Purchasing Managers' Index (PMI) rose from 60.4 in February to 60.8 in March, the best reading in the last eleven years. The upturn is the result of strong growth in new orders and employment, while output and exports remain upbeat. Taiwan's gross domestic product (GDP) growth for 2021 may outstrip our last forecast of 4%. We remain a bit cautious as both input and output costs are rising and it may dent the spurt in exports. Taiwan Vice President Lai Ching-te expects GDP growth to reach 4.64%.

Taiwan's consumer price index is expected to grow about one percent in 2021, compared with an earlier forecast of less than one percent.

Exports are likely to grow approximately 10% this year as display panels join semiconductors as a new driver of growth due to supply shortages and rising prices. Taiwan's technology advantage over rival exporting economies has put the country in a strong position

The rapid growth in exports has put pressure on the local currency to appreciate further. The Taiwan dollar has strengthened more than 6% over the past 12 months against the U.S dollar and the central government would like to hold it around this level.

Taiwan's central bank acknowledged grudgingly that it is intervening in foreign exchange markets. The bank does not like the word intervention and prefers its actions to be

referred to as 'smoothing' process. Daily efforts to stabilize the Taiwan dollar began in earnest in June of last year, holding at around the 29.5 level against the U.S. dollar until September. Since then, it appears that the bank has been managing the currency's appreciation, with intraday trading crossing the 28 mark, before retreating at close.

The Biden administration will make it easier for US diplomats to meet with Taiwanese officials. The Biden administration is sticking with the Trump administration policy that made it easier for US diplomats to meet with Taiwanese officials, the reason being that the US fears that China is flirting with the idea of seizing control of Taiwan as President Xi Jinping is willing to take risk to boost his legacy. The US administration perceives that China is more impatient and better prepared to test the limits and flirt with the idea of unification now on the basis of Chinese administration's behaviour and posturing in the past two months.

	19	20	21	22	23
GDP (%p.a.)	2.0	3.0	4.0	3.0	3.0
Inflation (%p.a.)	1.0	-1.0	1.0	1.0	1.0
Current A/c(US$ bill.)	70.0	71.0	90.0	100.0	65.0
NT$/$(nom.)	31.0	29.0	28.5	27.5	27.0

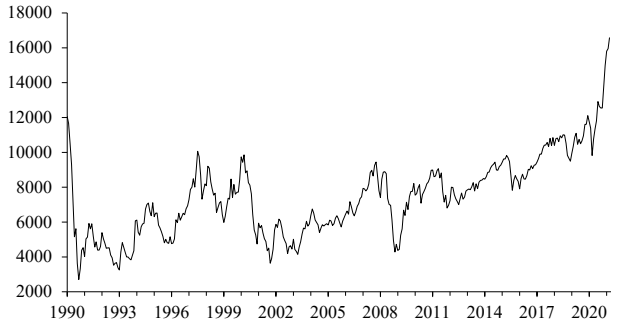
Brazil

Brazil is passing through a major health crisis. Different strains of Covid-19 variants were found in Brazil and spread of the virus has been lethal. Researchers believe that the spread of P.1 strain is the cause of Brazil's problem. Currently, Brazil accounts for almost a third of the daily global deaths from Covid-19. More than 300,000 people have died, and daily deaths are more than 3,000 people per day even though Brazil's population is far less than the US which saw similar casualties earlier. Researcher are trying to figure out the new Covid-19 variant from the Amazon which may turn out to be more virulent than the strains found so far. The public is in panic and President Bolsonaro is fighting for his own survival. The doles given out to people are not working anymore.

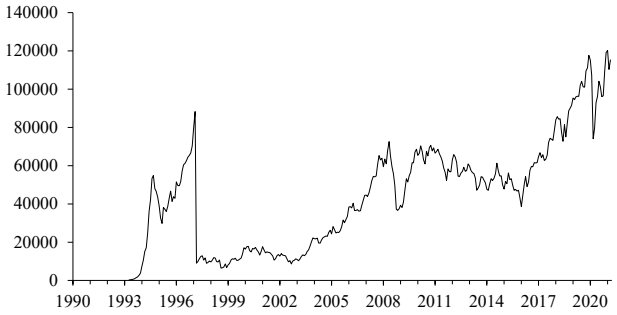
Not surprisingly, Brazil's central bank has pared down its GDP growth to 3.6% from 3.8% for 2021. This is still more optimistic than our forecast of 3% where we have taken into account enormous uncertainty surrounding the pace of recovery.

The monthly and annual rates of factory gate inflation jumped to 5.2% and 28.6%, respectively, both the highest since 2014 when recording of this statistics started. In response to this spike, the central bank raised interest rates by 75 basis points to 2.75% — the first increase in six years and the biggest in over a decade. Besides this, the currency is weakening and fuel prices have risen sharply. Consumer price inflation expectations are rising above the bank's year-end target of 3.75%. Consumer price inflation touched 5.2% in February, near the top of the central bank's target range.

Taiwan: Weighted TAIEX Price Index



Brazil: Bovespa



Brazil recorded a current-account deficit of $2.3 billion in February, from a deficit of $7.3 billion in January. International trade is not able to take advantage of pickup in the world trade due to pandemic.

The Brazilian currency has depreciated about 10% against the dollar in the last three months as investors pull their money out of riskier markets that raked up debt during the pandemic. The central bank's aggressive intervention in early March saved Brazil's real from its lowest point in almost a year. The real has been hit from all sides this year — fiscal deficit and return of former president Lula as a probable contender in the next election, and a Covid toll that's one of the worst in the world.

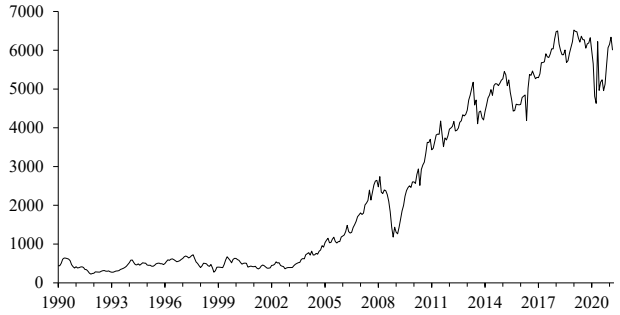
President Jair Bolsonaro announced sweeping cabinet changes amid growing pressure from the pandemic that's ravaging Brazil and making people angry. The centrist members of his cabinet have been replaced. Minister of defence, foreign affairs and justice have been replaced. The president has held his grip on his political base and he fired commanders of Brazil's army, navy and air force after he dismissed his defence chief as part of a broader cabinet restructuring. However, Brazil is not at risk of a coup.

	19	20	21	22	23
GDP (%p.a.)	0.8	-4.5	3.0	2.5	3.0
Inflation (%p.a.)	4.3	4.5	4.0	4.0	4.0
Current A/c(US$ bill.)	-36.0	-7.6	-20.0	-26.0	-22.0
Real/$(nom.)	4.2	5.5	5.8	5.8	4.7

Other Emerging Markets

Hong Kong: FT-Actuaries

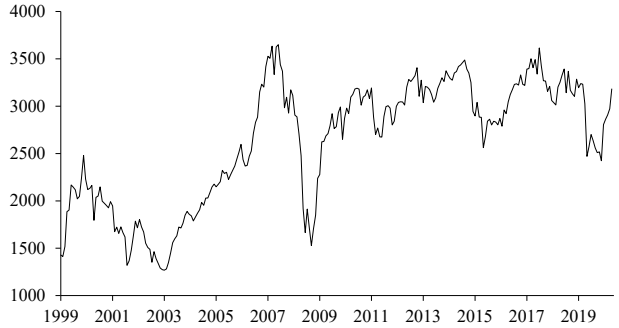
Indonesia: Jakarta Composite



Malaysia: FT-Actuaries (US$ Index)

Thailand: Composite Index

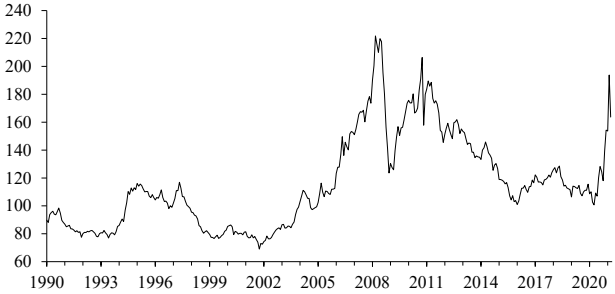
Singapore: Straits Times Index



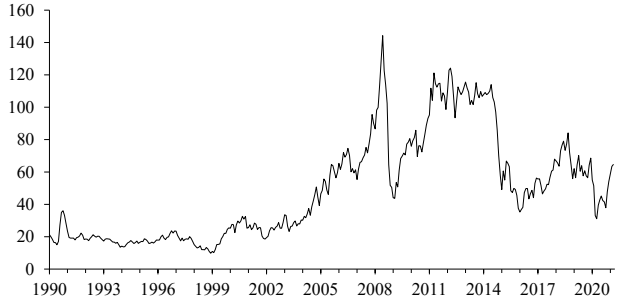
Philippines: Manila Composite

COMMODITY MARKETS

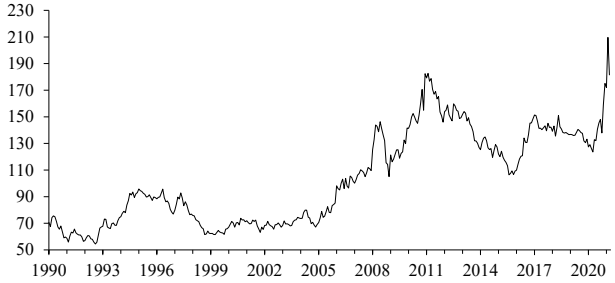
Commodity Price Index (Dollar)
(Economist, 2015 = 100)



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)

POLICY POST-BREXIT AND POST-COVID: A REVIEW OF POTENTIAL SUPPLY-SIDE AND RELATED POLICY CHANGES IN THE NEW ERA AND THEIR FISCAL IMPLICATIONS[1]

Patrick Minford

Trade and regulation post-EU — the leading edge of Brexit policy

Fiscal policy is bound up with all aspects of supply-side policy, for a very simple reason: in order to gain consent to policies that free up markets and put pressures on vested interests, the government often must grease the process with transitional help to those interested parties that comes at fiscal cost. We live in a democracy where veto power is widespread; to overcome it people and firms often need help to make the transitions required. Indeed, many of the economic distortions in the EU come from its having no fiscal power to raise taxes and spend money at will in this way. Instead the course of least resistance to vested interest demands is to award protection, either through trade barriers or through regulation. The EU environment is heavily encrusted with such distortions as a result.

Trade Regulation, and economic growth

Trade

At the heart of the EU's powers is the control of commercial policy, that is tariffs and non-tariff barriers, including standards set so as to exclude supplies from certain other countries, notably the US, also anti-dumping duties and quotas on supplies from particular countries. Commercial policy is designed to create large trade barriers against non-EU competitors, both in agriculture and manufacturing. In services such as financial, which are not so important EU industries, EU commercial policy is fairly liberal, though national governments remain highly restrictive of foreign competition, including from the rest of the EU; it is only recently that the single EU market has been extended to some services, so restraining national protection against the rest of the EU. UK service industries operate worldwide and so are little affected by this mainly national protectionism. UK service prices are therefore set by international competition at world prices; this will not change when we leave the EU.

However UK goods prices are currently dominated by EU prices, which are higher than world prices by the percentage of trade barriers, which are estimated in our research and elsewhere at around 20% for both food and manufactures. Leaving the EU and negotiating wide Free Trade Agreements (FTAs) with non-EU suppliers so that they gain free access to our markets will bring UK prices down 20% to world levels- this, which is equivalent in its effects to unilateral free trade, will according to the GTAP model now used by the Treasury bring gains of 4% of GDP, through better prices to consumers and competition-led rises in productivity by UK producers. According to Cardiff research the gain would be double, while simply abolishing half the EU protection would bring in the same gain. This is our preferred (cautious) assumption. Notice however, that such a reduction of barriers will meet a hailstorm of business opposition, which largely accounts for the near-total opposition of UK business to Brexit. The government will need to meet this hailstorm with offers of transitional help, smoothing the business path to higher productivity. A well-known example is electric cars, where the government has pledged support.

Astonishingly, the Treasury, in its latest report, assumes this gain from free trade to be only 0.2% of GDP, on the grounds that this policy is barely carried out- totally contrary to announced government policy.

The Treasury's gloom does not stop there. It also assumes that large trade barriers spring up along the UK-EU border after Brexit, for two reasons. First, the EU will refuse to recognise that our exports satisfy their standards, and we will do the same; second, it and we will institute border checks that artificially delay our trade in both directions at the border. However, both these things are illegal under WTO rules, to which both we and the EU remain entirely committed. Under its GTAP model, these new barriers cost us over 5% of GDP. Yet these costs are entirely illusory.

The Treasury, on its own admission, has a bad track record on its trade modelling. Before the referendum it produced equivalent estimates of the Brexit costs to the UK due to trade; it did so using 'gravity' equations instead of a full model of world trade with implied Brexit impacts through all channels. Since then, it has conceded that its gravity equation methods were faulty because they did not compute the full Brexit effects but rather took as constant aspects of the economy, such as wages and other home costs, that would also simultaneously change with Brexit. Hence their move to adopt the GTAP model.

Unfortunately, in changing their model they did not change their determination to find negative effects from Brexit via absurdly pessimistic assumptions, such as we have detailed above. When we replace these assumptions about a Brexit

[1] These issues are discussed at greater length in Patrick Minford (with David Meenagh)' After Brexit- what next? Trade Regulation, and economic growth'- Edward Elgar, December 2020

on WTO rules, we find the GTAP model gives a net gain of 2.6% of GDP. Our own Cardiff World Trade Model on our assumptions gives a gain of 4% of GDP.

Regulation

Regulation is the second major area controlled by the EU, through its powers to regulate the Single Market. It exercises these powers according to a 'social market' philosophy. A nation state has the power to tax/subsidise, and it can use this power to redistribute income to the less well-off. However, as just noted above, the EU has no tax powers because national governments have been unwilling to pass them over to it, even partially. Therefore to achieve social objectives of a redistributive nature the EU uses regulation; examples are labour market 'rights' which are essentially subsidies to workers paid for by implicit employment taxes on firms. Then in order to compensate firms, it awards the, protection either through trade barriers or favourable product regulation of standards- effectively creating non-tariff barriers against world producers meeting wide international standards..

Thus one finds that labour market regulation is a series of subsidies to workers and trade unions, paid for by firms. The effects on the economy can be assessed according to the labour tax equivalent, plus the direct implied transfer to worker-households. It was largely to carry out this assessment that my research team built the 'Liverpool Model' of the UK economy; this was the first macro-model of the UK to have a full 'supply-side', designed to compute the effects of tax and regulation on the economy's potential output.

The EU's regulation extends beyond the labour market, to three main other areas. The first is general product market standard setting, which as we have seen is related to setting non-tariff trade barriers. The general aim of standards is to benefit the main producer industries of the EU. Thus these industry lobbies essentially have had the power to legislate what suited them. As Adam Smith noted centuries ago, such power in the hands of business is likely to be anti-competitive; one notices that the EU Competition Directorate takes its most stringent actions against foreign, often US, companies- such as Apple, Google and Facebook. One can in principle assess this producer regulation as the equivalent of endowed monopoly power, like a consumer tax. In practice, estimates of this are hard to make, other than via the direct effect of the trade barrier; this barrier also puts an effective limit on the extent to which home industries can raise prices. So we have not estimated any additional effect of regulation as such via this route.

The second area beyond labour is finance, a service where the EU has shown a strong desire to control activity, though, or perhaps because the biggest EU finance industry has been in the UK. It has intervened with highly prescriptive regulations in this major UK industry, in a way extremely unpopular among its practitioners- supposedly to protect consumers. These regulations have given rise to an army of 'compliance' executives; but while this has raised costs substantially, gains to consumers have been unclear; in other major markets, such as the US, similar interventionism has been avoided. We can leave on one side here the new regulations on banks associated with the financial crisis, which relate to monetary policy and in the UK this were mostly self-inflicted.

Finally, there is the rest of the economy; the environment and climate where the EU has regulated strongly to force the adoption of non-fossil-based energy; the regulation of technology, especially in agriculture and pharmaceuticals, where the EU has given primacy to the precautionary principle, and held back technological innovation. The main effect in the first has been to raise energy costs substantially, instead of primarily focusing on developing new technology, which would be most effective in the long term and least costly in the short term. In technology, EU regulation has held back innovation.

In all these areas we have proposed estimates of the cost to the UK economy. Overall, we suggest a cost of 6% of GDP, of which we suggest 2% can be rolled back. In a parallel piece of analysis of the Thatcher reform programme we find comparable gains, suggesting this order of magnitude is indeed feasible.

To these gains we add that of avoiding uncontrolled EU unskilled immigration, which the UK taxpayer has subsidised by around 20% per migrant, costing 0.2% of GDP, mainly paid by poorer UK taxpayers. On top of this we eliminate the annual net payment to the EU budget, 0.6% of GDP.

Bringing in this deregulative agenda will not be costless to the Treasury since the beneficiaries of regulation, including middle-class consumers, are vocal defenders of it. To help get agreement there may well need to be transitional subsidies.

Fiscal and monetary policy:

Quite aside from the need for fiscal support of various kinds, there is a strong case for an expansionary fiscal policy episode to drive the economy away from the zero interest rate region where it is still currently becalmed; this is needed to get monetary policy and the monetary environment back to proper functioning, after the fiasco of money- related policies in the past decade and a half. We must first explain how central banks have made a complete mess of monetary policy over the Financial Crisis. Their first major mistake was to stimulate a big credit boom in the 2000s, which was the main cause of the crisis situation, through over-leveraged banks. Second, they permitted the Lehman liquidity crisis, by allowing Lehman to go bust, instead of getting it taken over, with liquidity pumped into the banking system; it was this bust that precipitated the crisis proper. Third, they stymied bank credit growth post-crisis by draconian bank regulation just when credit growth was needed for recovery.

Fourth, they flooded markets with Quantitative Easing (QE, the aggressive buying by central banks of bonds and other assets by printing money), which has created large distortions in financial markets. There is now evidence that this last episode, zero interest rates and QE, have damaged competition and new industrial entry by subsidising capital to large firms. This has created a market structure argument for 'normalising monetary policy' besides arguments from monetary policy itself, to the effect that we need to make it effective again.

To restore monetary policy effectiveness we need interest rates to rise back to normal, well away from the zero lower bound where they still are. The only way for policy to deliver this is via a fiscal expansion. This can be focused on using the much-improved public finance situation, explained above, to deliver tax cuts and growth-supporting spending).

Finally, monetary policy can, once it recovers effectiveness, more effectively target Nominal GDP than simply inflation. Such a new central bank targeting set-up, backed up by a fiscal commitment to prevent a Zero Lower Bound, will deliver a much more stable economy, making the whole programme of direct control of bank balance sheets and 'prudential' intervention redundant.

Tax reform

The UK needs a tax system for the 21st century, that delivers large and stable revenues without penalising either savings or incentives for successful people. This can be done by rebasing the income tax system on consumption, and cutting marginal tax rates in the process.

A good tax system is one that creates the minimum damage to everyone's incentives to work and save– the 'Ramsey Principle' – consistently with financing government spending and achieving the necessary income redistribution. This is achieved by taxes that are 'flat' (i.e. the same proportional rate) across people of all incomes (the popularly known 'flat tax'); that are flat across commodities of all sorts ('tax neutrality'); and that are flat across time. This last means that the tax rate is constant over present and future consumption; it implies both that tax should be levied on consumption and that the tax rate should be planned to be constant under forecast conditions ('tax smoothing').

Taxes can be cut without being balanced by simultaneous cuts in spending because extra work and less avoidance create an offsetting recovery in revenue (the Laffer effects); and because higher growth generates more future revenue. This is an important implication of tax smoothing. A UK flat tax on consumption would bring the imputed rent on owner-occupied housing into the tax base and would allow the standard rate of income tax to be cut cautiously to a 15% flat tax rate on consumption, thereafter being cut further in stages as the growth effect rolled in. Such tax reform would be popular since there would be no losers, no cutback in public spending programmes and many gainers, not the least of them the UK economy.

Public spending reform and the new fiscal strategy for growth

If one examines UK public spending, while it has a high share of GDP, at just under 40%, its effectiveness is constantly in dispute, whether in health, education, policing, or almost any area of public involvement. Yet the technical ability of central agencies to communicate and use information efficiently now exists, and with it the ability to coordinate decentralised efforts. Ideas for devolving areas downwards to communities could therefore be widely explored, following the work of Elinor Ostrom on public 'commons'. Some practical experiments appear to have been made in social care by health boards in the context of the internal market for health care, and In education via work on competition with the public sector. There is scope for a rethink of how competition works in railways and between modes (road v rail), as well as revisiting road pricing where Singapore is a living example of how it can be done.

Barriers to growth- reducing government obstacles to entrepreneurship and entrepreneurial innovation

The ultimate job for government is to remove the obstacles placed by tax and regulative policies on business formation by entrepreneurs. The very existence of government is an invitation to rent-seeking lobbyists for regulations that favour their special interests. Because there is then no general lobby for potential businesses opposing such open-ended interference, this lobbying process is constantly adding to the regulative environment in ways that impede business. It is this accretion that has periodically to be scraped away by a process of deregulation that prioritises the business freedom on which our growth and prosperity depend.

In this context we showcase recent research on how the Thatcher revolution in tax and regulation kick-started productivity growth; also on the connection between this growth and inequality in both the UK and China.

An issue that comes up repeatedly is the 'productivity puzzle', according to which productivity growth has slowed down markedly in recent years. However, it seems most likely that this is simply mis-measurement of the effects of rapidly growing digital productivity. Various efforts have been made to correct this measurement error, which suggest that the productivity slowdown in the official data does not really exist., consistently with the obvious gains from technology.

The North-South policy challenge

A major challenge is to bring the North's income up to the level of that of London and the South. As many people have pointed out, a good start would be to improve the

infrastructure of the North, which has lagged behind the South's, especially in transport. HS2 has become controversial because of cost overruns; but the main argument for it is not faster journeys, which is where the cost-benefit has focused, but simply that is the most economical way to produce the extra N-S journey and freight capacity needed because of increased congestion on road and rail. Doing this by expanding the current rail capacity would be expensively disruptive. HS3 should go ahead fast as well, together with the improvements promised in the Northern Powerhouse programme.

The usual assumption when the problems of the North are mentioned relative to the South is that 'more should be spent' on Northern infrastructure. This may be true but it misses the point. The essential point is that the North needs to achieve stronger cost competitiveness. The South achieves its results because it is highly competitive in world markets. This is certainly partly due to good infrastructure. But mainly it is the result of creating products and services that are in high demand internationally. In our Liverpool Model of the UK as a whole the level of GDP is governed by UK cost competitiveness. This in turn is the result of the level of tax net of its opposites, regulatory costs on business.

In a parallel piece of work analysing how UK growth occurred during the Thatcher years, Minford and Meenagh showed that it was related to the cutting back of tax rates and regulation during the 1980s. This led to a surge in entrepreneurship which boosted productivity growth.

Essentially the same ideas apply to the North, as apply to the UK as a whole. The North, after all, is simply one part of the same UK organism.

It is helpful to start by understanding how London itself became such a competitive economy. Plainly much money has been spent on its transport infrastructure. But much of this has been in response to the economic activity it has created. i.e. to its success from other causes. Essentially this success has been tied up with the development of the City of London, the world's top financial centre. This in turn came from the provision and development of huge amounts of land in the docklands, feeding a demand for the City's services across the world. This City industry in turn was fed by supplies of skilled labour plentiful in the UK, due to expanding higher education and a liberal approach to skilled immigration. Other supply-side factors were the common law courts which made the UK an attractive place for dispute resolution, and that ample supply of land, that gave the City space to expand.

The trade models we have looked at in earlier chapters give us corroborating insights. After abandoning EU protection of food and manufacturing, it will be the City and other service industries that expand as costs, especially of land, inflated by protection, come down.

Looking towards the North, what are the policy implications? Northern cities now have increased powers vested in mayors, just as London has had. This gives them an opportunity to think and act strategically to reduce costs and increase their regional competitiveness. If these cities and their cooperating surrounding regions can identify the infrastructure they need to support these moves, they now have a government strongly willing to oblige by providing it through central government funding. However, to be fair to central government this is not entirely new. Money has flowed from the centre to well-organised northern initiatives for some time. One only has to look at roads around Manchester or expenditures on the old docklands of central Liverpool to be aware that central government has spent liberally on northern development where needs have been identified. Essentially the system for providing infrastructure is demand-led by local needs, these in turn being created by economic growth.

The failures of the North to grow as fast as London cannot therefore be laid at the feet of central government unwillingness to spend on northern infrastructure. It looks rather as if it is the failure of the North to grow that has slowed down the associated infrastructure provision.

It might then well be asked: how can central government policy break into this slow-growth Northern equilibrium?

The answer is to be found in the way the Thatcher government broke into the low-growth UK equilibrium- by lowering taxes and similar regulative restraints on cost competitiveness. Lower taxes work across the whole economy. By lowering general taxes and easing economy-wide regulations, economic activity is boosted across the whole economy. But such moves today, with a congested Southern economy, will primarily benefit the North, because that is where there is spare capacity. One can think of the process as a two-stage one. Cutting taxes and regulative costs will boost competitiveness across the UK; but because of Southern congestion, Southern costs will rise in response, while Northern costs will not. Hence the net effect will be to lower Northern costs and raise Northern competitiveness, while leaving Southern largely unchanged.

In the North today transport infrastructure already covers the area. To contribute, new transport links must improve on existing ones by lowering costs. However, the policies that will work to generate growth in the North are the same as those that will generate growth across the whole economy. Our new Regional Model finds that general policies cutting taxes and regulative intervention have the biggest proportional effects in the North, in fact double those in the South, because there is less congestion there in resources, both labour and land. There is therefore no contradiction between stimulating the economy as a whole via supply-side policies and 'levelling-up'. The only exception is cutting entrepreneurial taxes and regulative costs, which is cheap in lost revenue: this has double the effect in the South, reflecting the existing entrepreneurial dominance of the

South. However, as the North catches up in economic activity it will draw level also in entrepreneurship, tending to equalise this regional effect. The Table following shows the model's key results.

Table 1: Long run Effects of different tax/regulative measures on North and South(Each package costed at £10 billion p.a.)

Percentage change in	GDP_N	GDP_S
Cut standard rate of income tax or VAT or other general income/consumption tax	1.1	0.5
Cut Corporation tax rate	0.8	0.4
Cut marginal tax rate and regulative burden on Entrepreneurs/SMEs	12	21
Increase infrastructure spending in North	1.6	-

It follows that in general the way to boost the North is to cut taxes and regulative costs across the UK as a whole, and then respond in the usual way to the resulting infrastructure demands from the North. It is not artificially to boost spending on Northern infrastructure independently of demand-led needs. The exception would be if some particular infrastructure project would itself stimulate some identifiable development; however, this has to be carefully evaluated. Too often infrastructure created to 'spur development' creates roads or bridges that 'lead to nowhere', i.e. to areas with little going on. In principle infrastructure spending lowers costs for business by raising productivity. For examples one only has to think back to the way railways promoted development in the USA. But of course the railway era in which this promotion occurred also came to an end once railways went to most places.