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# Distributional analysis of devolved public spending in Wales

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# Distributional analysis of devolved public spending in Wales – summary for Budget 2021-22

## Introduction

1. The Welsh Government has undertaken analysis to investigate who benefits from spending on devolved public services in Wales. In particular, this work looks at the impact of public spending on households in different parts of the income distribution.
2. As well as providing some broad results for Wales, this work has enabled the Welsh Government to explore the strengths and weaknesses of such analysis - the assumptions required and the limitations. This report includes a description of the methodology, a summary of the analytical results, and a brief discussion of the issues raised. It will inform the Welsh Government's future approach to distributional analysis and its potential for use as part of the budgetary process.

## Background

3. In recent years the Welsh Government has developed the capacity to analyse the distributional impact of taxes and benefit changes in Wales. Over the last 12 months, it has been working to complement that work by looking at who benefits from devolved public service provision in Wales (sometimes referred to as 'in-kind' benefits).
4. The Budget Improvement Plan<sup>1</sup>, published for the first time alongside the Welsh Government's 2020-21 draft Budget, and updated as part of the 2021-22 draft budget package, outlines the Welsh Government's vision to improve the budget process over the next 5 years. One element of this plan is to explore the potential for developing a Welsh distributional model to analyse the impact of public spending across the income distribution and to test any model arising from this work to determine its usefulness and credibility. This report provides the first substantive update on this element of the plan.
5. The analysis of the distributional impact of public spending also acts as part of improvements to information published around the annual budget to inform future strategic budget decisions. This approach will be consistent with giving due regard to the need to reduce inequalities of outcome as a result of socio-economic disadvantage, in line with the Socio-economic Duty<sup>2</sup> which will come into effect on 31 March 2021.

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<sup>1</sup> For more details see <https://gov.wales/sites/default/files/publications/2019-12/budget-improvement-plan.pdf>

<sup>2</sup> For more information see; <https://gov.wales/socio-economic-duty>

6. The Equalities and Human Right Commission (EHRC)<sup>3</sup> published a report in 2018 which used distributional analysis to show the impact of changes in public spending over the last decade in Wales, England and Scotland. The work was undertaken by Landman Economics. This form of analysis of public spending has also been published at the UK level by the Office for National Statistics as part of its annual release on the impact of taxes and benefits on household income<sup>4</sup>. HM Treasury<sup>5</sup> has used similar techniques in analyses accompanying its Budgets. The methods used in these publications were considered as part of the work underpinning this report.

## **Method**

### *Approach*

7. The analysis requires a public spending microsimulation model. This combines data on aggregate public spending with survey micro-data on the usage of public services by households, linked to household income information.
8. The methods adopted have been determined by data availability. There are considerable data constraints in this area with no single information source which identifies all public service usage in Wales alongside detailed income information.
9. The analysis undertaken by the Welsh Government most closely resembles that by Landman Economics for the EHRC. The Welsh Government appreciates the cooperation and openness it has received from Landman Economics. This has helped greatly in the production of the analyses presented in this report. This work has also looked to extend and build on the recommendations provided by Landman Economics wherever possible.
10. This work was also assisted by a Wales Doctoral Training Partnership Student internship scheme.

### *Scope of public spending*

11. The model covers devolved public spending in Wales, looking at those public services provided or funded by the Welsh Government and/or local government.
12. Data constraints mean that it is only possible to present the analyses at an all Wales level. It is recognised that there are differences in funding levels and

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<sup>3</sup> Available at <https://www.equalityhumanrights.com/sites/default/files/cumulative-impact-on-living-standards-of-public-spending-changes.pdf>

<sup>4</sup> For more details see;

<https://www.ons.gov.uk/peoplepopulationandcommunity/personalandhouseholdfinances/incomeandwealth/bulletins/theeffectsoftaxesandbenefitsonhouseholdincome/financialyearending2019>

<sup>5</sup> For example see;

[https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/871883/Budget\\_2020\\_DA\\_publication.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/871883/Budget_2020_DA_publication.pdf)

the way services are provided in different local areas which could affect the distributional impact of public spending. However the detailed information which would be required to present analyses at a sub-Wales level is not available.

13. This analysis only includes resource spending - day-to-day expenditure on public service provision such as staff costs. There is a fairly direct link between this type of expenditure and the benefit to recipients of the service. Capital expenditure is not included, partly because that link is much less direct. For example, capital investment in schools may not benefit those in education at the time of the expenditure. It is more likely to benefit future pupil cohorts who attend a new or renovated facility.
14. The analysis uses public spending estimates for 2019-20, and not the current financial year. Public spending in 2020-21 is likely to be an atypical year in terms of total public spending and in the areas of government which may have seen large increases, primarily to manage the pandemic. Given the estimates of public service use are taken from over the last few years, they are not likely to be reflective of this year's public service spending.
15. The analysis includes health, education and social care for older people. This accounts for around £11bn of devolved resource spending in Wales in 2019-20, representing around two-thirds of the total. This information is from detailed devolved spending data by function, as recommended by Landman Economics. It excludes UK Government spending in Wales.
16. The spending on each programme is shared across everyone who is identified or estimated to be using the service. The methods used to do this are laid out in the following sections.
17. The Welsh Government will consider whether potential future iterations of this work can suitably include any other elements of devolved public spending.

#### *Income data*

18. The purpose of this analysis is to show public service use by household income. One of the most detailed data sources available for this purpose is the Family Resources Survey (FRS)<sup>6</sup>. It underpins the analysis presented here.
19. Household income is estimated by aggregating post-tax income and benefits across all household members. Households are then ranked according to their income<sup>7</sup>.

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<sup>6</sup> For more details see <https://www.gov.uk/government/collections/family-resources-survey--2>

<sup>7</sup> Household income is adjusted to reflect different household composition. This adjustment, or equivalisation process, is intended to make income more comparable and reflect standard of living across different household types. The equivalisation process uses the modified OECD equivalence scale.

20. The FRS, whilst very detailed, does not have a big enough single year sample size in Wales to produce all the estimates required for this form of analysis on a robust basis. To address this, a three year pooled dataset has been used; aggregating the samples from 2015-16, 2016-17 and 2017-18, all uprated to 2019-20 values.

#### *Identifying service use*

21. To be able to model public services and assign public spending to people and households, it is first necessary to be able to identify who uses public services. There are two main methods to do this in this analysis. For some public services there is evidence about usage in the FRS, the same data source as provides the household income information. For other services, usage information is not available in the FRS. Here an out-of-sample prediction method has been used. The characteristics of persons or households who use the service are observed from other data sources and a statistical model has been produced to link this information to those with the same characteristics in the FRS to predict public service use.

#### *Measuring education use*

22. Education can be directly observed in the FRS. Adults and children are identified as users of this public service according to whether they are currently engaged in primary, secondary, further or higher education.
23. Means tests are applied to higher education student funding, according to household income. This determines shares of student finance (loan and grant) spend for individuals who are reported as being in higher education.

#### *Measuring health use*

24. Health service use is not identified in the FRS. Models have been generated to look at the characteristics of people who use different health services, such as GP services, based on data from the National Survey for Wales<sup>8</sup>, as recommended by Landman Economics. Those models have then been used to transfer expected health care usage to those with the same characteristics in the FRS.
25. The characteristics in the model are chosen based on whether they help explain health service usage and are also present in the FRS. The key characteristics in this instance are age, gender and indication of a longstanding illness.
26. The expected usage of health services is then refined, where possible, with data on frequency and intensity of service use. For example, whether the individual had a hospital appointment can be complemented with the number

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<sup>8</sup> For more details see <https://gov.wales/national-survey-wales>

of visits and average duration of stay. Frequency and intensity of use, where applied, vary by age and gender.

### *Measuring social care use for older people*

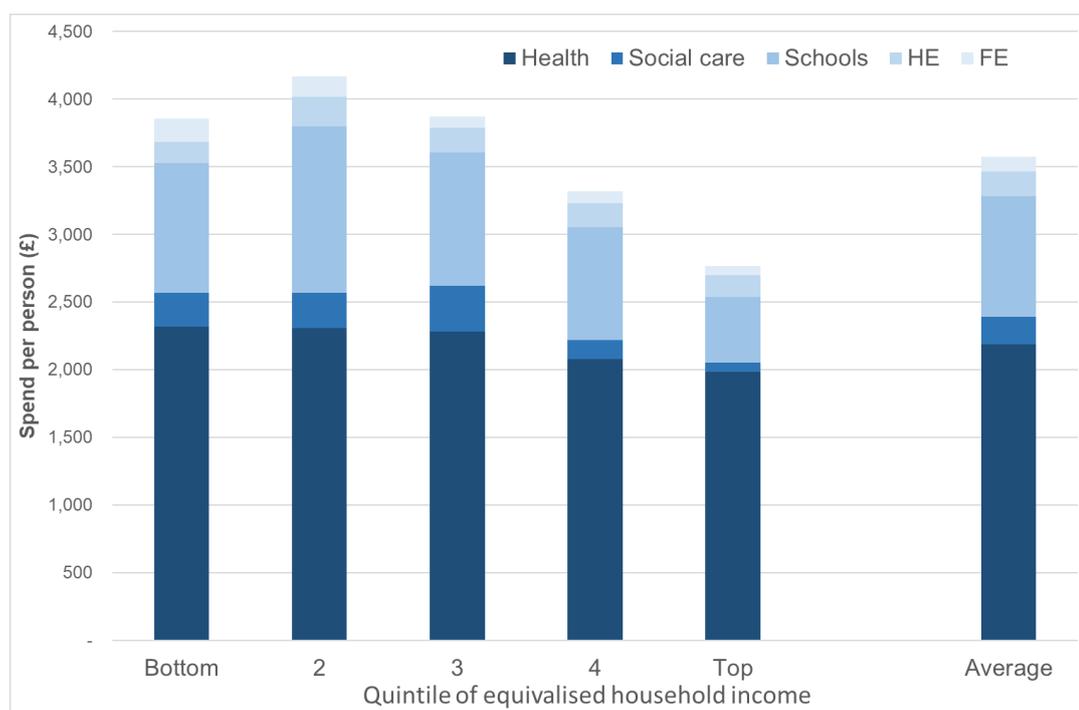
27. Domiciliary social care use can be directly observed in the FRS. Residential care cannot be directly observed as the FRS is a household survey which does not include care homes. An out-of-sample prediction method has been used, with the probability of going into residential social care estimated via a model. This probability is applied to over 65s in the FRS as a proxy measure for residential care use. The probability estimates are taken from Landman Economics based on data from the English Longitudinal Survey of Ageing (ELSA). Whilst this data only covers people in England, it is the most suitable source in the absence of equivalent data for Wales.

28. Capital and means tests, using the financial information provided in the FRS, are also applied to estimate the level of public provision of both residential and domiciliary social care for older people.

## **Results**

29. The results of the Welsh Government's modelling of the distributional impact of devolved resource public spending in Wales is shown in figure one. It shows that overall, across the public service areas included, spending is progressive with respect to income. However, it is not uniformly progressive by quintile of income.

**Figure one: Resource spending in Wales by household income and public service, 2019-20**



30. The chart shows that those households in the lowest income quintile may benefit less per person than the second and third lowest quintiles. However, those in the top two quintiles (the top end of the household income distribution) benefit less than those with lower incomes.
31. Health spending is found to be progressive with respect to income across the whole income distribution. However, there is relatively little variation across the quintiles.
32. All forms of education spending are found to be broadly progressive with respect to household income. School spending is progressive, partly because a relatively higher proportion of households with school age children are in the lower quintiles. Further education spending is also progressive, focused as it is in the lower income quintiles. Higher education is somewhat progressive, but with little impact in the lowest income quintile. This is because, even with a means test applied for student grant funding, those identified as attending higher education are least likely to be in the lowest income households.
33. Social care for older people is also relatively progressive, although proportionately more is spent on households in the third (middle) quintile. This is in part because a larger proportion of older people are in that quintile, driving a higher share of spend, even once the capital and income means tests are applied.
34. More detail on these individual elements is shown in the annex.

### **Issues with measuring the distributional impact of public spending**

35. Distributional analysis of public spending raises a number of conceptual and methodological issues. Some of these are laid out in this section.

#### *How to value public services?*

36. Unlike analysis of the tax and benefit system, public service spending does not relate directly to financial transfers between individuals, households and the government. This raises issues around how to value the services involved. The assumption applied to this analysis is that the value is equal to the average cost of providing the service. This may not equal the value to the recipient or to society more widely. However, it may represent a value close to what those who receive the service would otherwise have to pay. Therefore this analysis shows those parts of the household income distribution which receive relatively greater shares of public spending, albeit indirectly.
37. The inclusion of preventative spend is not well suited to this form of analysis. It can be considered a form of social investment, reducing the need for spending in the future. However, while potentially worthwhile, those future benefits are very difficult to capture in distributional analysis of public

spending. The beneficiaries may well differ from those who are currently identified as receiving a public service.

38. Changes in quality of service will only be captured if it has a direct and proportional impact on the cost. This analysis can only identify those who are likely to be receiving a particular public service and how much it costs to provide it. If in future years the analysis is to be used to look at changes in funding, then some additional consideration may be required regarding how quality of service can be reflected in addition to funding changes.

#### *Who receives the service and benefit?*

39. The analysis has focused on the forms of public service where those who may benefit from it are also those who receive the service. Whilst it may be possible to identify the recipients of public services from the survey data, this does not necessarily align with all those who benefit from the spending. For example, students attending school benefit from receiving an education. But the guardians or parents also benefit from the government paying for their children's education and also an element of childcare. These are both captured by conducting this analysis at the household level. However, education and other public services have wider societal benefits which are much harder to capture in this form of analysis and are not included here.

#### *Data and estimation issues*

40. The analysis involves a 'top-down' approach to measuring spend and the recipients of public services. It has not looked to model each detailed programme individually. Some programmes are designed to be more targeted, benefiting specific sections of society or specific geographic locations. These detailed aspects have not been included because of resource and data limitations.
41. The data used for this analysis, even though it has focused on broad service areas, is still constrained and in places relies on small samples of people living in Wales. This is despite pooling survey data over three years. Therefore, extending the analysis to look at more specific programmes and policy areas would require alternative methods and/or a boost to the Family Resources Survey sample for Wales.
42. Data constraints may also affect the precision of some of the results reported here. However, this is not expected to affect the overall results and conclusions. In general, the strengths of distributional analysis are in showing broad patterns rather than precise estimates of financial impacts in individual sections of the income distribution.
43. There is scope for further investigation of, and potentially for improvements to, the methods employed in this analysis to allocate public service usage. However, this is to some extent limited by the range of variables and characteristics in the available datasets.

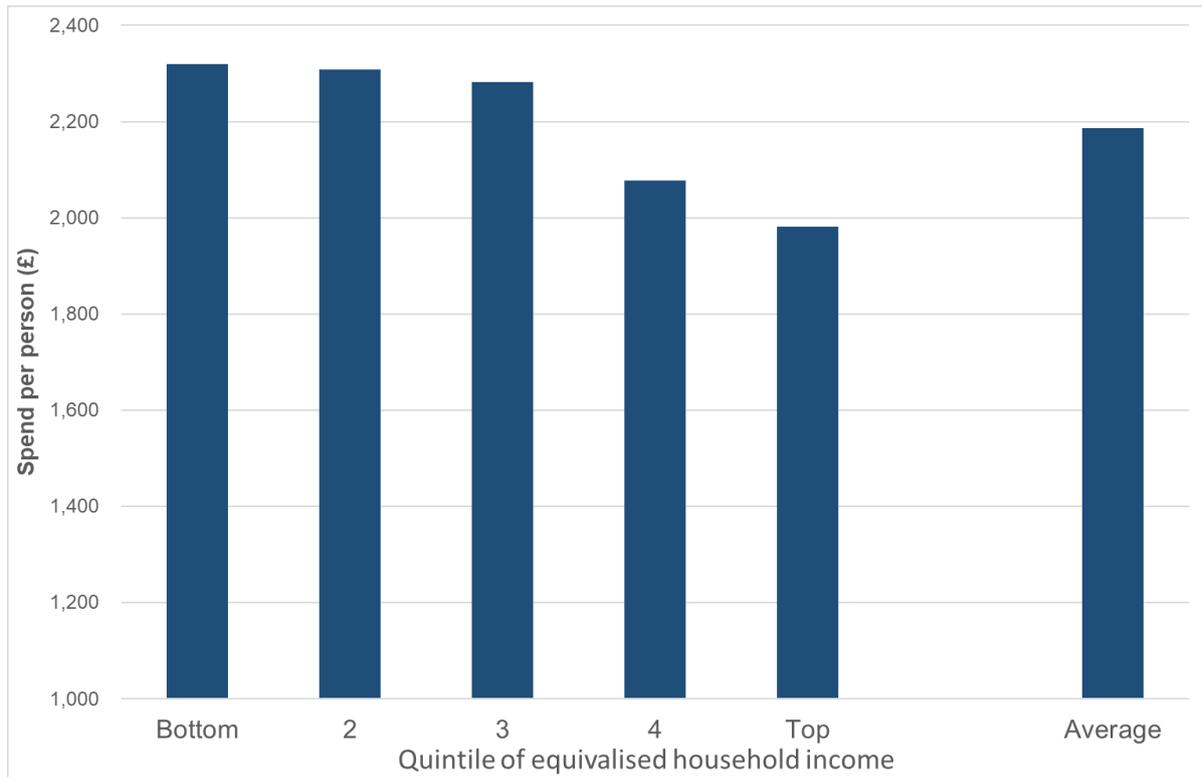
## Conclusions and Next steps

44. The distributional analysis of devolved public spending is a new and innovative area for the Welsh Government. It shows that across the main elements of devolved public services in Wales, expenditure is generally progressive with income, although there is some variation across different programme areas.
45. In time, this form of analysis has the potential to form part of the Welsh Government's budgetary process. The aim is for this type of analysis to form part of the suite of information accompanying future budgets. Its capacity to inform individual decisions as well as broad strategic thinking will depend on the availability of data in specific areas.
46. The Welsh Government will also look to enhance the modelling and methods used to improve the analysis where possible. This will include updating the data and spending year used here and exploring other potential data sources to refine the existing estimates where possible.
47. The Welsh Government will also explore the possibility of analysing the beneficiaries of public spending by metrics other than income, including protected characteristics. This will depend on data availability and having suitable sample sizes which can be used to analyse other characteristics of interest.
48. We welcome feedback from interested stakeholders to help inform our approach to enhance this analysis in future years. Feedback can be shared via the Welsh Treasury's email address - [WelshTreasury@gov.wales](mailto:WelshTreasury@gov.wales) / [TrysorlysCymru@llyw.cymru](mailto:TrysorlysCymru@llyw.cymru). We also envisage that Welsh Treasury's stakeholder engagement mechanisms – as set out in the published Budget Improvement Plan - can also be used to discuss this analysis with interested stakeholders to inform future developments.

## Annex

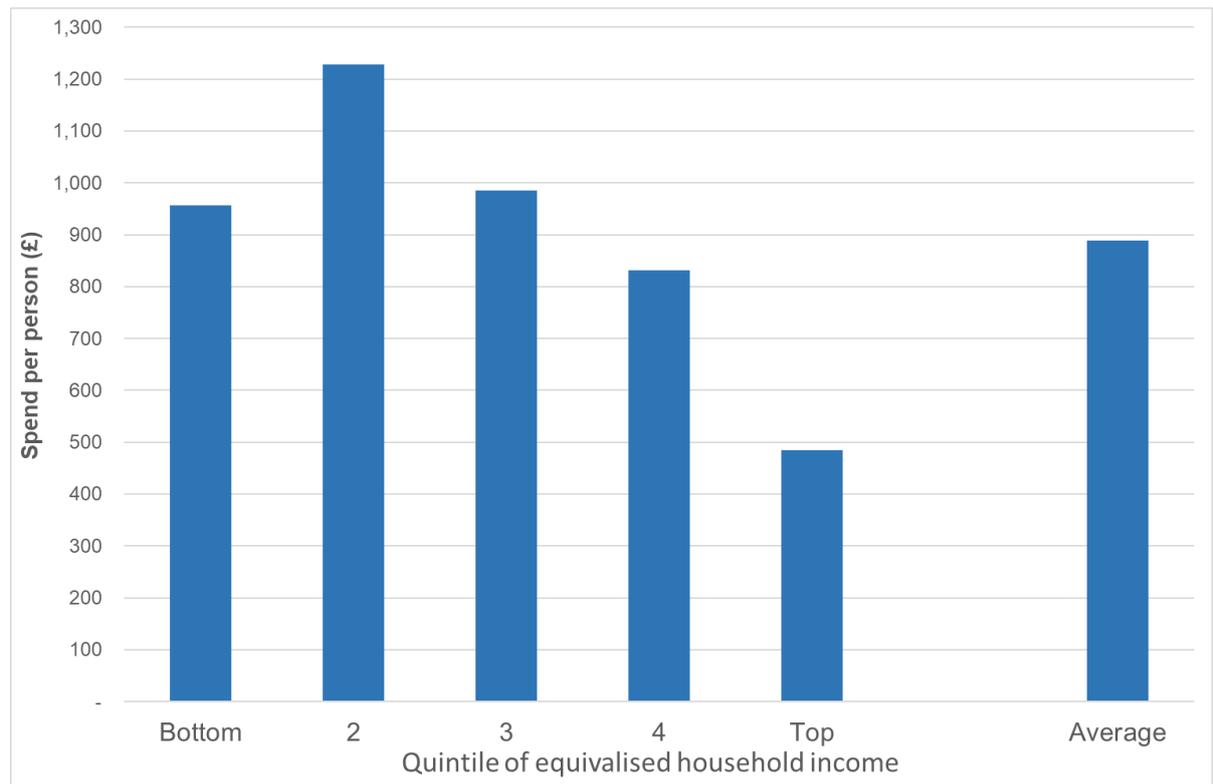
1. Resource spending on health is estimated to be progressive with respect to income (figure A1). More resource spending on health is attributed to people in the lowest income quintiles than average and higher income households. Spending in the lowest income quintile is around six per cent higher than average and spending in the highest quintile is around nine per cent lower than average.

**Figure A1: Health resource spending in Wales by household income, 2019-20**



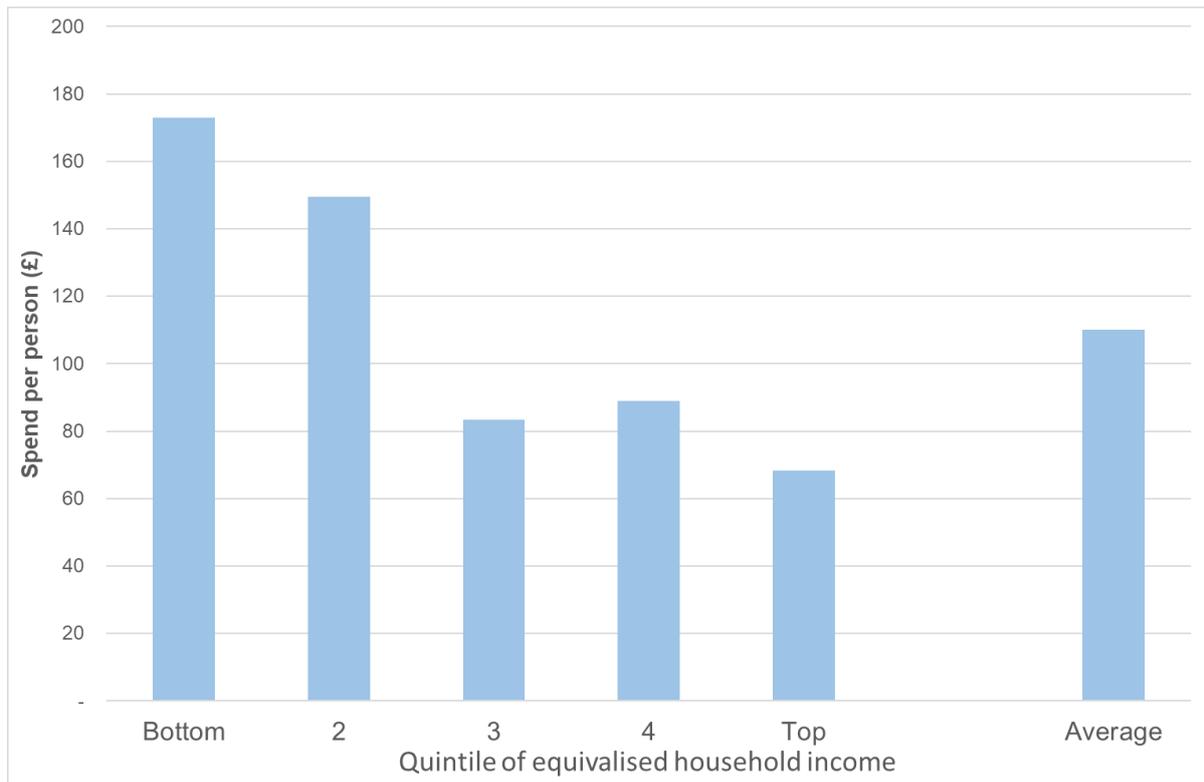
- School resource spending is also found to be progressive with respect to income (figure A2). Spending per person is eight per cent higher than average in the lowest income quintile and 38% higher than average in the second quintile. This is because, on average, more children of school age are in the second quintile. Spending per person in the top quintile is only 55% of the average. This is because relatively few school age children are observed in high income households.

**Figure A2: Schools resource spending in Wales by household income, 2019-20**



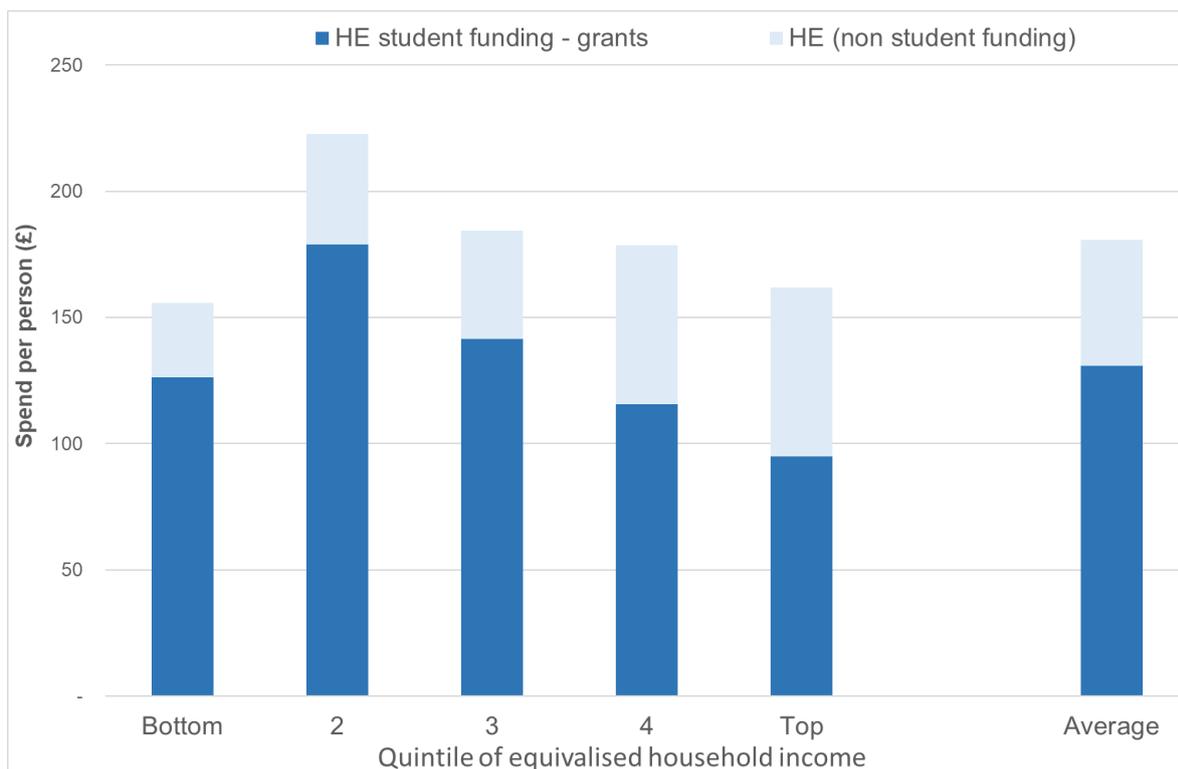
- Resource spending on further education is found to be highly progressive with respect to income (figure A3). Spending in the lowest income quintile is 57% higher than spending in the average household. Whereas spending in the highest income quintile is 62% of the average.

**Figure A3: Further education resource spending in Wales by household income, 2019-20**



4. Spending on higher education is estimated to be broadly progressive with respect to income. The analysis includes funding for higher education institutions and student grant funding. Spending per head is below average in the lowest income households but is higher than average in the second and third quintiles. Spending per head in the highest quintile is also below average. This result reflects two factors: people who attend higher education tend to be from higher income households, but also the means-tested grant funding provides more to those who come from lower income households.
5. These findings exclude all forms of student loans, part of which are classified as public expenditure. It is deemed unlikely that all student loans will be repaid in full, as the terms for repayment are income contingent and time-limited. The element that is not repaid is counted as public expenditure and estimated at the time the loans are made. The distributional impact of that public expenditure element is difficult to estimate and, for individual loans, will depend on the future incomes of today's students rather than the incomes of their current domicile.

**Figure A4: Higher education resource spending in Wales by household income, 2019-20**



6. Resource spending on social care for older people is generally found to be progressive with respect to income (figure A5). Spending in the lowest income quintile is 20% higher per head than average. Spending per head in the highest income quintile is only 34% of the average. However, this relationship with income is not uniform, with the highest spend per head amongst those in the middle (or third) quintile. This pattern applies to resource spending on both domiciliary and residential care provision.
7. The means tests (income and capital) for social care have been applied, which makes this form of spending more progressive than otherwise. However, the dominant effect is that more people in the middle income band are identified as being in receipt or expected to be in receipt of social care for older people. This is primarily because there are more older people in this income band.

**Figure A5: Social care for older people resource spending in Wales by household income, 2019-20**

