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From false multipliers to 'nonsense output-gaps'

Dr Geoff Tily

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From false multipliers to 'nonsense output-gaps'

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The risk of renewed recession means thinking around fiscal policies is changing. But as the Institute for Fiscal Studies' recent commentary about the spending review illustrates, austerity – or 'household budget' – thinking still dominates much public debate. The purpose of this paper is to restate the macroeconomic approach to fiscal policy, so that the public finances depend on the impact of government spending on the economy.

The demand approach to government expenditure depends on the theory of the multiplier. A very low multiplier allowed the OBR (in 2010) to judge cuts in spending would barely damage economic growth. But this has not been the case in practice: across all advanced economies austerity policies have gravely damaged economic growth. The scale of the damage points to a much higher multiplier: a figure of 1.5 for the UK is realistic and within the range of the IMF's 2012 reassessment.

Rather than follow suit and revise their analysis of demand, the OBR continued to attribute the weakness of the economy to the supply side. While the productivity puzzle has not been solved, their judgment is simply that the financial crisis had a more severe impact than first thought (later emphasis switched to the impact of the referendum result).

These judgements mean the OBR – along with most other forecasters, not least the Bank of England – have stuck to their original view that the output-gap would close very quickly (by 2015). Essentially the same arguments have been deployed by policymakers across the world; they have provoked a backlash against 'nonsense output-gaps'.

Rather than confirm supply-side weakness, productivity statistics since the crisis show the effects of austerity not the cause. Low outcomes in the UK are the result of the labour market adjusting on price (wages) rather than quantity (employment numbers) to weak aggregate demand. The prolonged absence of inflation is also at odds with supply-side defect.

Without a changed view of the output-gap the same course is relentlessly imposed. Moreover, repeatedly failed efforts to tighten monetary policy not only support the demand view but also point at fundamental vulnerabilities from private debt that remain unresolved.

Given assumptions on these critical policy variables are deeply embedded across the most important policymaking institutions, impartial arbitration may require a public commission.

"Nothing in economics is more potent than a simple idea whose time has come",
Gavin Davies[1]

1. Introduction

The argument for deploying fiscal policy at a time of economic weakness presents a paradox for many: it claims that higher government spending should lead to lower public debt. But this is a paradox only the basis of the household fallacy, that an economy's finances should be analysed and run like those of a household, a notion that the creation of macroeconomics was aimed at banishing. Macroeconomics introduces the concept of the "multiplier", the idea that government spending has a multiplied effect on the economy as a whole, with the effect on GDP a multiple of that original spending.

Since 2010 austerity policies were implemented globally. The theory to justify this required the multiplier to be negligible so that the macroeconomic theory of the multiplier could effectively be ignored. But, as Olivier Blanchard and Daniel Leigh of the IMF quickly recognised (in the 2012 *World Economic Outlook*), the damage to economic outcomes of austerity policies was evidence that the multiplier was considerably larger, and the macroeconomics behind it of great relevance to future policy. Savage cuts in the growth of public expenditure have ended up increasing not reducing the public debt.

Austerity programmes have therefore proved the multiplier argument in reverse. But without a fuller understanding of how policy has operated since 2010, future policy will remain greatly constrained and even dangerously deflationary.

Seemingly with the social and political dangers of more austerity understood, the grandees of the profession are performing a remarkable about face. Kenneth Rogoff has even remarked "To be frank it has never been remotely

[1] 'High fiscal multipliers undermine austerity programmes', ft.com blogs, 21 October 2012, http://blogs.ft.com/gavyndavies/2012/10/21/

obvious to me why Britain chose austerity".[2] Other economists have lined up alongside calls for higher spending and higher debt.

The rival view that higher spending might be the means to reduce debt is not unspoken, but is generally too low-key, limited in ambition and not fully developed in theory. Moreover, any spending initiatives are still contingent on judgements about capacity, reflected in policymakers' estimates of spare capacity: 'output gaps' and the 'NAIRU' (in the UK, those of the Bank of England and Office for Budget Responsibility). Future policy needs to be built on a recognition that these estimates of capacity are based on the same theoretical approach and confounded by the same misjudgements as multipliers.

Given the reality of a higher multiplier, cuts in spending inevitably lead to worse outcomes than expected. If judgements about multipliers do not change (as has been the case in practice), then these shortfalls are attributed to supply rather than demand failure. The output gap is therefore reckoned to be closed or closing, and the scope for recognising and deploying unused capacity is written off. (Relatively) low rates of unemployment are used to back up the idea of an economy operating at full capacity.

In practical effect, a contractionary policy stance is maintained. Not only is fiscal policy restricted, but, with the Bank of England making the same judgements as the Office for Budgetary Responsibility (OBR), tighter monetary policy is a permanent threat.

This stance is entirely phoney, a mechanical inevitability from a false starting point. Group think about multipliers explains the wider – and implausible – consensus. Gradually a backlash is beginning, not least a 'campaign against nonsense output-gaps' ('CANOO').

The reality is that the economy had been greatly constrained and a very significant change in policy stance is necessary to revive activity. With the output-gap properly understood, both current and capital expenditure will be needed to strengthen the economy.

The discussion proceeds as follows:

- section 2 summarises Keynes's approach as an expenditure multiplier, and suggests an estimate of 1.5;
- section 3 examines austerity policies and proposes an approach to assess the OBR's judgements about the multiplier;
- section 4 uses a similar approach to assess the impact of austerity across OECD countries;

[2] 'Never mind the debt: if there's a hard Brexit Britain will have to splash the cash' *The Sunday Times*, 3 February 2019

- section 5 reviews the debate on the multiplier since the financial crisis, including the OBR's defence when challenged on this issue;
- section 6 shows how weak economic growth has resulted in public finance outcomes falling far short of expectations;
- section 7 discusses the implausible evolution of the OBR's assessment of the output gap;
- section 8 –the central part of the argument – shows how shortfalls in outcomes are wrongly attributed to supply; and the inter-relation (circularity) between judgements on the multiplier, productivity and the output gap is set out;
- section 9 explains the NAIRU (non-accelerating inflation rate of unemployment) and reviews the implications for assessments of capacity;
- section 10 addresses financial considerations and policy in practice;
- section 11 sets the fiscal policy arguments in the context of a wider theory of the global financial crisis, to argue that a productive economy will have greatly more capacity than the speculative model that has prevailed for decades; and
- section 12 concludes with brief policy implications.

Policymakers have been greatly reluctant to review their thinking on multipliers or output gaps. The literature is conspicuous by its absence, especially in contrast to the vast (and entirely inconclusive) deliberations on supply. Ultimately an extreme theoretical position has constrained, and continues to constrain, not only the economy, but also the possibilities for society.

Given these ideas are deeply embedded across the most important economic institutions, a public commission would seem the only way to open the issue to genuine and impartial arbitration.

2. Keynes's multiplier

The multiplier operates on the economy through aggregate demand. Any new expenditure leads to a series of 'repercussions' that means that the aggregate impact should be considerably larger than the original intervention.

The direct effects of government spending on wind farms, for example, will be an increase in employment by wind farms and an increase in demand for the output of the suppliers of equipment to wind farms and an increase in employment by those suppliers. But the increase of employment doesn't stop there. There will also be a number of secondary repercussions. The extra

wages paid out to new employees will be spent on additional purchases, which in turn leads to further employment. So the workers newly employed by the wind farms and their suppliers stimulate more demand for food, entertainment, clothes, etc. In Keynes's words from 'The Means to Prosperity':[3] "The newly employed who supply the increased purchases of those employed on the new capital works will, in their turn, spend more, thus adding to the employment of others; and so on."

The logical consequence of this process could be spending continuing to circulate around the economy forever. But at each stage of the process there are *leakages*. Households don't on average spend all of any extra income and some demand is met by overseas producers. Higher production is also likely to associated with higher prices. None of these factors are inherently problematic, and serve to contain the process.

The most common way to illustrate this is to consider the series of 'repercussions', where the only leakage is through saving. The original government spending increases employment and thus results in an increase in labour income. This increase is either spent or saved. To simplify, we assume that a fixed proportion, c, known as 'the marginal propensity to consume ' (*mpc*), of the increase in income is spent; the remaining proportion, $s = 1 - c$, of the increase in income is saved. The proportion, c, that is spent is earned as income by others, which is then spent according in the same proportions (so a proportion c of c, which is c^2 of the original expenditure). And so on.

Working through these repercussions leads to a total amount of income/spending equal to

$1 + c + c^2 + c^3 + \ldots = 1/(1-c)$ $(= 1/s)$ times the original increase in government spending. This is known as the 'multiplier'.

Imports act just like savings as a leakage out of the economy. So taking into account imports, the formula for the multiplier becomes $1/(s + m) = 1/(1 - c + m)$, where m is the marginal propensity to import (*mpm*).

Both propensities can be estimated from past experience, using national accounts to calculate annual changes in consumption, imports and GDP. For the UK an *mpc* of around $2/3$ and an *mpm* of around $1/3$, result in an estimate for the multiplier of $1/(1 - 2/3 + 1/3) = 3/2 = 1.5$ (Tily, 2009).

This means that if the government increases expenditure by £10bn, this will translate to an increase in GDP (i.e. overall expenditure and thus income) of £15bn. These figures are not out of line with some contemporary estimates, as discussed below in section 5.

[3] His 1933 public statement of the multiplier argument originally published in *The Times* newspaper – see Keynes, 2010, pp. 335-66. Online version: https://gutenberg.ca/ebooks/keynes-means/keynes-means-00-h.html

Strictly the (expenditure) multiplier is set in cash terms, but there is obvious interest in the share that goes to increased output and jobs (i.e. the 'real' effect') *versus* the share that simply goes into price increases. In the context of both Keynes's theory and the conventional policy framework, given conditions of deficient demand, increasing government expenditure will increase real output and is likely to be necessary to ensure inflation meets rather than falling short of pre-ordained targets.

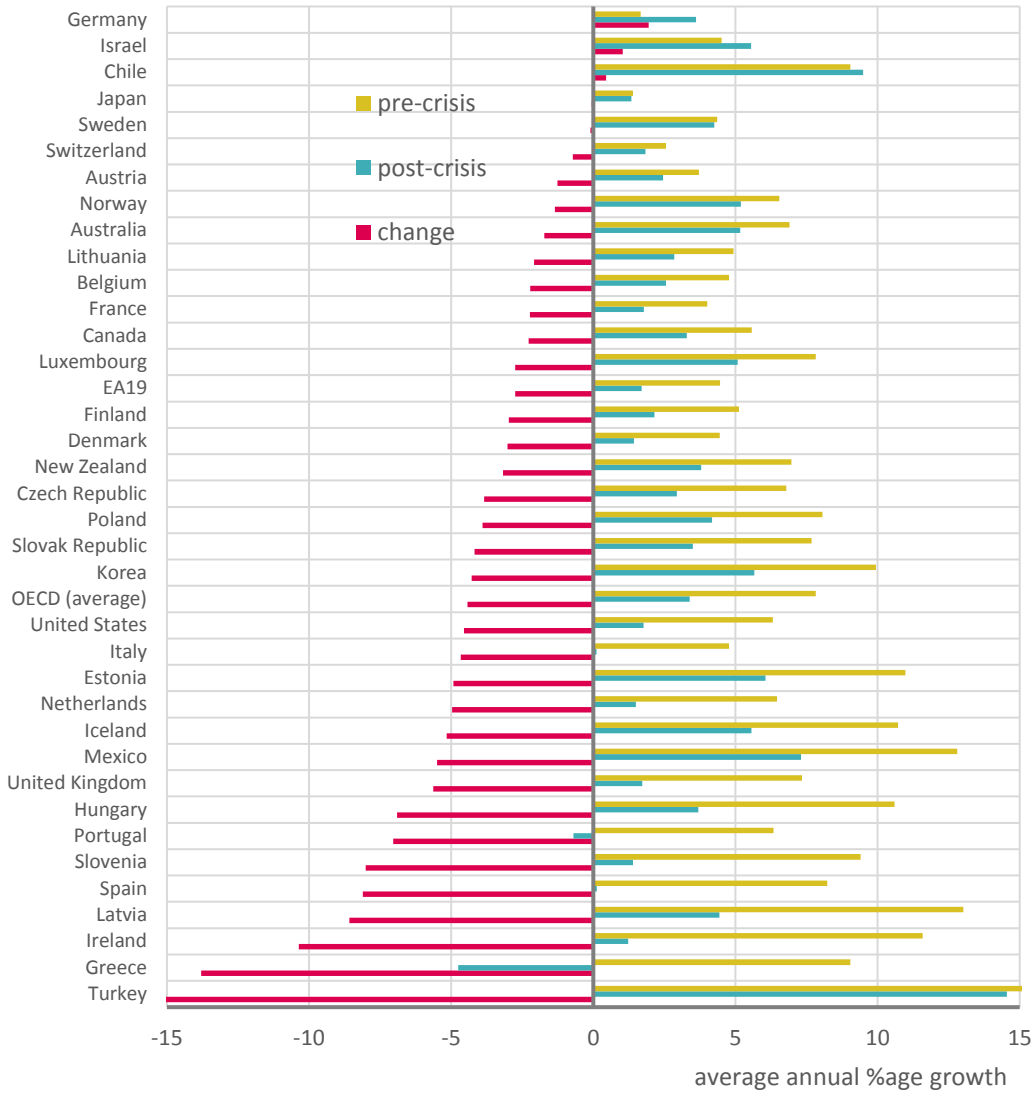
3. Austerity today

The endorsement of austerity by the OBR must be understood in the context of the rival macroeconomic view that sees public expenditure as problematic because it 'crowds out' private spending, and so cutting government expenditure should increase, 'crowd-in', private expenditure. While this has been a matter of long and inconclusive debate, this literal view of crowding out has been inherent in the OBR's economic model and thus their assessment of coalition austerity. The easiest way to see this is to disaggregate their overall forecasts for GDP growth and associated projections of government expenditure. (The specific role for multipliers is discussed in Section 5.)

First, in the graphs below, austerity is assessed for all OECD countries by comparing pre- and post-crisis experience. The crisis period itself (2008/9) is omitted, so as to compare recent experience with earlier normal(ish) conditions. Figure 1 shows public spending growth in nominal terms[4] before the crisis (1999-2007), after the crisis (2010-2018), and the change between the two periods. Austerity policies have generally not amounted to cuts in the *level* of spending; instead the *growth* of public spending has been greatly reduced. This has been the case for most OECD countries.

[4] The analysis is done in nominal terms because (i) economic activity is conducted in cash/nominal terms, (ii) government spending measures are more reliable in cash terms, (iii) the multiplier is a cash conception and (iv) the public finances are measured in cash. In general, OECD comparisons extent to 2018 as the latest full calendar year available; some UK analyses extend only to 2015 as the end of the original June 2010 OBR forecast. Given austerity (in general) operates on growth, comparisons of expenditure and income components are done in terms of percentage point contributions to GDP growth.

Figure 1: Government expenditure, pre and post crisis average annual



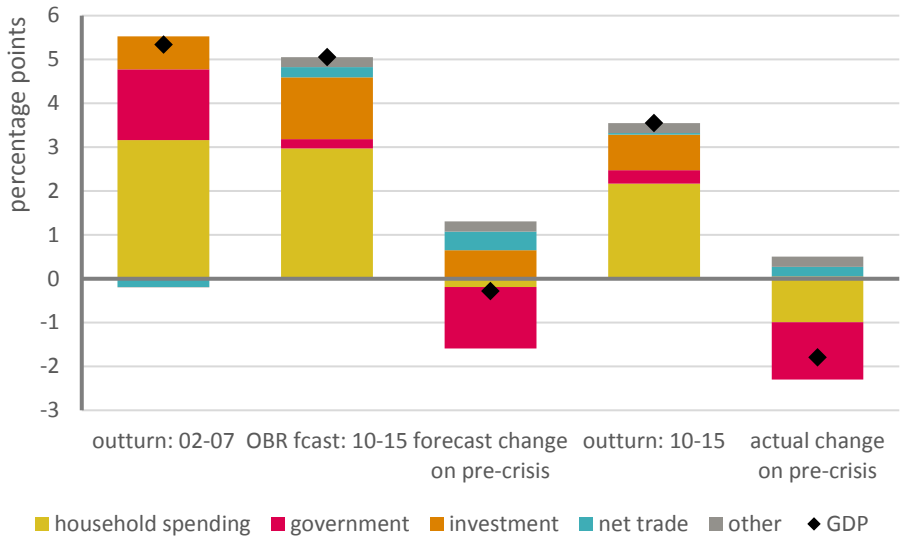
Source: OECD; for country comparisons, government expenditure figures exclude investment.

On this basis, public spending growth increased or was virtually unchanged in only five countries – Germany, Israel, Chile, Japan and Sweden (albeit with very low growth in Japan). Post-crisis public spending growth was negative – i.e. the level fell – in only Greece and Portugal. There is a cluster of ten countries, including the UK, where the growth in government spending was cut by between 3.8 to 5.6 percentage points a year.

The OBR's initial assessment was that the UK economy would not be deflected by austerity, with GDP growth expected to be virtually unchanged after the crisis from before it. Figure 2 shows the annual growth of nominal GDP and the sectors of demand that contributed to this growth for the pre-crisis (2002-2007) and post-crisis (2010-15) periods. For the latter period growth is shown first on the basis of OBR forecasts (in June 2010) and then on what actually happened.

The OBR expected reduced government demand (crimson) to be compensated for by stronger private demand, made up of investment (orange) and net trade (turquoise). But, instead, annual GDP growth slowed to 3.5% after the crisis compared to 5.3% ahead of the crisis, a reduction of 1.8 ppts. Gains to investment and trade growth were very small, and there was a significant reduction in household demand (yellow).

Figure 2: Contributions of demand components to pre- and post-crisis GDP growth



Source: ONS, OBR and TUC calculations on nominal figures

The effect of austerity is captured by the reduced contributions to growth from government expenditure. Overall the contribution of government expenditure was reduced by 1.3 percentage points per year, while the reduction in GDP growth was 1.8 percentage points per year, suggesting a multiplier of 1.4 (= 1.8 /1.3). Note that this assumes that there are no other conditions driving GDP down (like dysfunctional financial markets) or up (like QE or other subsidies to the financial sector).

The impact on real GDP growth was less severe, but since 2010 annual real GDP growth of 1.9% is well below the pre-crisis (1945-2007) norm of 2.8%.

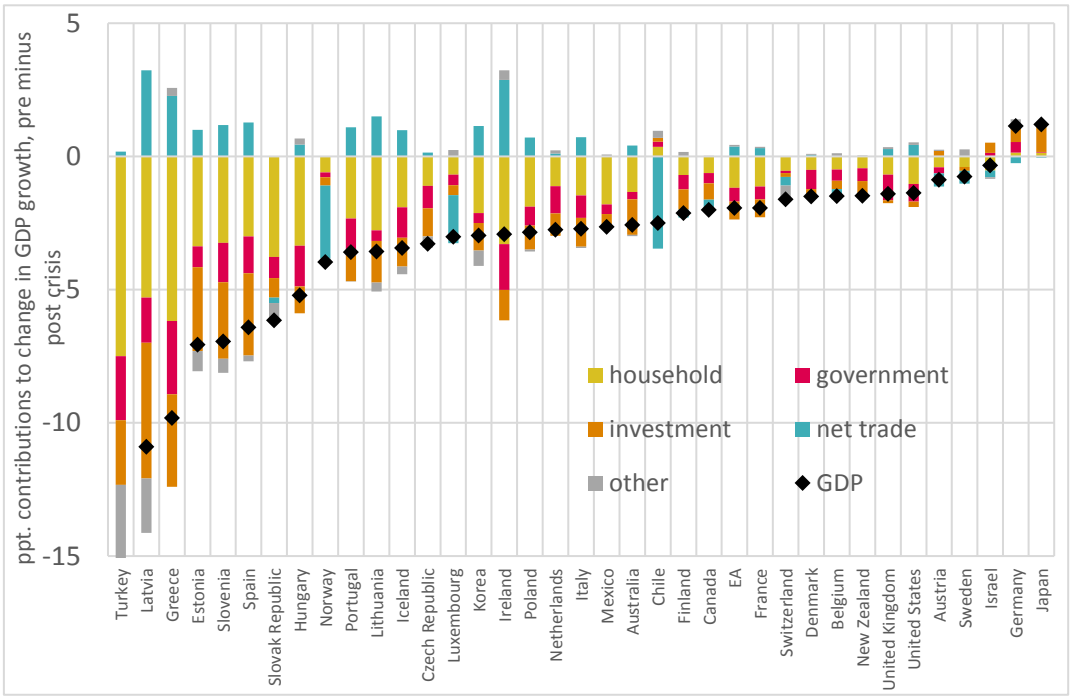
4. Country analysis

With austerity policies common to nearly all countries, nearly all have experienced lower GDP growth. Figure 3 shows the change in GDP growth

rates since the crisis for all OECD countries, derived in the same way as Figure 2 for the UK.

In all OECD countries where government expenditure growth was cut, investment and trade failed to step up to make up the shortfall. Reduced growth in public sector spending did not 'crowd-in' the private sector as predicted by the theories on which policymakers relied. For countries towards the left of the chart the fall in GDP growth has been very severe – and this is a rate per year. The colour breakdown shows that all sources of demand have contributed to these reductions. In the two countries where GDP growth increased, the contribution of government expenditure rose (Germany and Japan). Three other countries increased spending very marginally (Israel, Sweden and Chile), but GDP growth still slowed. Fundamentally: no countries that reduced spending had higher economic growth; on the basis of austerity theory, growth should have increased for all these countries.

Figure 3: Expenditure contributions to change in nominal GDP growth for OECD countries, percentage points



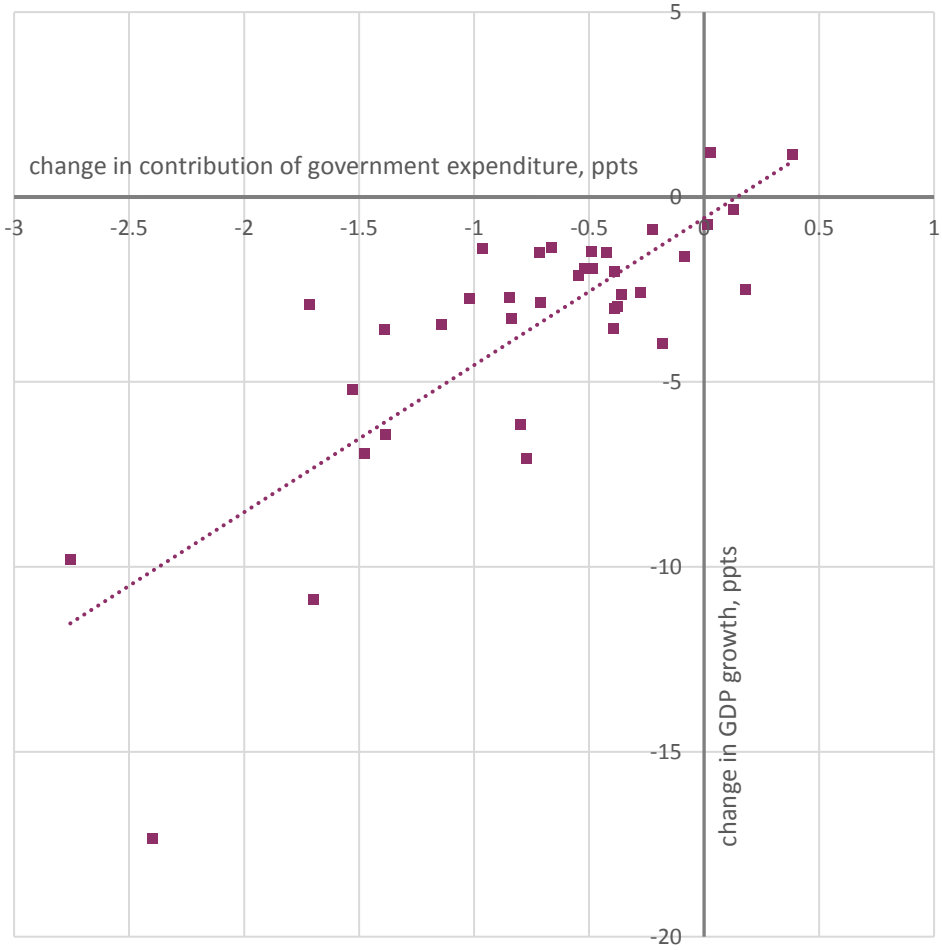
Source: OECD and TUC calculations; as in Figure 2, 'government' is only current expenditure.

On this basis the UK decline ranks 7th out of 37 countries. The G7 economies come in the top half of the ranking, along with the EA19 aggregate.

The scatter plot on Figure 4 extracts (from Figure 3) the change in average government expenditure contributions against the change in average GDP growth. Across these OECD countries, the decline in GDP growth is roughly proportionate to the scale of the reduction in the contribution of government spending (the correlation is 0.8). At face value, the impact of spending cuts across all OECD countries suggests a very large average multiplier of around four (by simple regression). Plainly, however, there are a lot of moving parts,

not least the ability and inclination of central banks to support activity. For some countries where the original recession was never halted, government spending cuts 'merely' exacerbated ongoing collapse.

Figure 4: changes in government expenditure and GDP growth, ppt contributions pre minus post crisis



5. Contemporary multiplier debate

When the multiplier was developed, early estimates for the UK were between 1.5 and 2; corresponding figures for the US were higher between 2.5 and 3 (Tily, 2009). A revival of the theory of 'crowding out' and associated thinking around low multipliers followed perceived failures of fiscal policy over the 1970s. But in the aftermath of the global financial crisis, higher multipliers were (briefly) conceded. Most importantly President Obama's Council of Economic Advisers, although a little short on detail, advised that the multiplier for the US was 1.5.[5]

[5] 'The Job Impact of the American Recovery and Investment Plan', US council of Economic Advisers, 9 January 2009. https://www.economy.com/mark-zandi/documents/The_Job_Impact_of_the_American_Recovery_and_Reinvestment_Plan.pdf

At the time, the FT (23/1/09) reported comments from two prominent academic economists. Ken Rogoff offered vague support: "Academic economists are far more uncertain about the impact of the fiscal stimulus than Wall Street … The range of estimates is very wide. But given the situation we're in it is certainly worth trying"; Robert Barro disagreed "… with partial crowding out the multiplier will be a lot less than one".

The OBR was created in May 2010 by the Coalition Government to monitor the government's progress in repairing the UK public finances. By this time Rogoff had switched sides, with his and Carmen Reinhart's 'Growth in a Time of Debt' (and the infamous 90 per cent of GDP threshold) deployed as academic justification for George Osborne's policy stance. In their June 2010 *Budget forecast*, the OBR was open about the multipliers that they had assumed (on their Table C8, reproduced below). They did not discuss theory, but the sense is that these are supply-side multipliers. Rather than operating through expenditure channels, the effects of public sector interventions are understood according to how they support or distort the operation of supply-side/market processes.[6]

Table C8: Estimates of fiscal multipliers

	Impact multipliers
Change in VAT rate	0.35
Changes in the personal tax allowance and National Insurance Contributions (NICs)	0.3
AME welfare measures	0.6
Implied Resource Departmental Expenditure Limits (RDEL)	0.6
Implied Capital Departmental Expenditure Limits (CDEL)	1.0

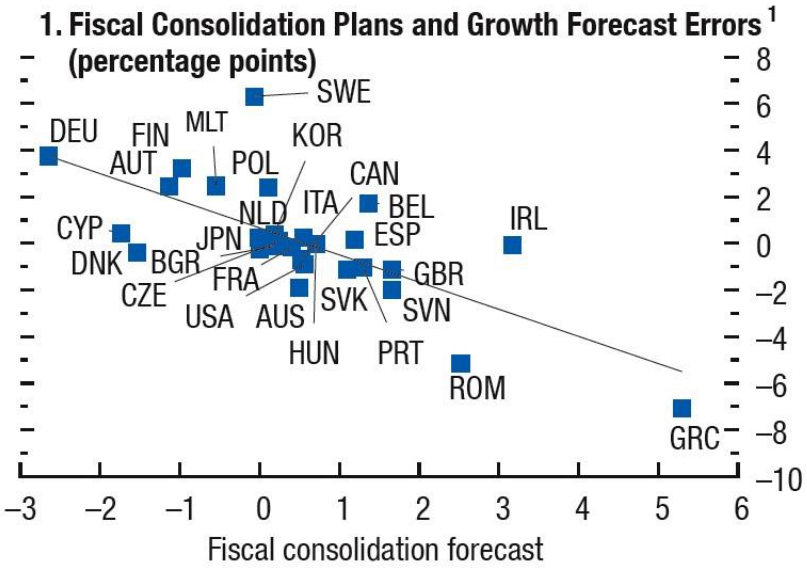
A footnote offers some sources, with prominence to work by the IMF and NIESR:

> A review of estimates for fiscal multipliers for different policy instruments and countries is available in *Fiscal Multipliers*, Antonio Spilimbergo, Steve Symansky, Martin Schindler (IMF Staff Position Note), May 2009. Further evidence was taken from papers including: *Fiscal Policy Action in the Banking Crisis*, National Institute Economic Review, January 2009; *Fiscal Stabilisation and EMU*, HM Treasury, 2003; *Public Investment and the Golden Rule: Another (Different) Look*, Roberto Perotti (IGIER Working Paper No 277), 2006; and *Estimating Tax and Benefit Multipliers in Europe*, Ali J Al-Eyd and Ray Barrell, Economic Modelling (Vol 22), 2005.

Within only two years even the IMF were alarmed at the scale of the damage to global growth. Their October 2012 *World Economic Outlook* included analysis of the impact of fiscal consolidations to date – underpinned by recognition that their forecasts of economic growth had gone furthest astray for those countries making the biggest cuts. On their chart below, forecasts

[6] If they are demand multipliers, then they must be based on a very low *MPC* and very high *MPM*; and it is not clear why the propensities would vary so greatly across these different interventions.

for the size of fiscal consolidation are set against deviations from original growth forecasts (in percentage points of GDP).



Their revised assessment was: "Our results indicate that multipliers have actually been in the 0.9 to 1.7 range since the Great Recession". Gavyn Davies's (of Goldman Sachs and previously an adviser to the Labour Party) reaction is at the top of this document.

As above, the OBR's own forecasts for GDP growth were also optimistic relative to outcomes (more so than reading off the IMF chart suggests) and broadly this has continued for the whole decade.[7] As will be discussed in section 6, the OBR have stuck resolutely to a supply-side interpretation of outcomes. On the demand side, they have defended resolutely their multipliers.

Some five years after the IMF analysis (25 January 2017) Ben Chu at the *Independent* newspaper reported a discussion with Sir Stephen Nickell on his retirement from the Budget Responsibility Committee.

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[7] The table below shows the OBR forecast for GDP growth in the five years ahead at each autumn forecast, and outcomes where available (from December 2014 outcomes are partial and based on the years available). Very broadly, the OBR adhered to real growth of around 2.5 % p.a. until after the EU referendum, when expectations were downgraded.

	Novembe r 2010	Novembe r 2011	Decembe r 2012	Decembe r 2013	Decembe r 2014	Novembe r 2015	Novembe r 2016	Novembe r 2017	October 2018
five year ahead forecast	2.6	2.3	2.2	2.5	2.3	2.4	1.9	1.4	1.5
outturn	2.0	2.1	2.2	2.0	*1.8*	*1.7*	*1.6*		

> [Nickell said] "The IMF had four different measures of multipliers, depending on which branch [you talked to] . The Great Britain team had multipliers very similar to ours [the OBR]. Olivier [Blanchard – the former chief economist of the IMF] wanted to have much bigger multipliers." And Nickell stresses that he is still "perfectly happy" with the OBR's original judgements on this front.

In its *Forecast Evaluation Report* of October 2017 (Box: 2.2, Pg 25) the OBR returned to the issue:

> There is significant uncertainty around fiscal multiplier estimates, with much debate over whether slow post-crisis growth could reflect higher or more persistent multipliers and a greater negative effect from fiscal tightening on actual or potential growth than we originally assumed. Looking at our GDP forecast errors relative to the profile of fiscal tightening, the evidence of that is limited. *Our assessment has been, and remains, that other factors were more likely to explain these differences – notably the fluctuations in confidence and credit availability associated with the waxing and waning of the euro crisis*. As Chart D shows, other than 2011-12 – when fiscal tightening was greatest and real GDP growth fell well short of our forecast – there is little correlation between the scale of fiscal tightening and GDP forecast differences. Most clearly, the largest growth shortfall relative to our June 2010 forecast comes in 2012-13, when the euro crisis intensified but fiscal tightening was somewhat less than in previous years.

Chart D: GDP forecast differences versus the scale of fiscal tightening

Source: IFS, ONS

There is very little novel in this analysis. Every year the OBR observe that "there is significant uncertainty around fiscal multiplier estimates". Every year they note that multipliers would need to be significantly bigger in order to

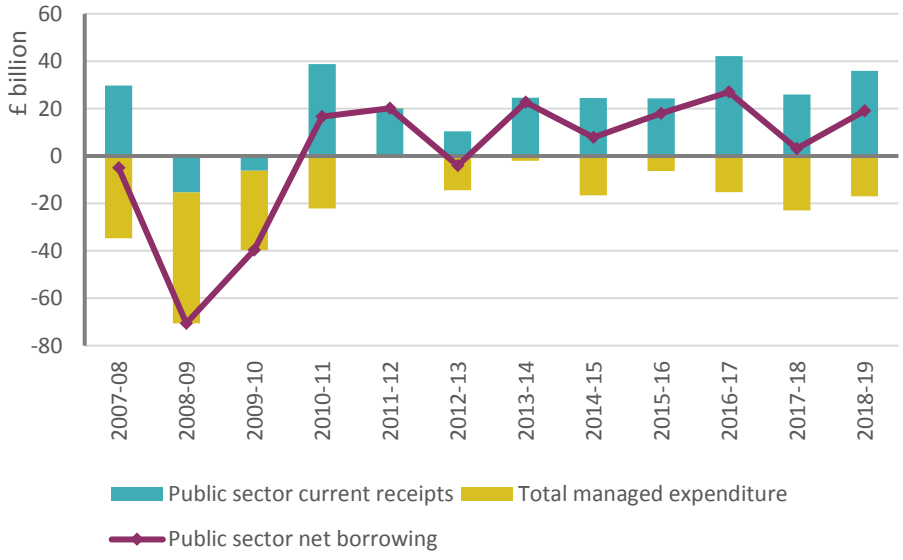
explain the scale of economic weakness since 2010 – which, of course, is exactly the point

The chart adds little. Their implicit claim is that if the demand argument was correct the relationship should be linear with a negative slope, so that years with higher tightening (i.e. bigger cuts) are associated with more negative differences in GDP growth from their forecast. In fact the relationship *is* negative. We note too that the years when the GDP difference was positive are 2010-11 – when there was probably some residual effect from the recovery under Labour's stimulus – and 2014-15 – when the government reduced cuts ahead of the election.

6. Failures of public finances

In May 2010 George Osborne inherited recovering growth and improving public sector finances, easily shown (Figure 5) as driven by repaired government revenues rather than reduced spending (just as the original collapse was driven more by reduced revenues than increased spending).

Figure 5: Changes in the public finances



Source: ONS and author calculations

The planned continued improvement under austerity then fell far short. Critical to policy (or rather, to policy rhetoric) has been the use of 'fiscal targets': one for the deficit that measures how far revenues fall short of spending and one for debt, the cumulative shortfall over time, both as a share

of GDP. The Chancellor used Spring Statement 2018 to celebrate 'balancing the books' on measure of the deficit known as the 'cyclically adjusted current budget' (or CACB). According to the OBR's June 2010 forecast, this deficit measure (Figure 6a) would be in surplus in 2014-15 (though the target permitted one year's slippage to 2015-16); the measure is now estimated to have been in surplus in 2017-18. But Philip Hammond abandoned the CACB target in January 2017. He switched to a cyclically-adjusted version of the fuller 'public sector net borrowing' (PSNB) measure, which includes capital spending. The target is to reduce 'cyclically adjusted net borrowing' to below 2% of GDP by 2020-21. Basically, the new and old targets are met according to the same timing, but the new target is used rhetorically – so that there is room for extra spending in the years to 2020-21.

Figure 6a: Cyclically-adjusted current budget

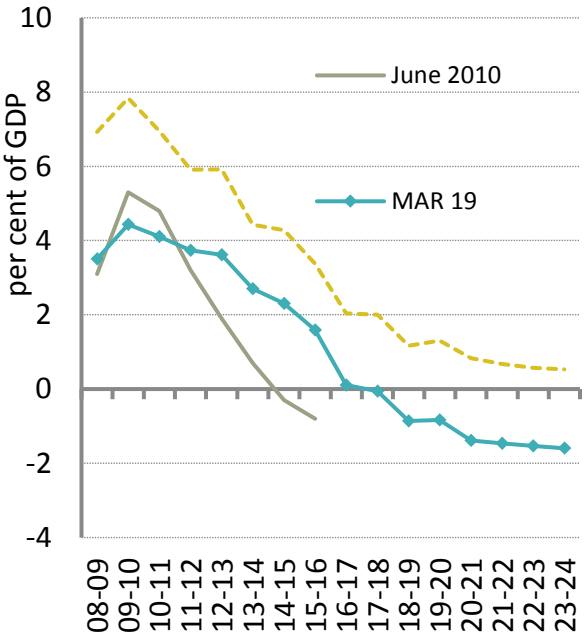
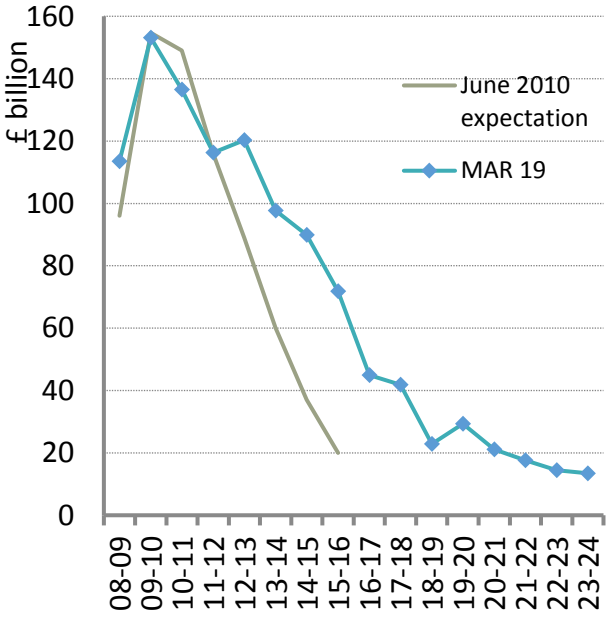


Figure 6b: Public sector net borrowing



Source: OBR

But the bigger picture is the scale of the shortfall against the original plans, and the failure of the 'household arithmetic' that assumes the budget for an economy is the same as the budget for a household. On the broader PSNB measure in cash terms (Figure 6b): over 2010-11 to 2014-15 borrowing was expected to be £450bn; borrowing over 2010-11 to 2017-18 is now estimated at £720bn – 60% more than expected.

Austerity meant greatly lower economic growth than expected, and so lower government receipts and higher public sector borrowing. Higher borrowing then meant that the anticipated gains in debt reduction have not materialised.

Under the original plans, public sector net debt was expected to peak at 70.3 % of GDP in 2013-14. It is now thought to have peaked three years later in 2016-17 at 85.1% of GDP (Figure 7a). The (EU standard) Treaty debt ratio was expected to fall to 80.4 % of GDP in 2015-16 and is now expected to reach 80% of GDP only in 2023-24, eight years later than expected (Figure 7b).

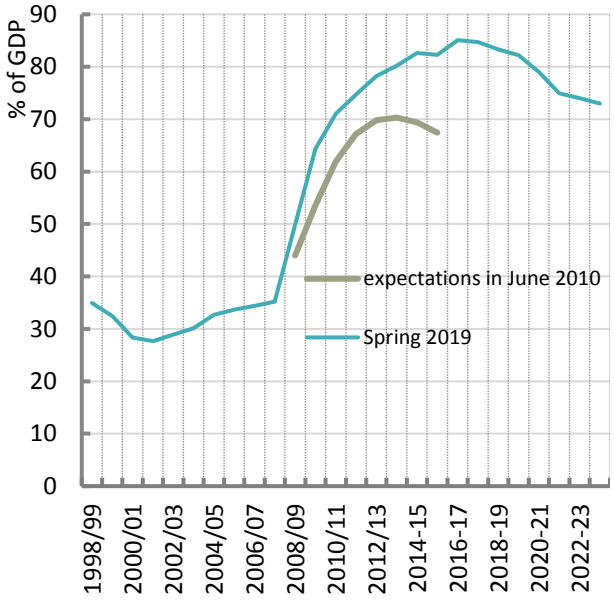


Figure 7a: Public sector net debt, % GDP

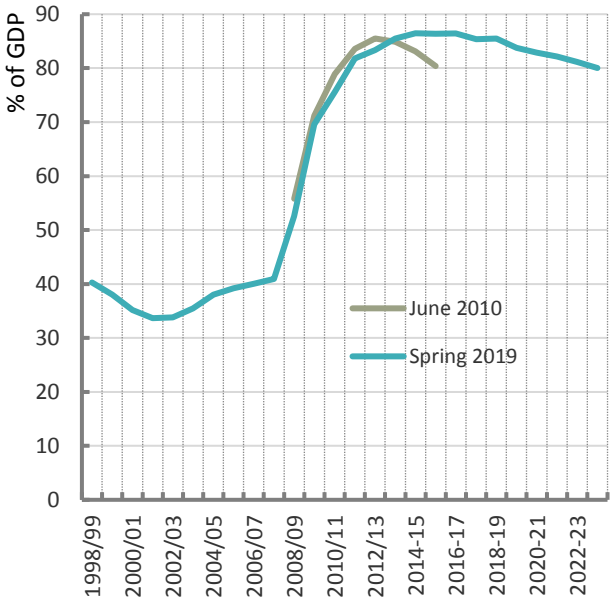


Figure 7b: Treaty debt ratio, % GDP

Source: OBR.

As above, George Osborne motivated his austerity policies by the Reinhart and Rogoff research claiming public debt of above 90 percent of GDP has a significant negative effect on economic growth. The (discredited) threshold may have been narrowly avoided on both measures, but austerity policies have led to high and sustained rather than reduced levels of public debt.

Analysis of public sector finance outcomes is complicated by classification changes and new transactions that affect target measures, or even by switches by the government to different targets. The most obvious example of the latter came when the Treasury switched to a measure excluding public sector banks. Sometimes institutional changes have moved activities outside the public sector, most obviously the recent reclassification of housing associations back into the private sector (reversing an earlier re-classification

in the opposite direction) [8]. The latest change reduced the public debt, as measured by the Public Sector Net Debt, by £60bn. The OBR commented: "But housing associations' role as providers of a public service means that this accounting change has no material effect on the underlying health and riskiness of the public finances – if the sector faced serious financial difficulties in the future, it seems equally likely that the Government of the day would choose to stand behind it whatever its statistical classification" (*Economic and fiscal outlook*, Nov. 2017, para 1.6). Other tricks employed are questionable privatisations, like that of Royal Mail; sales of shares in public sector assets like RBS have also been brought forward. In the case of student loans, the statistical classification currently seems to flatter the public sector finances and is expected to be amended to reflect the likely cost to the exchequer of debt write-offs.

Inevitably the most significant impacts since 2010 have come through financial interventions. Most obviously the 'funding for lending' and 'term funding scheme' (that offered subsidised central bank funding for retail banks) have added £137 billion to public debt, though notably without any fuss in the media.[9] Acting in the other direction are the 'cash transfers to the exchequer from the Asset Purchase Facility'. Under this arrangement the interest on gilts purchased under QE is returned by the Bank of England to the Treasury, so that overall interest payments on the public debt are greatly reduced relative to plans in June 2010. In total around £65bn in interest payments have been returned to the Treasury.[10]

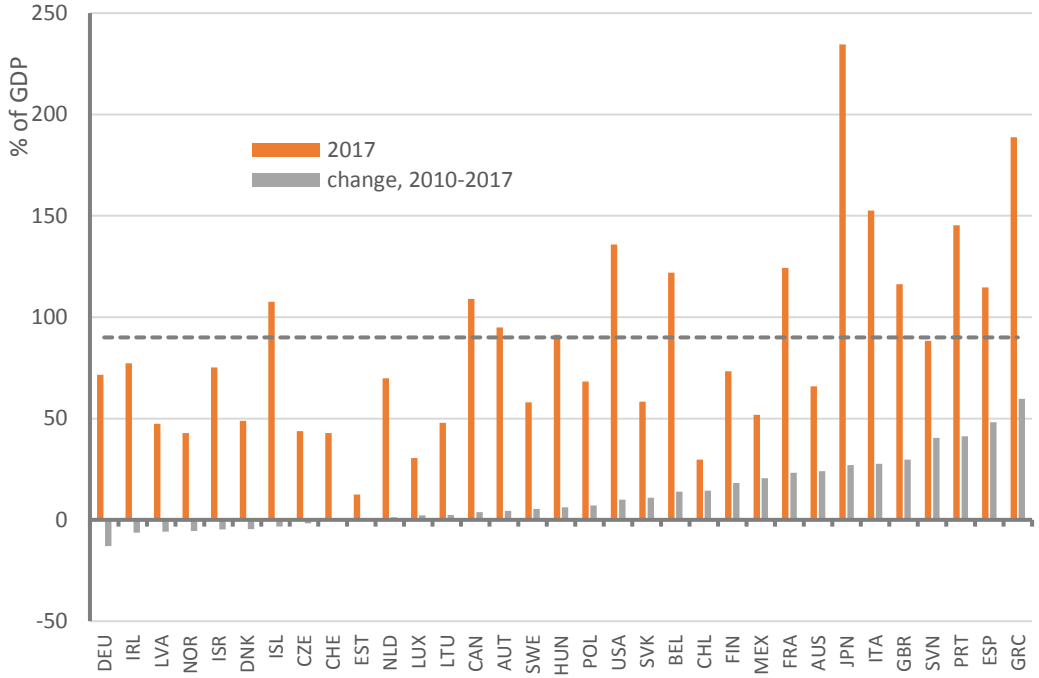
Across the OECD very few countries have managed significantly to reduce the debt ratio, and 13 now have (gross) debt ratios higher than 90 per cent. The countries with the largest increases are those that endured (and are still enduring) the most severe austerity (Figure 8).

[8] https://obr.uk/box/the-reclassification-of-housing-associations-into-the-public-sector/

[9] At the end of April 2019 the Bank of England showed lending under the TFS of £121bn and outstanding FLS drawings of £16bn; https://www.bankofengland.co.uk/markets/funding-for-lending-and-other-market-operations

[10] It is difficult to translate the overall public debt performance into a cash figure. Using current GDP figures and the OBR's public debt ratios, the original peak of 70.3% GDP corresponds to £1250 bn in 2013-14, and the current peak of 85.1% corresponds to £1690 in 2016-17. Very crudely, adding the funding schemes to the cumulative £270bn extra borrowing gives a total in the ballpark of £440 bn extra debt.

Figure 8: Public sector gross debt, OECD countries



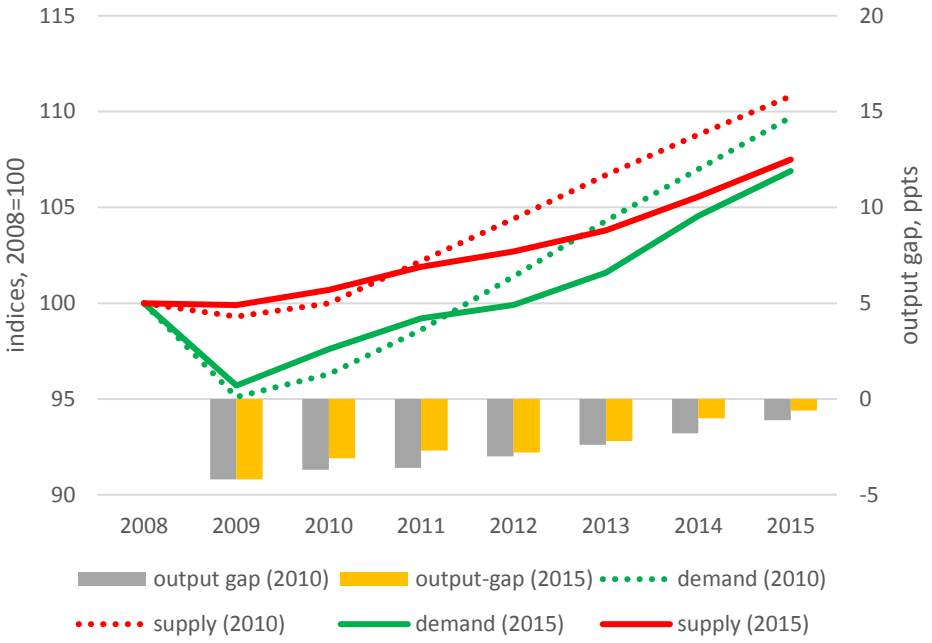
7.

The evolution of the OBR's assessment of supply, demand and the output gap

The contemporary policy framework for inflation targeting is based on the output gap, with outcomes judged in real time against projections for supply and demand. When the output gap is projected to go positive, avoiding inflation requires policy to contain demand and *vice versa*.

In practice since 2010 this has meant assessing whether *shortfalls* in GDP growth against expectation resulted from deficient demand (cyclical) or supply (structural). Figure * shows indicative figures for the OBR's changed assessment from June 2010 to June 2015. Given the OBR's assumption of low multipliers rule out demand effects, shortfalls are inevitably judged to be the result of supply deficiencies. The 'output gap' that reflects the OBR's overall judgement on spare capacity in the economy (that could be taken up by an increase in demand) is inevitably kept narrow.

Figure *: OBR's changed assessment of the real economy



Source: OBR and TUC calculations

In practice the OBR analysis is first motivated by a direct assessment of the output gap "using a range of cyclical indicators to estimate the amount of spare capacity on the economy" (*EFO*, November 2011, p. 45). This basically amounts to using survey (British Chambers of Commerce and Confederation of British Industry) measures of skill shortages. The indicators have generally showed skill shortages increasing over time, and led the OBR to judge the output gap was closing at a faster pace than they first anticipated. This seems an extraordinarily weak basis for such an important policy judgement.[11] The OBR back up this mechanical approach with judgements around potential, in the light of low productivity outcomes shown in the official statistics.

Recognising it is difficult adequately to explain the shortfall in productivity, for several years the approach followed the following formula: "financial crises are typically associated with large output losses that persist for many years after the event" (*EFO*, Nov. 2011, p. 51); "we judged that it would take until the start of 2014 for potential growth to return to its long run average … with little evidence of potential output growth picking up significantly, we now expect

[11] And occasionally they have had to aim off the signal; for example in November 2011 the implicit narrowing was judged implausible given output growth was flat and much weaker than previously judged.

this transition to take longer … this judgement is consistent with the view that uncertainty surrounding the stability of the euro area will continue to undermine the functioning of the financial markets and financial systems for some time to come" (*EFO*, Nov. 2011, p. 51). So the shortfall in performance was attributed to worse than expected dysfunction in the financial system (the "slow healing of the financial system" – *EFO* March 2016, p. 42). Since the referendum other factors have come into play. In the last but one (October 2017) *Forecast Evaluation Report*, the OBR judged: "the banking system is now much better capitalised and more robust than it was in the immediate aftermath of the crisis" (p. 6). Instead emphasis is on the following factors (p. 7, my bullets):

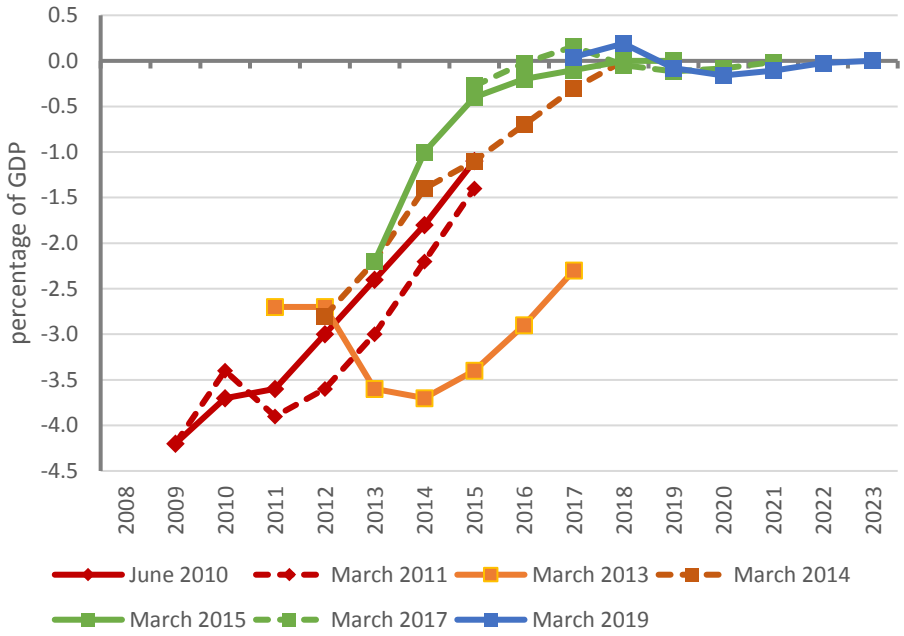
- "… sustained weakness in investment will have limited the contribution to labour productivity growth from capital deepening"
- "The abnormally low level of interest rates could also be weighing on productivity growth by allowing weak and highly indebted firms to survive for longer than they normally would, by alleviating the burden of servicing their debts".
- "Heightened uncertainty created by the Brexit vote may also have encouraged firms to expand production by increasing inputs of relatively flexible labour rather than less easily reversed investment in capital".

While undeniably plausible, these are little more than speculations. No international evidence is brought to bear. Moreover, each factor would normally be grounds for expansionary fiscal policy.

Figure 9 traces more fully the evolution of the OBR view of the output gap since austerity began. Widest at the peak of the crisis, it closes quickly. There is barely any correction of the overall trajectory; the exception was Budget 2013, when the view was substantially changed.[12] On all other occasions, the economy has been projected to return to capacity (i.e. to reach an output-gap of zero) by the end of the forecast, or at least shortly afterwards. Since March 2015, the OBR have basically considered the economy to be at, near or above capacity.

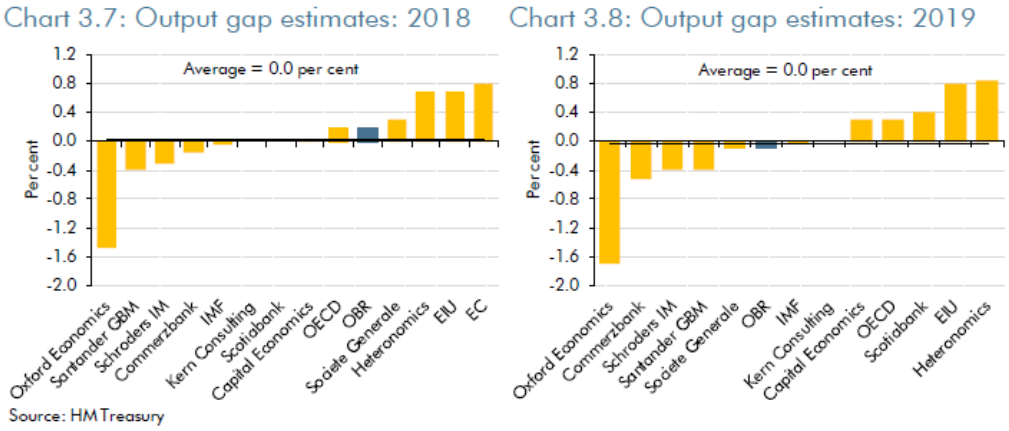
[12] Likely teeing up the government's fiscal stimulus in 2014 (see Figure 11 below).

Figure 9: Predicted output gap as % of GDP



Source: OBR

The fixity of these forecasts stands at odds with wider acceptance of uncertainty around economic forecasts, more so because the output gap is unobservable and purely hypothetical in nature. The OBR also routinely report other institutions' (mostly banks') assessments of the output-gap – their range of views is again incredibly narrow (see their Charts 3.7 and 3.8 below).



The most critical omission from the OBR and wider commentary is *inflation*, given the purpose of the output–gap framework is to ensure official targets are hit. Judgements around closing output gaps sit very oddly with disinflation up to 2015 and benign inflation more generally. For 2015 UK (CPI) inflation was zero, with similar outcomes across most OECD countries. The situation was reversed following large-scale QE led by the ECB; exchange rate movements following the referendum meant the UK briefly overshooting the target. But,

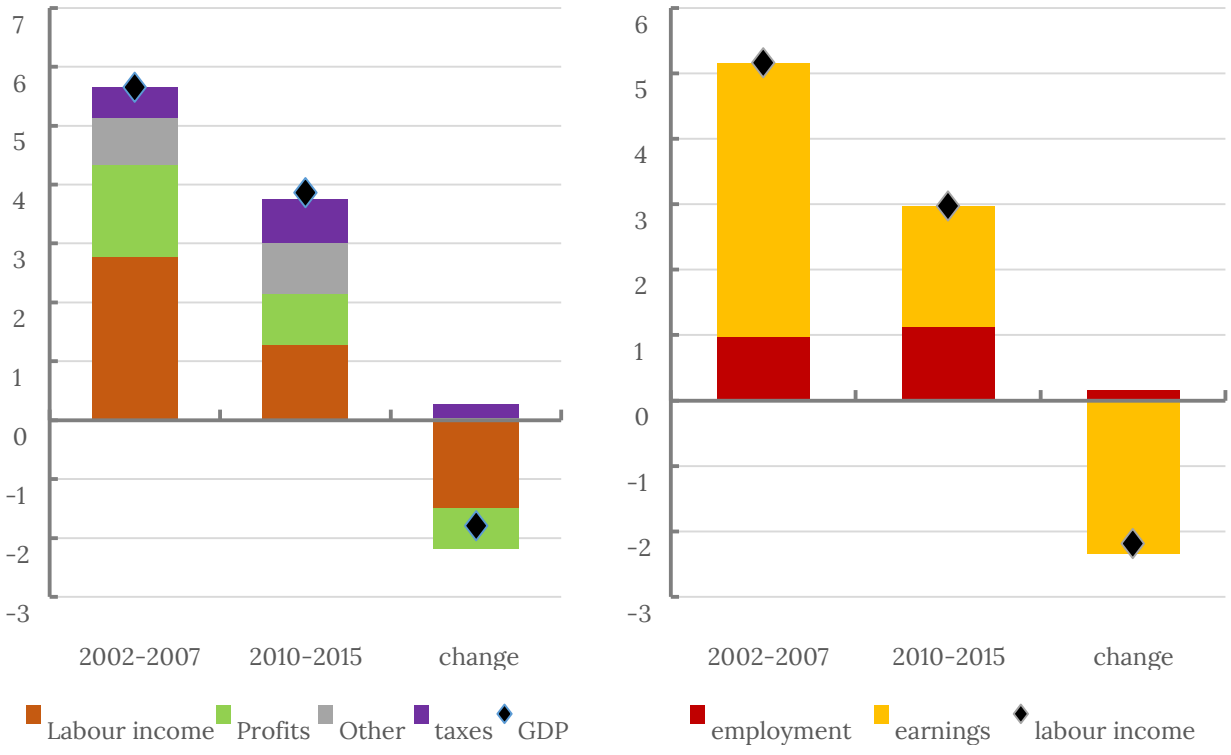
at the time of writing (August 2019), *reduced* inflation across the OECD sits oddly with the judgment that aggregate output gaps have been at zero for around five years.

8. Productivity and the output gap

These judgements about the output gap correspond to the widely perceived problem of low productivity. But it is a fundamental error to interpret productivity outcomes as necessarily indicating a failure of supply. In the post-crisis period, weak productivity has been a result of how the labour market has adjusted to the weak GDP growth caused by inadequate demand. Employment numbers have been held up by reduced wages and worsening quality of work, a price rather than a quantity adjustment.

The process can be seen in two steps. Figure 10a shows how different types of incomes have adjusted to the shortfall in GDP growth since the crisis (similar to Figure 2 for change in sources of demand). The GDP(I) reduction is shared between labour (-1.5 ppts) and capital (-0.7 ppts), with the former disproportionately disadvantaged.

Figure 10a: GDP(I) growth, ppt contributions Figure 10b: Labour income growth, %



Source: ONS and author calculations

Figure 10b shows that the whole of the adjustment in labour income is accounted for by wages rather than employment. Annual wage growth fell to 1.9 per cent after the crisis compared to 4.2 per cent ahead of the crisis; annual employment growth rose to 1.2 per cent after the financial crisis compared to 0.9 per cent before the crisis. This disproportionate adjustment is critical for productivity outcomes.

With all the labour income adjustment on price/wage rather than quantity/employment, the productivity calculation compares lower GDP growth with disproportionately higher jobs growth. The result is a large reduction in productivity growth that is broadly in line with the reduction in wages growth.

In general terms, under these conditions (i.e. when growth is falling), productivity is simply an (increasing) function of the extent to which the labour income adjustment operates through quantity rather than price. Had the adjustment on employment been larger, then higher productivity growth would have matched higher wages. (Note the approach inherently operates in cash or nominal terms, as the price adjustment is the key factor.) Over more 'normal' recessions there is a still an element of cyclicality, but the adjustment is usually on quantity rather than price. In terms of demand: normal recessions are characterised by an abrupt collapse in demand; post-crisis conditions are exceptional for very prolonged sluggish demand. It seems plausible that the labour adjustment processes might be different.

On the demand view causality is simply reversed, with productivity a symptom of wider economic conditions rather than the cause. International comparisons show over the past decade most countries have disproportionately adjusted through wage and quality of work rather than jobs, and the UK not out of line with the 'average' situation. [13]

The counter argument is still that the same results might be driven by supply rather than demand. Strictly, the relation between productivity and wages should be regarded as an accounting identity, and the economic problem one of identification. Though, without going any further, output-gap estimates are put into context. Any shortfall in 'productivity' is essentially arbitrary according to any projection of a preceding rate of growth from a specific point in time. Over the period of the first OBR forecast, output per hour ended up around 16 per cent below the pre-crisis trend and around 9 per cent below the OBR's projection in 2010. Set against the size of this shortfall, the miniscule range of output-gap forecasts illustrate the extent of the bias to the supply view. *Identification* depends on wider evidence for the dominant factor. The evidence for demand follows the analysis of austerity on Figures 2 and 3 above. This is simply re-enforced by the inherent failure of the evidence for supply,

[13] 'Getting it right this time: lessons from a decade of failed austerity', TUC, 24 October 2019. https://www.tuc.org.uk/research-analysis/reports/lessons-decade-failed-austerity

given the widely acknowledged failure to resolve the productivity puzzle, notwithstanding the OBR obligation to offer a specific judgement. Moreover, as above, normally inflation outcomes would be used to arbitrate between supply and demand.

Most economists might candidly admit the reality of this circularity from multipliers to output-gaps via productivity, but until very recently it has been largely ignored in practice. But in December 2018, the economist Noah Smith argued in a Bloomberg column: [14]

> Maybe we have the economic-growth equation backward. The supply-side view of sustainable growth permeates modern economics, from undergraduate classrooms to cutting-edge macroeconomic models to the writings of economics pundits … It may be time to momentarily step away from economic orthodoxy and look at demand-based policies to help boost productivity.

Robin Brooks, chief economist at the Institute for International Finance (the international bankers' think tank, and formerly of Goldman Sachs and the IMF) recently launched a 'Campaign against Nonsense Output Gaps' (CANOO), particularly in the context of Euro zone policy. More recently, in a discussion of Blanchflower's new book, Gertjan Vlieghe touched on the relation between demand and productivity:

> I thought he would perhaps argue that, if only there was more demand stimulus, higher productivity growth might return, i.e. that some part of the lost productivity is cyclical and reflects lower intensity of factor utilisation, not structural developments. I would have some sympathy with that idea.[15]

Notwithstanding these positive developments, let alone the claimed 'end of austerity', the output gap continues to contain the scope for fiscal policy going forwards. At Budget 2018 the OBR gave some ground by permitting increased government spending to be matched by a structural improvement. But in doing so there is a sense that the OBR is now calling the policy shots according to politics not economics.

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[14] Noah Smith, 'Maybe We Have the Economic-Growth Equation Backward', Bloomberg Opinion, December 4, 2018,. https://www.bloomberg.com/opinion/articles/2018-12-04/maybe-we-have-the-economic-growth-equation-backward

[15] "Not Working - Where Have All the Good Jobs Gone?" - David Blanchflower in conversation about his latest book with Dr Gertjan Vlieghe. https://www.niesr.ac.uk/events/not-working-where-have-all-good-jobs-gone-david-blanchflower-conversation-about-his-latest] In the same discussion John Llewelyn (consultant) argued productivity might be endogenous rather than exogenous, and Jagjit Chadha (director of NIESR) spoke of wages adjusting in respect of a given total amount of demand.

9. The NAIRU

The other measure of capacity is unemployment. From the 1970s the theory (rooted in the classical economics that Keynes sought to contest, but rebranded as 'monetarism') that the unemployment rate cannot go beyond a certain point without causing rising inflation has dominated policymaking. Very broadly the UK 'non-accelerating inflation rate of unemployment' (NAIRU) was reckoned to be around 5-6 per cent. Current UK unemployment of 4% is the lowest since the 1970s, and so is widely regarded as showing the economy operating beyond capacity. The most obvious objection is the level of underemployment. The official count is 2.4 million or 7.3 per cent (of total employment), still above the pre-crisis level. (On a Keynes the crisis did not necessarily indicate the economy was operating beyond capacity – section 11.)

Moreover, the application of the theory is far from clear cut. Since 2010 policymakers have repeatedly revised down NAIRU estimates, the Bank in small steps from 5¼ to 4¼ per cent. Given the NAIRU is not regarded as fixed, there is no logical end to this process. Unemployment may now be the lowest since the 1970s, but ahead of the 1970s unemployment was never above 4 per cent and was generally not associated with unsustainable inflation. It is difficult to claim capacity against a threshold that operates in this way.

Others go further to reject altogether the NAIRU. Under the title 'The Natural Rate Hypothesis: an idea past its sell-by date', Roger Farmer (2013) shows empirically the instability of the relationship between unemployment and inflation.[16] Similar thinking was stated in more trenchant terms by Matthew Klein in the *Financial Times*: "in addition to being morally odious, the theory is empirically unsupportable and is increasingly questioned by a younger generation of central bankers".[17] Above all, Jay Powell, the Chairman of the Federal Reserve, has acknowledged "the relationship between the slack in the economy or unemployment and inflation was a strong one 50 years ago … and has gone away".[18]

More concretely, low unemployment is simply the flip side of price (and quality) rather than quantity adjustment. In its own right, the logic of the process is the reverse of the logic of the NAIRU and downward sloping Philips curve. The ongoing downward revisions to the NAIRU come as productivity

[16] Farmer is concerned also to rescue Keynes's *General Theory* from Paul Samuelson's neo-classical synthesis; certainly Keynes rejected the idea of natural rates, though he did not disregard inflation.

[17] Matthew C Klein, 'NAIRU: not just bad economics, now also bad politics', FT Alphaville, January 24, 2018. https://ftalphaville.ft.com/2018/01/24/2198028/nairu-not-just-bad-economics-now-also-bad-politics/

[18] 'Powell seeks a cure for the 'disease' of low inflation, *Financial Times*, 22 July 2019. https://www.ft.com/content/e2ff8c4e-aa2f-11e9-984c-fac8325aaa04

repeatedly comes in lower but jobs higher than forecast. Taking supply-side economics at face value, structural gains in the labour market sit oddly alongside a structural deterioration in the whole economy.

10. Financial considerations and policy in practice

The multiplier was part of a fuller argument that government spending was self-financing. As Keynes wrote in 'The Means to Prosperity': "There is no possibility of balancing the Budget except by increasing the national income, which is much the same thing as increasing employment".

The common language of 'deficit spending' is at odds with this approach; Keynes spoke of 'loan-financed expenditures'. The deficit is an outcome of policy (the balancing item on the income and capital account); a loan is an input (on the liabilities side of the financial account). His language doubtless sought to rule out tax finance; but he did not call exclusively for money financing i.e. the use of credit creation by banks or the central bank.

Absent from 'Keynesian economics', monetary considerations were the foundation to all Keynes's theoretical and practical initiatives. At the time Jens Warming (a Danish economist) offered a valuable and succinct theoretical proposition: "If a bank promises credit for an investment it really disposes of something belonging to the future: the coming saving" (Warming 1932, p. 220).

Keynes's prescription for loan financing evolved from his wider theory and practical experience, requiring interest rates held permanently low (Tily, 2007). In the Second World War (at the Treasury) he devised debt management policies that permitted a vast increase in expenditure while still fixing long-term interest rates (the 'three per cent war'). A wider choice of government debt was offered (long, medium and short as well as Treasury bills), and the market was allowed to choose how to invest across those instruments. Liquidity preference theory showed how accommodating the market's demands for quantities – i.e. the cash amount of debt issued at different maturities – allowed the authorities to set price – i.e. rates of interest across the spectrum. The approach also involved monetary financing: newly-devised 'Treasury deposit receipts' obliged banks (rather than the central bank) to lend to government. And were – I think (the literature is conspicuous by its absence) – deployed to make up the residual between debt sales to the market and total spending.

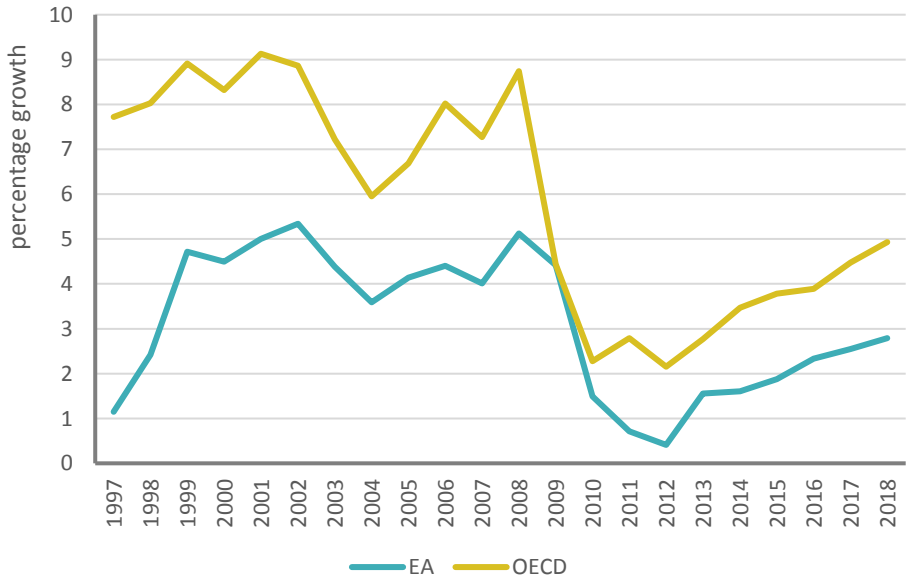
Today central bank policy is at odds with finance ministry policy, given expansionary monetary policy and contractionary fiscal policy. But there is

still a significant overlap in the case of quantitative easing. While portrayed as part of monetary policy, QE indirectly supports fiscal policy through exchanging newly created central bank reserves for government debt (in secondary markets). Moreover, the interest earned on these gilts is returned to the Treasury, in a way that is advantageous to the public sector finances (section 6).

As would be expected from liquidity preference theory, QE has reduced greatly the rate of interest on government debt. (Views about the trajectory of monetary policy and wider judgements about risk and the economy play a role on the immediate outlook for interest rates, but are subject to repeated change.) The process has served to publicise the nature of money as merely a book entry, confounding the threat that 'there is no money left'. Inevitably there have been calls to use money creation directly to finance spending (green QE, peoples' QE etc). While resisted, the present policy is the worst of both worlds. Effectively QE is relied on to support a failed fiscal policy in the most opaque way possible. Two years ago Mark Carney (2017) observed that in each year since 2013 government borrowing across G4 economies was basically equal to the scale of new QE, at around $1.5 trillion.

There are regular attempts to reduce the scale of monetary support, but these are generally short lived. The most recent attempt over 2018 has now been scaled back, with interest rate now less likely to rise and reduced 'quantitative tightening'. Likewise finance ministries have proven flexible over the extent of austerity. Figure 11 shows the growth of government expenditure by country grouping picking up (albeit modestly) after the most severe phase of austerity over 2010-2012.

Figure 11: Growth in nominal general government final consumption expenditure



Source: OECD

Figures for individual countries show closely matched spending increases for the UK, US and EU. Some of the strongest spending revivals were in the weaker countries, not least Spain, Portugal and Ireland, but, tragically, not in Greece.

The combination of fiscal flexibility and the expansion of central bank balance sheets has likely kept the global economy from falling back into recession and/or deflation. But it is a desperate and deceptive approach to policy that surely cannot continue indefinitely.

11. Fuller argument

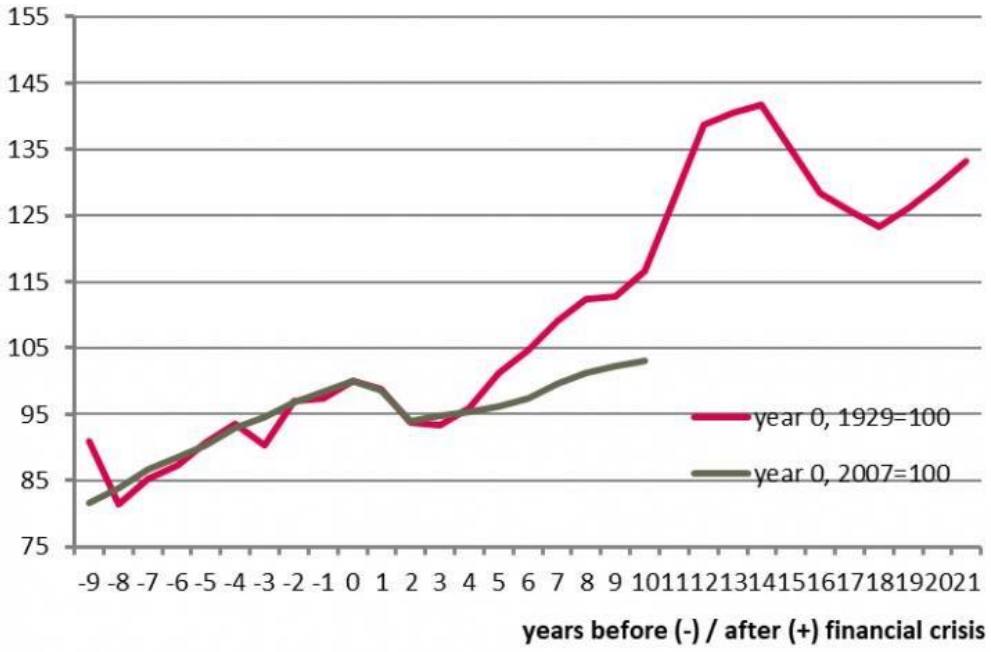
Keynes's concern about setting a low rate of interest followed from the wider substance of the *General Theory*. In very broad terms he understood the great depression to be the result of a monetary architecture that advantaged financial interests at the expense of productive (industrial and labour) interests. His analysis was embraced by the Trade Union movement under Ernest Bevin and Walter Citrine, and ultimately by Attlee's Labour Party (1944): "Blame for unemployment lies much more with finance than with industry. Mass unemployment is never the fault of the workers; often it is not the fault of the employers". The great depression did not signal that the economy had been operating beyond its means, but simply the failure of a dysfunctional financial regime.

It is generally not recognised how rapidly Keynes's thinking became influential in the 1930s. Cheap money and revised exchange arrangements, introduced after Britain came off the gold standard on 21 September 1931, followed his proposals. Spending cuts were ended by 1933, and from 1934 fiscal policy was strongly expansionary.[19] His analysis underpinned policy through the war and for the next 25 years, not least as the rationale for the Bretton Woods Agreement. The great gains in prosperity resulted from a regime that fostered higher aggregate demand driven by both monetary and fiscal arrangements, leading to vigorous private activity (especially investment) and a greatly extended role for government Given the Phillips relation is now seemingly regarded as wholly flexible, there is a need to reassess the inflation that led to the end of the regime. Most obviously, given the role of policy excess – beginning with the OECD 50 per cent growth target for the 1960s, abandoning of Bretton Woods in the wake of US spending excesses, and in the UK the competition and credit control regime and Tory 'Barber boom' – the general importance of analysis rooted in aggregate demand cannot be invalidated.

[19] Chick, Pettifor and Tily (2010 [2016], Table 3F) show the total of general government consumption expenditure and gross fixed capital formation over 1933-39. Annual growth are as follows: 1934: 4%; 1935: 10%; 1936: 13%; 1937: 17%; and 1938: 20%.

The dismantling of the post-war consensus has once more advantaged speculative interests at the expense of productive interests, and led to a grave under-utilisation of resources as well as violent instability. As in the 1930s, the inevitable financial implosion and global recession (under the weight of unsustainable *private* debts) has no relevance for what a productive economy might achieve going forwards. Policymakers' gravest mistake is to conflate the failure of a dysfunctional financial regime and the capacity of the real economy (the 'financial' and 'business' 'cycles' in Carney's recent language). The output-gap and the associated conception of natural rates of growth are too mechanistic for Keynes's worldview, but he was the pioneering figure in the development of the National Accounts and the macroeconomic approach to the Treasury's annual 'Budget' event. Even if we take the theory of the output gap as a given, the economic system is operating *vastly* below potential. Martin Beck (then – 2012) at Capital Economics suggested an output 'chasm'.[20] Figure 12 comparing the recovery in the 1930s with present outcomes (using real GDP per head) illustrates the vast difference when austerity thinking is dismissed.

Figure 12: Real GDP per head, indices



Source: ONS and BoE

Lastly, the present policy stance may have so far protected against depression and deflation, but financial excesses are not only unresolved but greatly

[20] 'Is the output gap a crack or a chasm?', Capital Economics UK Economics Focus, 2 Oct. 2012.

exacerbated. Central banks are retreating from tightening policy because they have been forced (again) to recognise that financial risks are much greater than inflationary risks. The underlying fragilities (namely private sector asset and liability inflations) are rightly increasingly prominent in policymaker commentary, but outside the scope of the present discussion.

12. Practical implications

Statistics – weak economic growth, stagnant real wages and absent inflation – and economics – a sound theory of the multiplier, productivity and capacity – indicate a grave deficiency in aggregate demand. Government has an instrumental role to play. In the absence of wider monetary reforms, public infrastructure expenditure is likely to be most effective as it operates on both demand and (by deliberately aiming at the structural weaknesses of the UK economy) supply. Many emphasise corresponding advantages from social infrastructure expenditure. And plainly capital investment is the means to address social and wider priorities not least global warming, re-industrialisation and regional imbalances. The likelihood that the output gap is greatly larger than the consensus view means that current spending on public services and public sector wages and salaries is not only desirable but necessary. Spending should be loan-financed, generating increased tax revenues rather than needing higher tax rates. Ultimately the policies should mean lower not higher public sector borrowing and debt.

The constraint on this agenda is not economic reality but economic thinking. Plainly there is no shortage of challenge to the government's policy agenda, but there is less challenge at the technical level. Much commentary is two-handed and does not seek formally to arbitrate. Even while advocating spending, Rogoff conceded a wide range of opinion on the multiplier. For Nickell the same wide range justifies the OBR approach. Simon Wren-Lewis has stuck his neck out further than most and in 2015 made these telling remarks:[21]

> My own best guess would be that the multiplier has been larger than one, which gives me significantly higher costs, but I have never suggested that I know with certainty what the size of the multiplier has actually been. However there has, to my knowledge, been no public debate on these terms.

Given its fundamental role, how can this lack of debate be right? There are all the hallmarks of groupthink and an ideological factor. The situation is exemplified by the consensus on output gaps. It is wildly implausible that the

[21] Mainly Macro blog, 'The trouble with macro', 19 May 2015. https://mainlymacro.blogspot.com/2015/05/the-trouble-with-macro.html

uncertainties involved should lead to such a narrow range of opinion, especially an opinion contrary to the evidence from inflation – rightly or wrongly, the key variable for policy. To reiterate: this consensus, across the investment banks, several consultancies and leading policymaking institutions, has resulted in forcing austerity and now (at best) tightly constrained future spending increases. Rather than a technical judgement, the output gap might be better understood as a device to enforce pre-ordained policy goals. "The output-gap estimates, in short, are politics pursued by the technical means of economics".[22]

In the UK, the role of the Bank of England and OBR is critical. The OBR have resolutely defended multipliers that conform to an extreme view of economics, have never been well justified, proved at odds with outcomes in reality, and have been abandoned even by the IMF (and their abandoned view was part of the OBR evidence). But at least the OBR have been open about their reasoning; the Bank of England have said almost nothing.

Ultimately both institutions have fallen gravely short on multipliers and have not confronted the potential endogeneities between multipliers, productivity and the output gap. Given the gravity of the economic situation and repeated failures to read correctly contemporaneous events, this is all the more problematic. The most obvious way to proceed is by a review of the output gap that draws on wider opinion.

[22] Adam Tooze, 'Output Gap Nonsense', Social Europe blog, 30 April 2019 https://www.socialeurope.eu/output-gap-nonsense

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