



Llywodraeth Cymru
Welsh Government

Welsh Government

Distributional analysis of devolved public spending in Wales

December 2023

gov.wales

Distributional Analysis of Public Spending in Wales: update for December 2023 draft budget

Introduction

1. This report provides an updated analysis of the distributional impact of devolved resource public spending in Wales. Previous reports were published alongside the draft budgets in December 2020¹ and 2021². The analysis covers programmes representing the majority of the overall budget and finds devolved resource spending to be generally progressive across the household income distribution, with some variation across the different areas of spending examined.
2. This report:
 - i. briefly describes the methodological approach adopted in the analysis,
 - ii. discusses the strengths, weaknesses, and uses of such an analysis, and
 - iii. documents the data and methodological improvements included in this edition.

Methodology

3. The key objective of the distributional analysis is to show public service use by household income. One of the most detailed data sources available on household incomes comes from the Family Resources Survey (FRS)³. The FRS sample for Wales has been pooled over three years to improve the robustness of the analysis that is presented here.
4. Using the FRS data, post-tax and benefit incomes are estimated using a microsimulation model called UKMOD⁴. Post-tax and benefit incomes are then aggregated across household members to produce an estimate of household incomes in Wales. Households are then ranked according to their income - by quintile - from the poorest fifth to the richest fifth⁵.
5. Data on household incomes are combined with public service use information, to assign public spending across individuals and households across the income distribution. The focus here is on resource spending, i.e., day-to-day expenditure on public service provision, as there is a fairly direct link between this type of expenditure and the benefit to the recipient of the service. Capital expenditure has been excluded from the analysis, as that link is less clear.

¹ Available from: <https://www.gov.wales/distributional-analysis-of-devolved-public-spending-in-wales>

² Available from: <https://www.gov.wales/distributional-analysis-of-devolved-public-spending-in-wales-2022-2023>

³ For more details see <https://www.gov.uk/government/collections/family-resources-survey--2>

⁴ *Richiardi M, Collado D, Popova D (2021). UKMOD – A new tax-benefit model for the four nations of the UK. International Journal of Microsimulation, 14(1): 92-101. DOI: 10.34196/IJM.00231.*

⁵ 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.

6. Public service use is identified in the analysis in two main ways. It is either observed directly in the FRS, as is the case for some elements of education provision. Or failing that, it is estimated using an out-of-sample prediction method. In such cases, the characteristics of a person or household who use a service are observed from another data source, such as the National Survey for Wales. A statistical model is used to link this information back to those persons or households with the same characteristics in the FRS, which contains information on their incomes. Their predicted service use is then used to allocate spending across households.

Strengths, weaknesses, and uses of distributional analysis

7. Distributional analysis of public spending raises a number of conceptual and methodological issues. The first [Distributional Analysis of Devolved Public Spending in Wales](#) publication explored these issues in detail.
8. In general, the strengths of distributional analysis are in showing broad patterns, rather than precise estimates of financial impacts within individual sections of the income distribution. It can help to provide a backdrop to strategic thinking about broad spending priorities, and it allows some broad inferences to be drawn regarding the overall impact of devolved public spending on different households in Wales, albeit indirectly. The assumption applied in this analysis is that the value of a service is equal to the average cost of providing it. However, this may not equal the value to the recipient, or to society more widely.
9. Moreover, as the analysis involves a 'top-down' approach to measuring spend, as well as the recipients of public services (focussed on the average user), it is not detailed enough to shed light on the impacts of individual policy programmes, or specific changes between budgets. It is also not well suited to some spending programmes, for example those that focus on preventative spend or certain target populations or geographic areas. In the case of the former, those benefitting from the spending may well differ from those currently receiving the services. And in the latter, the more detailed aspects of those targeted populations or geographic areas may not be possible to capture due to data limitations.

Data and Modelling updates

Data

10. The updated analysis uses a three-year pooled dataset from the FRS covering 2018-19, 2019-20 and 2021-22. Data for 2020-21 have been excluded due to the impact of the coronavirus pandemic on FRS responses and sample size that year. (Previous iterations of the analysis used a pooled FRS dataset covering 2015-16, 2017-18 and 2018-19 respectively).
11. In several instances, public service use is predicted using the National Survey for Wales dataset. The analysis uses the latest data available here for 2022-23,

and also utilises new questions added to the National Survey to help refine the estimates of households' use of both health and higher education services.

Modelling

12. The model currently covers health, education, transport, and the majority of adult social care spending. It accounts for £17bn of devolved resource spending in Wales, representing around 70 per cent of the total. The numbers presented relate to the latest spending plans for 2024-25, as shown in the draft Budget, published on 19 December 2023.
13. For health, transport, higher education (grant spending) and the non-residential aspects of social care, service use is now based on data from the National Survey for Wales. Service use for all other elements of education is based on data from the FRS, and residential social care use for older people has been estimated using an out of sample prediction method, similar to previous years⁶.
14. In previous iterations of the analysis, the health module drew on data from the National Survey for Wales for information regarding service use, and the Patient Episode Database Wales (PEDW) to estimate frequency of health service use. Whilst the National Survey enabled a detailed out of sample prediction for service use, the PEDW data was more limited. It did not provide information on the characteristics of patients. This resulted in a detailed out of sample prediction model for those using services, but far more restricted prediction of the intensity of use. To overcome this issue, additional questions were added to the National Survey in 2022-23, resulting in detailed data on those who use health services in Wales, and the frequency of that use. This has enabled a more robust model upon which to allocate health user spending for GP, health visitor, and hospital inpatient and outpatient appointments in this update.
15. A change has also been made to the way in which higher education maintenance grant spending across household income quintiles is determined. Rather than assigning grant spending to students living in Wales, the approach adopted in this update is to attribute grant spending to households in Wales with children at university. This allows for the appropriate household income means test to be applied, in order to distribute grant spending across household income quintiles.
16. This version of the distributional analysis also takes account of the upcoming policy change regarding Free School Meals eligibility in 2024-25, with all primary age children at state-run schools eligible.

Results

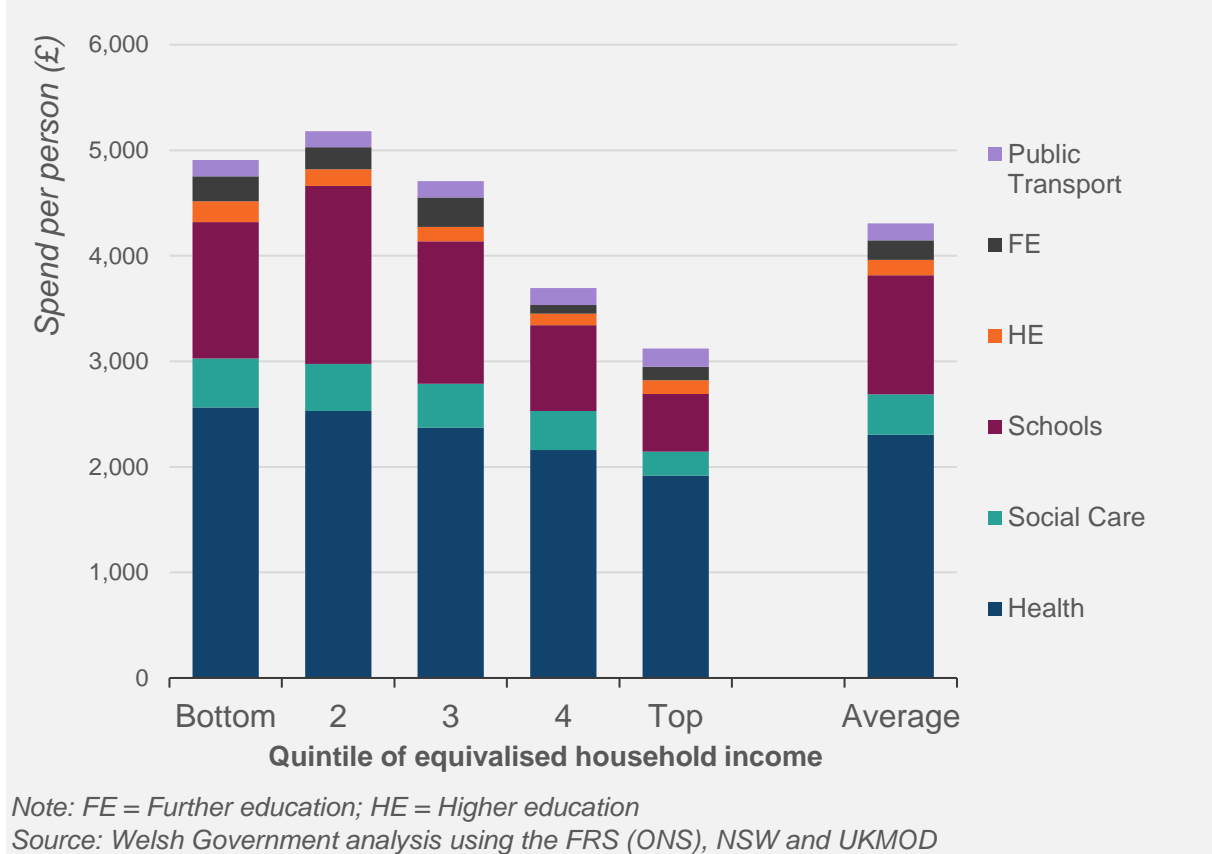
17. **Figure 1** below presents the updated analysis in full, including the new developments incorporated this year. The results presented here are based on UKMOD version B1.09. UKMOD is maintained, developed, and managed by the Centre for Microsimulation and Policy Analysis at the Institute for Social and

⁶ This utilises information from the English Longitudinal Study of Ageing (ELSA).

Economic Research (ISER), University of Essex⁷. The results and their interpretation are the authors' sole responsibility.

18. The overall picture presented remains consistent with previous iterations of the analysis: overall, across the public service areas included, spending is progressive with respect to household income. However, it is not uniformly progressive by quintile of income. More detailed analyses are presented in the Annex.

Figure 1: Devolved resource spending in Wales by main service area, 2024-25



Future plans

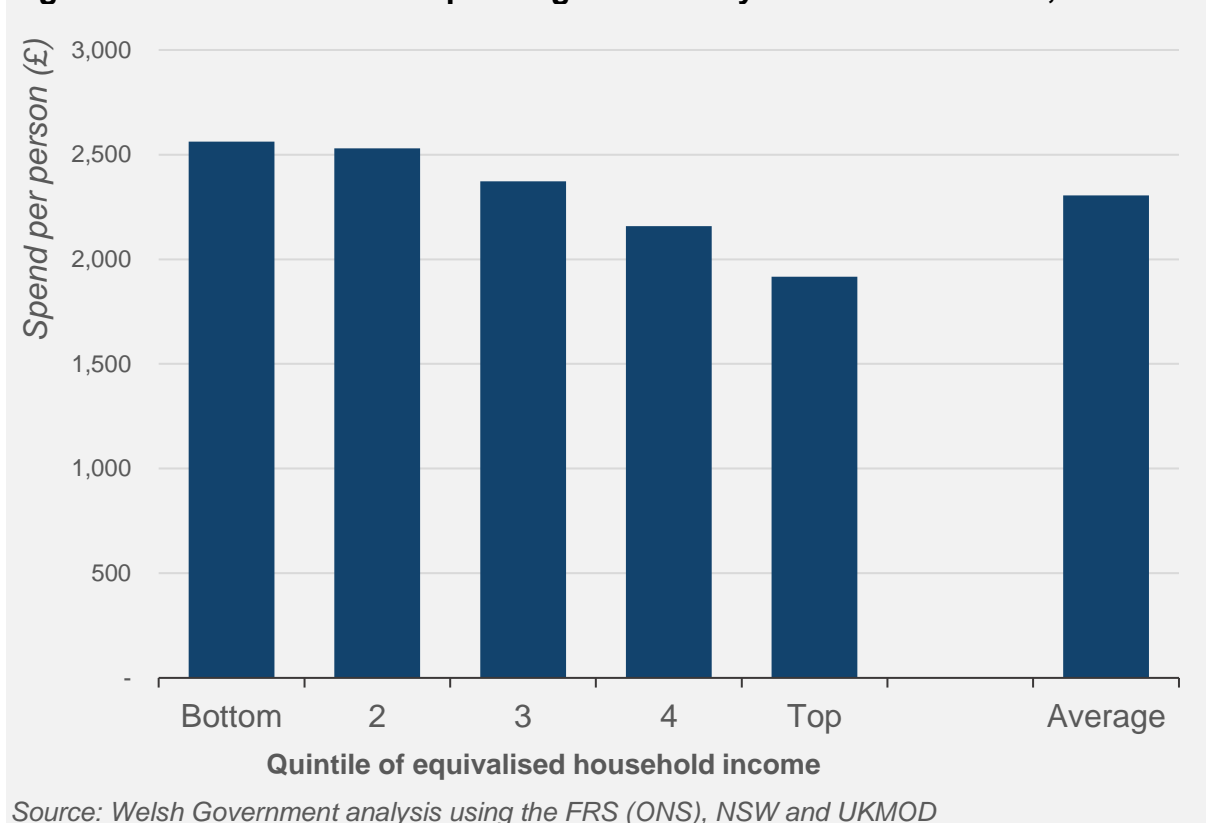
19. The work and analyses required to update the distributional analysis will be kept under review. Decisions about future updates will be based on the availability of substantive data or methodological improvements. Otherwise, the underlying relationships captured by the analysis are unlikely to alter significantly from year to year.
20. Opportunities surrounding the analysis more generally will continue to be explored, as there may be occasions to explore new data linking methods. Developments in equivalent distributional analyses published by the UK government and other devolved governments will also be monitored, with a view to incorporating any future improvements where feasible.

⁷ Richiardi M, Collado D, Popova D (2021). **UKMOD – A new tax-benefit model for the four nations of the UK**. *International Journal of Microsimulation*, 14(1): 92-101. DOI: 10.34196/IJM.00231.

Annex

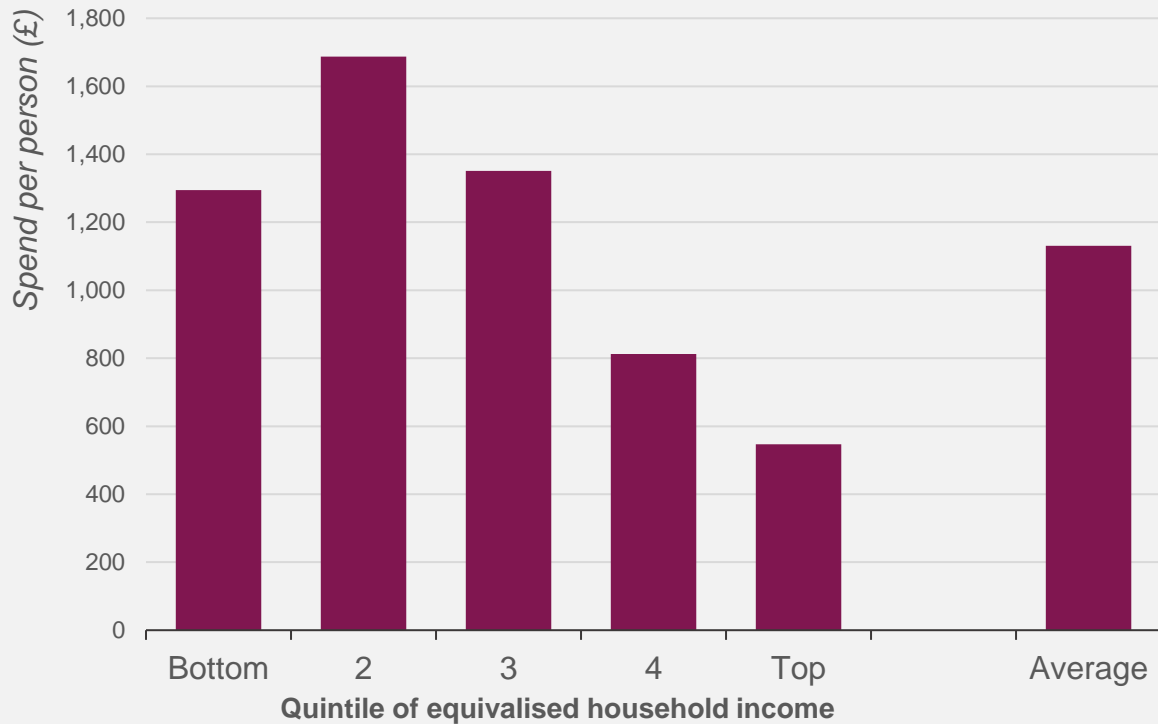
1. Resource spending on health is estimated to be progressive with respect to income (figure A1). More resource spending on health is attributed to people in the lowest income quintiles than average and higher income households. Spending in the lowest income quintile is around six per cent higher than 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, 2024-25



2. School resource spending is also found to be progressive with respect to income (figure A2). Spending per person is 14 per cent higher than average in the lowest income quintile and 49 per cent 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 48 per cent of the average. This is because relatively few school age children are observed in high income households.

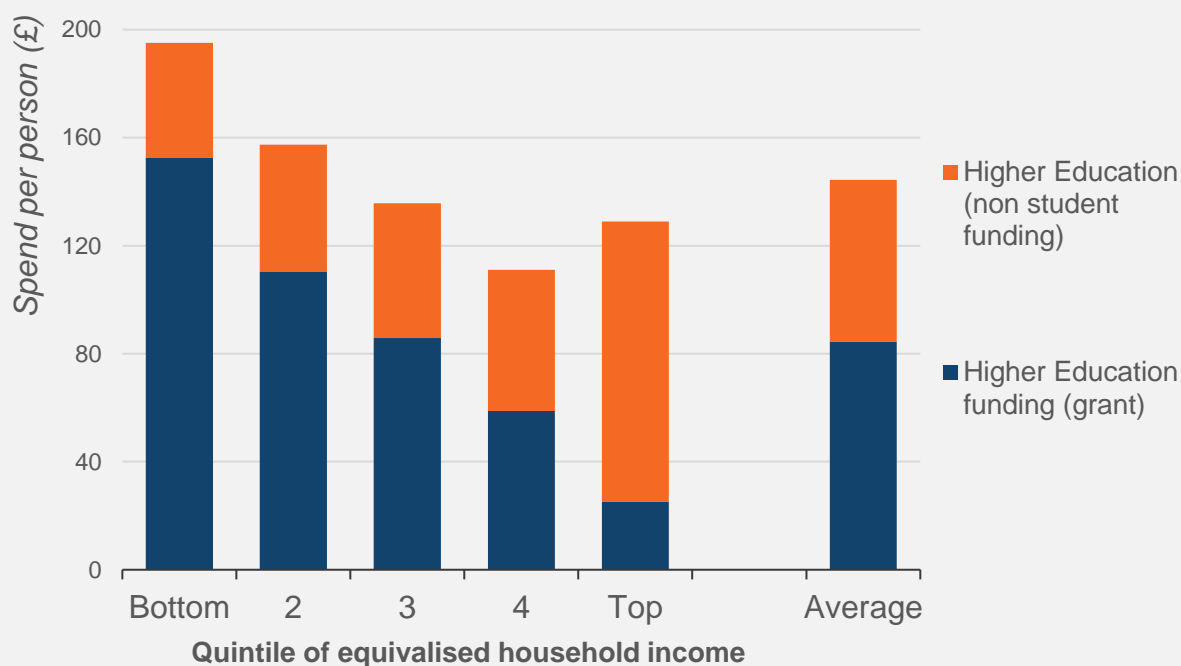
Figure A2: Schools resource spending in Wales by household income, 2024-25



Source: Welsh Government analysis using the FRS (ONS), NSW and UKMOD

3. Spending on higher education is estimated to be highly progressive with respect to income. The analysis includes funding for higher education institutions and student grant funding. This result reflects two factors: people who attend higher education tend to be from higher income households, but this effect is largely offset by the means-tested grant funding, which provides more to those who come from lower income households.
4. 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.

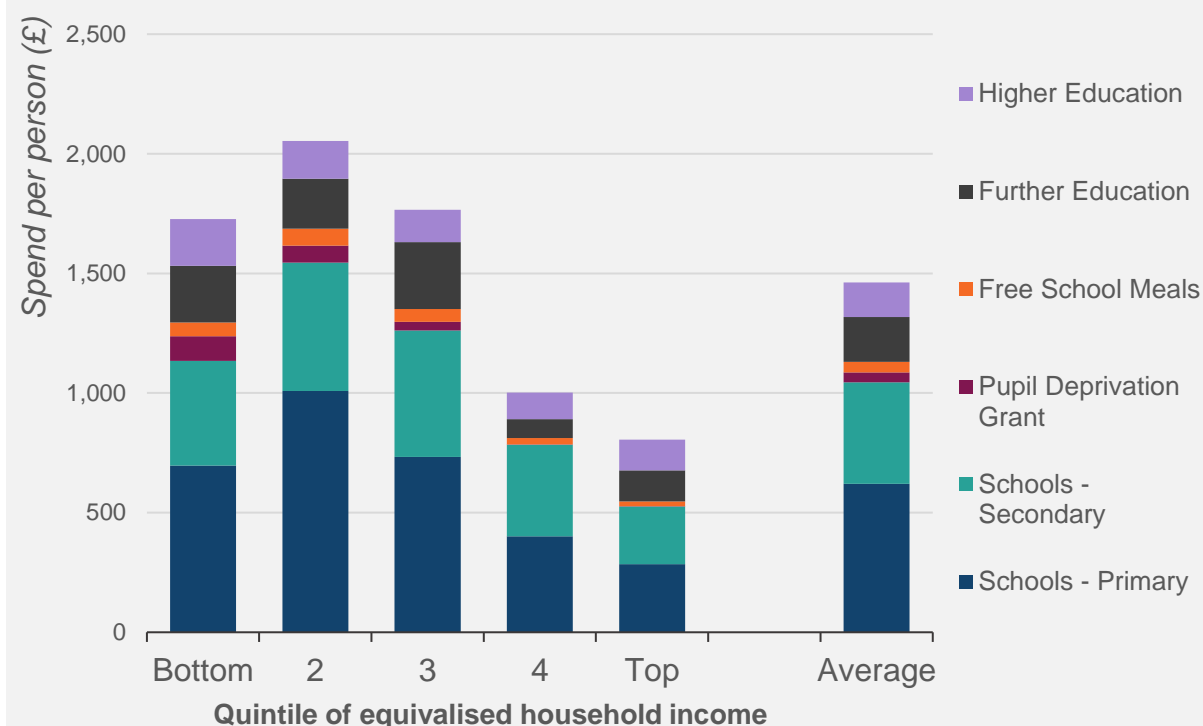
Figure A3: Higher education resource spending in Wales by household income, 2024-25



Source: Welsh Government analysis using the FRS (ONS), NSW and UKMOD

5. Figure A4 below shows devolved resource spending in Wales on education combined. Given the distribution of all the elements shown above, in particular for schools which constitutes over two-thirds of education spending, overall education spend is found to be broadly progressive.

Figure A4: Devolved education resource spending in Wales by household income, 2024-25



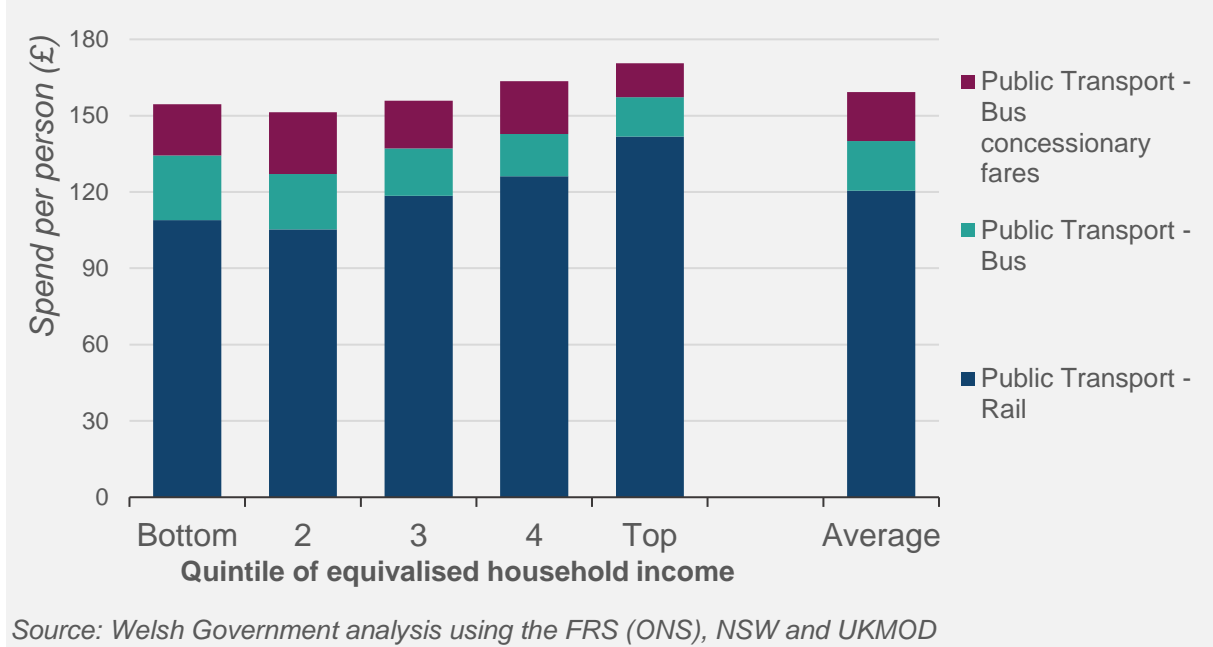
Source: Welsh Government analysis using the FRS (ONS), NSW and UKMOD

6. The results for the new addition of public transport spending (Figure A5 below) suggest that resource spending overall is relatively flat with respect to household income. Spending on bus services is progressive, but rail subsidies are not. This is broadly consistent with the findings by the ONS for UK public spending on bus and train fare subsidies⁸.
7. This analysis only captures spending on those predicted to use the service, consistent with the other service areas. It does not capture any of the potential wider societal benefits that might be associated with any form of public spending. These elements are much harder to capture in this form of analysis and are not included here, consistent with all other versions of distributional analysis in the UK to date. It is also worth noting that the rail usage information employed in this analysis is not limited to those services which are devolved in Wales. It may be that the income profile of those using devolved services is different from those using non-devolved services.
8. Within each quintile, there would likely be variations in usage between individuals. Some individuals may use transport frequently whilst others might only use services comparatively little or not at all. The analysis here does not pick up this horizontal equity dimension, however, it is important to recognise the

⁸ Available from: [Effects of taxes and benefits on UK household income - Office for National Statistics \(ons.gov.uk\)](https://ons.gov.uk/effects-of-taxes-and-benefits-on-uk-household-income)

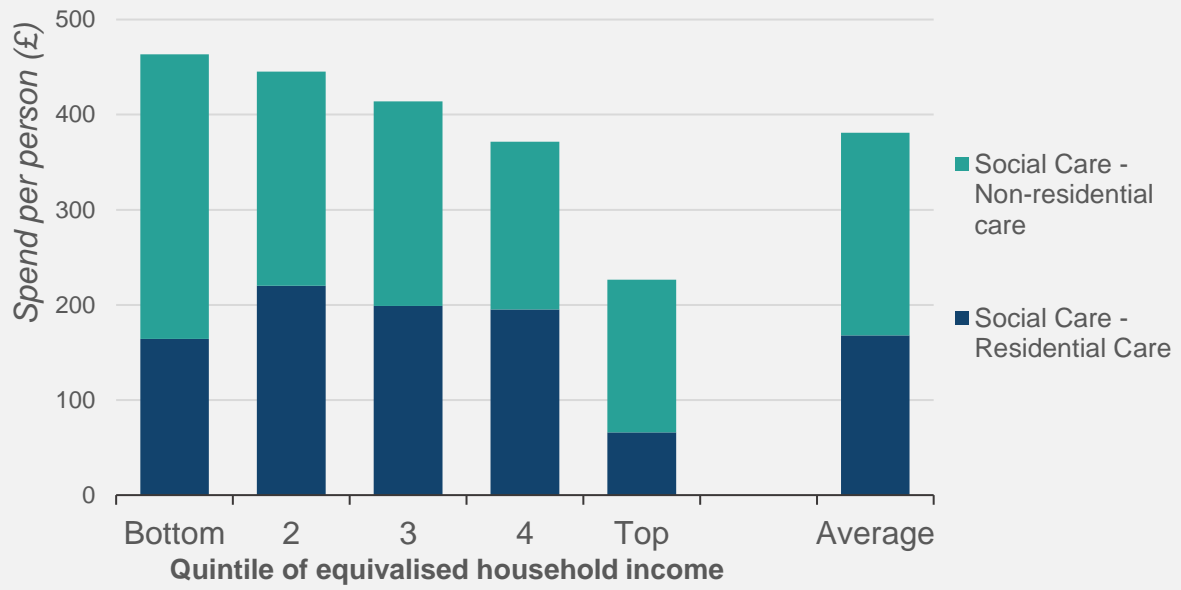
likely variation in usage, particularly given the balance of rural and urban communities in Wales.

Figure A5: Devolved transport resource spending in Wales by household income, 2024-25



9. Resource spending on social care for adults is found to be progressive with respect to income (see figure A6). Spending in the lowest and second income quintiles is 22 and 17 per cent per head higher than average, respectively. Spending per head in the highest income quintile is only 59 per cent of the average.
10. The relationship with income is not uniform for residential social care for older adults, with spending per head highest amongst the second, third- and fourth-income quintiles. The predicted use of older adult residential care is also highest amongst these three quintiles – and increases from quintile to quintile. However, in spending terms, the impact of increasing predicted use is tempered by the application of the capital and income means tests for residential care.

Figure A6: Social care for adults resource spending in Wales by household income, 2023-24*



Note: Residential care only modelled for older adults due to data limitations.

Source: Welsh Government analysis using the FRS (ONS), NSW and UKMOD