Technical Annex on the Foundation Formula

Introduction

Aside from social care services, local authorities provide a wide range of other public services, such as central services, waste services, planning, leisure and sports, cultural services, environmental health services, public transport (including bus services), concessionary travel, flood defence, and coastal protection. The current structure of local government is based on a two-tier system, with lower tier authorities ('shire districts') and upper tier authorities ('shire counties') being responsible for different service areas. Single-tier authorities also exist that deliver both tiers of services, such as London boroughs, metropolitan districts, and unitary authorities.

We assess the relative needs across local authorities for these service areas using two separate simple formulas, one for each tier. The formulas use authority-level data on deprivation and the number of commuters and domestic tourists, as well an adjustment for input costs. An expenditure-based regression is used to determine the formula shares. The need for a few non-social-care services (highways maintenance, home-to-school transport, temporary accommodation, and fire and rescue services) is assessed using several bespoke formulas.

Methodology

The following detailed steps would enable the reproduction of the formula shares. Note the terms in **bold** are explained in detail in the technical definitions part below. The approach outlined in this technical annex was reviewed by the Institute for Fiscal Studies (IFS) as part of their technical peer review[1].

Key Inputs

Expenditure

We use the **net current expenditure (NCE)** on lower tier and upper tier non-social-care services by each authority for the 2021/22, 2022/23 and 2023/24 financial years. The Foundation Formula **control totals** are used to determine this value, which is based on **Revenue Outturn (RO)** data.[2] The expenditure data is transformed to be in millions of pounds.

Residents

[1] A technical peer review of MHCLG's suggested approach to allocating funding between English local authorities

[2] The methodology of how the control totals are calculated is provided in the Control Total Technical Annex.

We use the Office for National Statistics (ONS) mid-year population estimates[3] as the measure of the total residential population of an authority. For future years of the multi-year settlement, we use the ONS 2022-based subnational population projections[4].

Commuters

We use the Census 2021 origin-destination data on place of work to estimate the total number of commuters for each authority[5]. The data is used to calculate two values for each authority: the total number of residents in an authority whose workplace is in the rest of the UK (referred to as 'out-commuters') and the total number of residents elsewhere in the UK whose workplace is located in the given authority (referred to as 'in-commuters').

There have been a number of structural changes to local government since the 2021 Census, with new unitary authorities formed from the merger of non-metropolitan districts. The origin-destination data is transformed to reflect these changes, with in-commuters whose origin and destination lie within the new unitary authority being excluded from the total in-commuter count.

We use the number of net in-commuters as its measure of commuter flow. This is calculated by subtracting the number of out-commuters from the number of in-commuters for each authority. This is done to reflect the potentially lower need for non-social-care services from residents who travel outside of the authority for work.

Domestic Day Visits and Visitor Nights

We estimate the number of domestic day visit and overnight stays by residents in England using the annual Great Britain Tourism Survey (GBTS) run by VisitBritain.

We use the **'tourism day visit' (TDV)** definition of domestic day visits. This would exclude visits by residents within the same authority as much as possible. For overnight stays, we use a measure of total **bed nights** across all journey purposes (holidays, visiting friends and relatives, and business). This would capture need generated by overnight domestic visitors across their entire stay in an authority.

VisitBritain has previously published estimates of total day visits and visitor nights for each local authority, based on three-year rolling averages. The most recent data is for the three-year period from 2017 to 2019. VisitBritain has additionally produced a 3-year average county-level data set, covering the period from 2022 to 2024[6]. We use the latest county-level data to estimate the level of domestic tourism for each authority, apportioning the county-level totals

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[3] https://www.nomisweb.co.uk/datasets/pestsyoala

[4] Population projections for regions by five-year age groups and sex, England - Office for National Statistics

[5] Origin-destination data, England and Wales: Census 2021 - Nomis - Official Census and Labour Market Statistics

[6] Domestic Tourism, regional and subregional data | VisitBritain.org

based on the 2017-2019 within-county shares. The apportionment will be done separately for the day visitor and the visitor night measures.

The data on day visitors and visitor nights is presented in terms of annual volume. The annual volume values for both types of domestic tourists will be divided by 365 to estimate the average daily volume of tourists coming to an authority.

Deprivation

We use a measure of relative deprivation based on the latest **Index of Multiple Deprivation (IMD)**[7] score of an authority. The average score measure[8] is to summarise the average level of deprivation across both lower tier and upper tier authorities, based on the scores the **Lower Super Output Areas (LSOAs)** in the area. The measure is population-weighted, to take account of the fact that LSOA population sizes can vary.

Expenditure-based regression

We use an **expenditure-based regression approach** to derive the RNF shares for the Foundation Formula.

Dependent variable estimation

We use a measure of expenditure-per-capita adjusted for area costs as the **dependent variable** of the regression. A **GDP deflator**[9] is first applied to the formula expenditure for the 2021/22 to 2023/24 financial years so that it is expressed in constant 2024/25 prices. A 3-year average of the real term formula expenditure is then calculated for each authority, based on those 3 financial years. This is done to smooth out any annual volatility in spending. The average annual expenditure measure is then divided by the **Area Cost Adjustment (ACA)** of each authority, to account for any variation in spending arising from the cost of providing non-social-care services. Two separate ACAs are applied to authorities in the Lower Tier and Upper Tier components of the Foundation Formula. The cost-adjusted expenditure measure of each authority is then divided by the 3-year average of the residential population between 2021 and 2023 to get the final cost-adjusted real term expenditure-per-capita measure used as the dependent variable.

We exclude any authority which has not submitted their RO data in at least one of those three financial years. This approach was chosen to maintain consistency in the dependent variable calculation. It is assumed that local authorities that have not submitted data will not on their own significantly influence the final formula shares. The Lower Tier Foundation Formula

[7] English indices of deprivation 2025 - GOV.UK

[8] English indices of deprivation 2025: technical report

[9] https://obr.uk/download/november-2025-economic-and-fiscal-outlook-detailed-forecast-tables-economy/?tmstv=1764610561

excludes 13 authorities[10] due to missing submissions, while the Upper Tier Foundation Formula excludes 2 such authorities[11].

The City of London is major outlier in terms of its spending-per-capita, due to its small residential population and relatively large non-social-care expenditure. This means that including it in the regression model would lead to the results being less representative of more typical local authorities. As such, it is excluded from the regression model to ensure robustness.

It should be noted that while excluding an authority means that it will not influence the estimated formula weights, such an authority will still be assigned a final formula share.

The Isles of Scilly are out of scope of the Foundation Formula and hence are not included in this regression.

Independent variables

Both the lower tier and upper tier regressions have the same two **independent variables.** The first one is the average IMD score of each authority. The second one is the daytime inflow of an authority, which is defined as the sum of its net in-commuters, day visitors and visitor nights. The value of daytime inflow is expressed in terms of thousands of persons.

Regression results

An **ordinary-least squares (OLS) regression** is then be run on the dependent variable and independent variables for all non-excluded authorities. The regression results for the Lower Tier Foundation Formula and the Upper Tier Foundation Formula are summarized in Table 1 and Table 2, respectively.

Table 1: Lower Tier Foundation Formula regression table

	Coefficients	**Standard Error**	**t-value**	**p-value**
(Intercept)	113.65587	5.24331	21.676	0.00
IMD Score	1.51896	0.24149	6.290	0.00
Daytime Inflow	0.30717	0.09215	3.334	0.00

Standard errors: OLS

R^2 (Adjusted R^2): 0.1659 (0.1599)

[10] Babergh, Birmingham, Brentwood, Cambridge, Cannock Chase, Castle Point, Colchester, Mid Suffolk, North West Leicestershire, Pendle, Stafford, Westmorland and Furness, and Woking.

[11] Birmingham and Westmorland and Furness.

Observations: 282 (13 missing, CoL and IoS excluded)

Table 2: Upper Tier Foundation Formula regression table

	Coefficients	Standard Error	t-value	p-value
(Intercept)	121.36035	8.93969	13.575	0.00
IMD Score	1.99040	0.34790	5.721	0.00
Daytime Inflow	0.26011	0.08583	3.031	0.00

Standard errors: OLS

R^2 (Adjusted R^2): 0.203 (0.192)

Observations: 149 (2 missing, CoL and IoS excluded)

Calculation of formula shares

Each regression model is used to fit a dependent variable estimate for each authority. This is done by multiplying the values of their independent variables by the relevant coefficient estimate and then adding on the value of the intercept.

The fitted value of an authority is then multiplied by its projected residential population for each year of the multi-year Settlement. This makes sure the final formula shares reflects the population distribution across authorities by the end of the Settlement and avoids any significant changes in shares. The value is then multiplied again by the relevant ACA, to get a figure of spending need for each authority.

The estimated spending need figures for all authorities are then summed up. This is done separately for authorities in scope of the Lower Tier and Upper Tier formulas. For each formula, the final formula share of each authority is then its share of the total sum of estimated spending.

Changes from the Fair Funding Review 2.0 consultation

Updates to input data

A major change to the data used to construct the Foundation Formula since the Fair Funding Review 2.0 was the incorporation of more up-to-date deprivation data. The deprivation measure set out in the Fair Funding Review 2.0 used average authority scores from the 2019 English IMD. The Foundation Formula now incorporates the 2025 IMD. This change was made to assess authority relative need using the latest possible data available.

The data source used to estimate the number of domestic tourists has also been updated. The Fair Funding Review 2.0 had used provisional 2-year average county-level data, covering the period from 2022 to 2023[12] for overnight trips and from October 2021 to September 2023 for day visits. This data set has now been updated to cover 3 years of county-level data from 2022 to 2024. The number of day visitors and visitor nights was re-estimated using the new data. This change was made so that the estimates more accurately reflect post-pandemic domestic tourism trends.

The data for ONS mid-2022 and mid-2023 population estimates for England and Wales were revised in July 2025 to include improved international and internal migration estimates. The dependent variables were updated to reflect this change.

The fitted variables of each authority produced by the two regressions are now scaled up by their projected residential population for each year of the multi-year Settlement. Previously this was scaled up by the mid-2023 population estimates.

The coefficients of both regression models were re-estimated using the updated data.

Commuter and tourist weights

The Fair Funding Review 2.0 proposed accounting for commuter and domestic tourists by grouping them together with residents as the 'daytime population' of an authority. The daytime population measure would be used to calculate the dependent variable in the regression models. Commuters and tourists likely use non-social-care services like waste collection or cultural facilities at different levels of intensity compared to residents. The consultation recognised this and recommended that components of daytime population should be weighted to reflect this difference in relative need, though no weights were applied when calculating the indicative consultation shares.

Based on recommendations in the IFS technical peer review, a methodological change was made to the formula to allow for the calculation of these weights. Commuters and domestic tourists were moved from being inputs to the dependent variable to being part of an independent variable, defined above as 'daytime inflow'. This change was made to allow for the weights to be calculated through statistical methods.

Definition of commuters

There is a choice of defining the commuters as either 'gross in-commuters' or 'net in-commuters', that whether to account for out-commuters or not. The Fair Funding Review 2.0 proposed to use gross out-commuters as the definition of commuters. This decision was driven by concerns for potential perverse incentives as well as the lack of estimated weights for commuters. Assuming per-person need generated by net in-commuters is one-to-one to

[12] UK Government Web Archive

that of a resident would imply that resident to commuter outside the authority for work would not have any need at all, which would be counter-intuitive result.

The change in formula methodology detailed above means that commuters weights are now estimated through a statistical approach. A decision was made, informed in part by a recommendation in the IFS peer review, that on balance this reduced the concerns outlined above. The definition of commuters is now 'net in-commuters'. This change means that the Foundation Formula is now able to account not just for the additional need pressure from people commuting in for work, but also for any reduced pressure from people commuting out for work.

Application of GDP deflator

Based on a recommendation in the IFS peer review, the OBR GDP deflator is now applied to annual formula expenditure when estimating the dependent variable. This was to avoid biasing the value of the dependent variable towards those years where councils experienced higher nominal prices due to inflationary factors.

Data and technical definitions

Data

- Local authority revenue expenditure and financing England: Revenue outturn multi-year data set[13] (years 2021/22, 2022/23 and 2023/24)
- ONS, total population mid-year estimates[14]
- ONS, 2022-based population projections for regions by five-year age groups and sex, based on migration category variant and 2023 local authority geographies[15]
- Census 2021 origin-destination workplace data[16]
- Domestic tourism statistics for England Counties, 2022 to 2024[17]
- England local authorities, overnight and day trips, 2017 to 2019[18]

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[13] https://assets.publishing.service.gov.uk/media/68e3b61b49e17d00a56ffe12/Revenue_Outturn_time_series_data_v3.csv

[14] https://www.nomisweb.co.uk/datasets/pestsyoala

[15] Population projections for regions by five-year age groups and sex, England - Office for National Statistics

[16] https://www.nomisweb.co.uk/sources/census_2021_od

[17] https://www.visitbritain.org/research-insights/england-domestic-tourism-regional-and-subregional-data

[18] https://www.visitbritain.org/research-insights/england-domestic-tourism-regional-and-subregional-data

- GDP deflator from the OBR's November 2025 Economic and fiscal outlook – detailed forecast tables: economy (tab 1.7, column V - headed 'GDP deflator')[19]
- Local Authority Lower Tier Foundation and Upper Tier Foundation Formula Area Cost Adjustment[20]

Technical definitions

- **GDP deflator:** an index that measures the change in prices over time. Use of which enables us to understand the inflation-adjusted value of revenue outturn expenditure in different years in a common unit value.
- **Area Cost Adjustment:** an index that is applied to account for the differences in the costs of delivering services.
- **Ordinary least squares (OLS) regression:** a statistical method which enables us to estimate the relationships between a dependent variable and one or more independent variables in a linear model and derive the weight or strength of these relationships.
- **Dependent variable:** a variable that depends or responds to the outcome of independent variable(s).
- **Independent variable:** a variable that is closely connected or explains an event or outcome.

[19] https://obr.uk/download/november-2025-economic-and-fiscal-outlook-detailed-forecast-tables-economy/?tmstv=1764610561

[20] https://www.gov.uk/government/publications/area-cost-adjustment-values-table