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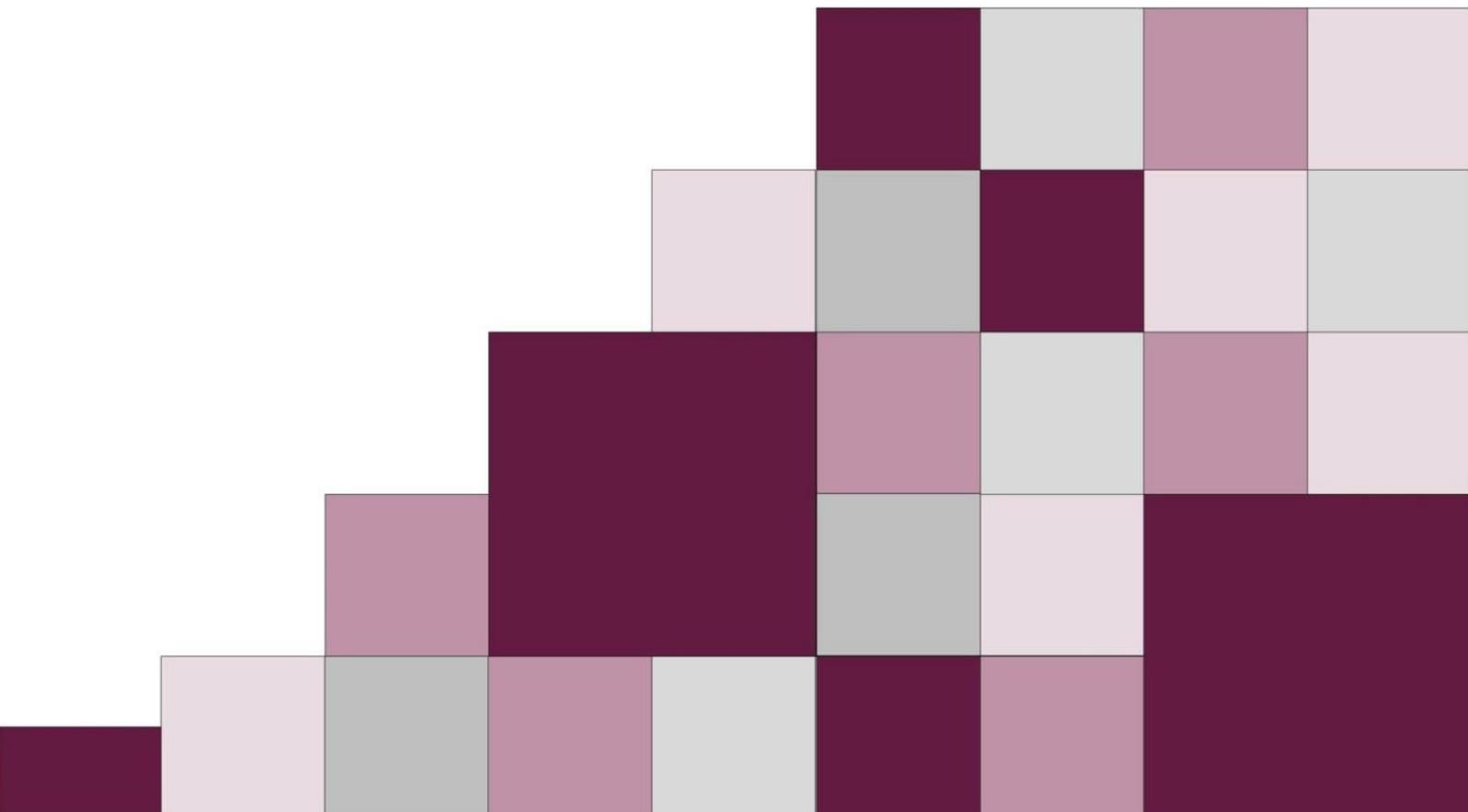
Inclusive Growth Monitor: Technical Notes

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Introduction

This technical note accompanies the report entitled *An Inclusive growth monitor for measuring the relationship between poverty and growth* which was funded by the Joseph Rowntree Foundation.

The report was published in May 2016 and can be found at https://www.jrf.org.uk/report/inclusive-growth-monitor

This note contains details of all the data sources and methods used to construct and analyse the full set of 18 indicators used in the report to measure the relationship between poverty and growth at city regional level.

Future versions of the indicator set will be produced by the Inclusive Growth Analysis Unit (IGAU) and found at www.manchester.ac.uk/inclusivegrowth

Composition and Derivation of Inclusive Growth Indicators

1.1. INCLUSION THEME

1.1.1. Income Dimension

I1.1: Out-of-work benefits	
Definition	% of working-age population receiving out-of-work benefits
Value format	Percentage
Main data source	DWP Work and Pensions Longitudinal Study (benefit claimants - working-age client group)
Data source access	Via NOMIS: https://www.nomisweb.co.uk/query/construct/summary.asp?mode=construct&version=0&dataset=105
Geographical base	Place of residence; LEPs, regions and countries
Further data derivation	None required
Denominator	Resident population aged 16-64 estimates (built into source data set)
LEP conversion	Not required
Other notes	Out-of-work benefit recipients comprise all individuals whose entitlement is based on their lack of employment. Welfare benefits included under this heading are as follows: - Jobseekers Allowance - Incapacity Benefit/Employment Support Allowance - Income Support - Other income-related benefits.

I1.2: In-work tax credits	
Definition	% in-work households with and without children receiving Child and/or Working Tax Credits
Value format	Percentage
Main data source	HMRC Child and Working Tax Credit Finalized Award Statistics - Geographical Statistics
Data source access	Via GOV.UK: https://www.gov.uk/government/collections/personal-tax-credits-statistics
Geographical base	Place of residence; LADs, regions and countries
Further data derivation	Figures produced from source data set by subtracting 'out-of-work families' from 'total in receipt' to give numbers in work receiving tax credits
Denominator	Estimates of number of working households by LEP area, from Annual Population Survey - combined economic activity status of households data set. Accessed via NOMIS: https://www.nomisweb.co.uk/query/construct/summary.asp?mode=construct&version=0&dataset=136
LEP conversion	Absolute figures for recipients for constituent LADs aggregated for each LEP, and the resultant values combined with the denominator to generate a new overall LEP percentage.
Other notes	Based on annual figures provided by HMRC series "Personal tax credits: Finalised award statistics - geographical statistics"

I1.3: Low earnings	
Definition	20th percentile of gross weekly earnings (Twenty per cent of full-time workers receive earnings equal to or below this threshold)
Value format	Monetary value in £
Main data source	Annual Survey of Hours and Earnings (ASHE) resident analysis
Data source access	Via NOMIS: https://www.nomisweb.co.uk/query/construct/summary.asp?mode=construct&version=0&dataset=30
Geographical base	Place of residence; LADs, regions and countries
Further data derivation	None required
Denominator	Not required (but see below)
LEP conversion	ASHE earnings figures for each LAD multiplied by number of full-time workers in quintile to produce aggregate earnings for each year. This and number of full-time workers then aggregated separately for each LEP area, with the result of the former divided by the result of the latter to produce a new overall LEP threshold.
Other notes	ASHE is based on a sample of employee jobs taken from HM Revenue & Customs PAYE records. Information on earnings and hours is obtained in confidence from employers. ASHE does not cover the self-employed nor does it cover employees not paid during the reference period.
	All source figures are estimates based on relatively small samples for individual LADs. Standard errors for both earnings and full-time workers may be as high as 12 to 14 per cent. Where estimates for small areas are missing because of unreliability, these have been treated as zero.

1.1.2. Living Costs Dimension

I2.1: Housing affordability	
Definition	Ratio of lower quartile house price to lower quartile earnings
Value format	Ratio (to two decimal places)
Main data source	Department for Communities and Local Government Housing Statistics, Table 576: Ratio of Lower Quartile House Price to Lower Quartile Earnings by District, from 1997.
Data source access	Via GOV.UK: https://www.gov.uk/government/statistical-data-sets/live-tables-on-housing-market-and-house-prices
Geographical base	Place of residence; LADs, regions and England
Further data derivation	Figures for 2014 derived separately from two data sets: • Office for National Statistics House Price Statistics for Small Areas (HPSSA) Dataset 15: Lower quartile house price for national and subnational geographies, quarterly rolling year. Table 6a: figures for local enterprise partnerships, Q4 1995 to Q2 2015. Values for Q2 2014 used in these calculations. Accessed via ONS Housing page: http://www.ons.gov.uk/peoplepopulationandcommunity/housing/articles/housepricestatisticsforsmallareas/yearendingquarter41995toyearendingquarter22015/relateddata?page=3 • Annual Survey of Hours and Earnings (ASHE) resident analysis, lower quartile gross annual pay of full-time workers, 2014. Accessed via NOMIS (see I1.3 above). ASHE annual earnings figures for each constituent LAD then multiplied by number of full-time workers in quartile to produce aggregate earnings for each year. This and number of full-time workers then aggregated separately for each LEP area, with the result of the former divided by the result of the latter to produce a new overall LEP lower quartile earnings figure. The lower quartile house price for each LEP divided by this lower quartile annual earnings figure then generated the ratio for 2014.
Denominator	Not required
LEP conversion	Lower quartile house price/earnings ratios for each constituent LAD weighted by total number of households in each area (taken from the Annual Population Survey estimates). Number of households and weighted values then aggregated separately for each LEP area, with the results of the latter divided by the results of the former to produce a new overall ratio. Note that original ratios from the CLG data set are used where LEP boundaries coincide with whole administrative areas such as counties.
Other notes	Drawn directly from time series data as part of CLG's "Live tables on the housing market and house prices". These are based on data extracted from ASHE gross annual earnings on the one hand, and Land Registry house sale price records on the other. Current CLG data set only runs to 2013; 2014 values have been calculated from alternative sources (see above).

I2.2: Rented housing costs	
Definition	Median monthly rents for private sector two bedroom properties
Value format	Rental charge in £
Main data source	Valuation Office Agency Private Rental Sector Market Statistics: Summary of property type '2 bedrooms' gross monthly rents by region and administrative area for England (Tables 1.4 and 2.4: includes average, median, upper and lower quartile values)
Data source access	Via GOV.UK: https://www.gov.uk/government/statistics/private-rental-market-statistics-england-only
Geographical base	Place of residence; LADs, regions and England
Further data derivation	None required
Denominator	Not required (but see below)
LEP conversion	Median rental figures for each constituent LAD multiplied by number of households in that area living in the private rented sector (figures extracted from the 2011 Census of Population, via NOMIS: Table QS405EW - Tenure - Households). These aggregate rental figures and PRS households then summed separately for each LEP, with the result of the former divided by the result of the latter to provide median rent figures for LEPs.
Other notes	Values are for the 12 months ending in March each financial year. Thus, figures listed for 2014 are strictly speaking for 2013/14. Also note that the figures are not based on comprehensive coverage of all privately rented properties, but just those entered into the lettings administrative information database. This means that there may be variations in sample sizes underpinning the source data, both between years and also between areas in the same year. Comparisons over time and across geographical space therefore need to be treated with some caution.

I2.3: Fuel poverty	
Definition	% of households classed as being 'fuel poor' (using Low Income-High Costs model)
Value format	Percentage
Main data source	DECC Fuel poverty sub-regional statistics
Data source access	Via GOV.UK: https://www.gov.uk/government/collections/fuel-poverty-sub-regional-statistics
Geographical base	Place of residence; LADs, regions and England
Further data derivation	None required
Denominator	Number of households (built into source data set)
LEP conversion	Estimates for both 'fuel poor' households and total number of households for constituent LADs aggregated separately for each LEP area. Results of the two calculations then combined to produce a new overall percentage figure for each LEP.
Other notes	Current data set only runs to 2013; next release of series (with 2014 data) is due in July 2016. In the current version 2013 values have been replicated in the derivation of the overall normalised scores for 2014.

1.1.3. Labour Market Exclusion Dimension

I3.1: Unemployment	
Definition	% of working-age population not in employment but actively seeking and available to start work
Value format	Percentage (rate)
Main data source	Annual Population Survey (APS) - combined economic activity status data set.
Data source access	Via NOMIS: https://www.nomisweb.co.uk/query/construct/summary.asp?mode=construct&version=0&dataset=17
Geographical base	Place of residence; LEPs, regions and countries
Further data derivation	None required
Denominator	Economically active resident population aged 16-64 (built into source data set)
LEP conversion	Not required
Other notes	The unemployment variable in the APS data set uses the International Labour Office (ILO) definition, which states that "the main criteria for identifying a person as unemployed are that a) he/she has been actively looking for a job in the past 4 weeks, and b) he/she is available to start work within 2 weeks." See: https://www.nomisweb.co.uk/published/stories/story.asp?id=10

I3.2: Economic inactivity	
Definition	% of working-age population who are economically inactive
Value format	Percentage (rate)
Main data source	Annual Population Survey (APS) - combined economic activity status data set.
Data source access	Via NOMIS: https://www.nomisweb.co.uk/query/construct/summary.asp?mode=construct&version=0&dataset=17
Geographical base	Place of residence; LEPs, regions and countries
Further data derivation	None required
Denominator	Resident population aged 16-64 (built into source data set)
LEP conversion	Not required
Other notes	According to Leaker (2009), "the economically inactive include those who want a job but have not been seeking work in the last four weeks, those who want a job and are seeking work but are not available to start work, and those who do not want a job." This group is usually subdivided into the following categories: • students • those looking after home or family • the temporarily sick • the long-term sick • discouraged workers • the retired • others (e.g., those who do not need a paid job, and those who provided no reason).

I3.3: Workless households	
Definition	% of working age households with no one in work
Value format	Percentage (rate)
Main data source	Annual Population Survey (APS) - households by combined economic activity status
Data source access	Via NOMIS: https://www.nomisweb.co.uk/query/construct/summary.asp?mode=construct&version=0&dataset=136
Geographical base	Place of residence; LEPs, regions and countries
Further data derivation	None required
Denominator	Working age households (i.e., those that include at least one person aged 16 to 64) (built into source data set).
LEP conversion	Not required
Other notes	A workless household is defined as one in which no individuals aged 16 and over are in employment.

1.2. PROSPERITY THEME

1.2.1. Output Growth Dimension

P1.1: Output (GVA)	
Definition	Gross Value Added (GVA) per capita
Value format	Monetary value in £ at current basic prices
Main data source	ONS Regional GVA (Income Approach) Statistics
Data source access	Via ONS section of National Archives website: http://webarchive.nationalarchives.gov.uk/20160105160709/http://www.ons.gov.uk/ons/rel/regional-accounts/regional-gross-value-added--income-approach-/december-2015/stb-regional-gva-dec-2015.html
Geographical base	Place of work; NUTS2 and 3, regions and countries
Further data derivation	Population bases for each LAD reconstituted by dividing total GVA by per capita figures for each area.
Denominator	Total resident population (built into source data set - see above)
LEP conversion	Total GVA and reconstituted population bases for each constituent NUTS area aggregated separately for each LEP. The result of the former then divided by the result of the latter to produce a new overall per capita GVA figure for each LEP area. Note that original per capita figures from the ONS data set are used where LEP boundaries coincide with whole administrative areas such as counties.
Other notes	GVA (Income Approach) (GVA(I)) figures are made up of a number of components, as follows: • Compensation of employees: the total remuneration payable to employees in cash or in kind, including the value of social contributions payable by the employer. • Gross operating surplus: comprises gross trading profits and surpluses, non-market capital consumption and rental income, less holding gains. • Mixed income: the income generated by sole traders (self-employed people not registered as partners). • Taxes on production: compulsory taxes levied by the government relating to the production and import of goods and services, the employment of labour, or the ownership or use of land, buildings or other assets in production. • Subsides on production: payments made by government or the European Union to enterprises, including subsidies to farmers for land set-aside, as well as government incentives to promote research and development.

P1.2: Private sector businesses	
Definition	Number of private sector workplaces per 1,000 resident population
Value format	Rate per 1,000
Main data source	ONS UK Business Counts - Local Units
Data source access	Via NOMIS: https://www.nomisweb.co.uk/query/construct/summary.asp?mode=construct&version=0&dataset=141
Geographical base	Place of work; LEPs, regions and countries
Further data derivation	None required
Denominator	Resident population, taken from the ONS Mid-Year Population Estimates. Accessed via NOMIS: https://www.nomisweb.co.uk/query/construct/summary.asp?mode=construct&version=0&dataset=31
LEP conversion	Not required
Other notes	A local unit refers to an individual site (for example a factory or shop) associated with an enterprise (also known as a workplace). Figures are extracted from the Inter Departmental Business Register (IDBR), using records of local units that were live in March of each year.

P1.3: Wages/earnings	
Definition	Median gross weekly pay for full-time workers
Value format	Monetary value in £
Main data source	Annual Survey of Hours and Earnings (ASHE) workplace analysis
Data source access	Via NOMIS: https://www.nomisweb.co.uk/query/construct/summary.asp?mode=construct&version=0&dataset=99
Geographical base	Place of work; LADs, regions and countries
Further data derivation	None required
Denominator	Not required (but see below)
LEP conversion	ASHE earnings figures for each LAD multiplied by number of full-time workers listed in source data set to produce aggregate earnings for each year. This and number of full-time workers then aggregated separately for each LEP area, with the result of the former divided by the result of the latter to produce a new overall LEP earnings figure.
Other notes	ASHE is based on a sample of employee jobs taken from HM Revenue & Customs PAYE records. Information on earnings and hours is obtained in confidence from employers. ASHE does not cover the self-employed nor does it cover employees not paid during the reference period. All source figures are estimates based on relatively small samples for individual LADs. Standard errors for both earnings and full-time workers may be as high as 14 to 16 per cent. Where estimates for small areas are missing because of unreliability, these have been treated as zero.

1.2.2. Employment Dimension

P2.1: Workplace jobs	
Definition	Employee jobs by working-age population (jobs density)
Value format	Ratio
Main data source	ONS Jobs Density series
Data source access	Via NOMIS: https://www.nomisweb.co.uk/query/construct/summary.asp?mode=construct&version=0&dataset=57
Geographical base	Place of work and place of residence; LEPs, regions and countries
Further data derivation	Figures for 2014 were generated firstly by comparing BRES total workplace employment figures for each LEP by year 2010-2013 with the equivalents used in the ONS Jobs Density series (see below). Discrepancies were expressed as a multiplier which was then averaged across the four years to provide a scaling up factor for each LEP area for 2014. This was then applied to 2014 BRES employment figures for each LEP to generate estimates in line with previous years. These were then combined with figures for resident working age population (taken from the Mid-Year Population Estimates - see under G1.2 above) to provide an overall jobs density figure for each LEP for 2014.
Denominator	Resident population aged 16-64 (built into source data set for 2010-2013; from Mid-Year Population Estimates for 2014)
LEP conversion	Not required
Other notes	Current ONS data set is only available to 2013. Employment figures used in the ONS Jobs Density series are special estimates which effectively scale up employment figures from BRES to account for those excluded (e.g., people working in agriculture and in various forms of self-employment). Access to BRES data is restricted to those with Ministerial authorisation (available on application, subject to status).

P2.2: Employment rate	
Definition	% of working age population in employment (employment rate)
Value format	Percentage (rate)
Main data source	Annual Population Survey (APS)
Data source access	Via NOMIS: https://www.nomisweb.co.uk/query/construct/summary.asp?mode=construct&version=0&dataset=17
Geographical base	Place of residence; LEPs, regions and countries
Further data derivation	None required
Denominator	Resident population aged 16-64 (built into source data set)
LEP conversion	Not required
Other notes	All source figures are estimates based on samples for individual LEPs. Standard errors for employment rates tend to be fairly low at this scale (typically between 1 and 3 per cent).

P2.3: Employment in low pay sectors	
Definition	% employed in administrative and support services, wholesale and retail trade, accommodation and food services, and residential social care
Value format	Percentage (rate)
Main data source	Business Register Employee Survey (BRES)
Data source access	Via NOMIS: https://www.nomisweb.co.uk/home/notice_info.asp
Geographical base	Place of work; LEPs, regions and countries
Further data derivation	Totals generated by summing figures across all component sectors (see below for further details).
Denominator	Total workplace employment (also from BRES, built into source data set)
LEP conversion	Not required
Other notes	Component sectors (following the 2007 Standard Industrial Classification) are as follows: • G: Wholesale and retail trade; repair of motor vehicles and motorcycles • I: Accommodation and food service activities • N: Administrative and support service activities • 87: Residential care activities Please note that access to BRES data is restricted to those with Ministerial authorisation (available on application, subject to status). See link to relevant NOMIS page above.

1.2.3. Human Capital Dimension

P3.1: Higher level occupations	
Definition	% workers in managerial, professional and technical/ scientific occupations (SOCs 1, 2 and 3)
Value format	Percentage
Main data source	Annual Population Survey (APS)
Data source access	Via NOMIS: https://www.nomisweb.co.uk/query/construct/summary.asp?mode=construct&version=0&dataset=17
Geographical base	Place of residence; LEPs, regions and countries
Further data derivation	Totals generated by summing figures across all component categories (see below for further details).
Denominator	Resident population aged 16-64 in employment (from APS via NOMIS)
LEP conversion	Not required
Other notes	Component categories (following the 2010 Standard Occupational Classification) are as follows: 1. Managers, Directors and Senior Officials 2. Professional Occupations 3. Associate Professional and Technical Occupations

P3.2: Intermediate and higher level skills	
Definition	% working-age population qualified at NVQ Level 2 and above
Value format	Percentage
Main data source	Annual Population Survey (APS)
Data source access	Via NOMIS: https://www.nomisweb.co.uk/query/construct/summary.asp?mode=construct&version=0&dataset=17
Geographical base	Place of residence; LEPs, regions and countries
Further data derivation	Totals generated by summing figures across NVQ2, NVQ3, NVQ4+ and Trade Apprenticeship categories
Denominator	Resident population aged 16-64 (built into source data set)
LEP conversion	Not required
Other notes	Trade Apprenticeship qualifications are generally allocated equally between NVQ Levels 2 and 3

P3.3: Educational attainment	
Definition	% of pupils at the end of Key Stage 4 achieving 5 or more GCSEs or equivalent at grades A* to C (including English and Mathematics)
Value format	Percentage
Main data source	Department for Education GCSE (Key Stage 4) Statistics
Data source access	Via GOV.UK: https://www.gov.uk/government/collections/statistics-gcses-key-stage-4
Geographical base	Place of residence; LEAs, regions and England
Further data derivation	Number of pupils achieving specified grades reconstituted for each LEA by combining total number of pupils and percentage achieving these grades.
Denominator	Number of end of Key Stage 4 pupils (built into source data set)
LEP conversion	Figures for number of pupils at end of KS4 and for the number achieving the specified grades for constituent LEAs both aggregated separately for each LEP area. The two results then combined to produce a new overall percentage for each LEP. Note that original source figures from the DfE data set are used where LEP boundaries coincide with a single LEA area such as a county. Note also that in LEPs containing some Shire (lower tier) LADs but not the whole County LEA, the figures for the latter have been included in the calculation.
Other notes	The reduction in the percentage of pupils achieving the specified grades in 2013/14 appears to be related to three main factors: • a sharp rise in the number of pupils aged 15 or younger taking GCSE exams; • tougher science papers; and • more students taking subjects multiple times.

Converting Indicators to a LEP Basis

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As the previous section illustrates eight of the core data sets underpinning the eighteen indicators contain sub-national geographical breakdowns which do not correspond to LEPs. In order to convert the figures to a LEP basis it was first necessary to define each LEP in terms of their constituent areas. The result was a series of look-up tables which could be used to extract the relevant figures for these constituent areas, then allowing re-aggregation of these figures in order to provide a new overall figure for each LEP.

The types of area for which these look-up tables were compiled are as follows:

- Local Authority Districts (LADs) (including Metropolitan Boroughs and Unitary Authorities)

- Local Education Authorities (County Councils, Metropolitan Boroughs and Unitary Authorities)

- NUTS2 and NUTS3 areas.

The look-up tables are held as a series of worksheets, and are available on request.

Normalised Scores

3.1. Introduction

The technical specifications set out in the previous section highlight the fact that the different 'inclusive growth' indicators have not been calculated on the same basis, with some related to the total resident population, others to the working-age resident population, some to the number of employees working in the area, and the rest to a range of other appropriate 'population' denominators. These variations occur within each dimension, as well as between them.

Although all initial indicator data has already been subject to simple standardisation in the form of percentages or rates per thousand, the use of different denominators still makes comparisons between them difficult. This in turn makes it difficult to combine them into a single 'score' for each dimension or theme in a way which allows direct comparison to be made between prosperity and inclusion. In order to construct this scoring system it was necessary to transform or rescale each figure using a recognised statistical technique, so that values for all indicators are on an equivalent scale. For this it was decided that the statistical calculation known as normalisation was most appropriate.

3.2. Normalisation

This involves the adjustment of data values calculated on different bases to a common scale. In doing so it brings the probability distribution for each into alignment - in other words, it eliminates the effect of outliers in the data range to produce a normal distribution. In the simplest form ('unity-based' normalisation) the resulting data values run on a scale of 0 to 1. The formula for calculating each value is as follows:

$$X_j = \frac{X_i - X_{min}}{X_{max} - X_{min}}$$

where X_j = new value on a scale of 0 to 1;

X_i = the original data value;

X_{min} = minimum value in the data range;

X_{max} = maximum value in the data range.

In simple terms, 0 denotes worst performance, and 1 best. This normalisation technique is most effective with ratio measurements: it cannot be applied to interval scale data unless the values are first converted to ordinal rankings (which would itself be a form of normalisation). All the indicators fall into this ratio category.

For those indicators where a decrease in value signifies 'improvement' (e.g., unemployment, in-work poverty), the same calculations are applicable, but with an additional step for unity-based normalisation in which the rescaled value is subtracted from 1. This has the effect of reversing the value range order. This has been applied as required with cross-sectional data (annual levels) and change over time rates for each indicator (see table below). This ensures that all final indicators move in the same direction i.e. a positive score indicates an improvement in the underlying indicator.

The same normalisation technique has also been applied to percentage rates of change, both between years and over the whole period under study (2010-2014). Of course such rates of change may be positive or negative; the direction of movement can thus be masked by applying normalisation techniques which by definition return a positive value. Relative performance between areas might also fluctuate more wildly too, particularly when looking at year-on-year change, thus possibly giving a false impression of the progress being made. There is also the 'small number' problem, where a high rate of change in a small area might be of less impact than a low to medium rate for larger populations.

3.3. Benchmarking

Essentially the procedure of ascertaining the normalised figure for a given LEP area such as Leeds City Region was an exercise in benchmarking against other equivalent areas. Geographical benchmarking (i.e., values for all LEPs at a given point in time) was adopted as the approach which would be most easily understood. This required the full range of values for all LEPs for each indicator. Calculating these scores for each year and then comparing between them provides one way in which relative change over time may be tracked. The second approach used involved the same method for calculating normalised scores, but applied instead to percentage rates of change.

Normalisation approach used with each inclusive growth indicator

Dimension	Indicator	Approach
Income	I1.1: Out-of-work benefits	Reversed
	I1.2: In-work tax credits	Reversed
	I1.3: Low earnings	Standard
Living costs	I2.1: Housing affordability	Reversed
	I2.2: Rented housing costs	Reversed
	I2.3: Fuel poverty	Reversed
Labour market exclusion	I3.1: Unemployment	Reversed
	I3.2: Economic inactivity	Reversed
	I3.3: Workless households	Reversed
Output growth	P1.1: Output (GVA)	Standard
	P1.2: Private sector businesses	Standard
	P1.3: Wages/earnings	Standard
Employment	P2.1: Workplace jobs	Standard
	P2.2: Employment rate	Standard
	P2.3: Employment in low pay sectors	Reversed
Human capital	P3.1: Higher level occupations	Standard
	P3.2: Intermediate and higher level skills	Standard
	P3.3: Educational attainment	Standard