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Fractal Inequalities? A Multi-Scalar Analysis of Income Inequality and Fiscal Redistribution in Greater Essex

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Abstract

National fiscal policy is designed and evaluated at the aggregate level, yet uniform tax-benefit reforms interact with local socio-economic structures to produce heterogeneous place-based outcomes. This paper asks whether place-blind policies are place-neutral, using Greater Essex and its 14 districts as a case study of income inequality and fiscal redistribution across multiple geographical scales. We employ UKMOD, the UK tax-benefit microsimulation model, calibrated to Greater Essex through machine-learning reweighting, to analyse the distribution of pre-existing inequality and the effects of the 2025-26 fiscal reforms. Theil decomposition shows that roughly 99 per cent of inequality in Greater Essex, for both market and disposable income, operates within districts rather than between them, consistent with comparative evidence for fine geographic partitions. Below the district, most inequality remains within neighbourhoods, down to postcode levels. The reforms leave this structure essentially unchanged; yet, they reduce poverty by less in Greater Essex than in England or the UK, and district-level reductions vary widely. Place-blind policy is approximately place-neutral in the structure of inequality but not in its poverty incidence, with direct implications for how geographic equity objectives are formulated and assessed.

Keywords: Regional Inequality, Tax-Benefit Microsimulation, Distributional Analysis, Place-Based Policy, Inequality Decomposition

JEL Codes: D31, H23, I32, R12, C63

1. Introduction

Regional inequality has become a defining feature of the contemporary UK economy, with persistent disparities in income, employment, and living standards across and within nations and regions (McCann 2020; Stansbury et al. 2023). The UK exhibits among the highest levels of regional inequality in the developed world (McCann 2020), with productivity gaps between London and other regions widening over recent decades.

This geographic polarisation has profound social and political consequences, concentrating disadvantage in specific places and leaving lasting effects on social mobility across generations (Social Mobility Commission 2017). In response, successive governments have prioritised place-based policies aimed at levelling up disadvantaged regions.

Yet place-based policies remain small relative to tax-benefit policies: the flagship Levelling Up Fund committed £4.8bn over several years (Ward 2023), against total welfare spending of £333bn in 2025-26 (OBR 2025). The issue whether and how national tax-benefit policies interact with the map of regional vulnerabilities is therefore central. Despite this, systematic sub-national distributional analysis of UK fiscal policy remains limited. National Budget announcements routinely include distributional analysis by income decile, household type, and demographic group, but almost never examine how impacts vary across geographic areas. This gap is consequential: if uniform national tax-benefit policies interact with local demographic structures to produce systematically different outcomes across places, then fiscal policy may inadvertently exacerbate the very inequalities that place-based interventions aim to address.

The 2025-26 fiscal reforms illustrate this tension. We model two policy changes in particular. The first concerns the Winter Fuel Payment, an annual tax-free lump sum for older people. The Labour Government had previously introduced means-testing for this policy, restricting eligibility for winter 2024/25 to pensioners on Pension Credit or other qualifying benefits. In June 2025, however, the government partially reversed this, restoring the payment on a quasi-universal basis for winter 2025/26 but recovering it through the tax system from individuals with taxable income above £35,000. The second is the Autumn Budget 2025 package, which removed the Universal Credit two-child limit, continued freezing income tax thresholds, and increased dividend, property, and savings taxation. The Treasury presented these reforms as achieving modest national poverty reduction and fiscal consolidation, but that assessment may obscure geographic variation: places differ in demographic composition, employment, housing costs, and income distributions, so ostensibly uniform policies may produce systematically different outcomes depending on where people live.

This paper provides a multi-scalar distributional assessment of the 2025-26 reforms, using Greater Essex as a case study. Greater Essex, a county in southeast England with a population of 1.9 million, spans markedly different local contexts, from prosperous London-proximate commuter towns to struggling coastal communities, making it a valuable case for examining how national policies interact with place-based structures at multiple scales. We employ UKMOD with a regionally calibrated variant, developed through machine-learning reweighting of the Family Resources Survey to represent Essex's demographic profile (Frimpong and Richiardi 2026).

The analysis addresses three research questions. First, to what extent does national income inequality mask regional and sub-regional inequality? Second, do national policies provide a one-size-fits-all solution to regional and sub-regional inequality? Third, what is the impact of the 2025-26 reforms at the local level?

Specifically, we test three hypotheses. The first is that the share of inequality attributable to differences between geographic units is smaller for smaller, more homogeneous units. We would expect differences between Scotland, England, Wales and Northern Ireland to exceed those between the different Government Office Regions (GORs) in England, and these in turn to exceed those of the counties of a region and the districts of a county.

Our data allow us to test this by comparing the nine English GORs with the 14 districts of Greater Essex (see Figures 1 and 2). These geographic levels are not nested within a single population, hence the property that between-group inequality cannot decrease when moving to a finer partition (Shorrocks and Wan 2005) does not apply: each decomposition considers a different population (England and Greater Essex respectively), so the overall level of inequality itself changes with the level of analysis. We therefore expect the between-district share in Greater Essex to be smaller than the between-region share across England's more heterogeneous regions.

The decomposition literature establishes that within-unit inequality dominates at every scale of this kind (Shorrocks and Wan 2005). Cross-national evidence confirms that within-region inequality consistently exceeds between-region inequality: across eight European countries in 2010 the between-region contribution to disposable income inequality ranged from around 1 per cent in Belgium to 6 per cent in Hungary, a share the source attributes partly to the large size of the regions used (Piacentini 2014), while for UK regional decompositions within-shares range from 93 to 99 per cent across earnings measures and time periods (Shorrocks and Wan 2005; see Table 1). This motivates our second hypothesis that a place-blind reform applying identical rules everywhere leaves the between-unit structure of inequality (the share of total inequality arising between geographic units versus within them) largely unchanged.

Our third hypothesis is in apparent tension with the second and posits that the same reform may produce heterogeneous poverty and fiscal outcomes across districts,

because districts differ in the share of households near relevant policy thresholds. This distinction is central: the structure of inequality and the incidence of poverty and fiscal change are different lenses on the same reform, and a policy can be neutral with respect to one while differentiated with respect to the other.

Our findings confirm all three hypotheses. The within-district share is 99.43 per cent for market income, 99.25 per cent for pre-reform (baseline) disposable income after housing costs, and 99.24 per cent after the reform.

The between-district share of less than 1 per cent is smaller still than the 3.15 per cent between-region share across English Government Office Regions. A within-district share of around 99 per cent for Greater Essex sits at the upper end of, but within, the documented range described in the literature, and is what theory predicts for small, internally diverse units.

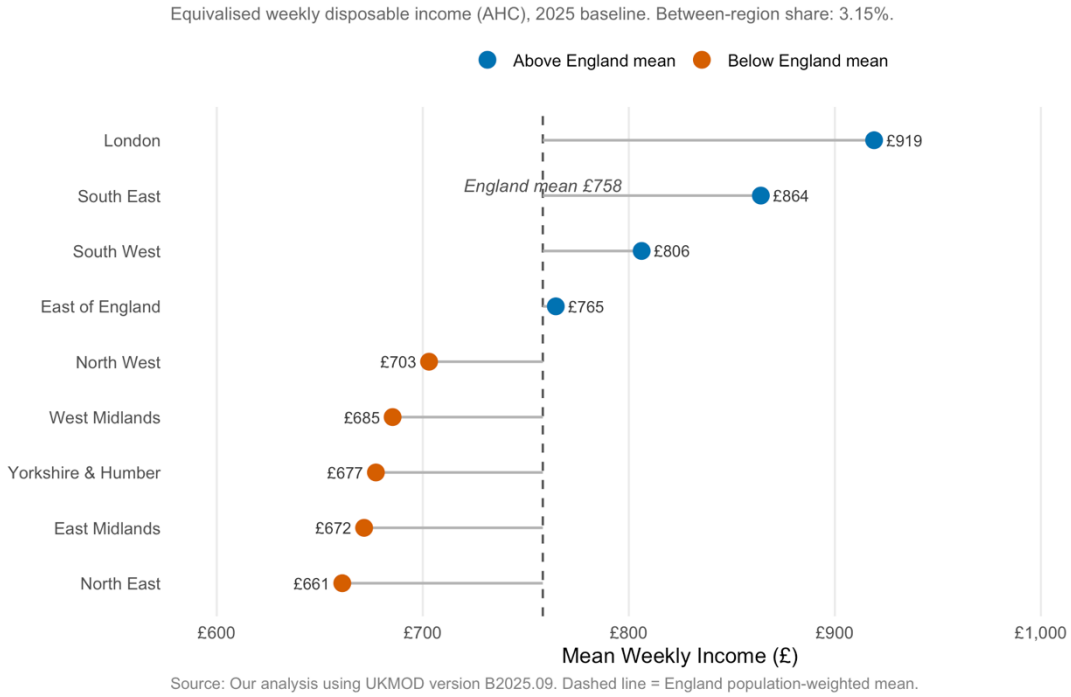
The between-area share of inequality in equivalised disposable income grows only as the areas become much smaller: from under 1 per cent between districts to 16.6 per cent between middle Super Output Areas (MSOAs, typically 5,000 to 15,000 residents), and 34.6 per cent between Lower layer Super Output Areas (LSOAs, typically 1,000 to 3,000 residents). Most inequality however remains within areas at every level, including postcodes aggregated to at least 10 households (69 per cent within).

The reforms leave this architecture of inequality essentially unchanged. Yet they produce heterogeneous place-based outcomes: the magnitude of poverty reduction and fiscal gain differs considerably across neighbouring districts facing identical policies, because those districts differ in the demographic composition of households near the relevant thresholds.

Our central result that differences between individuals in the same locality are larger than differences between the localities themselves down to the postcode level has a direct implication for policy design. Where inequality is overwhelmingly a within-place phenomenon, instruments that operate on the gaps between areas can address only a minor fraction of it, and reducing inequality requires reaching households within localities rather than closing the distances between area averages.

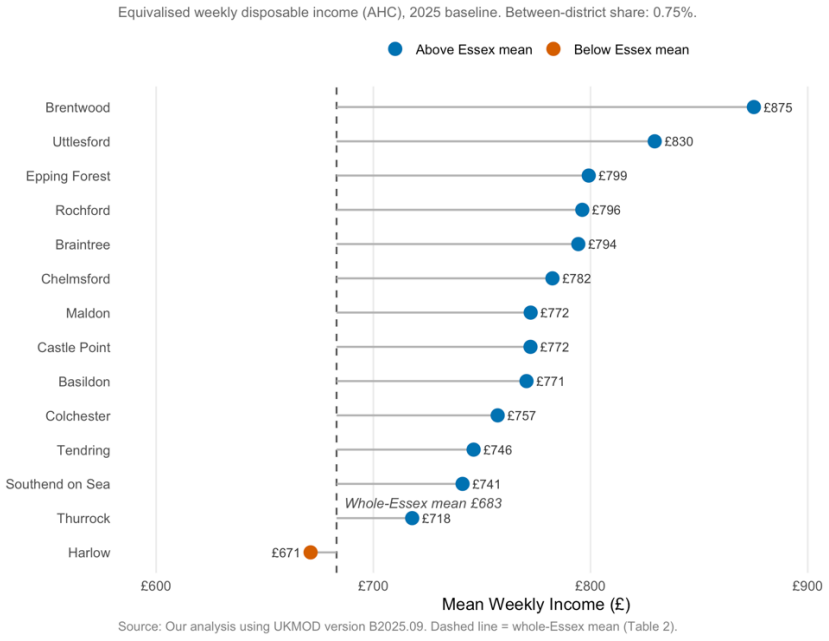
The remainder of the paper is structured as follows. Section 2 reviews the literature on regional inequality and Theil decomposition and presents the Greater Essex context. Section 3 describes the methodology. Section 4 presents results across the three geographic layers. Section 5 discusses findings and their policy implications. Section 6 concludes.

Figure 1: England 9 GORs mean income dot-deviation chart



Note: Mean equivalised weekly disposable household income after housing costs (AHC) by Government Office Region, 2025 baseline (pre-reform). Dashed line = England population-weighted mean. Source: our analysis using UKMOD version B2025.09; Family Resources Survey 2022/23 input data.

Figure 2: Essex 14 districts mean income dot-deviation chart



Note: Mean equivalised weekly disposable household income after housing costs (AHC) by district, 2025 baseline (pre-reform). District means come from the 14 separately calibrated district files; the dashed line is the whole Essex mean from the county calibration (Table 2). Source: our analysis using UKMOD version B2025.09; Family Resources Survey 2022/23 input data.

2. Background

2.1 Regional inequality, geographic scale, and fiscal redistribution

Regional economic inequality has become a defining feature of contemporary advanced economies, but understanding how it operates requires attention to geographic scale. The standard approach of comparing regions against a national average places differences in average incomes across regions at centre stage, but it obscures a second and equally important phenomenon: variation in incomes among individuals within each region. These two components behave differently, respond differently to policy, and carry different implications for how redistribution should be designed and evaluated.

The decomposition literature generally finds that within-region differences account for most overall inequality. This literature builds on Shorrocks (1980) and Cowell (1980), who show that generalised entropy measures, including the Theil indices, permit an exact decomposition of total inequality into within-group and between-group components without a residual. For nested geographic partitions, the between-unit component is non-decreasing as the partition becomes finer: subdividing regions cannot reduce the between-group share, whereas combining smaller units into larger ones cannot increase it (Shorrocks and Wan 2005). Nested here means that each finer partition sits entirely within the coarser one, so that every district belongs to exactly one region and every region to exactly one nation, forming a single hierarchy over one fixed population. This monotonicity result does not apply to the comparisons we draw. Our geographic levels are not nested within a common population: the England regional decomposition and the Greater Essex district decomposition are computed over different populations, so the between-unit share at one scale implies nothing about the between-unit share at the other. Within Essex, districts, MSOAs and LSOAs are nested, and the monotonicity result applies; aggregated postcodes do not nest within LSOAs.

Empirically, between-region components at the NUTS2 regional level accounted for around 1 to 6 per cent of total disposable income inequality across eight European countries in 2010, with within-region inequality accounting for the remainder (Piacentini 2014). This finding holds across diverse contexts: in the United States, Levernier et al. (2000) show that within-county variation dominates cross-county differences in poverty, while Ganong and Shoag (2017) document that between-state income convergence has slowed even as within-state inequality has grown. In Europe, Ezcurra and Pascual (2005) find the within-region component consistently larger across EU member states, and Monastiriotis (2014) reaches the same conclusion for Central and Eastern European regions.

Table 1 presents selected spatial decompositions from Shorrocks and Wan (2005) showing that UK regional within-shares range from 93 to 99 per cent across earnings measures and time periods, establishing the empirical benchmark against which the Essex findings are assessed.

For fiscal policy evaluation, these patterns have important implications. Even when a reform reduces inequality nationally, its effects may vary substantially across localities. Policies targeting demographic or socioeconomic groups will have geographically uneven impacts because those groups, and their underlying income and household characteristics, are unevenly distributed across space.

Figari et al. (2026), using a spatial extension of the EUROMOD tax-benefit model for 107 Italian provinces and 74 Greek areas at NUTS-3 level, find considerable local heterogeneity in the anti-poverty effects of national uniform child benefit reforms, with the child poverty gap rising in areas where losers outnumbered winners at the bottom of the income distribution.

Regional averages may therefore conceal substantial sub-regional variation in population composition and policy incidence, producing an incomplete or potentially misleading account of local effects. Evaluating fiscal reforms solely at the national level consequently risks overlooking an important geographic dimension of redistribution.

The UK context makes this particularly acute. The UK ranks among the most interregional unequal countries in the industrialised world across 28 indicators spanning GDP per capita, GVA per worker, and disposable income at both regional and sub-regional scales (McCann 2020). This divergence stems primarily from the exceptional performance of London, driven by finance and business services, alongside deindustrialisation concentrated in the North and Midlands, and reflects productivity differences rather than employment-rate gaps, which have largely converged (Stansbury et al. 2023). Place-based spending initiatives have not yet delivered the scale of change needed to address these structural disparities (Stansbury et al. 2023). This policy context makes rigorous multi-scalar distributional analysis of fiscal reforms essential: understanding how mainstream fiscal policy differentially affects regions and sub-regions becomes critical when place-based interventions remain limited in scope.

Table 1: Selected spatial decompositions of income inequality in the UK: evidence from the literature

Country	Geographic partition	Income concept	No. of groups	Year	Within-share (%)	Between-share (%)
UK	Region	Employee income	12	1979	99	1
UK	Region	Employee income	12	1985	98.2	1.8
UK	Region	Employee income	12	1991	97.5	2.5
UK	Region	Employee income	12	1994/5	97.6	2.4
UK	Region	Earnings (NES)	11	1975	96.8	3.2
UK	Region	Earnings (NES)	11	1980	95.7	4.3
UK	Region	Earnings (NES)	11	1991	93.2	6.8

Source: Shorrocks and Wan (2005), Table 1B, reporting spatial decompositions of the mean logarithmic deviation from earlier studies. Employee-income rows use Family Expenditure Survey data; earnings rows use New Earnings Survey (NES) data. Within- and between-shares are percentages of total inequality.

2.2 The 2025-26 fiscal reforms

The 2025-26 fiscal reforms were implemented amid substantial economic challenges. Following years of real income stagnation, high inflation, and cost-of-living pressures, the reforms sought to balance restoring public finances, addressing persistent poverty, and pursuing stated commitments to reducing regional disparities.

These changes occurred against a backdrop of a 2% decline in real terms in median household income in 2023-24, with child poverty across the UK standing at 31% after housing costs (House of Commons Library 2025; ONS 2025a).

The reforms comprise two separate policy decisions, distinct in their announcement but coinciding in the 2026 policy year modelled here. The first concerned the means-testing of the Winter Fuel Payment, announced as a standalone decision in July 2024, restricting the payment, previously universal for pensioners, to those receiving Pension Credit or other means-tested benefits. In June 2025, the government partially reversed this decision for winter 2025/26, restoring the payment on a quasi-universal basis but introducing an income-based recovery mechanism: pensioners receive the payment, but those with individual taxable income above £35,000 have it recovered through the tax system.

The second was the Autumn Budget 2025 package announced in November 2025, which included the removal of the Universal Credit two-child limit from April 2026, continued freezing of income tax and National Insurance thresholds until April 2031, and increases to dividend, property, and savings taxation.[1]

The Treasury's distributional analysis presented these reforms as achieving modest national poverty reduction and fiscal consolidation. However, this assessment focuses on UK-wide impacts and implicitly assumes that national averages adequately represent sub-national experiences, an assumption this paper directly interrogates.

2.3 Greater Essex as a case study

Greater Essex, comprising 12 district councils and two unitary authorities with a combined population of approximately 1.9 million, provides a particularly valuable case for multi-scalar inequality analysis. The county generated £44.8 billion in Gross Value Added in 2021, but this aggregate prosperity conceals substantial internal heterogeneity (Essex County Council 2024).

The county spans dramatically different local contexts. London-proximate districts such as Brentwood and Epping Forest exhibit higher earnings and lower unemployment, while coastal and rural areas, including Tendring and Southend-on-Sea, show substantially lower incomes and higher unemployment rates. As of 2023, 27.7% of households in Essex earned below £30,000 annually (Essex County Council 2024). Vulnerability to low income in the county concentrates among single-parent households, women living alone aged 65 and over, and households from Black and minority ethnic backgrounds (Essex County Council 2024).

This internal diversity makes Greater Essex a productive case for multi-scalar analysis. A county-level average obscures variation between its districts that is analytically meaningful even if modest in scale, and the combination of prosperous commuter districts and struggling coastal communities ensures that any place-based heterogeneity in reform impacts will be visible in the data. Whether that heterogeneity operates primarily within districts or between them, and whether the between-within balance is stable as the spatial partition is refined, are empirical questions the Theil decomposition is designed to answer.

[1] The Universal Credit two-child limit, introduced in 2017, restricted the child-related element of Universal Credit – the main social assistance program in the UK – to the first two children in a household, with limited exceptions. Families generally received no additional support for third or subsequent children born after 6 April 2017.

We test the latter directly by comparing the between-within split across England's nine regions with that across Essex's fourteen districts (Section 4.2).

2.4 Tax-benefit microsimulation modelling

Tax-benefit microsimulation models have become central tools for ex-ante and ex-post distributional analysis of fiscal reforms. They combine representative household microdata with detailed policy rules to simulate impacts on incomes, poverty, and inequality.

Microsimulation has proven valuable for national distributional analysis, but its application to sub-national geographies remains limited, mainly because of limitations of the survey data on which they are generally based. Recent innovations include NIESR's NiReMS model, which combines spatial econometrics with dynamic microsimulation at the regional level (Bhattacharjee et al. 2024). However, such models require substantial resources and are not yet widely available for applied policy analysis. Figari et al. (2026) extend EUROMOD to NUTS-3 level by reweighting EU-SILC to census and tax data, an approach close to ours.

UKMOD is a static microsimulation model that simulates the UK tax-benefit system at the individual level. It calculates entitlements and liabilities based on detailed policy rules and individual and household characteristics (Richiardi et al. 2021). Among publicly accessible platforms, UKMOD has emerged as the primary transparent, open-source tool for UK tax-benefit analysis. It permits analysis of tax and benefit effects on household incomes for England, Scotland, Wales, Northern Ireland, and the UK, with capacity for regional analysis at the Government Office regional level (12 regions in the UK). As a static model, UKMOD captures the immediate first-year effects of policy reforms on household incomes without modelling behavioural responses, such as changes in labour supply or variations in benefit take-up. An add-on computing behavioural responses is available (van de Ven et al. 2026).

3. Methods

3.1 Overview

We employ a two-part analytical strategy. The first part characterises the baseline distributions of market income and equivalised disposable household income for Essex, compared with England and the UK. It then decomposes inequality within Essex into within-district and between-district components at different levels of geographical detail.

The second part assesses the distributional and fiscal effects of the 2025-26 fiscal reforms, using static tax-benefit microsimulation. It compares outcomes across geographic scales and examines sub-regional variation across Essex's 14 constituent local authority districts.

3.2 UKMOD-Essex Calibration

Our analysis builds on a regional variant of UKMOD calibrated to represent Greater Essex's demographic and economic profile (Frimpong and Richiardi 2026). This calibration addresses a fundamental challenge in sub-national microsimulation: the Family Resources Survey (FRS), while nationally representative, contains insufficient observations for robust small-area analysis without adjustment. We use three different sources of data. The first is the 2022/23 UKMOD input data derived from the Family Resources Survey. The second is a commercially available dataset mapping limited characteristics for a large share of the Essex population. The third is aggregate values of relevant variables for Essex as provided by the Office for National Statistics (ONS), the UK statistical office. Our approach employs a two-step machine learning reweighting strategy, combining propensity score estimation with Inverse Probability Weighting (IPW). A Gradient Boosted Machine (GBM) model estimates the probability that a given household from the national FRS sample would appear in the Essex target population, conditional on observed characteristics including age, tenure, household size, employment status, equivalised income, and presence of children.

After estimating propensity scores, we computed IPW weights, then stabilised, trimmed, and calibrated them through iterative proportional fitting (raking) to match official marginal totals for Essex across age groups, employment status, and presence of children. Validation checks confirmed improved covariate balance and common support between the reweighted FRS sample and Essex administrative targets. County results use the whole-Essex calibration; district results use 14 separately calibrated district files. The two are independent, so county figures need not lie within the district range.

Full technical details, including balance diagnostics, effective sample size calculations, and sensitivity analyses, are provided in Frimpong and Richiardi (2026).

3.3 Theil Index Decomposition

To compare within-district and between-district inequality, we compute the Theil T index, which permits exact decomposition into subgroup components without a residual term (Shorrocks 1980; Cowell 1980). The Theil T index is defined as:

$$T = \Sigma (w_i / W) \times (y_i / \mu) \times \ln (y_i / \mu)$$

where y_i is the income of individual i, w_i is the survey weight, W is the total weight, and μ is the weighted mean income. This decomposes exactly into:

T = T_between + T_within

where T_between captures inequality arising from differences in mean incomes across districts, and T_within is the income-share weighted sum of Theil indices within each district. We apply this decomposition to three income measures: market income (unchanged between baseline and reform), equivalised disposable household income at baseline, and equivalised disposable household income under the reform scenario. The assumption that market income does not change between the baseline and the reform scenario is standard in a static, non-behavioural analysis. Individuals might change their behaviour – particularly with respect to labour supply, in response to the changed incentives of the tax-benefit system. In practice, however, this is often a second order concern compared with the direct, arithmetic effect of the change in the tax-benefit rules.

Comparing baseline and reform decompositions reveals whether the 2025-26 reforms alter inequality primarily within districts or between them. Individuals with zero or negative market income are excluded from the market income decomposition, as the Theil T index requires strictly positive incomes. Recoding these incomes to £1 and including them raises the between-district share of market income inequality from 0.57 to 0.66 per cent.

3.4 Geographical scope

Our first focus is the district level within the Greater Essex region. We replicate the decomposition across the nine English Government Office Regions, using separately simulated regional UKMOD output files, and compare the between-region share with the between-district share.

We then extend the decomposition below the district to Middle Layer Super Output Areas (MSOAs) and Lower Layer Super Output Areas (LSOAs). Going below the LSOA level is problematic as the majority of postcodes in Greater Essex has three or fewer households (Table A5). To circumvent the issue, we aggregate postcodes with fewer than 10 households with their smallest adjacent postcode, until every postcode group contains at least 10 households. This procedure however identifies a fewer number of postcodes than LSOAs (1,076 and 1,110 respectively). We therefore exclude the postcode analysis from the main text, reporting results in Appendix 2.

3.5 Reform Analysis and Outcome Measures

We compare two scenarios: a pre-reform baseline reflecting the 2025 tax-benefit system, and a post-reform scenario incorporating the main 2025-26 fiscal reforms implemented from April 2026.

When applying later policy systems to an earlier population, monetary variables in the UKMOD input data are automatically updated to the policy system year using a variety of uprating factors (see van de Ven and Popova 2026). Non-monetary variables, on the other hand, remain unchanged. Comparing a 2025 baseline with a 2026 reform scenario therefore means considering how the two policy systems would have affected a population with fixed socio-demographic characteristics as in 2022/23 FRS data.

We focus on equivalised income to control for differences in household composition across geographies, and because this is the most relevant income concept for individual well-being. Equivalised income is computed by summing income (whether market or disposable) across household members, and then dividing by the OECD modified equivalence scale, which assigns a weight of 1 to the first adult, 0.5 to each additional adult, and 0.3 to each child.

Poverty is measured as the share of individuals in households with equivalised disposable income below a fixed line set at 60 per cent of the UK baseline median equivalised disposable income. This common line is applied uniformly across all geographies and the 14 Essex districts. It is held constant between the baseline and reform scenarios, so that changes reflect movements in the income distribution rather than movements in the poverty threshold. Poverty results are reported in Section 4.4.

3.6 Use of generative AI

During the preparation of this work, the authors used Claude (Anthropic) to assist with writing and debugging R code for the analysis and with drafting and editing parts of the text. All code was reviewed, run and checked by the authors; all results were verified against UKMOD output; and all text was revised by the authors. The authors take full responsibility for the content of the publication.

4. Results

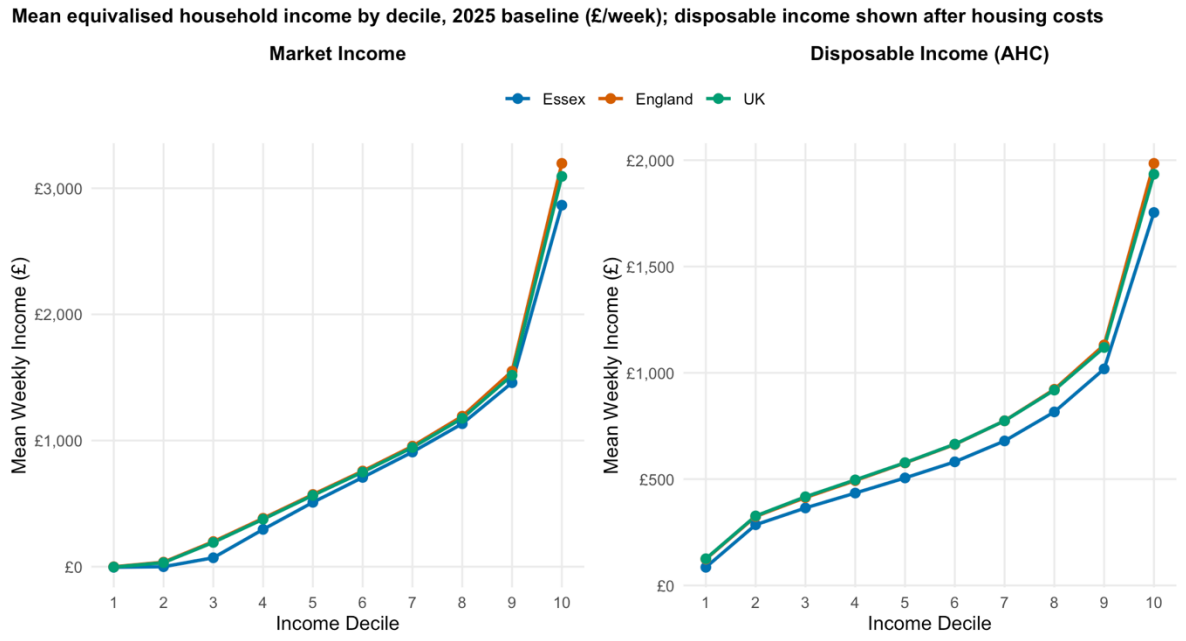
4.1 Regional Level: Income Distributions and Redistribution

Before the tax-benefit system intervenes, Greater Essex exhibits a distinct market income distribution compared with England and the UK. Mean equivalised weekly market income in Essex stands at £820.59, below both England (£935.56) and the UK (£916.37). This reflects the county's labour market composition and the drag of lower-wage coastal and rural districts on the county average. Despite this lower average, the Gini coefficient for market income is higher in Essex (0.533) than in England (0.509) or the UK (0.506), indicating that pre-redistribution inequality is greater in Essex than nationally. This combination of lower average market income alongside higher market income inequality creates a greater need for redistribution in Essex than nationally.[2]

The decile profile reveals where this divergence is concentrated (Figure 3). Essex tracks England closely across most of the distribution, sitting modestly below it from the third decile upwards. The gap widens sharply at the top: mean market income in the highest Essex decile falls well short of the England equivalent, reflecting the absence of London-level earnings among the highest earners. This truncated upper tail accounts for the lower county average. At the bottom of the distribution, Essex and England are similarly positioned, suggesting that the low market-income floor is a national rather than an Essex-specific phenomenon. Essex therefore combines a compressed upper tail with a lower tail resembling England's, a distributional shape that coincides with higher measured inequality despite fewer very high earners, and one that carries through to the fiscal results in Section 4.3.

[2] Market income is often reported on an individual, unequivalised basis rather than the equivalised household basis used here. On that basis the market income Gini is 0.65 for Greater Essex, 0.68 for England, and 0.68 for the UK, with weekly medians of £250, £186, and £188. These figures are more dispersed than the equivalised household measures above, since equivalisation and household income sharing both compress the distribution. The ranking also differs, with Essex slightly below England rather than above, reflecting that the individual measure captures personal earning dispersion while the equivalised measure captures household living standards. Market income here is original income before taxes and benefits, at the individual level, including zero and negative values.

Figure 3: Income distribution by geography and income concept



Source: Our analysis using UKMOD version B2025.09. AHC = After Housing Costs. OECD modified equivalisation scale used to compute equivalised income.

The tax-benefit system compresses these market income differences. Mean equivalised weekly disposable income after housing costs is £683.06 in Essex, £758.26 in England, and £753.96 for the UK. Although redistribution reduces the income gap, Essex's relative position improves only slightly, from 89.5% to 90.6% of the UK average.

Under the baseline, the Gini coefficient falls from 0.533 to 0.343 in Essex, moving from market to disposable income, a reduction of 35.6%, compared with reductions of 31.7% in England and 32.6% for the UK. Essex therefore experiences proportionally greater redistributive compression than either England or the UK, reflecting the greater role of transfers relative to taxes in a county with lower average market incomes and higher pre-redistribution inequality. Notably, despite entering with higher market income inequality, Essex emerges with lower disposable income inequality than England (Gini 0.343 versus 0.348), underscoring the stronger redistributive compression at work.

Despite this, mean disposable income in Essex (£683.06) remains below England (£758.26): redistribution compresses but does not eliminate the underlying market income gap.

The 2025-26 reforms alter this picture only marginally. The redistributive effect rises to 35.9% in Essex post-reform, 32.4% in England, and 33.4% for the UK, while mean disposable income increases to £700.95 in Essex, £780.76 in England, and £776.39 for the UK. The reforms therefore leave the geographic pattern of redistribution unchanged. Table 2 presents the full set of baseline and reform inequality measures for each geography.

The Theil T index mirrors the Gini pattern: Essex (0.199) shows lower total disposable income inequality than England (0.228) and the UK (0.217) despite higher market income inequality. This reflects the strong compression achieved by the tax-benefit system on a distribution with a less extreme upper tail.

Table 2: Market and Disposable Income Inequality - Essex, England, and UK

	Essex	**England**	**UK**
Equivalised market income (baseline)			
Mean weekly income (£)	820.59	935.56	916.37
Theil T	0.381	0.424	0.415
Gini coefficient	0.533	0.509	0.506
Equivalised disposable income AHC (baseline)			
Mean weekly income (£)	683.06	758.26	753.96
Theil T	0.199	0.228	0.217
Gini coefficient	0.343	0.348	0.341
Equivalised disposable income AHC (reform)			
Mean weekly income (£)	700.95	780.76	776.39
Theil T	0.197	0.224	0.213
Gini coefficient	0.342	0.344	0.337
Redistributive effect (% Gini reduction)			
Baseline	35.60%	31.70%	32.60%
Reform	35.90%	32.40%	33.40%

Note: Market income Gini computed on positive-income households only. Disposable income AHC = after housing costs. Redistributive effect = percentage reduction in Gini from market to disposable income. Source: our analysis using UKMOD version B2025.09; Family Resources Survey 2022/23 input data for the UK and England, reweighted data described in Frimpong and Richiardi (2026) for Essex. Gini coefficients throughout are computed by UKMOD Statistics Presenter; the Theil T index, which Statistics Presenter does not produce, is calculated by the authors from the same UKMOD output files.

4.2 Sub-Regional Level: The structure of inequality within Greater Essex

Decomposing total Essex inequality into within-district and between-district components shows that most of the inequality in Greater Essex continues to operate within geographies rather than between them. Applying the Theil T index to both market income and equivalised disposable household income after housing costs, the between-district component accounts for only 0.57% of total inequality for market income, 0.75% for disposable income at baseline, and 0.76% after the reform, with the remainder arising from variation among individuals within the same district. The residual is effectively zero in all three cases, confirming the exactness of the additive decomposition.

Table 3 presents the full decomposition results across all three scenarios. These figures are consistent with the comparative literature on spatial decomposition.

The same Theil decomposition applied to nine English Government Office Regions produces a between-unit share of 3.15% of total English inequality for disposable income after housing costs, compared with 0.75% of total Essex inequality between the fourteen districts. These two decompositions cover different populations, England and Greater Essex respectively, and are therefore not a nested comparison: the difference reflects greater homogeneity among Essex's districts than among England's regions. However, even across England's nine regions, a more heterogeneous set of areas, the between-region component remains small (3.15 per cent) and within-unit inequality still accounts for most of the total (Figure 4).

4.2.1 District mean incomes and the limits of between-district inequality

The district mean income profile makes this concrete (Figure 2; the corresponding regional profile across England's nine regions is shown in Figure 1). Equivalised mean disposable income after housing costs ranges from £671.12 per week in Harlow to £875.20 per week in Brentwood, a gap of £204.08, with Tendring the fourth lowest at £746.17. On market income, the range is wider, from £747.26 in Harlow to £1,140.43 in Brentwood. These differences map onto the known geography of Essex deprivation and prosperity, with London-proximate commuter districts at the upper end and coastal and former new town districts at the lower end. The income distributions within each district span a comparable range, from the lowest to the highest income households, which is why differences in district averages account for less than 1% of total dispersion across the county.

4.2.2 The reform effect: within or between districts?

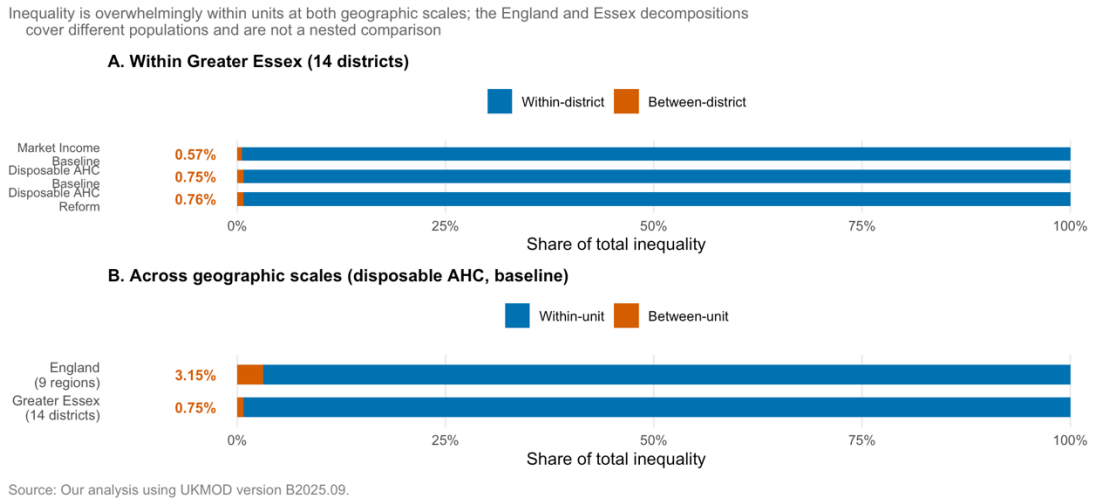
The 2025-26 fiscal reforms reduce total Essex disposable income inequality marginally, with the Theil T falling from 0.1994 to 0.1972. This reduction operates entirely within districts. The between-district component is unchanged at 0.0015 to four decimal places, while the within-district component falls from 0.1979 to 0.1957, absorbing the full reduction. The reforms therefore alter the distribution of incomes among households sharing the same locality without materially changing the relative standing of districts against one another. Table 3 presents the full decomposition results. Figure 4 illustrates the within- and between-share across all three income scenarios, alongside the GOR comparison.

Table 3: Theil T Decomposition - Within and Between Districts, Greater Essex

	Equivalised Market Income Baseline	Equivalised Disposable AHC Baseline	Equivalised Disposable AHC Reform	Reform Effect
Total Theil T	0.3811	0.1994	0.1972	-0.0022
Between-district	0.0022 (0.57%)	0.0015 (0.75%)	0.0015 (0.76%)	~0.0000
Within-district	0.3789 (99.43%)	0.1979 (99.25%)	0.1957 (99.24%)	-0.0022
Residual	0	0	0	
Persons excluded (%)	11.02%	1.45%	1.46%	

Note: Persons with zero or negative income are excluded as Theil T requires strictly positive values. Shares of persons are population weighted. Reform effect = reform minus baseline decomposition. Source: UKMOD B2025.09.

Figure 4: Theil T Decomposition



4.2.3 Below the district

Table 4 extends the decomposition from districts to MSOAs and LSOAs. The between-area share of inequality rises as the geography becomes finer in a nested way: under 1 per cent between districts, 16.6 per cent between MSOAs and 34.6 per cent between

LSOAs. Most inequality however remains within areas: 83.4 per cent of the total within MSOAs and 65.4 per cent within LSOAs (Figure 5).

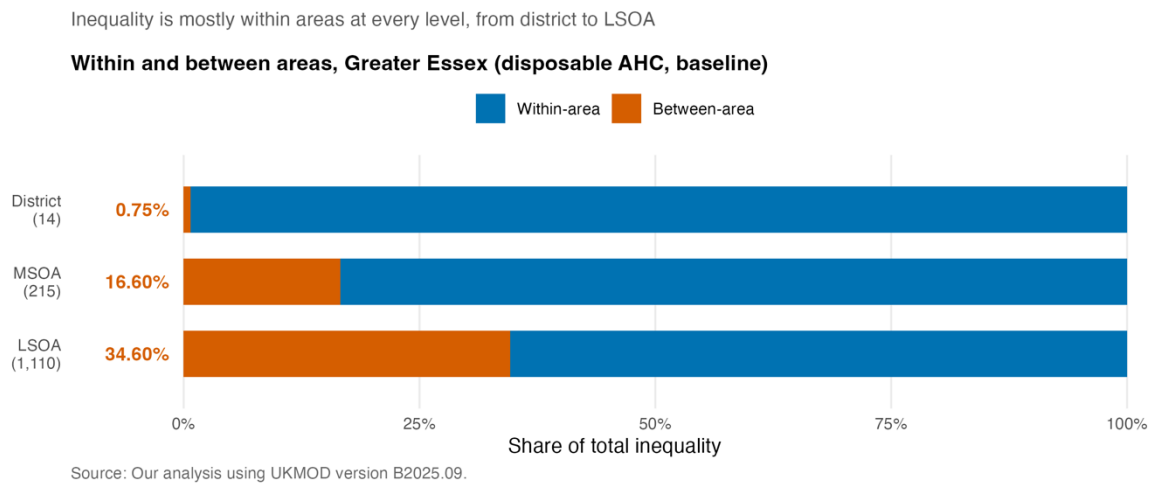
Table 4: Within-area share of inequality by geographic level, Greater Essex.

Geographic level	Number of areas	Median households per area	Within-area share, baseline (%)	Within-area share, reform (%)
District	14	1,177	99.25	99.24
MSOA	215	72	83.40	83.47
LSOA	1,110	14	65.40	65.52

Note: Theil T decomposition of equivalised disposable household income after housing costs. Persons with zero or negative income are excluded. The household locations reproduce the ONS small area income pattern across MSOAs (rank correlation **0.77**) and the income deprivation ranking of the English Indices of Deprivation 2025 across LSOAs (**0.60**) – see Table A4 in the Appendix. Source: our analysis using UKMOD version B2025.09.

Results at the postcode level, after aggregation, resemble those at the LSOA level, reflecting the similar number of units of analysis: 68.8 per cent of inequality lies within postcodes and 31.2 per cent between them (Table A6). The 2025-26 reforms leave this pattern unchanged. Within area shares change by no more than 0.12 percentage points at any level.

Figure 5: Within and between area shares of income inequality by geographic level, Greater Essex



Note: Theil T decomposition of equivalised disposable household income after housing costs, in the baseline. Source: our analysis using UKMOD version B2025.09.

4.3 Overall fiscal implications

The 2025-26 fiscal reforms generate a net gain to the Exchequer across all geographies examined. At the UK level, the reforms considered here produce a net fiscal gain of £5,953.35 million annually (£3.98 per household per week), driven by revenue increases of £22,341.63 million. This substantially exceeds expenditure increases of £16,388.28 million. England shows a similar pattern, with a net gain of £5,556.64 million (£4.44 per household per week). Greater Essex generates a net fiscal gain of £171.38 million (£3.49 per household per week), consistent in direction with the national picture, though slightly smaller per household. Figure 6 shows the per-household weekly impact across the three geographies (full figures in Table 5).

Modelled aggregates are consistent with independent projections. The increase in state pension expenditure of £6.99 billion and in Second State Pension expenditure of £0.88 billion compare with £6.70 billion and £0.90 billion respectively in the Government Actuary's projections for the 2026 uprating order. The small difference partly reflects the model's UK rather than Great Britain coverage (Government Actuary's Department 2026). Comparison with published Budget costings is less direct, since those score discretionary measures against a baseline incorporating statutory uprating, whereas the figures here differ between two complete policy systems.

4.3.1 Expenditure and revenue

Universal Credit expansion is the dominant driver of changes in expenditure across all geographies, reflecting the removal of the two-child limit. In Essex, Universal Credit is the largest single driver of the £408.82 million increase in government expenditure. This

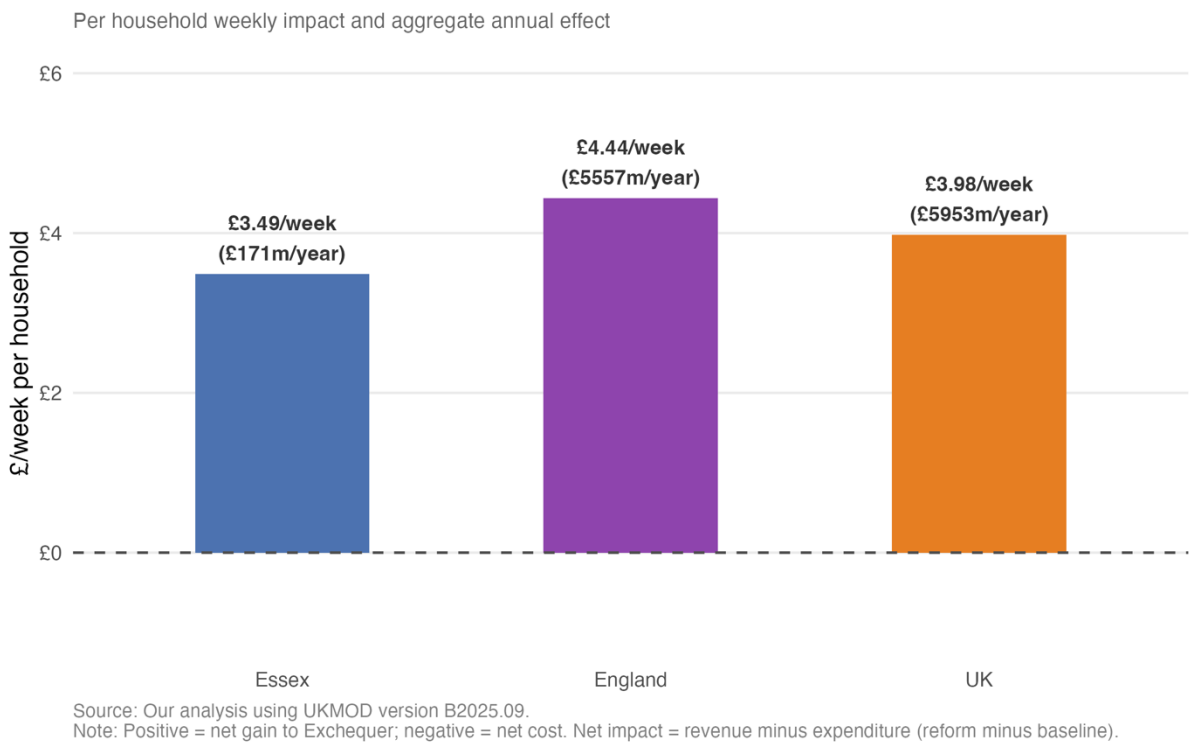
accounts for £171.30 million or 42 per cent of the total, compared with £5,289.44 million in England and £6,192.86 million for the UK.

On the revenue side, Personal Income Tax is the dominant driver across all geographies, generating surpluses of £340.73 million in Essex, £12,058.43 million in England, and £13,982.19 million for the UK. This reflects the continued freeze of income tax thresholds. Employee National Insurance contributions generate a further £45.85 million surplus in Essex, £1,213.19 million in England, and £1,436.19 million for the UK. Essex generates lower revenue per household (£11.82 per week) than England (£15.38 per week) or the UK (£14.93 per week), consistent with the county's lower average market income documented in Section 4.1. Essex also incurs lower expenditure per household than England and the UK. The combination produces a net per-household fiscal gain in Essex (£3.49 per week) that is slightly below England (£4.44 per week) and the UK (£3.98 per week).

4.3.2 Sub-regional variation within Greater Essex

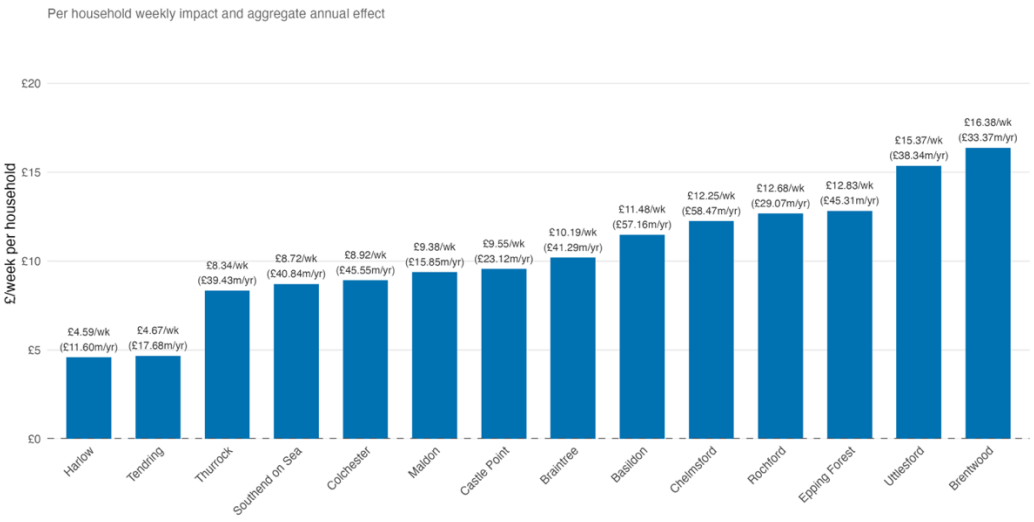
District-level fiscal breakdowns are presented in the Appendix (Table A1). Substantial heterogeneity exists across Greater Essex's 14 districts in the magnitude of net fiscal impacts. All 14 districts generate a net fiscal gain, ranging from £58.47 million in Chelmsford to £11.60 million in Harlow. Per household, the gain ranges from £4.59 per week in Harlow to £16.38 in Brentwood (Figure 7), so county-level analysis alone obscures substantial differences in how the same reform package lands across localities.

Figure 6: Net fiscal impact of the 2025-26 reforms by geography, per household



Source: Our analysis using UKMOD version B2025.09.
Note: Positive = net gain to Exchequer; negative = net cost. Net impact = revenue minus expenditure (reform minus baseline).

Figure 7: Net fiscal impact of the 2025-26 reforms across Greater Essex districts, per household



Source: Our analysis using UKMOD version B2025.09.
Note: Positive = net gain to Exchequer. Net impact = revenue minus expenditure (reform minus baseline).
Per-household figures based on district population shares applied to the Essex weighted household count (944,271).

Table 5: Fiscal impact of 2025-26 reforms

	Essex	England	UK
Government expenditure change			
Total (£ million/year)	408.82	13,704.68	16,388.28
Government revenue change			
Total (£ million/year)	580.20	19,261.32	22,341.63
Net fiscal impact			
Total (£ million/year)	171.38	5,556.64	5,953.35
Per household (£/week)	3.49	4.44	3.98
Key expenditure drivers (£ million/year)			
Universal Credit	171.30	5,289.44	6,192.86
Pension Credit	21.37	619.64	702.95
Housing Benefit	9.41	240.77	271.64
Council Tax Reduction	11.92	273.80	323.43
Child Benefit	11.00	328.85	389.43
Key revenue drivers (£ million/year)			
Personal Income Tax	340.73	12,058.43	13,982.19
Employee NIC	45.85	1,213.19	1,436.19

Note: Positive values indicate increases in expenditure or revenue. Net fiscal impact = total revenue change minus total expenditure change; positive values indicate a net gain to the Exchequer. Per-household weekly figure calculated as annual total divided by weighted household count (Essex 944,271; England 24,082,819; UK 28,782,960) and by 52 weeks. Winter Fuel Payment figures are negligible (Essex +£0.04m, UK +£0.46m, England £0.00m). Source: Our analysis using UKMOD, version B2025.09.

4.4 Poverty Impact

Using a fixed poverty line set at 60 per cent of the UK baseline median equivalised disposable income, applied uniformly across all three geographies and the 14 Essex districts and held constant between the baseline and reform scenarios, the 2025-26 fiscal reforms reduce overall poverty everywhere. Measured on this common line, baseline poverty is markedly higher in Greater Essex than nationally: 23.58 per cent after housing costs, against 19.37 per cent in England and 18.80 per cent for the UK. After housing costs, the poverty headcount falls by 1.75 percentage points in Greater Essex. This represents 33,135 fewer people in poverty, compared with reductions of 2.15 percentage points in England (1,223,970 fewer people) and 2.06 percentage points for the UK (1,391,424 fewer people). The reforms therefore reduce poverty by less in Greater Essex than nationally, despite Essex starting from a higher baseline rate.

Before housing costs, Essex poverty falls by 1.55 percentage points (29,434 fewer people), against 1.78 percentage points in England and 1.86 percentage points for the UK. The poverty reduction is smaller in Essex than nationally on both measures.

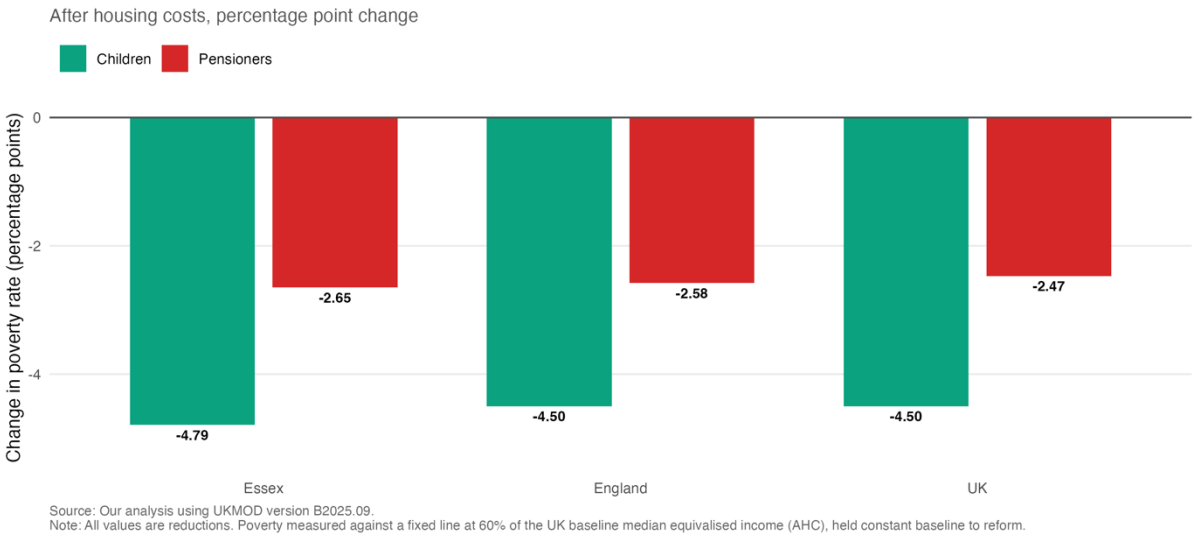
4.4.1 Child, adult, and pensioner poverty

The reforms reduce poverty across every population subgroup. Child poverty after housing costs falls by 4.79 percentage points in Essex, 4.50 percentage points in England, and 4.50 percentage points for the UK. This is from a much higher Essex baseline of 36.70 per cent against 27.92 per cent in England. Working-age adult poverty falls by 1.07 percentage points in Essex, 1.30 percentage points in England, and 1.21 percentage points for the UK. Pensioner poverty falls by 2.65 percentage points in Essex, 2.58 percentage points in England, and 2.47 percentage points for the UK. The reduction is of similar magnitude across all three geographies. Table 6 presents the full breakdown of changes in poverty by demographic group across Essex, England, and the UK (Figure 8).

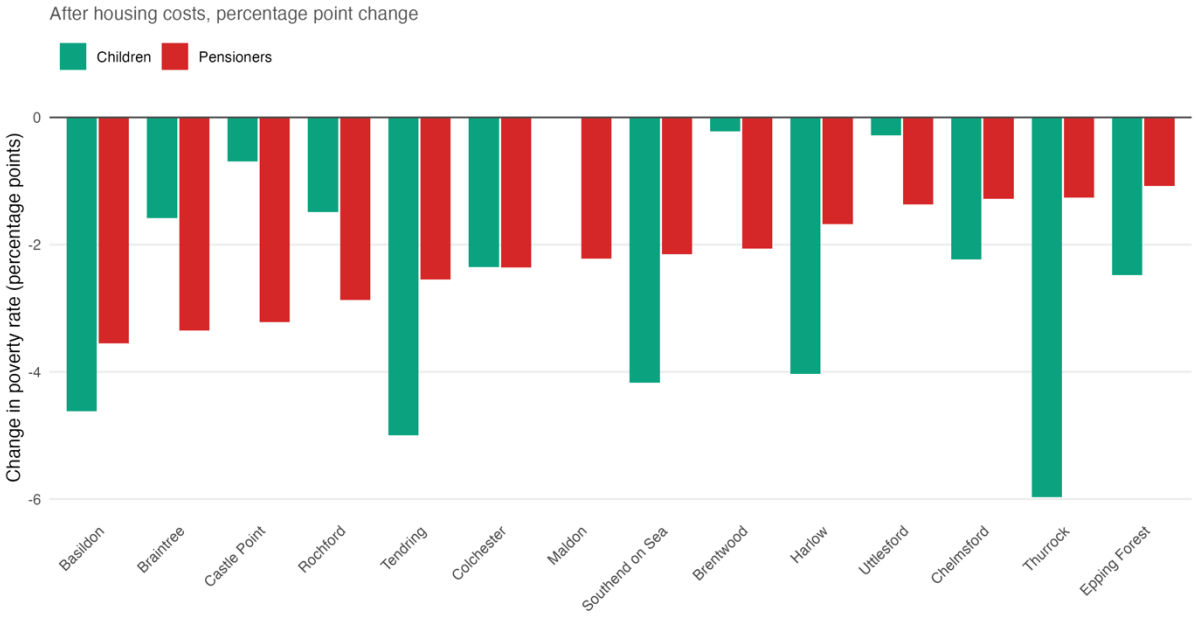
4.4.2 Sub-regional poverty variation

Substantial heterogeneity exists across Greater Essex's 14 districts in the overall change in poverty after housing costs, ranging from a reduction of 2.34 percentage points in Basildon to 0.61 percentage points in Uttlesford. Every district records a poverty reduction; the spread of 1.73 percentage points between districts is more than four times the 0.40 percentage-point difference between Essex and England. This shows that sub-regional variation within a single county can rival inter-regional differences in policy impact. Child poverty reductions range from 5.97 percentage points in Thurrock to no measurable change in Maldon. Pensioner poverty reductions range from 3.55 percentage points in Basildon to 1.08 percentage points in Epping Forest. Working-age adult poverty reductions range from 1.54 percentage points in Basildon to 0.35 percentage points in Epping Forest. Detailed district-level poverty breakdowns are presented in Figures 9 and 10 and the Appendix (Table A2).

Figure 8: Change in poverty rate by population group

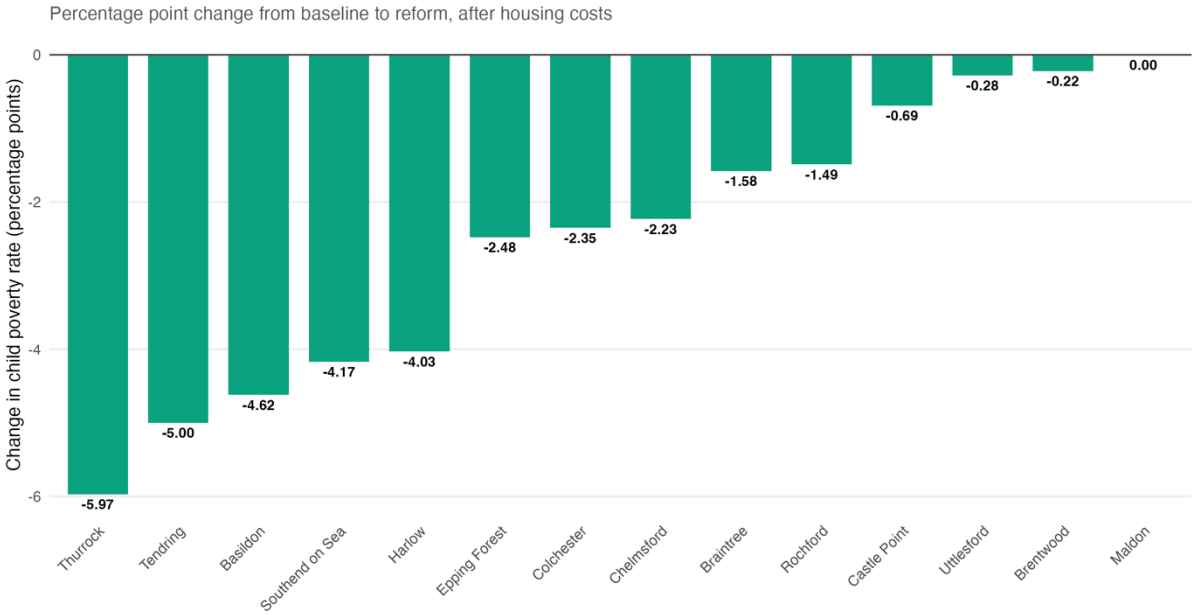


Source: Our analysis using UKMOD version B2025.09.
Note: All values are reductions. Poverty measured against a fixed line at 60% of the UK baseline median equivalised income (AHC), held constant baseline to reform.



Source: Our analysis using UKMOD version B2025.09.
Note: Poverty measured against a fixed line at 60% of the UK baseline median equivalised income (AHC), held constant baseline to reform.

Figure 10: Change in child poverty rate across Essex districts



Source: Our analysis using UKMOD version B2025.09.
Note: Poverty measured against a fixed line at 60% of the UK baseline median equivalised income (AHC), held constant baseline to reform.

Table 6: Poverty impact of the 2025-26 reforms

	Essex	England	UK
Overall poverty rate (AHC)			
Baseline (%)	23.58	19.37	18.80
Reform (%)	21.83	17.22	16.74
Change (pp)	-1.75	-2.15	-2.06
Change (number)	-33,135	-1,223,970	-1,391,424
Overall poverty rate (BHC)			
Baseline (%)	13.54	13.82	13.91
Reform (%)	11.99	12.05	12.05
Change (pp)	-1.55	-1.78	-1.86
Change (number)	-29,434	-1,013,063	-1,253,569
Child poverty (AHC, %)			
Baseline	36.70	27.92	26.79
Reform	31.92	23.43	22.29
Change (pp)	-4.79	-4.50	-4.50
Pensioner poverty (AHC, %)			
Baseline	22.24	17.50	17.14
Reform	19.59	14.92	14.67
Change (pp)	-2.65	-2.58	-2.47
Working-age adult poverty (AHC, %)			
Baseline	21.48	17.27	16.86
Reform	20.41	15.97	15.65
Change (pp)	-1.07	-1.30	-1.21
Poverty by household type (AHC, % change pp)			
Lone parents	-5.00	-3.64	-3.56
Households with children	-3.14	-3.36	-3.24
Three+ children	-15.97	-10.03	-10.25
No earners	-3.64	-2.65	-2.79
One earner	-1.88	-3.71	-3.25
Two+ earners	-0.41	-1.02	-1.02

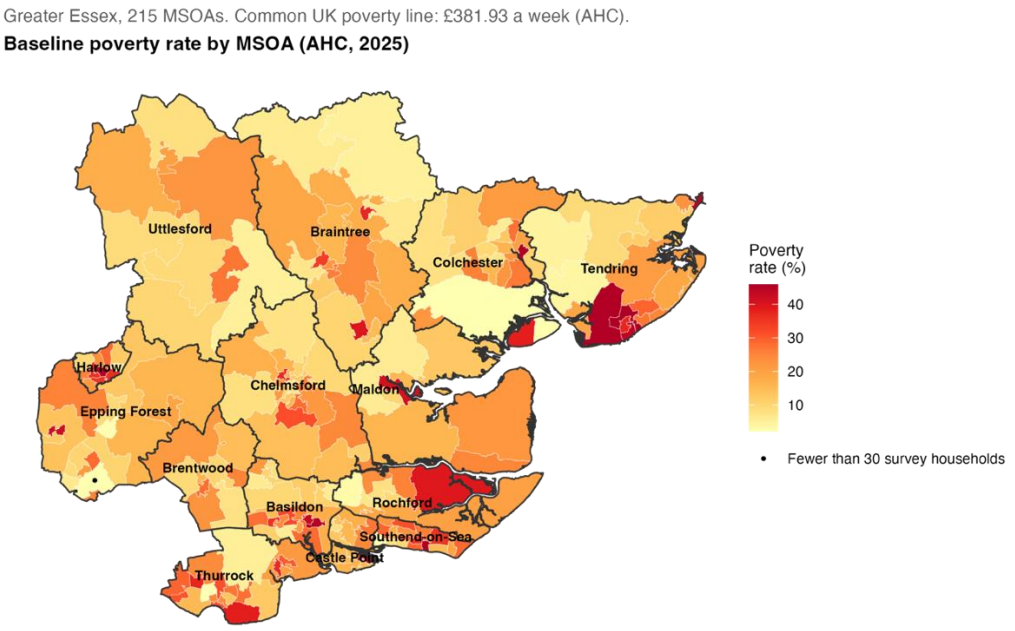
Note: AHC = After Housing Costs; BHC = Before Housing Costs. Poverty is measured as the percentage of individuals in households with equivalised disposable income below a fixed line set at 60% of the UK baseline median equivalised disposable income, held constant between the baseline and reform scenarios and applied uniformly across all three geographies. Negative change = reduction in poverty;

positive change = increase in poverty. Based on UKMOD B2025.09, comparing the 2025 baseline with the 2026 reform scenario.

4.4.3 Poverty below the district

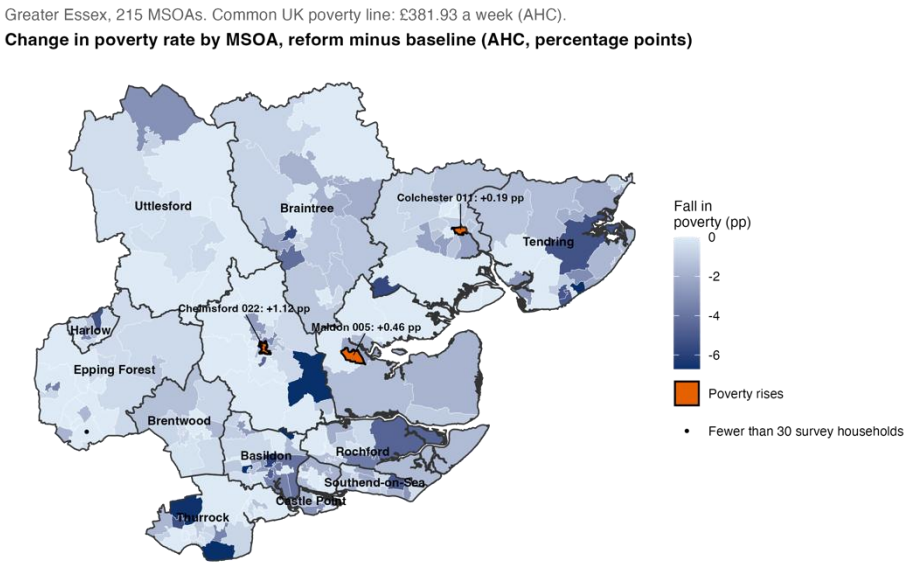
Figures 11 and 12 map baseline poverty and its change under the reforms across Greater Essex's 215 MSOAs, using the same located households and common UK poverty line as above. Baseline poverty after housing costs ranges from 2.2 to 45.9 per cent across MSOAs (2nd to 98th percentile; median 18.9 per cent), against 14.7 to 24.0 per cent across districts (Table A2). Poverty falls in 212 of the 215 MSOAs, by a median of 0.81 percentage points and by up to 10.9 points, against district reductions of 0.61 to 2.34 points. Reductions tend to be larger where the baseline poverty is higher (rank correlation -0.36). Poverty rises slightly in three MSOAs. As with inequality, poverty and reform effects vary far more across MSOAs than between districts.

Figure 11: Baseline poverty rate by MSOA, Greater Essex



Note: Share of persons below the poverty line, after housing costs. Colours capped at 2.2% and 45.9% (2nd and 98th percentiles).
Source: Our analysis using UKMOD version B2025.09.

Figure 12: Change in poverty rate by MSOA, Greater Essex



Note: Percentage-point change in the poverty rate, reform minus baseline, poverty line held fixed.
Blues capped at -6.7 pp (2nd percentile).
Source: Our analysis using UKMOD version B2025.09.

4.5 Inequality

The 2025-26 fiscal reforms reduce income inequality modestly across all geographic levels. After housing costs, the Gini coefficient falls by 0.002 in Greater Essex, 0.004 in England, and 0.004 in the UK. Before housing costs, the reductions are 0.002 in Greater Essex, 0.004 in England, and 0.004 in the UK. The Essex reduction is smaller than the national reductions on both measures. The S80/S20 ratio moves in the same direction: after housing costs it falls from 6.15 to 6.10 in Greater Essex, from 6.21 to 6.07 in England, and from 5.99 to 5.84 in the UK. Greater Essex records lower baseline inequality than England (Gini 0.343 versus 0.348 after housing costs), and this positioning holds after the reforms (0.342 versus 0.344). Table 7 presents detailed inequality measures.

District-level inequality changes mirror the minimal aggregate impacts. All 14 Greater Essex districts record small reductions in the Gini coefficient after housing costs, ranging from 0.0032 in Tendring to 0.0013 in Rochford. Baseline inequality varies more substantially across districts than reform-induced changes, ranging from a Gini of 0.3070 in Rochford to 0.4094 in Brentwood, a spread of 0.1024 that is roughly thirty times the largest district reform change of 0.0032. The S80/S20 ratio shows more mixed movement, ranging from a reduction of 0.373 in Epping Forest to an increase of 0.060 in Harlow, though these changes remain small relative to baseline differences. Table A3 in the Appendix presents detailed inequality metrics by district.

The reforms reduce the Gini in every district while leaving the wide baseline dispersion across districts intact. Across Greater Essex, the Gini coefficient changes by no more

than 0.002 points (Table 7), against a 4.79 percentage-point fall in child poverty (Table 6). The reforms produce larger changes in poverty rates than in overall income dispersion.

Table 7: Inequality impact of 2025-26 fiscal reforms, Greater Essex vs England and UK

	Essex	England	UK
Gini coefficient (AHC)			
Baseline	0.343	0.348	0.341
Reform	0.342	0.344	0.337
Change	-0.002	-0.004	-0.004
Gini coefficient (BHC)			
Baseline	0.291	0.310	0.305
Reform	0.289	0.307	0.301
Change	-0.002	-0.004	-0.004
S80/S20 ratio (AHC)			
Baseline	6.153	6.206	5.986
Reform	6.100	6.069	5.843
Change	-0.053	-0.137	-0.143
S80/S20 ratio (BHC)			
Baseline	4.279	4.722	4.623
Reform	4.219	4.608	4.517
Change	-0.060	-0.114	-0.106

Note: AHC = After Housing Costs; BHC = Before Housing Costs. Gini coefficient ranges from 0 (perfect equality) to 1 (perfect inequality). S80/S20 ratio shows income of top quintile relative to bottom quintile. Based on UKMOD B2025.09 comparing 2025 baseline with 2026 reform scenario.

5. Discussion

5.1 Key findings and interpretation

Uniform national reforms produce different outcomes at each geographic scale, and each scale reveals heterogeneity hidden at the level above.

First, Essex enters the reform with higher market income inequality than England (Gini 0.533 versus 0.509) despite lower average market income, but stronger tax-benefit compression leaves it with lower disposable income inequality (0.343 versus 0.348). National analysis does not see this pattern, and the reforms leave it unchanged.

Second, 99.25% of Essex disposable income inequality operates within districts, not between them. For comparison, the 0.75% between-district share is well below the between-region share of 3.15% across English regions, reflecting higher homogeneity of the Essex districts. The reforms barely change this: place-blind policy is approximately place-neutral in the structure of inequality, meaning the division of total inequality between and within geographic units. The same pattern holds below the district level: most inequality remains within local areas, be they MSOAs, LSOAs, or even postcodes.

Third, structural stability coexists with heterogeneous incidence. Poverty falls everywhere but by 1.75 percentage points in Essex against 2.15 in England. At the aggregate level, all three geographies record net fiscal gains, £3.49 per household weekly in Essex against £4.44 in England, but this masks wide variation at district level. All 14 Essex districts gain fiscally, but the gain per household ranges from £4.59 per week in Harlow to £16.38 in Brentwood.

On the common poverty line, Essex begins from a substantially higher baseline poverty rate than England (23.58 against 19.37 per cent after housing costs) yet its reforms deliver a smaller reduction, so the poorer county is left relatively further behind. District poverty reductions range from 2.34 points in Basildon to 0.61 in Uttlesford, a spread wider than the Essex-England gap. The same question, how much inequality lies between units versus within them, yields the same answer at every scale: this is the fractal pattern.

5.2 Policy implications

Uniform policies produce uneven outcomes because local demographic structures differ. Essex combines substantially higher child poverty (36.70 against 27.92 per cent after housing costs) and higher baseline poverty overall than England, so identical reforms land differently by subgroup and district. If over 99% of inequality is within districts, policies targeting gaps between areas address only a small part of it. We do not assess gaps between UK nations or between the North and South. Even at neighbourhood level, most inequality lies between households in the same area. This holds down to groups of neighbouring postcodes.

Put differently, differences between individuals within a district are far larger than differences between districts, and this holds down to a fine geographical partition: the reforms leave that structure intact. Reducing inequality requires reaching households within localities. Universal Credit expansion does this, operating on household circumstances regardless of location, and is the largest expenditure driver in every geography. National fiscal evaluation cannot see variation at the scale where inequality operates, including a more than threefold difference in per-household fiscal gains across districts. Routine sub-regional distributional assessment alongside national budget analysis would give place-based equity objectives the evidence base they currently lack.

Ultimately, the appropriate scale for fiscal evaluation depends on the question. National analysis shows whether reforms cut aggregate inequality; regional analysis shows whether they narrow geographic gaps; sub-regional analysis shows whether they alter inequality within places. Privileging national analysis produces incomplete assessments. Using newly available reweighted survey datasets in combination with open-source microsimulation models contributes to closing this gap.

5.3 Limitations

The analysis captures first-year impacts only, without behavioural responses or macroeconomic feedback. Measurement error persists in the estimated household weights, particularly for small subgroups. The market income Theil decomposition excludes the 11.02% of persons with zero or negative market income; including them, with income recoded to £1, raises the between-district share from 0.57 to 0.66 per cent. Within-district inequality remains above 99 per cent. The study examines one county, so generalisation requires caution. Fiscal estimates capture only direct tax and benefit changes modelled in UKMOD, excluding debt costs and indirect tax revenues.

No official income data exists below MSOA level to check LSOA and postcode results directly. Small areas contain few sample households, which can inflate between-area differences, so the between-area shares below the district are best read as upper bounds.

Uncertainty about poverty rates increases with the level of geographical detail, as the sample size gets smaller. MSOAs typically contain between 2,000 and 6,000 households, but the median number of survey respondents is only 73. As an illustration, the 95% confidence interval around a central estimate of 20% at-risk-of-poverty (AROP) is around 2 percentage points for a sample size of 1,200 respondents (the median number of respondents in each district), and more than 9 percentage points for a sample size of 70 respondents. Figures 11 and 12 are therefore best read as illustrative.

6. Conclusions

This paper asked whether place-blind policies are place-neutral. They are approximately place-neutral in the structure of inequality but not in their poverty or fiscal incidence, and the distinction matters for how geographic equity objectives are designed and evaluated.

Three contributions emerge. First, we establish the geographic architecture of inequality that fiscal reforms operate on. Essex enters with higher pre-redistribution inequality than England despite lower average market incomes, but stronger tax-benefit compression

leaves it with lower disposable income inequality. This structure is independent of the reforms considered and invisible to national analysis.

Second, Theil decomposition shows that almost all the income inequality in Essex operates within districts, not between them, across income concepts and scenarios, and the reforms leave this unchanged. If inequality is overwhelmingly within-district, place-based policies targeting between-area income gaps address only a fraction of the problem: reducing the gap between Harlow and Brentwood leaves the far larger variation within each district untouched. This holds below the district: inequality is almost always mostly within local areas.

Third, this structural stability coexists with heterogeneous incidence. Poverty declines across all geographies, and all three record net fiscal gains at the aggregate level, but the magnitudes differ. All 14 districts record net fiscal gains, but these range from £4.59 per household per week in Harlow to £16.38 in Brentwood. On the common poverty line, Essex begins from a substantially higher baseline poverty rate than England (23.58 against 19.37 per cent after housing costs) yet the reforms deliver a smaller reduction, so the poorer county is left relatively further behind. District poverty reductions range from 2.34 points in Basildon to 0.61 in Uttlesford, a spread wider than the Essex-England gap.

These findings point to three priorities. Routine sub-regional distributional assessment should become standard in budget evaluation, since variation across Essex's 14 districts exceeds the Essex-England difference, which is not routinely part of Treasury distributional analysis. Place-based objectives require explicit attention to how the national tax-benefit system interacts with local demographics, since that system itself produces uneven sub-regional effects that can counteract targeted levelling-up investment. Pensioner outcomes merit particular attention. Pensioner poverty falls by 2.65 percentage points in Essex against 2.58 in England, a similar aggregate reduction. However, district-level pensioner reductions range from 3.55 points in Basildon to 1.08 in Epping Forest, so pensioner impacts vary substantially even within one county.

Methodologically, microsimulation methods combined with machine-learning calibration and additive decomposition offer a tractable approach to multi-scalar distributional analysis, without bespoke regional models or proprietary data. As fiscal pressure and demographic divergence persist, the gap between national policy intent and local outcomes will widen without systematic attention to place-based impacts at multiple scales. The framework here offers a practical means of closing it.

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Data Availability: The Family Resources Survey 2022/23 is available from the UK Data Service under licence. UKMOD is freely available from the Centre for Microsimulation and Policy Analysis, University of Essex. The commercial household dataset used for reweighting and location is proprietary and cannot be shared. Official small-area statistics used for validation are publicly available from ONS and MHCLG. Code is available from the authors on request.

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Appendix 1. District Level Analysis

Table A1: Fiscal breakdown by district, 2025-26 reforms

District	Net fiscal impact (£m/yr)	Universal Credit (£m/yr)
Chelmsford	58.47	16.79
Basildon	57.16	25.30
Colchester	45.55	23.75
Epping Forest	45.31	16.30
Braintree	41.29	21.16
Southend on Sea	40.84	26.34
Thurrock	39.43	27.68
Uttlesford	38.34	6.05
Brentwood	33.37	8.93
Rochford	29.07	6.31
Castle Point	23.12	7.06
Tendring	17.68	16.98
Maldon	15.85	5.54
Harlow	11.60	15.31

Note: Net fiscal impact = total government revenue change including employer National Insurance contributions, minus total government expenditure change; positive values indicate a net gain to the Exchequer. All districts show a net gain. Universal Credit is shown as the principal expenditure driver. Each district is calibrated to its own population, so figures are district-specific and not additive across districts. Source: UKMOD Statistics Presenter, version B2025.09.

Table A2: Poverty impact by district, Greater Essex (AHC): baseline rate and change

District	Overall baseline (%)	Overall change (pp)	Children (pp)	Pensioners (pp)	Working-age adults (pp)
Basildon	19.67	-2.34	-4.62	-3.55	-1.54
Tendring	20.24	-2.12	-5.00	-2.55	-1.25
Thurrock	23.44	-2.05	-5.97	-1.26	-1.40
Southend on Sea	24.02	-1.39	-4.17	-2.15	-0.60
Braintree	18.62	-1.30	-1.58	-3.35	-0.62
Rochford	16.01	-1.28	-1.49	-2.87	-0.70
Harlow	23.50	-1.21	-4.03	-1.68	-0.57
Colchester	18.89	-1.12	-2.35	-2.36	-0.56
Castle Point	18.23	-1.10	-0.69	-3.22	-0.42
Chelmsford	17.82	-0.97	-2.23	-1.28	-0.67
Maldon	18.60	-0.93	0.00	-2.22	-0.61
Brentwood	19.36	-0.77	-0.22	-2.06	-0.52
Epping Forest	17.09	-0.75	-2.48	-1.08	-0.35
Uttlesford	14.73	-0.61	-0.28	-1.37	-0.44

Note: AHC = After Housing Costs. Overall baseline is the 2025 poverty rate; other columns are the percentage-point change from baseline to reform. All measured against a common line set at 60% of the UK baseline median equivalised disposable income, applied uniformly across all 14 districts and held constant baseline to reform, consistent with Table 6. All changes are reductions except Maldon child poverty (0.00). Districts sorted by overall poverty reduction. Full district breakdowns by household type and before housing costs are available from the authors on request. Source: our analysis using UKMOD version B2025.09.

Table A3: Inequality impact by district, Greater Essex (AHC)

District	Gini baseline	Gini change	S80/S20 change
Rochford	0.3070	-0.0013	0.004
Castle Point	0.3073	-0.0024	0.013
Colchester	0.3206	-0.0021	-0.067
Maldon	0.3221	-0.0022	-0.114
Uttlesford	0.3259	-0.0016	-0.076
Basildon	0.3327	-0.0023	-0.109
Tendring	0.3327	-0.0032	-0.047
Harlow	0.3347	-0.0016	0.060
Chelmsford	0.3418	-0.0015	-0.084
Thurrock	0.3442	-0.0022	-0.078
Braintree	0.3482	-0.0026	-0.109
Southend on Sea	0.3513	-0.0024	-0.088
Epping Forest	0.3536	-0.0023	-0.373
Brentwood	0.4094	-0.0014	-0.048

Note: AHC = After Housing Costs. Gini baseline is the 2025 baseline Gini coefficient; Gini change and S80/S20 change are baseline to reform. Gini changes are reductions in every district. Districts sorted by baseline Gini. Full district inequality metrics including before housing costs and reform-level values are available from the authors on request. Source: UKMOD Statistics Presenter, version B2025.09.

Table A4: Validation of household locations below district-level

Check	**Value**
Rank correlation, MSOA mean income with ONS small area estimates	**0.77**
As above, within districts	**0.75**
Rank correlation, LSOA mean income with IoD 2025 income rank, all LSOAs	**0.60**
As above, within districts	**0.57**
As above, within MSOAs	**0.38**

Note: Spearman rank correlations. ONS small area income estimates: net equivalised household income after housing costs, FYE2023 (ONS 2025b). IoD 2025 income rank: 1 = most deprived; positive correlations mean higher-income LSOAs in our data are less income deprived in the official index (MHCLG 2025). Source: our analysis using UKMOD version B2025.09.

Appendix 2. Postcode Level Analysis

Table A5: Households per postcode before and after aggregation, Greater Essex

Households per postcode	Original postcodes	Aggregated postcodes
1	7,771	0
2	2,169	0
3	636	0
4-5	258	0
6-9	54	0
10-14	21	498
15-19	11	479
20-29	6	96
30 or more	3	3
Total postcodes	10,929	1,076
Median households per postcode	1	15

Note: Sample households. Postcodes with fewer than 10 households are aggregated with their smallest adjacent postcode, within districts, until every postcode group contains at least 10 households. No households are excluded. Adjacency is based on postcode locations from the ONS UPRN Directory (ONS 2025c). Source: our analysis using UKMOD version B2025.09.

Table A6: Within-area share of inequality at the postcode level, Greater Essex.

Geographic level	Number of areas	Median households per area	Within-area share, baseline (%)	Within-area share, reform (%)
Postcode (aggregated)	1,076	15	68.80	68.89

Note: Theil T decomposition of equivalised disposable household income after housing costs. Persons with zero or negative income are excluded. Postcodes with fewer than 10 households are aggregated with their smallest adjacent postcode; defining adjacency by postcode order instead of location gives 68.59 per cent within. The household locations reproduce the ONS small area income pattern across MSOAs (rank correlation **0.77**) and the income deprivation ranking of the English Indices of Deprivation 2025 across LSOAs (**0.60**) – see Table A4. Source: our analysis using UKMOD version B2025.09.