Chief Economist's Report 2020

Key points

- This report is produced at a point of very high uncertainty and the analysis will need to be updated during 2021.
- As a result of the pandemic, Wales and the UK experienced an unprecedented collapse in economic output (GDP) in the second quarter, followed by a large recovery in the third quarter.
- The impact on the labour market, and on incomes, has been severe but very much less than the impact on output, as a result of the various support schemes put in place by the UK and Welsh Governments.
- So far, the effect on the economy in Wales appears very similar to the UK as a whole.
- Disadvantaged groups in the labour market are being most badly affected, with particularly adverse impacts on the low paid and on young people entering the labour market. Poverty will have increased.
- One effect of the crisis will therefore be to increase inequality, and as a result of "scarring" impacts on younger people in both education and the labour market, this effect will persist.
- Prospects are highly uncertain; if effective vaccines are rapidly rolled out, as currently appears quite likely, an early and sharp recovery appears possible. However, on the basis of the less positive "headline" scenario described by the Office for Budget Responsibility (OBR), the number in Wales who are unemployed could increase from 70,000 today to approximately 114,000, with unemployment not returning to pre-crisis levels until the end of 2024.
- Failure to confirm a deal with the EU on new trading relations with the EU would further reduce output. This would be in addition to the long run loss of output which will be associated with a move from the pre-2021 trading relationship with the EU to a free trade agreement (assessed by the OBR as a loss of 4 per cent in output each year).
- Growth in productivity, pay and incomes has been very sluggish in Wales and the UK since the financial crisis of 2008, with household incomes around £3,000 lower than they would have been on pre-existing trends.
- On the basis of median household incomes, probably the single best indicator of material living standards for a typical household, the most recent data shows that Welsh incomes stand at around 94% of the figure for the UK as a whole and that Wales has broadly kept track with the UK over the last two decades.
- Despite very major improvements in labour market performance since devolution, Wales continues to lag many other parts of the UK on productivity and pay, and as a result still lies near the bottom of the "league table" of UK countries and regions on indicators of economic output and living standards.
- Perhaps contrary to expectations, overall, there is little evidence that spatial disparities in living standards have widened over recent years, either when

comparing Wales with the rest of the UK or when comparing areas within Wales.

- While there is a consensus that it is entirely appropriate to support the economy through the crisis with higher borrowing, the UK's fiscal position is clearly unsustainable over the medium term.
- Furthermore there are additional long term pressures on the UK's fiscal position, particularly those that arise from an aging population and the increasing costs of providing health and social care.
- Welsh short term fiscal prospects will be largely determined by policy decisions to be taken by the UK Government during fiscal events over the next year; the recent Spending Review provided some additional resources to the Welsh Government, but these are very modest in the context of the short run pressures from the pandemic and the legacy of over a decade of austerity.
- Excluding COVID-19 funding, and depending on future decisions by the UK Government, the Welsh Government's resource budget per person is not expected to recover to its 2010-11 level in real terms until 2023-24.
- Wales faces additional fiscal risks as a result of the dependency of Welsh living standards on transfers through the UK fiscal system, a relatively weak tax base, and on population projections, which, while uncertain, indicate that over the medium to longer term the population aged 16-65 is forecast to decline, while it will increase across the UK as a whole.

Introduction

This year's report has been produced during a period of very great uncertainty due to the evolving nature of the Covid-19 pandemic and the lack of clarity over the transition path to a new relationship with our key trading partners in the European Union.

The UK Government has postponed its planned multi-year spending review and instead it published a one year review on 25 November 2020. Further fiscal events over the course of the next year seem highly likely.

For these reasons this year's report provides a concise summary of key economic developments and briefly considers economic and fiscal prospects. A more considered analysis will be published during 2021.

Many of the Welsh Government's policy levers operate most effectively over the medium to long term. This report therefore reviews a number of important longer run trends and challenges that both pre-date the Covid-19 crisis and are likely to persist beyond it.

Wales in the Covid-19 crisis

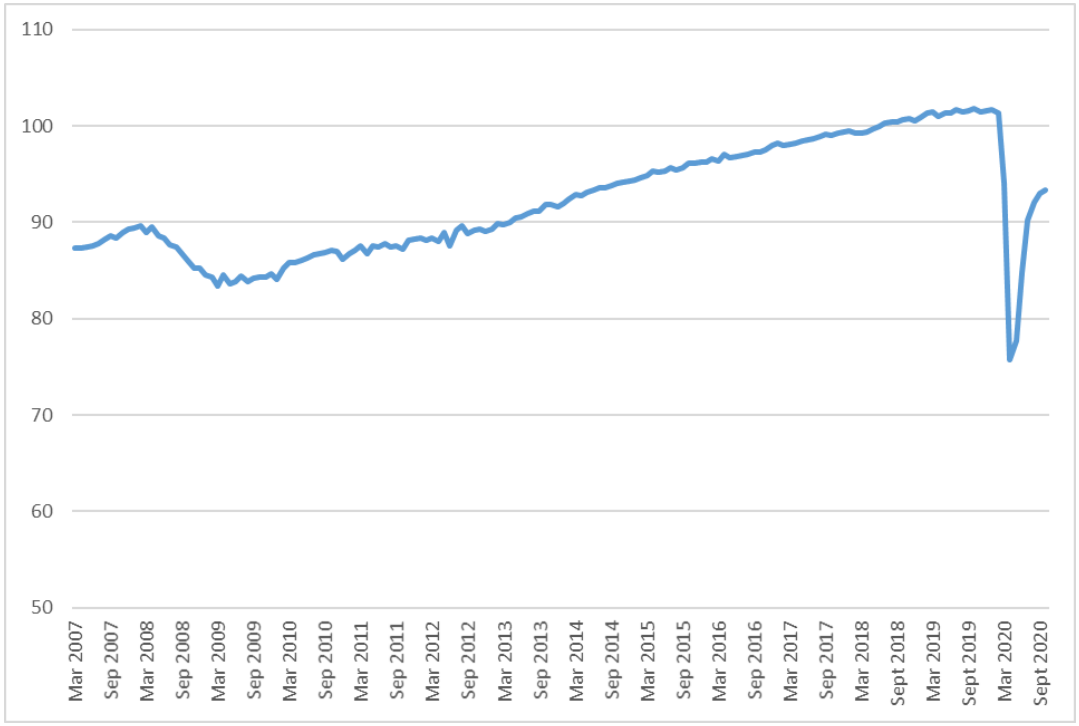
Recent developments

As is generally understood, Wales is deeply embedded in the wider UK economy and the new, experimental, Trade Survey for Wales has again confirmed this by showing that the value of Welsh trade with the rest of the UK is much greater than the value of international trade.

In consequence, the short run performance of the economy in Wales is very strongly influenced by developments across the UK as a whole (and this is confirmed by several charts in this report).

Despite its well-known limitations, GDP provides a reasonable indicator of short term economic fluctuations, particularly when the changes are large. The latest monthly data for UK GDP is shown in Chart 1.

Chart 1: UK GDP



Source: ONS

Chart 1 shows an unprecedented collapse in UK GDP in the second quarter of 2020, and even after a sharp recovery over the summer, the provisional figure for October remains 7.9% below the level in February. Taken in isolation, a figure of 7.9% would represent a larger fall than witnessed during the very deep recession of 2008.

This broad picture of a very sharp contraction of course also applies in Wales.

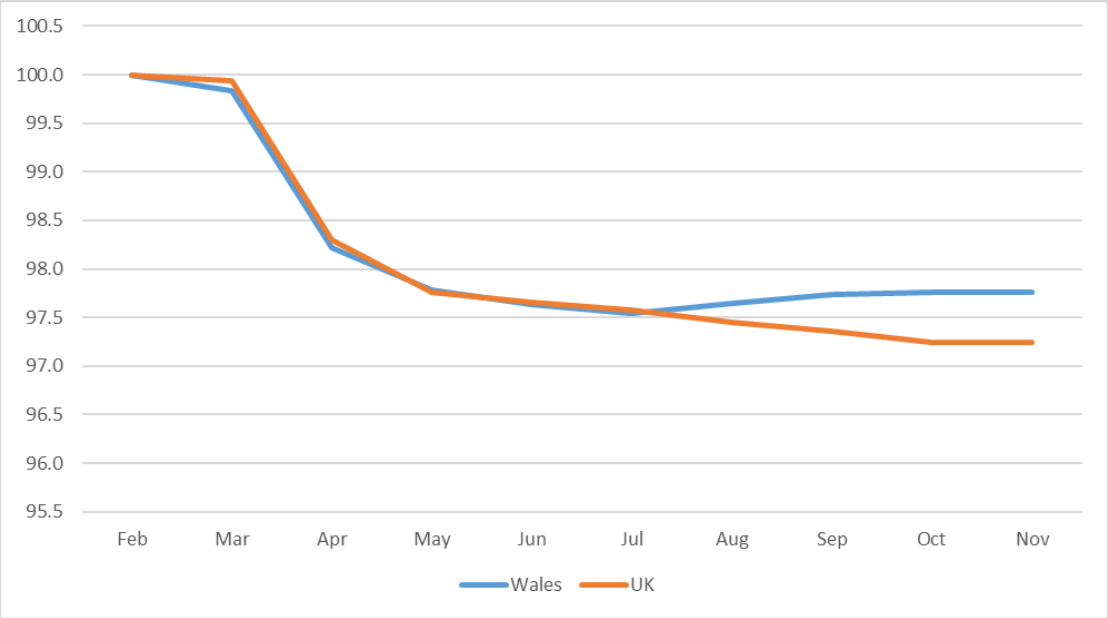
The most recent GDP data for Wales is for the first quarter of 2020. More timely data for Welsh GDP is not available. However, the quarterly data for Wales is in any case difficult to interpret as it shows high volatility and is subject to large revisions (with, for example, some previous quarters being revised from high positive growth

to contraction). So even if more timely Welsh GDP data were available, it would be of limited value.

The most timely and relevant data we do have for Wales is from the labour market, and particularly informative series include the count of employees registered for PAYE and the experimental Claimant Count (which includes people who are unemployed and some people who are in low-paid employment or in employment with few hours).

As both measures are counts rather than sample surveys, they are not subject to sampling error of the kind that affects the Labour Force Survey and which can cause difficulties in interpreting results during times of great economic change.

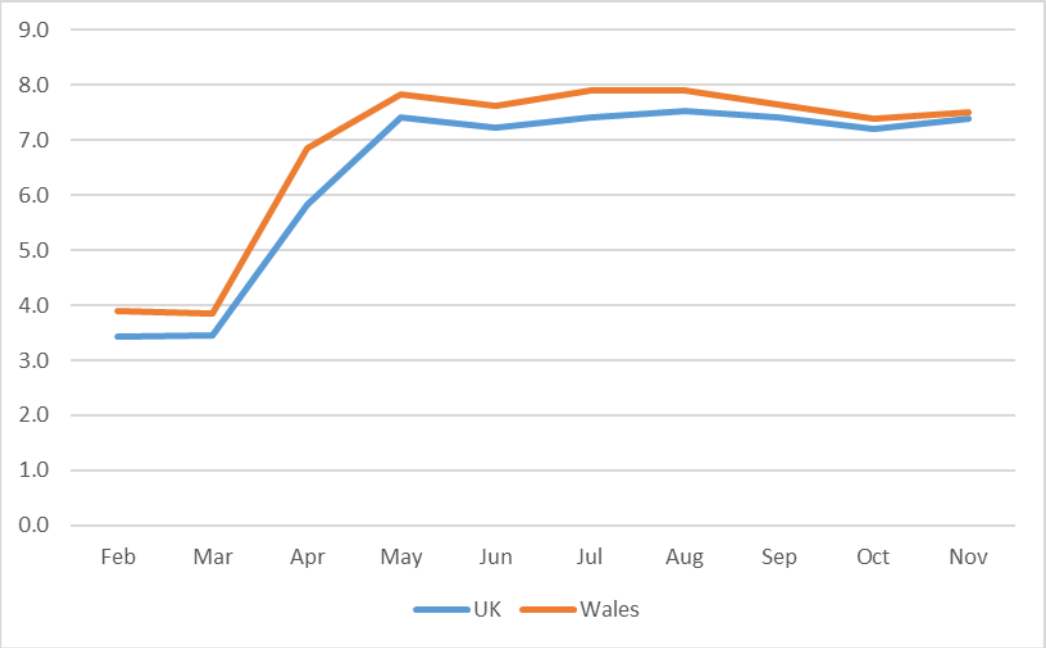
Chart 2: Payroll employee numbers (February 2020=100)



Source: ONS

The trends in employees in Wales and the UK followed a broadly similar trajectory until July. Since then, numbers have been broadly stable in Wales and may even have risen a little, while they have fallen across the UK as a whole. As at Novemer, (on a provisional basis) employee numbers were 2.4% below the February level in Wales and 2.8% across the UK as a whole. The figures for the UK as whole will, at least in part, reflect the particularly adverse impact in London and some other major cities.

Chart 3: Claimant Count



Source: ONS

Again, the Claimant Count for Wales follows a similar trend to that for the UK as a whole, with the count approximately doubling, but with Wales having a somewhat higher figure throughout and with recent data showing a narrowing of the gap.

These adverse effects of the crisis in the labour market, while obviously concerning, are much smaller than the impact on GDP. This reflects the very large schemes put in place by the UK and Welsh Governments to protect jobs, and particularly the Coronavirus Job Retention Scheme and the Self-Employment Income Support Scheme.

Despite these schemes, however, redundancies have reached record levels, and the economy is failing to create the new jobs needed to replace those that have been lost[1].

The reduction in GDP experienced by the UK (and hence also Wales) is one of the largest in the developed world. However, the UK's relative performance is better when assessed on the basis of unemployment, which is probably more important for well-being, at least over the short run.

Impact on disadvantage and inequality

A wide range of research (including by the Resolution Foundation[2] and the IFS[3]) has found that the labour market effects of the current recession are hitting

[1] In a typical week in Wales (i.e. outside recessions) between 2,000 and 3,000 jobs are created, which replace a similar number lost through the normal processes of economic change and restructuring. This process of job creation has stalled.
[2] https://www.resolutionfoundation.org/publications/jobs-jobs-jobs/
[3] https://www.ifs.org.uk/publications/14879

disproportionately the young (particularly those entering the labour market), those nearing the end of their working lives, those with lower qualification levels, those in low-paid employment, those in more "fragile" employment (on non-standard terms and conditions) and the otherwise disadvantaged, including Black, Asian and Minority Ethnic, and other minority, groups.

The impact on lower skilled, lower paid workers is in part a consequence of the sectoral impact of the recession, with hospitality and retail particularly hard hit. But it is also a feature of recessions more generally that those who are already at most disadvantage in the labour market suffer most. The overall effect is therefore to increase inequality.

One particular feature of the current crisis, and which is likely to persist, risks exacerbating differential effects.

Research indicates that people can benefit significantly from remote and home working (gaining for example from reduced commuting times and costs, and from increased flexibility) but the scope for working remotely is greatest amongst higher income groups.

At the same time, home working will increase some costs, including home heating, and that may adversely affect the smaller number of low income people who move to working from home.

In so far as home working results in reduced reliance on the hospitality sector (rather than spatial re-balancing), there may also be adverse effects on employment in the sector.

On balance, therefore, remote working risks further increasing inequalities in living standards unless appropriate mitigations are put in place.

In addition to the adverse shorter run impacts of the recession, there is a wide body of evidence[4] showing that recessions have "scarring" effects on both businesses and individuals, reducing incomes and increasing the risk of unemployment into the future.

For individuals, particularly those suffering socio-economic disadvantage, the effects of such scarring can be very long lasting, with evidence of lifetime effects, not just on economic outcomes but also on health and well-being, and can include reduced life expectancy.

Children and young people will of course also have suffered from the disruption to their education. The extent of this disruption is unprecedented, but relevant evidence indicates that there is a high risk of permanent scarring, with greater impact on the life chances and long term health and well-being of the most disadvantaged children. Measures to recover the lost learning should have a high priority.

[4] https://voxeu.org/article/lasting-scars-covid-19-crisis
https://www.resolutionfoundation.org/app/uploads/2020/05/Class-of-2020.pdf
https://ec.europa.eu/social/BlobServlet?docId=13626&langId=en

In summary, inequalities between people are expected to widen over both short and long terms, increasing the need for effective mitigation measures from both UK and Welsh Governments.

There is also some evidence that the recession has had differential effects across places. However, it is too soon to draw conclusions on this – effects have varied as the recession has progressed, and in general, differences between places appear to have been very modest compared to the scale of the overall contraction and to the differences across population groups[5].

Prospects – UK context

The growth in coronavirus infections in the UK and across Europe, and the associated introduction of new restrictions, means that a further economic contraction in the final quarter of 2020 appears almost unavoidable, setting back the partial recovery seen over the late summer.

However, recent developments in the production of vaccines hold out at least the hope of a rapid recovery in 2021.

The Office for Budget Responsibility's (OBR) latest economic forecast was published alongside the UK Government's Spending Review on 25 November. The headline forecast is summarised in Table 1 with the headline forecast and alternative scenarios for GDP shown in Chart 4.

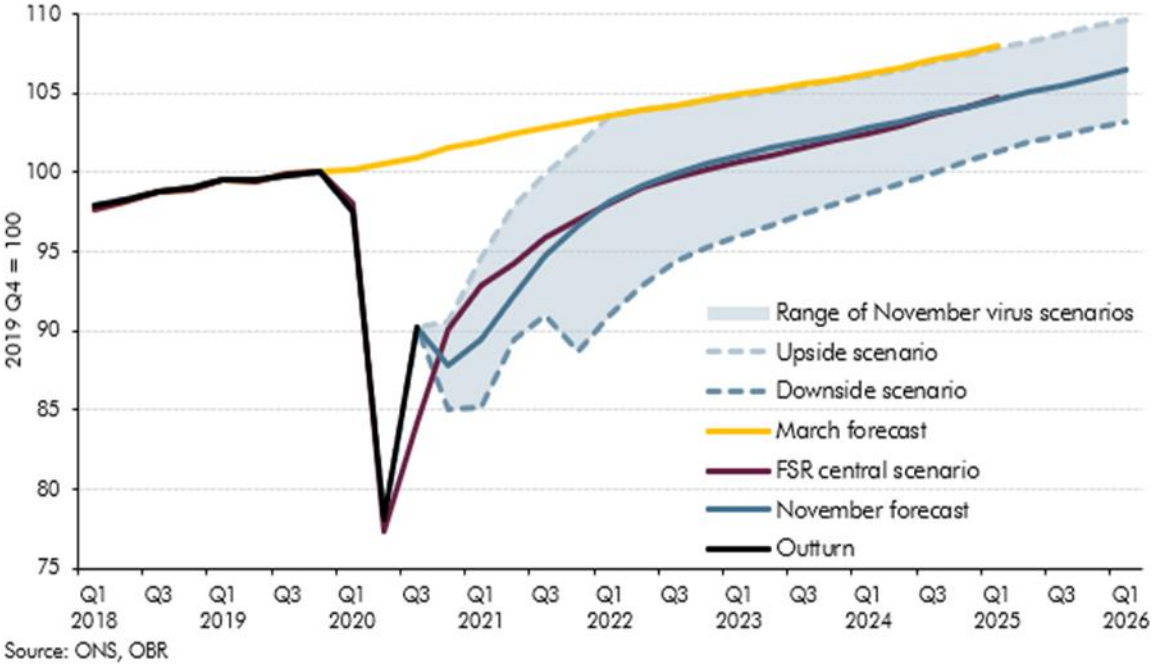
Table 1: OBR Headline Economic Forecasts

	Percentage change on a year earlier, unless otherwise stated						
	Outturn	Forecast					
	2019	2020	2021	2022	2023	2024	2025
Gross domestic product (GDP) per head	0.7	-11.8	5.2	6.2	2.0	1.4	1.5
Aggregate GDP	1.3	-11.3	5.5	6.6	2.3	1.7	1.8
Productivity (GDP per hour)	0.0	0.9	0.1	0.3	1.1	1.0	1.4
Real Household Disposable Income	1.5	-0.6	-0.7	1.7	2.0	1.5	1.3
Employment (millions)	32.8	32.7	31.9	32.2	32.7	33.1	33.2
LFS unemployment (% rate)	3.8	4.4	6.8	6.5	5.4	4.5	4.4
Average earnings	2.9	1.2	2.1	2.0	2.4	3.0	3.5
CPI	1.8	0.8	1.2	1.6	1.7	1.9	2.0

Source: OBR

[5] Highlighting small, uncertain and temporary differences through mapping is liable to mislead.

Chart 4: OBR November GDP Forecast and Scenarios



Note: FSR central scenario is from the Fiscal Sustainability Report (FSR) published in July 2020.

The OBR noted that he economic outlook remains highly uncertain and depends upon the future path of the virus, the stringency of public health restrictions, the timing and effectiveness of vaccines, and the reactions of households and businesses to all of these. It also depends on the outcome of the continuing Brexit negotiations.

The economy recovered in the third quarter more quickly than the OBR had anticipated in July, but the "second wave" and associated restrictions will have significantly negative effects in the fourth quarter, with outcomes over the winter and subject to great uncertainty.

The OBR therefore presented three scenarios for the virus (see Chart 4): an upside scenario, in which lockdown succeeds in bringing the second wave of infections under control and the rapid rollout of effective vaccines enables output to return to its pre-virus level late next year; the headline November forecast, in which restrictive public health measures need to be kept in place until the spring and vaccines are rolled out more slowly, leading to a slower return to pre-virus levels of activity at the end of 2022; and a downside one, in which lockdown has to be extended, vaccines prove ineffective in keeping the virus in check, and a more substantial and lasting economic adjustment is required with economic activity only recovering to its pre-virus level at the end of 2024.

In the upside scenario, output eventually returns to its pre-virus trajectory, but in the other two scenarios output is left permanently scarred by the pandemic, by 3 and 6 per cent respectively. All three scenarios assume a smooth transition to a free-trade agreement with the EU in the New Year.

The OBR also describes an alternative scenario in which the negotiations end without a deal or a deal is not confirmed and implemented. This would further reduce output

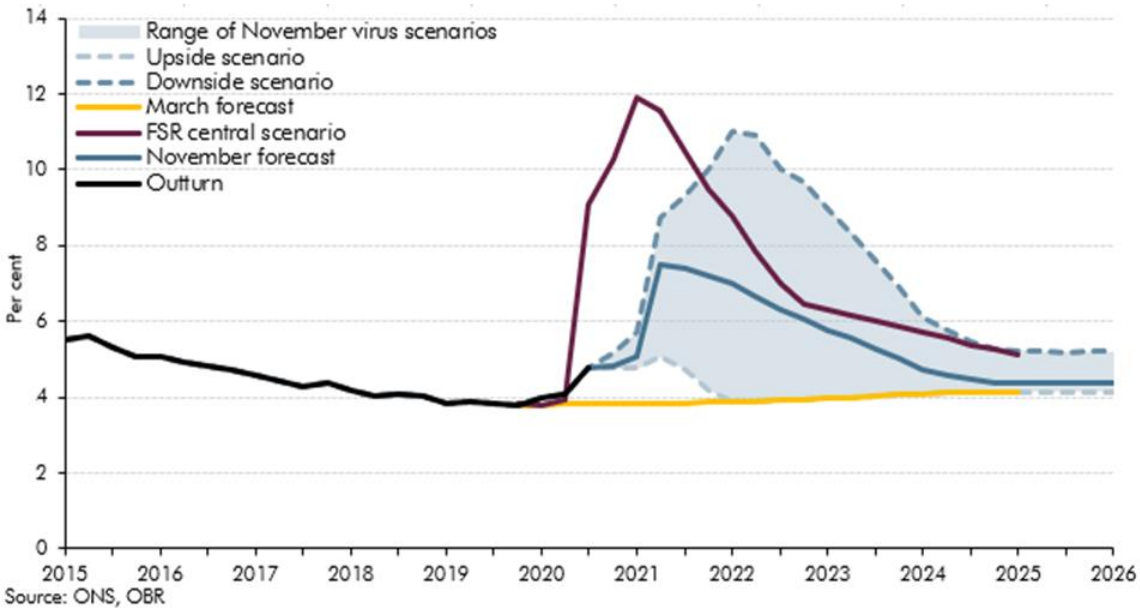
by 2 per cent initially and by 1½ per cent in 2025-26. This is in addition to the long run loss of output of 4 per cent which the OBR considers will be associated with a move from current trading relationship with the EU to a free trade agreement[6].

On the basis of the headline forecast and a smooth transition, the OBR expects economic output or GDP to contract by 11.3% this year, the largest decline in 300 years. On the assumption that coronavirus will diminish in impact next year, GDP is expect to increase by 5.5% and by 6.6% the following year and then settle down to more 'normal' type rates of expansion.

Under the headline forecast, the level of GDP is not expected to return to its pre-pandemic level until the end of next year. By 2025, the level of GDP is expected to be approximately 3.0% smaller than the level expected at the time of the March Budget. (This is a measure of the long term cost or scarring effect of the pandemic.)

The OBR also set out three scenarios for unemployment (see Chart 5).

Chart 5: OBR Unemployment Forecast and Scenarios



Despite a range of interventions in the labour market to protect employment, by the middle of next year, the rate of unemployment is expected to be 7.5% (2.6 million people) in the UK compared with 4.8% today (1.6 million people) and 8.5% in the aftermath of the financial crisis of 2008.

Prospects - Wales

The OBR does not provide a separate economic forecast for Wales, but has previously noted that, when developments are assessed on the basis of GDP per head, there is

[6] The OBR thus considers that over the long run, moving from current trading relations with EU to trading on WTO terms would result in the loss of 5.5% of annual output, compared to what would happen otherwise. There is a range of assessments of such an outcome made by independent experts, with the LSE for example judging the loss might be even higher – around 8%.

no difference in trend between Wales and the UK[7]. Any short term divergences appear essentially random, with no obvious basis for prediction.

In respect of unemployment, were Wales to experience a similar proportional rise to that forecast for the UK under the OBR's headline forecast, we would see the number unemployed increase from 70,000 today to approximately 114,000, with unemployment not returning to pre-crisis levels until the end of 2024. Again this would be somewhat below the peak figure reached in the years following the financial crisis which started in 2008.

Although the Chancellor announced a Restart Scheme to help unemployed people find work, when considered in the context of the scale of the collapse in vacancies and the huge rise in redundancies, there is a strong economic case for more extensive measures to promote job creation.

As noted above, the OBR also consider a scenario in which there is a disruptive break with our European trading partners at the end of the year as a result of a deal not being confirmed.

The sectors likely to be most severely impacted by a disruptive break from the EU are different from those most affected by Covid-19, so the effect would be to widen the locus of the crisis to almost the whole economy.

Most, but not all, research has indicated that areas like Wales, that specialise in manufacturing, and have relatively high exports to the EU, will be disproportionately damaged by leaving the single market. Moreover, it appears highly likely that low to middle earning employees will be the groups hardest hit, further widening socio-economic inequalities.

Longer run trends

Material well-being

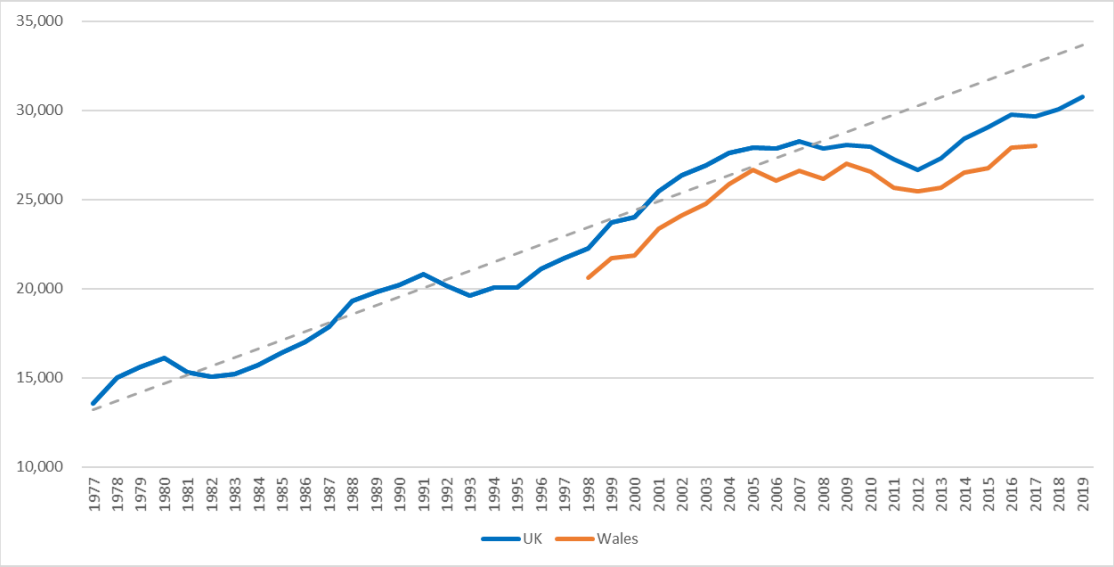
Since the recession of 2008, the UK and Wales have suffered from growth in pay and incomes that is far below the previous trend. This mainly reflects very sluggish growth in productivity.

It is improvements in productivity[8] – rather than increasing the use of inputs, including natural resources - that drives improvements in living standards and growth in the tax base over the long run.

Chart 6 shows the best single measure of material living standards for Wales and the UK.

[7] This finding is illustrated by the lack of trend shown by GDP per head in Chart 7 and also reflected in the shared trends in Welsh and UK median household incomes in Chart 6.
[8] i.e. deriving more output from each unit of input.

Chart 6: Median Household Income (equivalised), £



Source: ONS, DWP, Welsh Government calculations
Notes: Data for Wales only available for the period shown. Measure shown is after housing costs. The dashed line shows the UK trend based on the period 1977-2007.

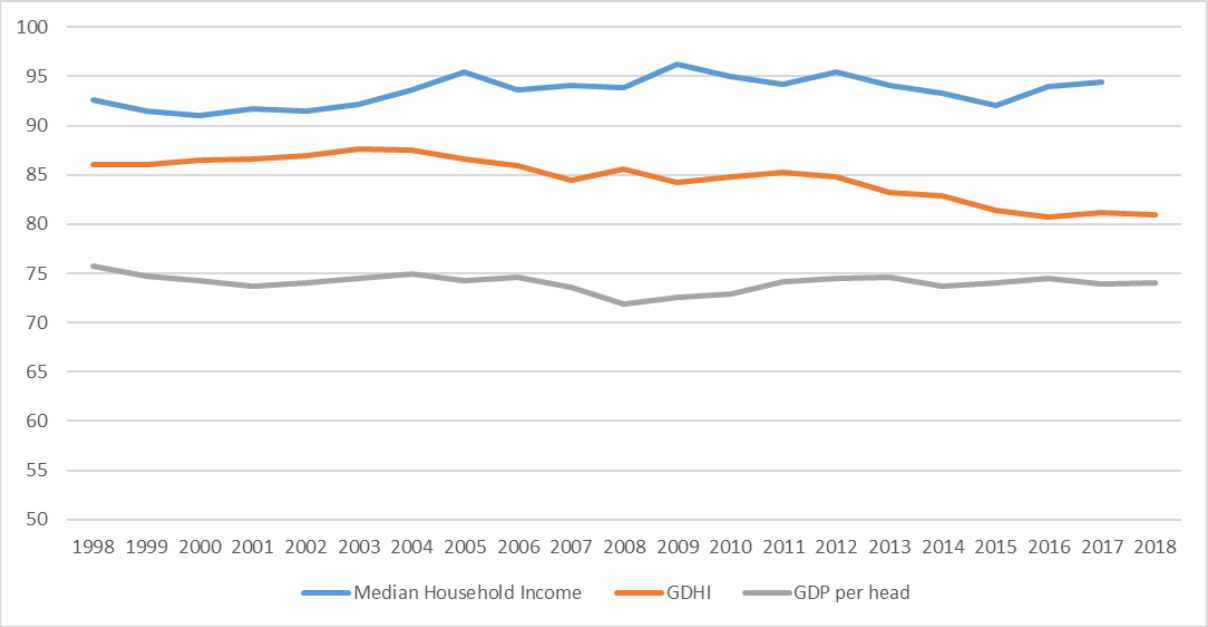
"Median household Income" measures the income of the household that is in the middle of the income distribution. It is adjusted ("equivalised") to allow for household composition. It therefore reflects the experience of a typical household. In the most recent available period[9], median household income in Wales stood at 94% of the level for the UK as a whole[10].

It can be seen from the chart that real incomes lie around £3,000 below what they would have been had the trend seen prior to 2008 continued. The underlying weakness of productivity growth over the most recent years is somewhat masked in the chart as the growth in incomes has been partly driven by a recovery in employment rates, something which obviously has only finite potential.

Over the last two decades, and based on the key indicator of median household incomes, living standards in Wales have broadly kept pace with the UK as whole. See also Chart 7.

[9] The most recent data is for the three year period 2016/17 to 2018/19, but more recent data on pay and employment indicates that the figure is likely to remain broadly representative.
[10] Adjusting for the lower cost of living in Wales wold further reduce this gap, increasing Welsh median household incomes to around 96% of the UK figure, according to the most recent data from the ONS: https://www.ons.gov.uk/economy/inflationandpriceindices/articles/relativeregionalconsumerpricelevelsuk/2016

Chart 7: Indictors of Welsh Relative Economic Performance (UK=100)



Source: ONS
Notes: Median Household Income is after housing costs. GDHI is Gross Domestic Household Income per head. GDP is Gross Domestic Product.

GDHI is a measure of mean, not median, income and therefore reflects Wales's relative lack of high income individuals. GDP represents the value of goods and services produced in Wales. On all three indicators, in the most recent period Wales is ranked 11th out of 12 UK countries and regions, above the North East of England.

The charts shows that Welsh performance is closer to the UK average on the indicator of median incomes than on Gross Domestic Household Income (GDHI) or GDP.

Wales's relative performance on GDP is reflected in Wales's relatively weak tax base, with the better outcomes on the income measures reflecting in large part transfers through the UK fiscal system.

It is unclear why GDHI in Wales has decreased relative to the UK in recent years. The fact that Median Household Income has not shown a similar trend suggest it may have something to do with the relative increases experienced by high income earners in Wales and the rest of the UK.

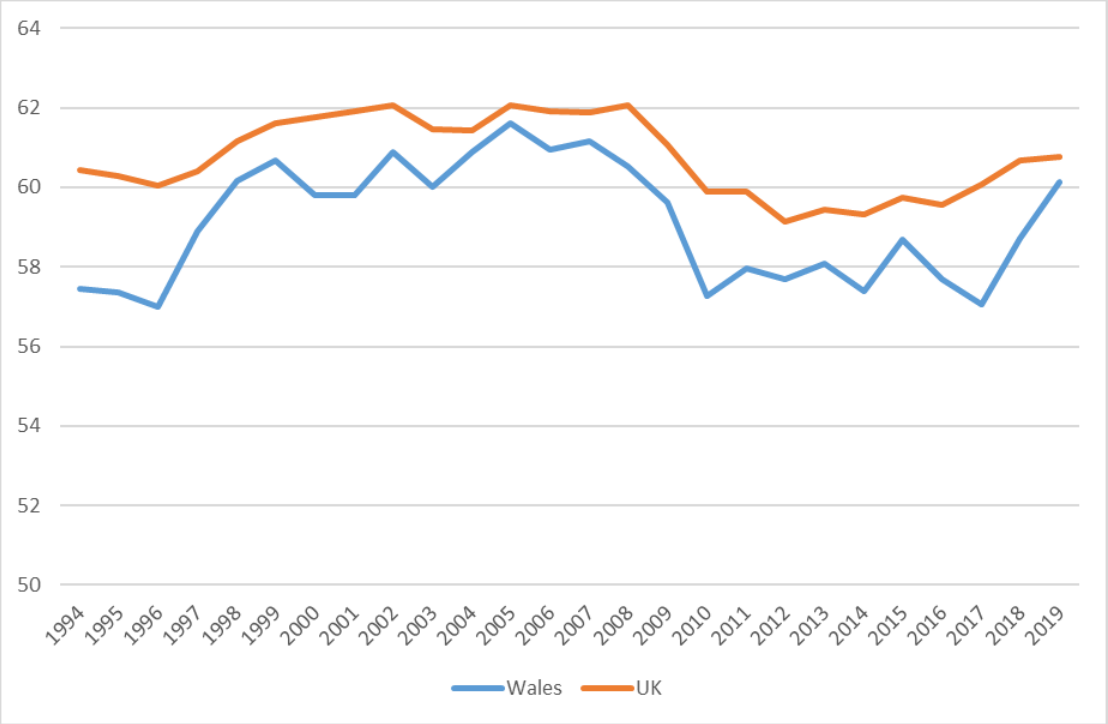
Labour market performance

Prior to the current recession, the labour market in Wales had been performing strongly, with the historic gap in employment and activity rates between Wales and other parts of the UK greatly reduced. In the years before devolution, the gap in employment rates between Wales and UK had typically been 5-6 percentage points. In recent years this has fallen, often to under 2 percentage points. Furthermore, the largest improvements have been seen in areas with historically low employment rates, and particularly those that have benefited from EU Structural Funds.

Apart from the effects on incomes, there is strong evidence that being in employment has multiple benefits for people's well-being, so the longer run trend in Welsh employment rates is clearly very good news.

Moreover, the increase in employment has not been associated with a significant trend away from "conventional" employment – that is, being a full-time employee. See Chart 8.

Chart 8: Percentage of People in Employment who are Full-Time, Permanent employees



Source: Welsh Government

Chart 8 shows that, while there was a decrease the share of full-time permanent employment in the years following the financial crisis of 2008, and the figure for Wales is lower than that for the UK throughout, there is little if any trend change in share.

Whilst the indictor shown in Chart 8 differs from the Welsh Government's preferred measure of "fair paid" jobs[11], the latter is not available for the long time series shown.

[11] This is defined as the percentage of people who are on permanent contracts (or on temporary contracts but not seeking permanent employment) and earn more than 2/3 of the UK median wage. This is only available for the period since 2013, but also shows no trend. https://app.powerbi.com/view?r=eyJrIjoiY2EyNjRiMzctYjNlMS00MTUwLWI3NTMtOTc3ZDYzMjExNWJkIiwidCI6ImE0YTZmOGZmLTJlZjUtNDBkOC1iMDJkLTliM2UyYmIwYmRkNCJ9

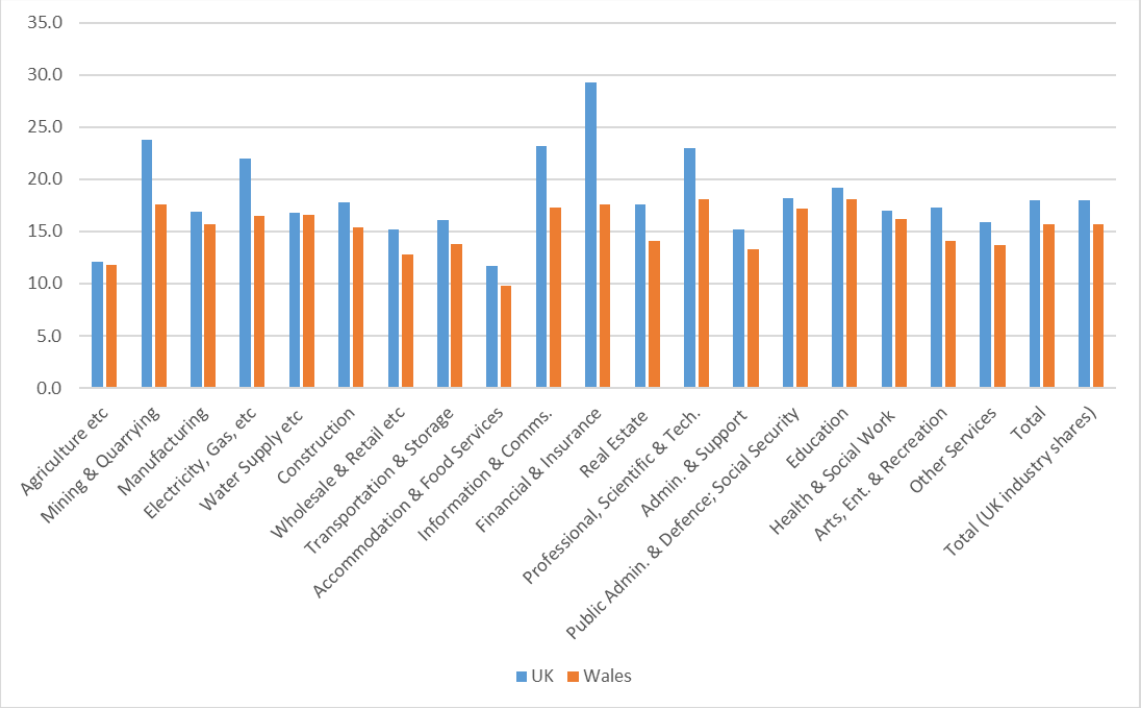
Productivity and pay

Wales's strong performance on employment has, however, not been matched by trends in productivity and pay, where Welsh outcomes remain well below the UK and with little trend movement in the gap.

It has been suggested that low productivity and pay in Wales reflects the prevalence of low paying industries. First, it should be noted that the most recent data for median hourly pay show Welsh rates that are similar to those in Yorkshire and the Humber and above those in the East Midlands and Northern Ireland. Wales is not an "outlier".

More importantly, careful analysis shows that industrial mix does not explain Welsh relative pay levels. See Chart 9.

Chart 9: Hourly Pay by Industry, 2019 (£)



Source: ONS, Welsh Government Calculations

It can be seen from Chart 9 that the gaps in pay between Wales and the UK are within, not between, industries. The final column use UK weights to derive an estimate of what median pay in Wales would be if Wales had the same mix of industries as the UK as a whole. The result is virtually identical to observed Welsh median pay.

Research indicates that by far the single most important factor explaining differences in productivity and pay is education and skills. Second to this, it has been found that productivity reflects economic geography, with lower productivity in more sparsely population areas and in places with dispersed settlement patterns. Productivity in some service sectors has been found to particularly benefit from location in major agglomerations. In addition, agglomeration and skills effects interact, as more highly educated people are attracted to major cities.

It has been speculated that the growth in remote working may in the future erode this established pattern of advantage and disadvantage, with potential major implications for future settlement patterns, housing demand and transport usage. Such a change could offer opportunities to Wales.

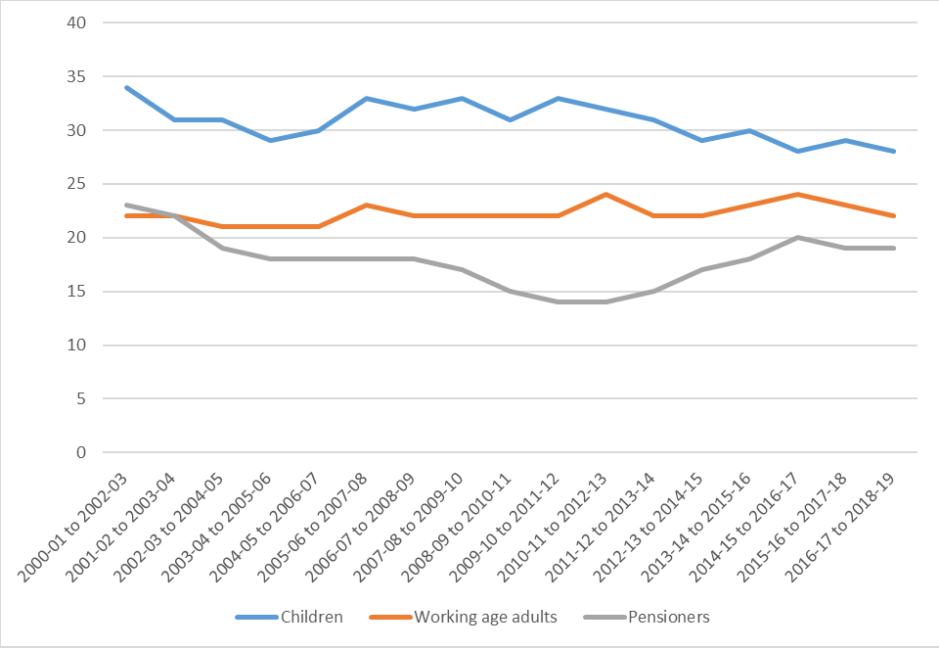
Economic inequality, socio-economic disadvantage and the "left behind"

Income inequality is lower within Wales than across the UK as a whole, but this reflects the low proportion of high and very high income earners in Wales. In this respect, measures of relative low income, such as relative poverty, appear more relevant than measures of inequality for tracking progress in tackling socio-economic disadvantage in Wales.

Poverty

Chart 10 shows trends in relative poverty in Wales.

Chart 10: Poverty in Wales (after housing costs, %)



Source: DWP
Notes: Three year averages. Poverty is defined as living in a household with an income of less than 60% of the median level.

There is little trend in the poverty rate for working age adults; for pensioners a decrease over the first decade of the 21st century has since been reversed. Child poverty shows a slight downward trend.

In the most recent period, child poverty in Wales is below the UK average, and lower than most English regions. For working age adults, poverty is slightly higher than the UK average, and for pensioners poverty is higher than the UK average and higher than every English region except London (which has the highest poverty levels amongst UK countries and regions for all population groups).

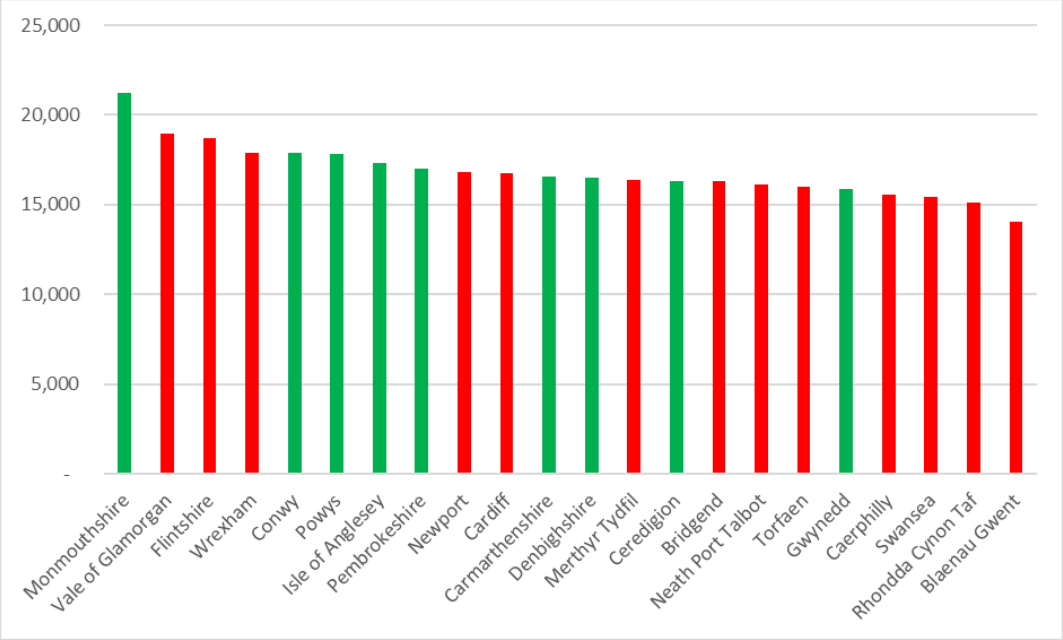
Recent research indicates, unsurprisingly given the labour market effects described earlier, that the effect of the economic slowdown associated with the pandemic has been to increase poverty across the UK, with this having been partially mitigated by the temporary increased in Universal Credit, due to expire at the end of March 2021. These effects will of course also have been felt in Wales.

Spatial disparities in Wales

As described above, based on median incomes, Wales has neither converged nor diverged from the UK average over recent years. In other words, Wales has not been "left behind", in the sense that the gap with the UK as a whole has not increased. However, as also noted previously, all parts of the UK have experienced historically low growth in incomes, and this is likely to have been felt most keenly by people whose incomes were already low, potentially fuelling disaffection.

Within Wales, the only available measure of incomes at local authority level, Gross Domestic Household Income (GDHI), is shown in Chart 11.

Chart 11: Gross Domestic Household Income per head (£)

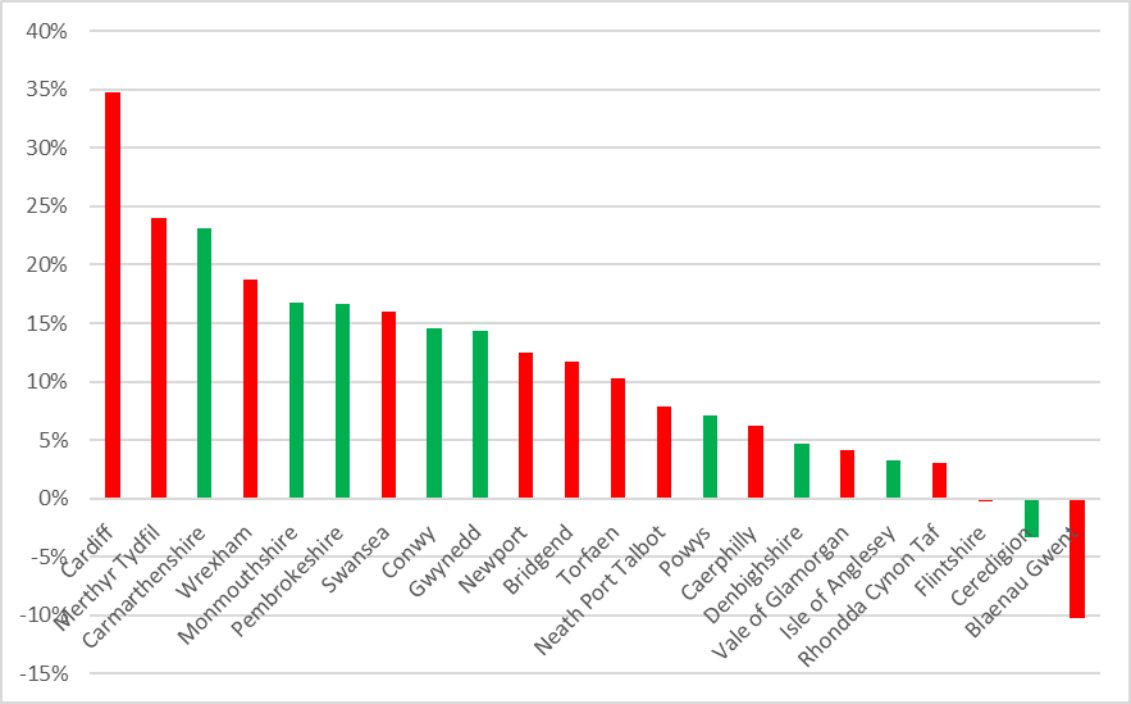


Source: Welsh Government

Notes: Local authorities with a larger share of population living outside main towns are shown in green.

Chart 11 shows no strong spatial pattern. It also indicates that more rapid growth is no guarantee of high living standards for the existing population; Cardiff, which sits near the middle of the chart has had by far the largest growth in jobs (and indeed in population) over the last two decades – see Chart 12.

Chart 12: Change in Number of Jobs, 2001/2 to 2018/19



Source: Welsh Government

While Chart 12 shows that some areas have clearly under-performed, there is no obvious spatial pattern.

When considering trends in socio-economic disadvantage it is crucial to distinguish outcomes as they affect residents from impacts on places, and to acknowledge that high numbers of disadvantaged people live in places that appear successful on certain metrics.

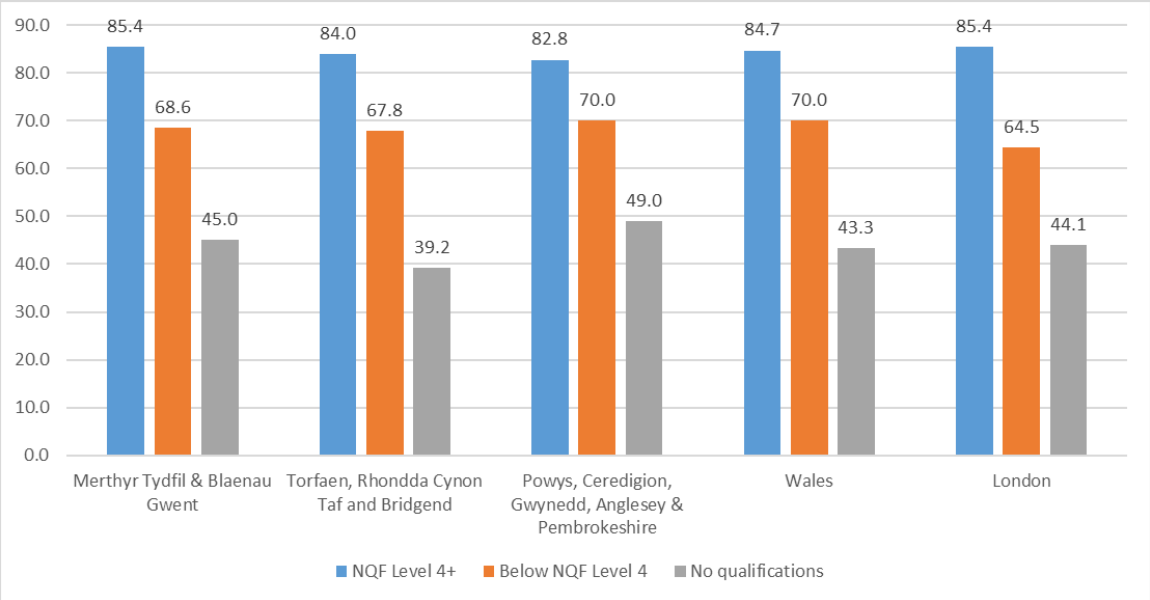
It is also important to recognise that the inequality between people within areas is very much greater than the inequality between areas.

For this reason, the tax and benefits system, which of course is in the main not devolved, pays a crucial role in reducing inequality both at the level of the individual and between areas (in so far as this reflects differences in population mix).

Charts 13 and 14 show the variation in employment rates and pay observed across broad areas of Wales are in both cases much less than the variation within those areas, with much of this latter variation being driven by levels of qualification.

Areas identified in Charts 13 and 14 have been selected to represent some of the Valleys and rural areas that have been characterised as “left behind”. The size of the survey means that it is not possible to provide a more detailed breakdown.

Chart 13: Employment Rates by Area, 2019 (%)



Source: Welsh Government

London has been included purely for comparative purposes – it is of course the area that is most commonly considered to have out-performed in recent years, yet it shows an association between levels of qualification and labour market outcome that is similar to other areas. In particular, employment rates within broad qualification groups in London are similar to those seen across Wales.

Chart 14 shows, unsurprisingly, that across all qualification levels, residents' earnings in London are considerably higher than in Wales (although this is of course offset by higher living costs).

Chart 14: Median Full Time Weekly Earnings by Area, 2019 (£)

Source: Welsh Government
Note: The sample size for the group with "no qualifications" is small and the figures should be treated as illustrative.

The chart shows that, within each broad qualification level, there is relatively little difference in residents' pay between the identified areas and the all-Wales average, although pay for those with higher levels of qualification in the Valleys areas does appear somewhat reduced. This may reflect differences in the mix of higher level qualifications rather than variation in pay for a given qualification.

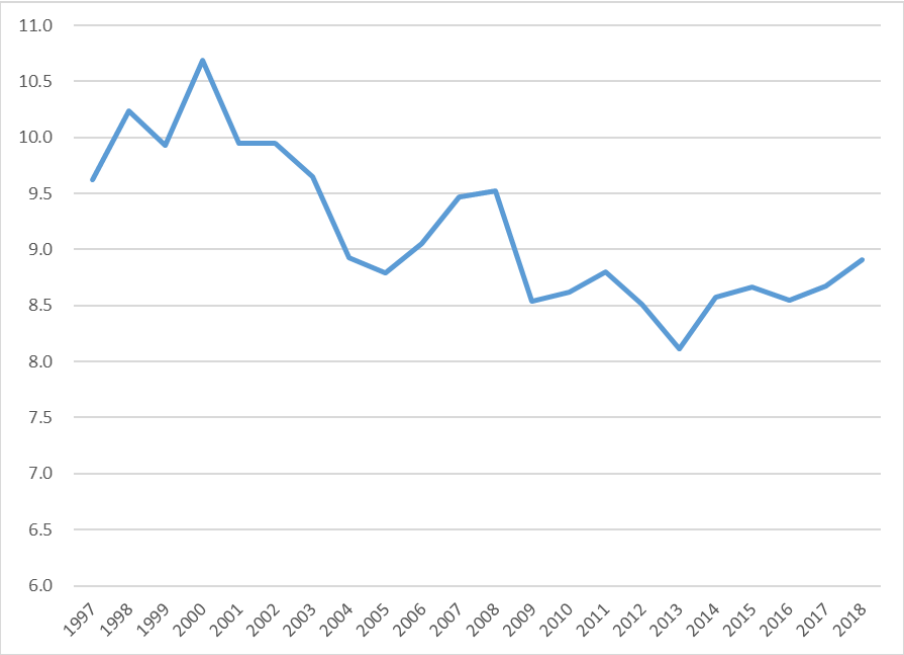
Relatively high earnings London (and the south East) of course also influence the UK average. When median earnings in Wales are compared with other UK countries and regions, rather than the UK as a whole, while Welsh performance leaves clear room for improvement, as previously noted, Wales is far from being an outlier. In 2019, Welsh median full time weekly earnings were a little above those in Northern Ireland and the North East of England, and very similar to the East Midlands and Yorkshire and Humberside[12].

Trends in spatial disparities in Welsh living standards

Perhaps contrary to expectations, the evidence does not suggest that living standards across different areas in Wales have been diverging over the last two decades. In fact, the opposite is the case, although slow convergence has been partially reversed over the last few years. Chart 15 shows an indicator of convergence – the "coefficient of variation" in household incomes across local authorities in Wales, with a higher figure represent greater differences.

[12] 2019, rather than 2020, data has been used here for comparability with the previous chart and to avoid any effects from the pandemic.

Chart 15: Divergence in Household Income (GDHI) in Local Authority Areas in Wales.



Source: ONS, Welsh Government calculations.

Inequality of course has many other dimensions including gender, ethnicity and sexual orientation. It is beyond the scope of this short report to explore systematically trends in all of these areas. Data and material on these issues is included in the annual "Wellbeing of Wales" report[13], which also covers other outcomes specified in the Future Generations Act.

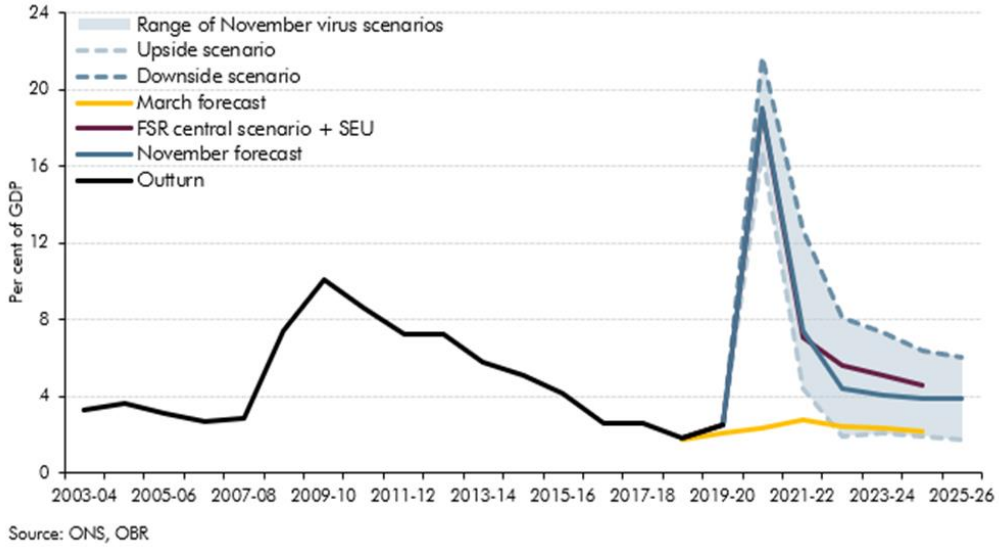
[13] https://gov.wales/wellbeing-wales

Fiscal context

UK – Short term fiscal prospects

The OBR's latest forecast for public sector net borrowing is shown in Chart 16.

Chart 16: Forecast for Public Sector Net Borrowing and Scenarios



In the OBR's November headline forecast, receipts fall by £57 billion in 2020-21, driven largely by the sharp fall in GDP. Although the drop is £32 billion less than assumed in the OBR's July central scenario, the second wave and further tax measures mean that the upside news from the first half of the year does not carry through to the second.

Spending rises by £281 billion (16 per cent of GDP) in 2020-21, £54 billion more than assumed in the July central scenario. Year-on-year borrowing increases by £337 billion, of which £280 billion is down to virus-related support measures.

Borrowing falls rapidly in 2021-22 as economic activity and tax receipts recover and much of the temporary fiscal support to households and businesses expires. It falls further in 2022-23 as virus-related spending ends and, in the headline forecast, settles at around £100 billion a year over the remainder of the forecast (around 4 per cent of GDP).

Relative to the March forecast, the £339 billion upward revision to borrowing this year drops to £98 billion next year, settling at around £42 billion higher from 2022-23 onwards. This medium-term difference is more than explained by lower receipts thanks to the scarring of real GDP and tax bases, but is partly offset by much lower debt interest spending and a £10 to £12 billion a year cut in departmental resource spending relative to March total.

Headline public sector net debt (PSND) rises by £473 billion in 2020-21, taking it above 100 per cent of GDP for the first time since 1960-61.

The OBR notes that the fiscal outlook is also contingent on the outcome of negotiations concerning the UK's future trading relationship with the EU.

While leaving the EU without a deal would provide a direct benefit to the public finances through higher tariffs on EU imports, this would be more than offset by the indirect fiscal costs associated with the attendant disruption to economic activity in the near term and lower productivity in the longer term. This would add a further £12 billion (0.7 per cent of GDP) to borrowing relative to the OBR's central forecast in 2021-22 and result in debt rising to 108 per cent of GDP by 2025-26, a level last seen in 1959-60.

The chair of the IFS has expressed the view that the OBR's forecast and scenarios are based on UK Government spending plans that may be undeliverable as they would represent a return to something close to austerity in many unprotected areas**.** On his view, the central scenario probably should have borrowing at least another 1% of national income higher in 2024-25 and subsequently. In that case, if the chancellor did want to aim for current budget balance as previously intended, it would eventually need a fiscal tightening of 2% of national income in real terms – about £40 billion in today's terms.

The growth in borrowing and debt under all scenarios appears manageable over the short run because of highly favourable funding conditions. These conditions cannot be assumed to persist indefinitely. As the OBR has made clear, a one percentage point increase in interest rates will now lead to double the increase in debt interest spending as would have been the case back in March.

In consequence, while there is consensus that it is entirely appropriate to support the economy through the crisis with higher borrowing, the UK's fiscal position is clearly unsustainable over the medium term - and this is before the effects of the longer pressures described below are felt.

Wales - Short/medium term fiscal prospects

The UK Government's Spending Review, published on 25 November, provided for the first time, details of the Welsh Government's budget for 2021-22. The Welsh Government's core resource Departmental Expenditure Limit has risen £694m in 2021-22, an increase of 4.6% in cash terms. In addition, the Chancellor has also confirmed the Welsh Government's share of additional funding in relation to COVID-19 in 2021-22 which provides for an extra £766m.

The March 2020 Budget showed an increase in UK general capital departmental expenditure limits of 19% between 2020-21 and 2021-22. A proportionate share of that would have meant a £400m increase in the Welsh Government's capital budget. Instead, the Welsh Government has received an increase of just £60m or less than 3%.

The UK Government spending review covered only 2021-22. The Welsh Government has no block grant settlement from the UK Government for subsequent years.

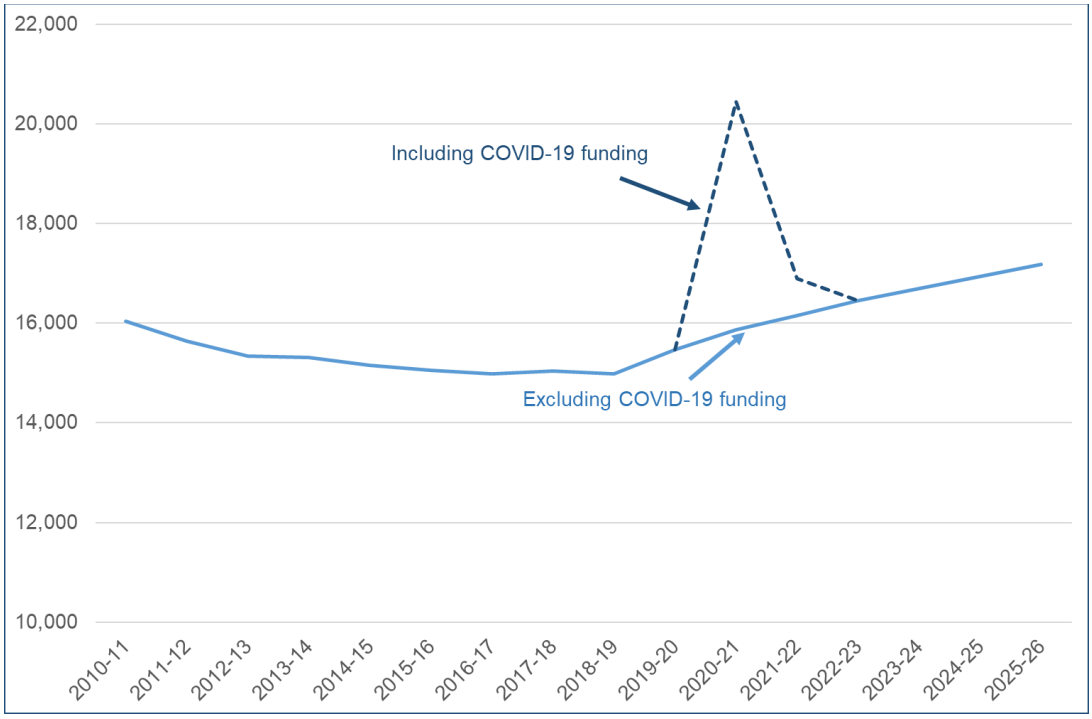
Beyond 2021-22, Chart 17 assumes that comparable spending in England, which affects the Welsh Government's budget via the Barnett formula, increases at the

same rate as the total resource Departmental Expenditure Limits published by the OBR alongside the UK Government's spending review.

The resource budget is shown including and excluding COVID-19 funding. That additional funding has increased the Welsh Government's resource budget by nearly 30 per cent in 2020-21 and will increase it by around 5 per cent in 2021-22.

Excluding COVID funding, the Welsh Government's resource budget is expected to grow by around 2.0% falling to 1.5% a year in real terms over the next few years.

Chart 17: Medium-term Projection for Welsh Government Resource Budget in Real Terms (£m, 2019-20 prices[14])

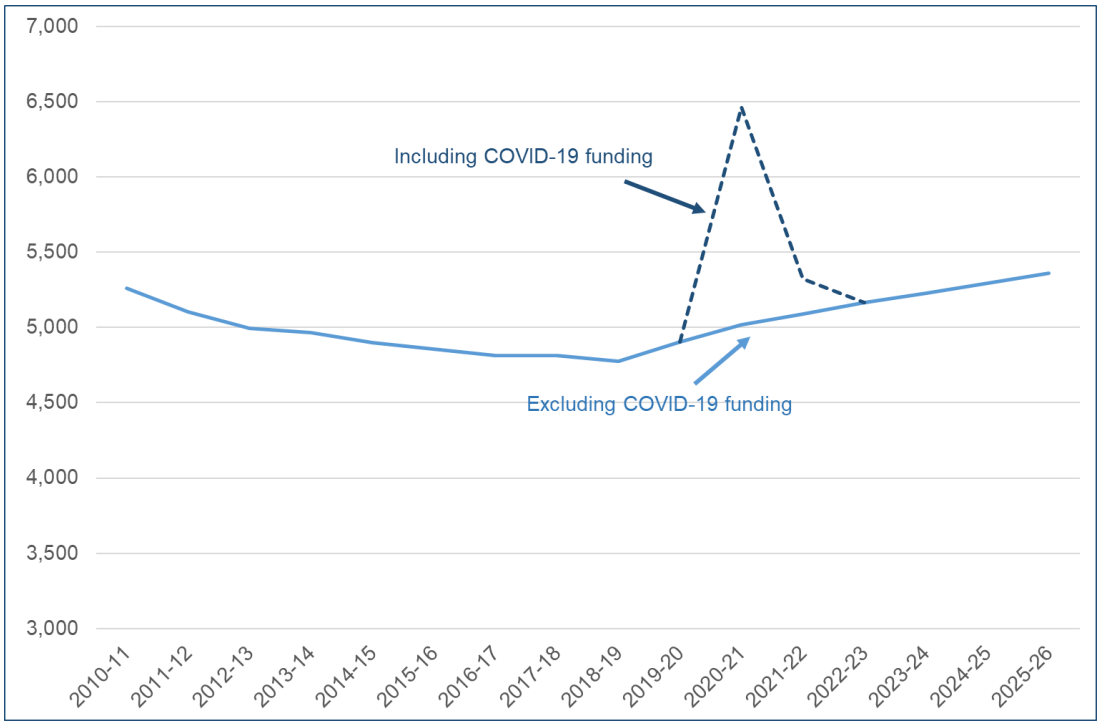


Source: Welsh Government

Chart 18 shows the same medium term prospects for the resource budget as chart 17, but on a per person basis. This shows more starkly the pressure the budget for day-to-day spending has been under in recent years. There was a 9% real terms reduction per person between 2010-11 and 2018-19. Excluding COVID-19 funding, the resource budget per person is not expected to recover to its 2010-11 level in real terms until 2023-24.

[14] For the purposes of charts 17 to 19, the OBR's GDP deflator growth forecast for 2020-21 and 2021-22 has been averaged across the two years. These charts also exclude farm support funding.

Chart 18: Medium-term Projection for Welsh Government Resource Budget in Real Terms per Person (£, 2019-20 prices)



Source: Welsh Government

UK - Longer term fiscal prospects

Last year's report[15] included a discussion of the long run sustainability of the UK's public finances, based on OBR analysis. That discussion is not repeated here, but the OBR's key conclusions were reinforced in their "Fiscal Sustainability Report" (published in July 2020) which updated their analysis[16]:

- The UK's fiscal position is unsustainable over the long term without significant tax rises (or a reduction in spending obligations) mainly as a result of pressures on the cost of delivering public services.
- The key drivers of increases in the cost of public services are an aging population (which drives mainly pension costs but also social care) and relative cost increases in the provision of health (which is much more important for health care costs than population ageing).

The main long term fiscal implication of the short run deterioration of the public finances described above is that the long run adverse trajectories implied by these pressures will have a worse "stepping off" point than previously assumed and that, associated with this, a number of risks have increased.

[15] https://gov.wales/sites/default/files/publications/2019-12/chief-economists-report-2019.pdf
[16] https://obr.uk/fsr/fiscal-sustainability-report-july-2020/

For example, higher levels of borrowing expose the UK Government even more to the risks of future interest rate increases.

It is sometimes asserted that fiscal risks can be ignored because any Government of a country with its own currency can finance a deficit by money creation. This is incorrect. Persistently high interest rates are likely to be associated with an economy operating above capacity, with high inflation. This is something that would have to be addressed through fiscal consolidation by a government that was pursuing monetary financing (and which would itself carry the risk of undermining private sector confidence and hence investment).

Welsh longer-term fiscal prospects – 2025-26 onwards

The longer-term projections shown in Chart 19 use the OBR's November forecast as set out above as a starting point. Three scenarios are then considered for the period to 2031-32.

Scenario one: OBR "demand-based" spending projections

- Based on the OBR's central projections for relevant non-interest, non-benefit spending from the 2020 Fiscal Sustainability Report. UK Government spending relevant to block grant funding grows a little over 1% a year faster than GDP, reflecting increased demand from factors, such as an ageing population and increases in the real costs of providing health and care. The OBR states that spending under this scenario would be unsustainable under current taxation policies.

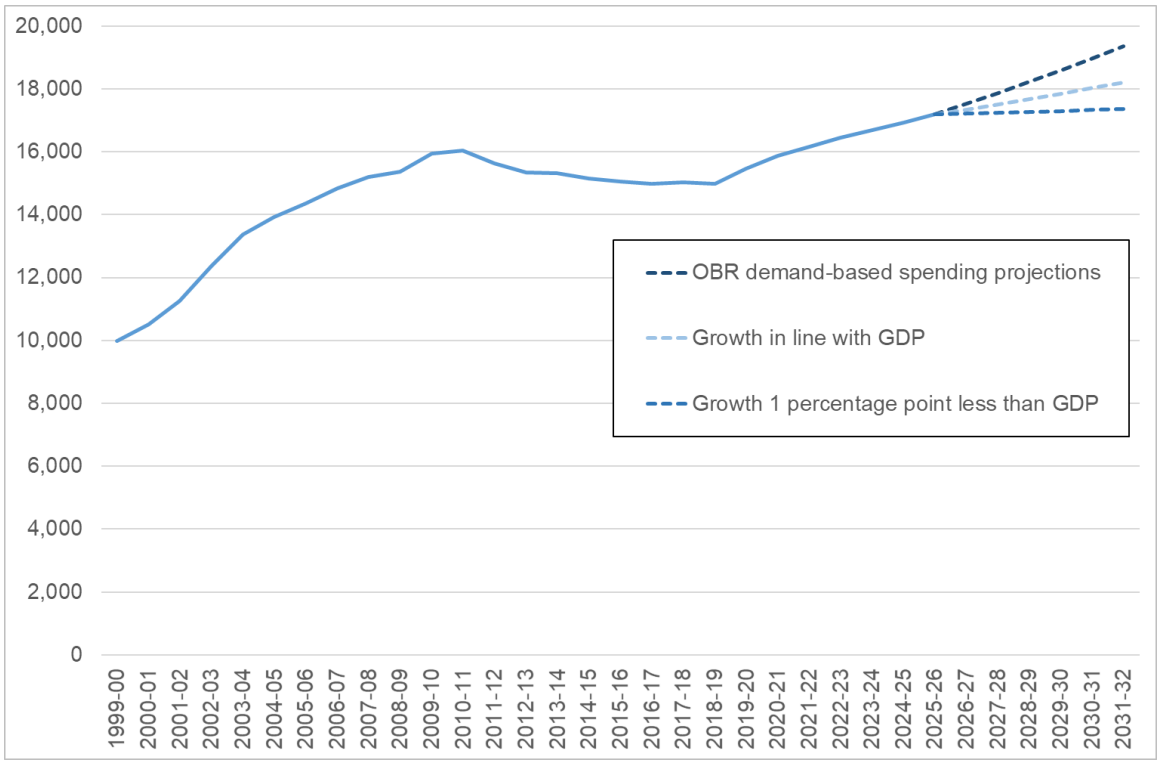
Scenario two: Growth in line with GDP

- UK Government spending relevant to Welsh Government block grant funding for day-to-day spending grows at the same pace as the UK economy. This level of spending might be considered more affordable than that implied by the first scenario by a UK Government unwilling to increase the share of national income taken in taxation.

Scenario three: Growth one percentage point less than GDP

- Relevant UK Government spending grows one percentage point slower than the UK economy, reflecting a scenario where the UK Government adopts a policy to reduce public sector net debt, currently at a level which may be regarded as excessive.

Chart 19: Long-Term Projections for Welsh Government Day to Day Spending (resource budget excluding COVID-19) in Real Terms, under Three Scenarios (£m, 2019-20 prices)



Source: Welsh Government

The demand-led scenario has Welsh Government funding growing a little faster than in recent years, but not as fast as during the 2000s. Given the OBR's conclusion that this level of spending growth is unsustainable without tax increases, this scenario may well be regarded as implausibly optimistic, particularly once the effects of the epidemic on the public finances are taken into account.

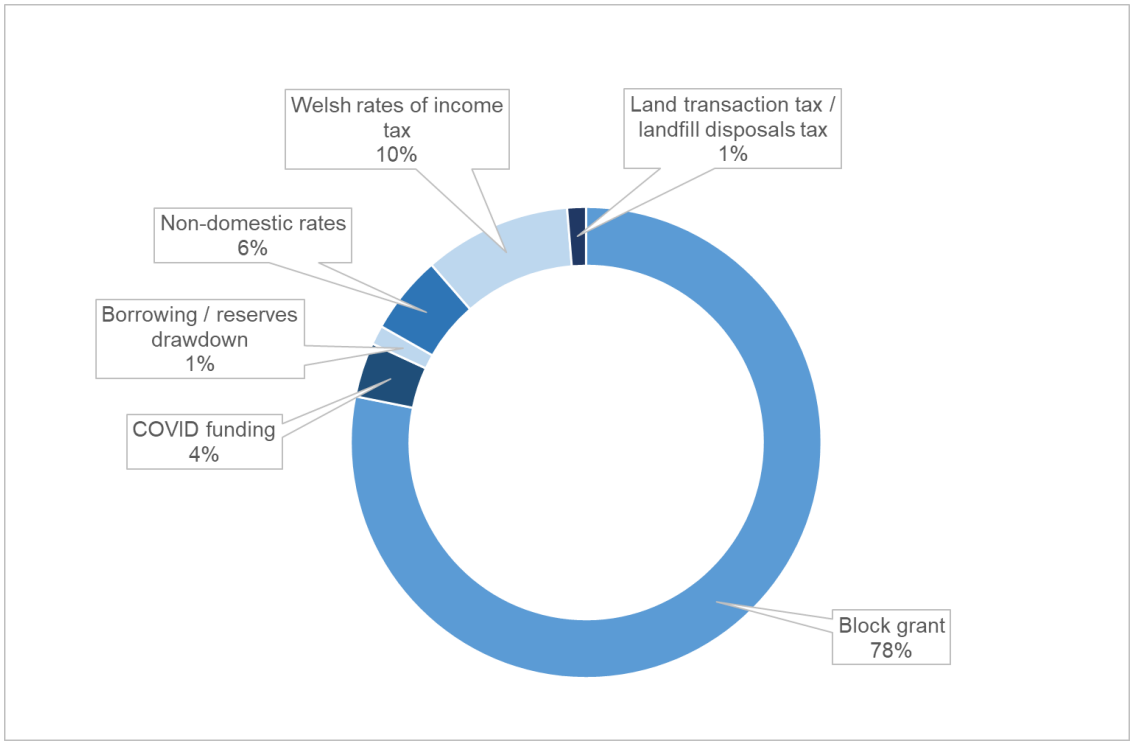
The lower scenario, in which the UK Government reduces public sector debt, would see the Welsh Government resource budget broadly flat in real terms.

Both the middle and lower scenarios, combined with an NHS budget which continues to grow at the same rate as announced for England for the next few years would mean funding for the rest of devolved public services falling in real terms over the next decade.

Welsh tax revenues

As a result of tax devolution, only around 80% of Welsh Government funding is now derived from the block grant (see Chart 20). More funding from tax revenues creates additional uncertainty and links funding to some UK Government taxes.

Chart 20: Financing of Welsh Government Draft Budget 2021-22



Source: Welsh Government

The OBR's Economic and Fiscal Outlook accompanying the UK Spending Review included new forecasts for the devolved taxes and for the UK taxes which are used to produce the block grant adjustments. Updated revenue forecasts and further detail is included in the OBR's Welsh Taxes Outlook published alongside the Welsh Government's draft budget.

The latest forecasts show all of the devolved taxes are down compared to March. See Table 2. Land transaction tax revenues are down in 2020-21 by £78m and by £57m in 2021-22. This is largely due to a worsening outlook for the residential and commercial property market in the short term.

Landfill disposals tax revenues are also down in both years, although more so in 2020-21, due to the effect of the pandemic.

The Welsh rates of income tax (WRIT) forecasts are down by £78m in 2020-21 and then £209m by 2021-22. This is mainly driven by a weaker UK income tax forecast.

Table 2: Devolved Tax Forecasts (£ million)

	2020-21	2021-22
Land TransactionTax	176	231
change from Mar-20	*-78*	*-57*
Landfill Disposals Tax	28	33
change from Mar-20	*-6*	*-1*
Welsh Rates of Income Tax	2,045	2,064
change from Mar-20	*-125*	*-209*
Total	**2,250**	**2,328**
change from Mar-20	*-208*	*-266*

Source: OBR

Whilst the forecast revenues from the devolved taxes have fallen, the overall financial impact on the Welsh Government's budget also depends on the associated block grant adjustments (BGAs).

The block grant adjustments for land transaction tax and landfill disposals tax for 2020-21 are updated with these latest OBR forecasts. The changes largely offset the impact of the reduction to tax revenues.

For budget purposes, the WRIT block grant adjustment and the WRIT revenue forecast for 2020-21 are both fixed at the March 2020 forecasts. The net impact of WRIT on the Welsh Government's budget for 2020-21 remains at +£13m. Any changes to UK and Welsh revenues will be taken into account in the reconciliation exercise once the 2020-21 outturn is available in 2022. For 2021-22 the latest BGA estimates is used.

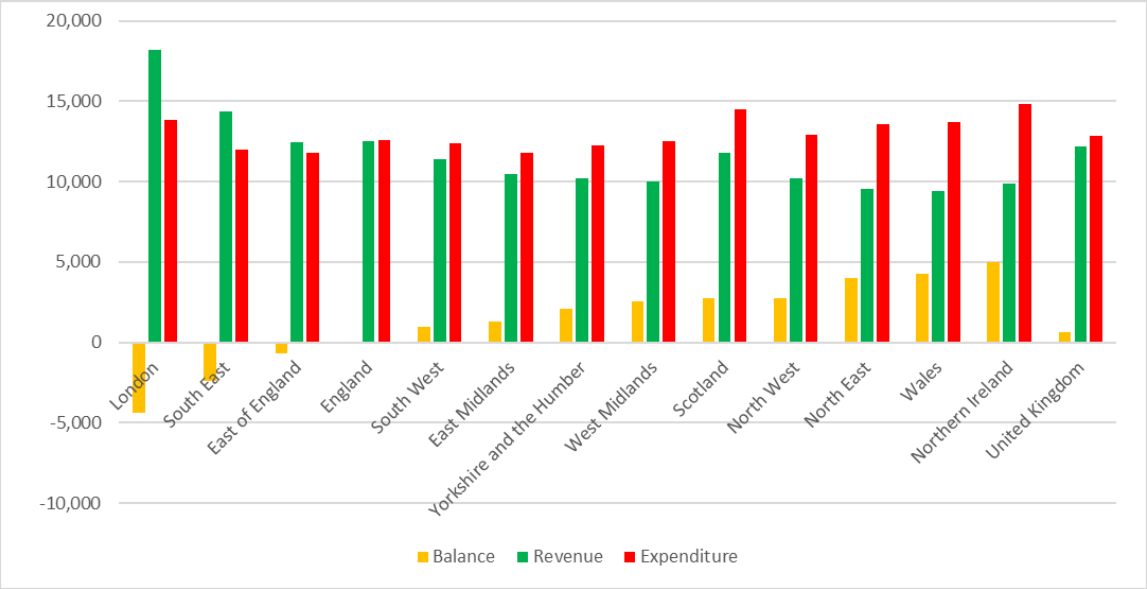
Fiscal balance

Chart 21 shows the fiscal balance for Wales and other UK countries and regions. A positive balance indicates expenditure higher than revenues.

Chart 21 also shows that public expenditure per head is higher in Wales than in most other UK countries and regions. This is as would be expected, given population age structures and other indicators of needs, although in the case of Scotland it also reflects a relatively generous level of funding from the UK Government.

Tax revenue per head in Wales is lower than any other UK country or region, though only a little below the figure for the North East of England. The underlying weakness of the tax base in Wales again reflects demographic factors, but also the relatively small number of high income earners in Wales.

Chart 21: Fiscal Balance per Head (£), 2018/19



Source: ONS Experimental Statistics
Notes: North Sea oil and gas revenues allocated on population basis

The large gap between revenue and expenditure for Wales represents a major transfer to Welsh people through the UK fiscal system, and this transfer is the main reason for the gap shown between measures of household income and GDP in Wales as shown in Chart 7. This reliance on fiscal transfers obviously represents a key risk to Welsh living standards.

Climate change

One particular fiscal risk that has been considered by the OBR is that associated with climate change.

In its latest analysis and advice[17], the Climate Change Committee, which is an adviser to both UK and Welsh Governments, has estimated that the overall cost to society of delivering net zero by 2050 could average around 0.5 per cent of GDP each year over the period to 2050. This is the estimate under its central "Balanced Pathway" scenario. The cost is estimated to be under 1 per cent of GDP under a wide range of scenarios.

These are net costs, and reflect a balance of higher investment - capital expenditure - and lower running costs. The CCC has estimated that the additional investment required in Wales could rise to around £3 billion by 2030.

A large part of these costs are attributable to decarbonisation of the energy system (broadly defined to include energy use in buildings, in industry and in vehicles, and the infrastructure for energy supply and carbon collection and storage). However,

[17] The Sixth Carbon Budget: https://www.theccc.org.uk/publication/sixth-carbon-budget/
The Path to Net Zero and Progress on Reducing Emissions in Wales:
https://www.theccc.org.uk/publication/the-path-to-net-zero-and-progress-reducing-emissions-in-wales/

there will also be significant costs associated with improving the energy efficiency of buildings and in some other areas.

Decisions on who should bear these costs are fundamentally matters of political choice, and it may be particularly appropriate for Government to take responsibility where cost would otherwise fall on those least able to bear them. However, the nature of the changes needed means that much of the cost will be borne by businesses and consumers as a result of changes to regulations, taxes and trading systems.

While costs are likely to somewhat higher in Wales than across the UK as a whole as a result of our industrial structure, these higher costs will be borne by business owners and consumers across the UK and beyond.

In its latest advice to the Welsh Government, the CCC states:

"This required increase in investment can, and should, be delivered largely by the private sector. These investment costs should not be interpreted as capital expenditure that would be delivered solely through the Welsh Government budget, nor as costs that only Welsh businesses and consumers have to bear. Many of the actions to reduce emissions will likely be paid for at UK level and/or socialised across the whole of the UK."

The extent to which costs in Wales are borne by the Welsh Government will, as just noted, be to some extent a matter of political choice. However, for illustration, if costs were allocated in proportion to GDP, the annual net costs to the Welsh Government could be around £100 million each year (rising with GDP).

Naturally, in so far as these costs are associated with "up front" capital spending expenditure may be very "lumpy" – higher (perhaps much higher) than £100 million in some years and lower in others.

This is of course an illustration of the possible costs of achieving net zero, rather than the partial contribution made by the current phase of the Low Carbon Delivery Plan, and it does not include adaptation costs, where improved flood defences in particular will also require significant investment.

It should also be noted that decarbonisation does not always imply additional spending, where some of the costs can be integrated into existing programmes and budgets, for example through redesigning support schemes or reprioritisation of existing spending..

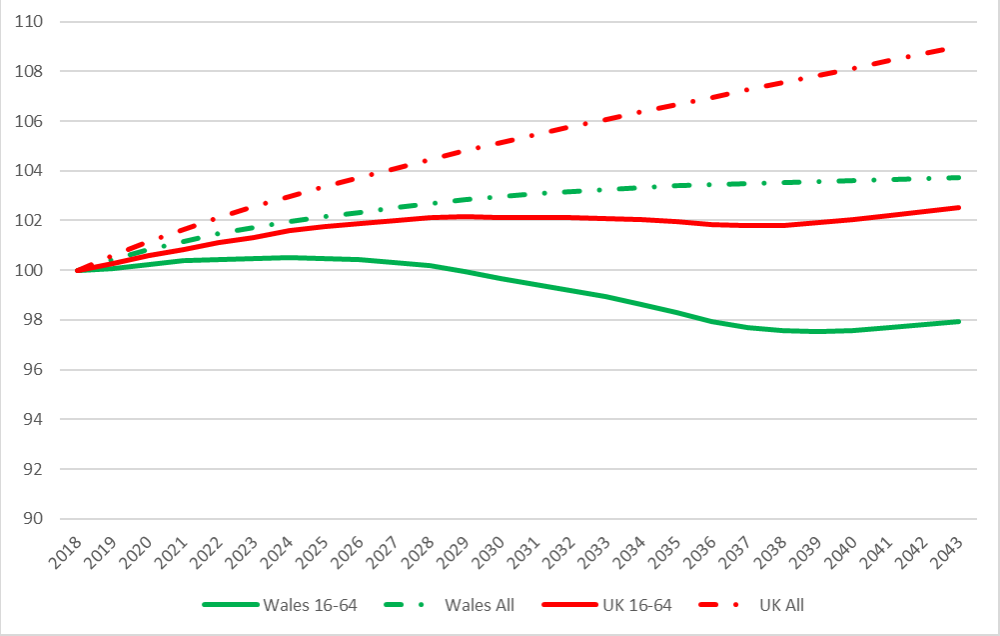
One way in which Welsh Government activities impact on carbon emissions is through the carbon that is "embodied" in the activities it undertakes and in the goods and services that it procures directly or through its partners. The Welsh Government is undertaking a programme of work to better understand the level of carbon emissions that result from its budgetary decisions through this channel, and the first, provisional and partial, analysis is included as an Annex to this report. More complete analysis will be available alongside the final Budget.

Demography

Population change poses a real fiscal risk to Wales. Wales has a higher share of older people in its population than the UK as a whole. However, the projected *changes* in share as the population ages into the future are similar so aging does not pose a direct risk.

In contrast, the latest principal population projections point to a major difference between Wales and the UK in terms of the size of the population that would be expected to be engaged in, or preparing to be engaged in, economic activity[18]. See Chart 22.

Chart 22: Principal Population Projections, 2018 =100.



Source: ONS, Welsh Government
Note: 16-64 cohort has been identified rather than "working age" as the latter is influenced by changes over time in the retirement age.

Chart 22 shows that in Wales, population aged 16-64 is projected to be broadly stable in Wales over the period to 2028, while it is rising across the rest of the UK. The cohort then decreases in size in Wales. Were this to transpire, such a trajectory would represent a risk to the – already relatively weak - tax base in Wales, both directly and also indirectly, as there is evidence that having an older workforce is likely to result in slower growth in productivity that would otherwise be the case.

[18] Projections are, of course, inherently uncertain, particularly in the context of changes to UK immigration rules.

Towards a Greenhouse Gas Assessment of the Welsh Government Budget

First Research Note: An Illustration the Data Development and Estimation Process

December 2020

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Yr Uned Ymchwil i Economi Cymru

1. Introduction and Background

In October 2020 the Welsh Economy Research Unit (WERU) was contracted by Welsh Government (WG) to assess the feasibility of developing a carbon assessment of Welsh Government budget expenditure. The agreed objectives were (broadly):

- To attempt an experimental/illustrative estimate of greenhouse gases (GHGs) associated with activity connected to the 2020/21 Budget, following established Scottish Government concepts, coverage and techniques as far as practicable;
- To allow users to engage in 'what if' scenarios; whereby the illustrative GHG consequences of different spending choices could be assessed in real time by moving expenditure between different expenditure groups;
- To report on the key statistical, data and estimation issues that might currently block the development of a realistic and robust estimate of the GHG impacts of WG spending.

In this first research note we report on the initial attempt to estimate the GHG emissions associated with the expenditure undertaken under the Health and Social Care Major Expenditure Group (MEG) in 2020/21 (2nd Supplementary Budget) – approx. £9.9bn (including AME but in this research note excluding capital spend of £400m).

2. Methodology[19]

Environmental and carbon accounting and impact analysis (typically) requires a detailed set of financial and environmental accounts for the territory in question. WERU has for many years collated and published Input-Output (IO) Tables for Wales, together with various extensions including Tourism and Environmental Satellite Accounts. However, the last published Tables (with environmental extensions) were for base-year 2007[20]. The experimental methodological task then was broadly as follows:

1. To estimate the carbon equivalent GHGs (in kilotonnes of CO2e) associated with the economic sectors described in the 2007 IO Tables, and to locate these carbon estimates within the Welsh IO framework incorporating any feasible update to 2018 data.
2. To place this extended IO framework into suitable modelling structure such that the GHG emissions associated with WG Health and Social Care spending could be assessed.

The consequent estimate would then:

1. Effectively be territorial in nature; that is, describe GHG emissions arising in Wales (a 'territorial' measure) not those consequent on the production of imported goods (i.e. **not** a 'consumption' measure[21]),
2. Be conceptually comparable to those emerging from Scottish Government carbon assessments,[22]
3. Include the direct and 'indirect' or 'multiplier' effects of this spending; for example, as WG funded trusts bought electricity or fuel to heat/light their hospitals, and carbon was emitted either from onsite fuel burn or supplying power stations,
4. Exclude 'second round' emissions, for example as patients drive their cars to hospitals for treatment,
5. Act **not as a 'real', reliable estimate of emissions consequent on WG health & social care expenditure,** but rather as an illustration of the

[19] All sources and full methodology will be detailed in upcoming reports.
[20] See here
[21] Due to data and modelling limitations we assume **all** WG spending occurs in Wales in the first instance. For more information of production versus consumption approaches in a Welsh context see Turner, K.et al. 2011. Incorporating jurisdiction issues into regional carbon accounts under production and consumption accounting principles. Environment and Planning A 43(3), pp. 722-741.
[22] but see later discussion.

challenges associated with obtaining such an estimate – in health, and by extension in other thematic areas.

3. Data

Emissions

The emissions data for this exercise were drawn from the National Atmospheric Emissions Inventory's (NAEI), Greenhouse Gas Emissions Inventories for Devolved Authorities (for 2018)[23]. The data are available by emissions source, but whilst there is great detail (over 200 combustion, enteric, land use, and other emitter classes) this does not map well to the 88 industrial sectors reported in the IO Tables for Wales. For example, the NAEI reports 32 agriculture, forestry and fishing emission sources which are fitted within two IO categories, whereas the single NAEI 'Miscellaneous industrial/commercial combustion' category must be allocated across 24 Input-Output sectors[24]. This allocation is time consuming (and manual) but given the emissions profile across sources – concentrated heavily into a small number of well-defined agricultural, industrial and transport sectors – not actually important in shaping the final estimates.

Input-Output Tables

More problematic are the issues associated with obtaining a full economic accounting for Wales in 2018. A separate (internally Cardiff Business School funded) project is seeking to develop updated Input-Output Tables for Wales, and when complete, this framework would be 'home' to our emissions estimates. However, a combination of resource reallocation due to COVID, researcher availability, and a recruitment freeze, means this project is progressing slowly. Initial estimations of the 2018-base year framework have (as of Dec 2020) highlighted a number of structural and other issues that require some thought to ensure the Tables are robust and useful going forward.

This first estimate therefore uses a hybrid approach, effectively marrying 2018 emissions by source with the financial 2007 IO framework. We consider this a less-bad option than basing our estimates on a problematic 2018 IO Table, but it does raise issues. The key disadvantage is that sectors which have declined in economic output since 2007 will have their GHG intensity under-estimated (per-£1m of output) and the reverse is true for expanding sectors. However, the supply chain relationships which drive the (extremely important) indirect/multiplier GHG impacts are well developed and well understood the 2007 Tables (albeit, they are old) and, importantly, the use of suitably amended 2018 GHG estimates means that key emissions trends – for example in Welsh energy generation which has moved from coal to gas and renewables – are accounted for, and our overall sector GHG

[23] https://naei.beis.gov.uk/reports/reports?section_id=4

[24] Using estimates from prior-published more detailed emissions data.

estimate tallies with the NAEI at around 31 Megatonnes[25]. We also undertake a broad inflation-adjustment of sector output/GHG intensity to account for the use of 2020 GHG data with 2007 financial data.

Our estimation process will be improved iteratively for future reports and notes, but we are not now in a position to guarantee a full set of published 2018 Input-Output Tables within the lifetime of this project.

Health and Social Care Expenditure

In order to estimate the GHG emissions associated with WG health and social care spending in Wales, we must estimate the 'pattern' of spend by individual commodity/industry. Ideally, this would be by the 88 sectors (currently) reported in the IO Tables, and in each case estimating the spend within Wales, as well as outside. We would also ideally require a full accounting of revenue versus capital spend across the piece to a similar disaggregation.

We are some way from this ideal. This is firstly, because Wales does not have a full set of official regional accounts (in IO format), which would detail regional institutional health & social care spending by commodity and, in the Wales case at least, be largely analogous to WG MEG spending. Secondly, estimating the vector of health & social care spending from scratch is extremely difficult due to the institutional complexity of the sector: WG disburses money to health trusts, local authorities and others who then use that money (often via further subcontract) to address the MEG priorities. We have not yet been able to establish if there is a central accounting of procurement by purpose, commodity, or company within WG, or whether such an estimate is possible in collaboration with the Welsh Local Government Association (WLGA), NHS colleagues and others[26].

In the absence of accurate and up to date estimates of MEG spending, we have a number of options based on extant resources;

- Use UK health & social case spending, available in an Input-Output vector from the UK Analytical IO tables ;
- Use partial IO data gleaned from a WERU projects with NHS Trusts in Wales and with NHS Wales[27];
- Amend Results from the relevant health & social care elements of other UK IO tables, including those for Scotland, and earlier Tables for Wales;

[25] Here, excluding household emissions

[26] Recommendations on the development of statistical resources and institutional approaches will be part of our final report.

[27] *The NHS and the Regional Economy,* Welsh Economy Research Unit, 2018. Available from Dr. Annette Roberts, robertsa1@cf.ac.uk

- Use the full 88-sector Input-Output vector developed during a project examining the spending of the Aneurin Bevan Health Board[28].

We have used the spending of the Aneurin Bevan Health board to estimate the 'pattern' of overall MEG spend in health and social care, inflating the over £1bn of spending (in 2012) to the £9.9bn total required. These data are old, and of course not indicative of wider MEG spending or carbon impacts (for example spending by the Welsh Ambulance Service will be much more fuel and hence CO2 intense, but not captured here[29]). However, for this experimental purpose the detail in the ABHB data by all 88 sectors and including staff/agency wage spend – enables us to track better the causal relationships developed in the impact analysis, and identify any issues or weaknesses in the process.

4. Results

Our initial estimate is that the spending under the Health and Social Care MEG as outlined in the 2nd Supplementary Budget would contribute to 1.56Mt (mega tonnes or millions of tonnes) of CO2-equivalent greenhouse gas emissions from Wales, assuming this was all spent within Wales, and including indirect effects. This is equivalent to around 4.0% of Wales' total territorial emissions in 2018.

Figure 1 The GHG Emissions Associated with Health & Social Care MEG in Wales (CO2 equivalents)

Broad Sector	tonnes	tonnes
Agriculture & other primary	240,000	15%
Manufacturing	172,000	11%
Energy, Gas & Water	514,000	33%
Construction	176,000	11%
Private Services	28,000	2%
Transport	198,000	13%
Public Sector & other services	232,000	15%
Total	**1,560,000**	**100%**

[28] https://wer.cardiffuniversitypress.org/articles/abstract/10.18573/j.2012.10439/

[29] The data do show purchases from the Ambulance Trust by ABHB but without a relevant IO sector for the Ambulance Trust it cannot be traced further.

5. Observations on the Initial Results

- The process of GHG estimation seems, in broad terms to 'work'. The model translates WG spending (subdivided by Aneurin Bevan Health Board commodity spend) into the GHG emissions patterns we might intuitively expect in terms of direct and supply-chain impacts.
- Overall levels of Health and social care emissions, at 4.0% of the total territorial emissions for Wales, seem reasonable: we think Health and social care spending constitutes around 5% (estimated) of total Welsh economic demand.
- Emissions intensity of Health & Social Care spending at 157t per £1m, is (roughly) comparable to the Scottish Health & Sport spend-intensity of 125t/£m.
- Emissions arise across all Welsh sectors, but energy & utilities are responsible for a third.
- The estimation of GHG emissions due to the household spending of those with income from Health and social care related employment is extremely complex. Our initial estimate (via entering household spend as an IO vector) resulted in a very large GHG estimate, which needs further investigation.
- For this note, we have constrained these 'health and social care wage emissions' to 770,000 tonnes based on information on GHG emissions from household transport & heating[30], but we are fully aware this element of impact needs much more thought and we are currently not fully accounting for indirect household emissions via, for example food purchases.

6. First Thoughts & Next Steps

This first, illustrative analysis has demonstrated the significant limitations that exist in terms of current data availability and modelling structures in terms of how we represent the GHG impacts of Welsh Government spending. We would point at this stage to;

- The relatively good availability of data on territorial GHG emissions data for Wales, reasonably up to date and by the sectors that matter.
- The relative paucity of economic data, where current ONS Regional Accounts are not in the 'shape' required (insufficient sector disaggregation) and do not

[30] From the NAEI database; before allocating to IO sectors)

have the coverage needed (only really GVA reported; no data on intra-regional purchases etc.).

- The lack of any bespoke data on how Welsh Government budgets are distributed over different Welsh and imported commodity/industry groups by MEG or any other thematic grouping – these data would be required for any reliable 'what if' analysis that involved moving money between headings and assessing the carbon consequences.

We do however also note that even this indicative analysis highlights some key characteristics of the carbon consequences of Welsh Government spending that are worthy of note:

- For this MEG, and likely for revenue spending across the majority of the (seven) MEGs, the 'direct and indirect' carbon consequences are likely to be at or slightly below the carbon-intensity of Welsh economic demand overall.
- The largest single element, by far of WG Health and social care-consequent emissions is in the energy sector (largely indirectly arising via supply chains). What then drives decarbonisation in this regard is not marginal changes within the way health boards spend money (or likely moving money between, say health and education), but in the ongoing decarbonisation of energy (heat & electricity) supply in Wales.
- Other decarbonisation improvements – for example in this case, renewable self-generation or energy efficiency measures in hospitals, are extremely difficult to capture in 'backward looking' IO Tables. Although these tables can be of some use in modelling the potential impact of such investment, they are not strictly necessary.
- Where, as in the health sector, case a high proportion of spend is staff wages, GHG impacts will be driven by the behaviours of households in allocating the resultant income. Our estimate[31] here is that around half of health and social care emissions are due to this household vector.

The next Research Note relating to this project will;

- Report on the feasibility and cost of improving the IO framework so that there is a greater proportion of more recent economic data underlying the analysis;

[31] Problematic and subject to revision.

- Extend our analysis to cover all WG MEGs using currently available data;
- Include an illustrative vector of capital spend to compare with revenue spend;
- Following discussions with Scottish Government, revise the methodology to match that approach more closely.

It is important to note that following this initial research note, our feeling is that we are some way away from a statistical and modelling architecture that could robustly reflect the 'real world' GHG impacts of Welsh Government spending. Moreover, it is worth noting that the Scottish process we are seeking to replicate is firstly, not under active development having proved limited in its application[32] and secondly, not able to capture the 'second round' emissions, caused by citizens using government provided services like roads and hospitals, that are likely an important element of territorial GHG emissions.

[32] Despite being a statutory budget requirement since 2012