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## Income inequality, relative poverty and spatial segregation: Scotland and West Central Scotland in context

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# **Luxembourg Income Study Working Paper Series**

**Working Paper No. 559**

## **Income Inequality, Relative Poverty and Spatial Segregation: Scotland and West Central Scotland in Context**

**Martin Taulbut**

**March 2011**



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**Luxembourg Income Study (LIS), asbl**

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# **Income inequality, relative poverty and spatial segregation: Scotland and West Central Scotland in context**

## **Abstract**

Mortality in West Central Scotland is generally higher than, and improving at a slower rate, than European regions which have experienced comparable levels of deindustrialisation. This paper uses data from the Luxembourg Income Study and other sources to consider whether income inequality, relative poverty and spatial segregation might contribute to this phenomenon. Measured by the Gini Coefficient, income inequality in Scotland is high in European terms, though comparable to levels seen in Wales, Northern Ireland and the Irish Republic. At the regional level, levels of income inequality in WCS are high compared to all the mainland European post-industrial regions; this is especially true in relation to the East German regions. There is less certainty over whether it is high compared to other UK post-industrial regions. These higher levels of income inequality feed through into high levels of relative poverty. Based on data from 1994-2001, relative poverty in WCS was high compared to levels found in the East European, German and Benelux regions (but similar to levels observed in Nord-Pas-de-Calais, Merseyside and Wales). However, spatial inequalities in relative poverty in WCS appear to be lower than in Merseyside.

## **Acknowledgements**

This paper uses data from the Luxembourg Income Study (LIS) Micro database, 2011; harmonization of original surveys conducted by the Luxembourg Income Study asbl. Luxembourg, periodic updating.

An amended version of this Working Paper appears in *The Aftershock of Deindustrialisation Part II: an investigation into health and its determinants in West Central Scotland and other post-industrial regions of Europe* (GCPH, 2011)

## Introduction

In the 2008 report *The Aftershock of Deindustrialisation*<sup>i</sup>, the authors found that mortality in West Central Scotland (WCS) was generally higher than, and improving at a slower rate, than other European regions with a comparable history of industrial development and subsequent de-industrialisation. This was despite the Scottish region's relatively more favourable socio-economic profile. In their discussion of potential explanations for this, the authors speculated that West Central Scotland (WCS) may experience wider levels of income inequality than the other regions and/or steeper increases in the level of income inequality than other regions over time. This would be important, given the published evidence on the impact of such inequalities on health outcomes<sup>ii, iii, iv, v</sup>: Wilkinson and colleagues have argued that more unequal societies exhibit a range of adverse health and wellbeing related outcomes compared to societies of comparable wealth but more equal distribution. He contends that these outcomes develop through 'psychosocial' processes that operate at the level of whole societies, rather than smaller communities or regions. Evidence has, therefore, been presented for countries, and also U.S. states, but not for regions. However, it is at least possible that the same processes described by Wilkinson *et al* also exist at a regional level. In this working paper we present national data for the 'parent' countries of relevant post-industrial regions, but in addition present new analyses of regional data to provide a better evidence base for discussion.

### *Important methodological note: the Gini Coefficient*

This section compares income inequality between Scotland and other nations, and West Central Scotland and other regions. Income inequality is measured here by the Gini coefficient, which measures the dispersion or inequality of a distribution. Originally developed by Corrado Gini, the Gini coefficient can have a theoretical value between zero and 1, with zero indicating complete equality of income distribution and 1 complete inequality. In reality, most middle- and upper-income countries tend to have a Gini between 0.20 and 0.40.

Published estimates of Gini coefficients at a national level are available from a number of sources, such as the EU-SILC (European statistics on income and living conditions)<sup>vi</sup>, the OECD (Organisation for Economic Co-operation and

Development)<sup>vii</sup> and the Luxemburg Income Study (LIS)<sup>viii</sup>. For the national comparisons, data were taken from the Luxemburg Income Study, which is specifically designed for international comparisons of poverty and income inequality (e.g. by ensuring common definitions of household income, variables and file structures) and allows comparisons to be made between different parts of Europe back to the 1980s. For the regional comparisons, LIS data was supplemented by data from the Scottish Household Survey (for WCS) and the Family Resources Survey (for Merseyside) with Gini coefficients calculated using an identical methodology to that used for the LIS data.

There are many different ways and methods to calculate the Gini Coefficient. To ensure comparability, all calculations use the net disposable income (i.e. income after taxes and housing costs). Since households usually differ in size, this must be adjusted for in the calculations. This process of adjustment is known as 'equivalisation'. The equivalisation method used here was the method favoured by LIS, the square root scale<sup>1</sup>. 90% Confidence intervals were calculated for each Gini estimate using the 'bootstrap' method<sup>ix</sup>.

Different methods of equivalisation (and different definitions of household income) may produce different estimates of the Gini coefficient. The Scottish Government uses the OECD income equivalisation scale to produce its estimates of Gini. However, the scale of difference tends to be small and affects the international 'ranking' of regions and nations only marginally. For example, in 2005-06, the Scottish Government estimated a Gini Coefficient for Scotland of 0.31, similar to the LIS figure from around the same period of 0.32<sup>x</sup>.

**N.B.** As stated above, *regional* income inequality estimates were calculated from Scottish Household Survey (SHoS) data. SHoS data are not used by the Scottish Government to calculate Gini coefficients. This is because of the potential impact of definitional differences regarding the number of adults from whom income data is

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<sup>1</sup> Household disposable income was divided by the square root of the number of people in each household and this new set of income figures was then used to produce Gini Coefficient estimates.

collected (more details of this are provided in Appendix X<sup>2</sup>). *Therefore, the data calculated from this source which are presented in this section should be interpreted with caution.* That said, however, comparisons of *national* Gini coefficients calculated from this survey for Scotland are almost identical to the national estimates published by the Scottish Government (0.31 vs. 0.31)<sup>3</sup>; furthermore, advice by experts in LIS was that these definitional issues<sup>4</sup> were unlikely to impact significantly on the calculation of the coefficient estimates. For both these reasons, the regional estimates from SHoS are included within this section.

Note also that this section draws extensively on the work and assistance of Gary Lai and David K. Jesuit (both of who are listed in the Acknowledgements section).

### **National comparisons I: how unequal is Scotland?**

Figure 1 shows the most recent available income inequality data for 18 West European countries, including Scotland. Denmark and Sweden have the very lowest levels of income inequality. Most of the remaining countries of Western Europe, including France, Germany, Belgium and the Netherlands, have Gini coefficients in the range 0.25-0.28. With a Gini coefficient of 0.32, Scotland lies in the third group of countries (which also includes Spain, Ireland and the other Celtic nations of the UK), with relatively high levels of inequality. Finally, Italy, Greece and England<sup>5</sup> had the very highest levels of income inequality in Western Europe.

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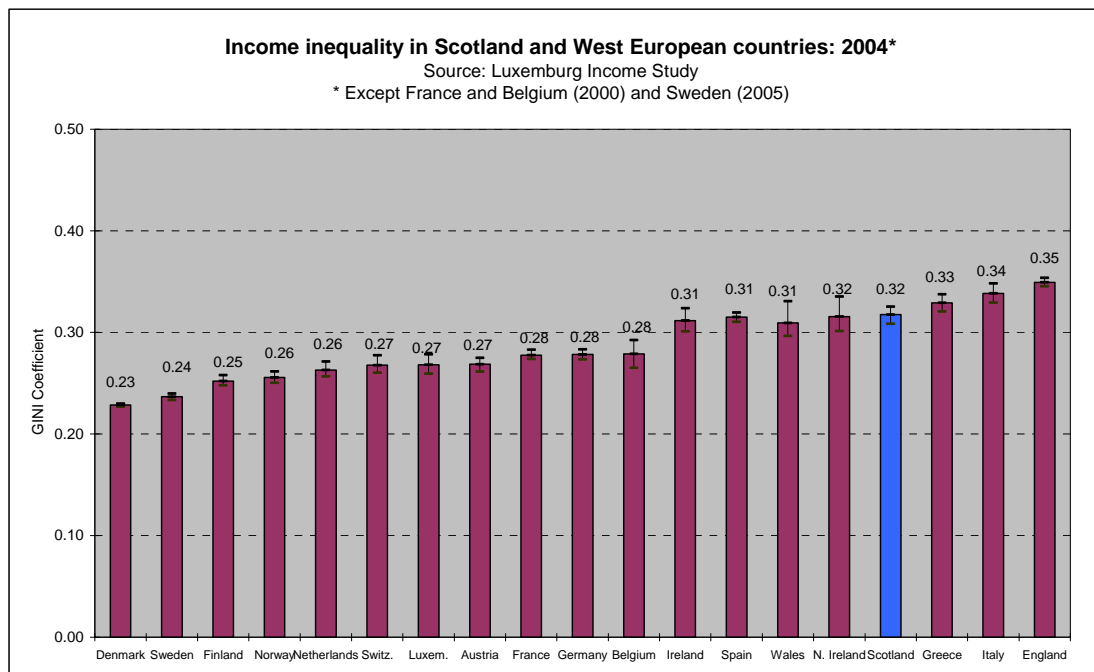
<sup>2</sup> In essence this relates to the fact that the Scottish Household Survey only collects income data from the 'head of the household' and his/her spouse, but not any other earning adult. Scottish Government estimates are based on survey data (from the Family Resources Survey Households Below Average Income Dataset) which includes income data from a third adult (

<sup>3</sup> Gini coefficient for Scotland calculated from 2005/06 SHoS data (using LIS methodology): 0.31; Scottish Government Gini coefficient based on 2005/06 Family Resources Survey Households Below Average Income Dataset: 0.31. Clearly, however, similarity of results at the national level does not necessarily exclude potential differences at a regional level.

<sup>4</sup> Personal communications, LIS User Support, February-March 2011.

<sup>5</sup> This may reflect the very high levels of income inequality seen in Greater London. In 2004, the Gini Coefficient for household income in the capital was 0.409, compared to 0.345 for the UK as a whole (Luxemburg Income Study, GCPH analysis).

Figure 1



*Sample sizes: Denmark=83304; Sweden=16268; Finland=11227; Norway=13123; Netherlands=9356; Switzerland=3270; Luxemburg=3622; Austria=5147; France=10301; Germany=11290; Belgium= 2080; Ireland=6083; Spain=12884; Wales=1224; N. Ireland=1911; Scotland=4472; Greece=5546; Italy=7996; England=20125.*

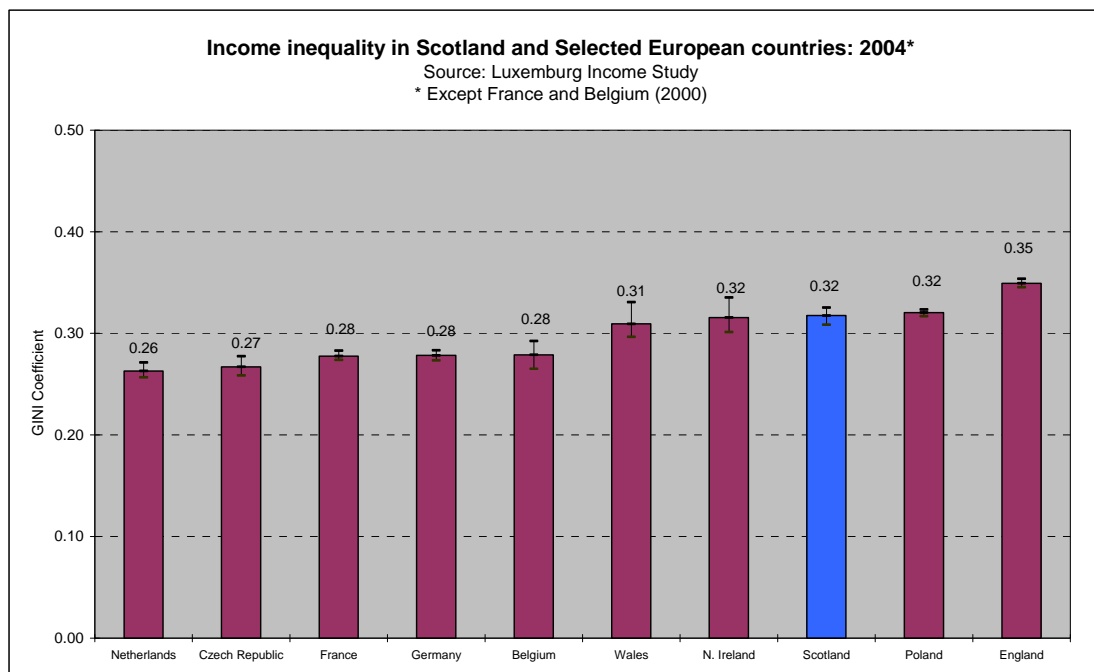
International comparisons for the same countries and time periods using EU-SILC (European statistics on income and living conditions) data largely confirm this analysis. The ranking of countries was very similar, with the four Scandinavian countries emerging as the most equal and Greece, Italy, Spain and Ireland the most unequal. Scotland was closer to the latter group of countries. For only one country, Belgium, was there a discrepancy between the two sources: EU-SILC reports a higher Gini Coefficient, placing it alongside Scotland, whereas LIS produces a lower figure, similar to France.

Levels of income inequality in Scotland can also be considered relative to other East European nations (again, based on EU-SILC data). In 2005, the Scottish Gini coefficient was lower than the Baltic States<sup>6</sup>, similar to Croatia and Romania, but higher than Slovakia, Slovenia, Bulgaria and Hungary.

<sup>6</sup> Latvia, Lithuania and Estonia.

Figure 2 approaches the issue in a different way, confining the analysis to Scotland and nine other European countries with a similar industrial history. Levels of income inequality in Scotland were significantly higher than those reported for every relevant mainland European country except Poland. There was little difference in income inequality between Scotland, Wales and Northern Ireland, although all three Celtic nations had lower levels of inequality than England. This may reflect the influence of the very high levels of income inequality in Greater London and the South East of England.

Figure 2



*Sample sizes: Netherlands=9356; Czech Republic=4351; France=10301; Germany=11290; Belgium=2080; Wales=1224; N. Ireland=1911; Scotland=4472; Poland=32146; England=20125.*

## National comparisons II: Trends over time

Figure 3 tracks income inequality in ten post-industrial European nations, including Scotland, between the mid-1980s and 2004. It suggests that:

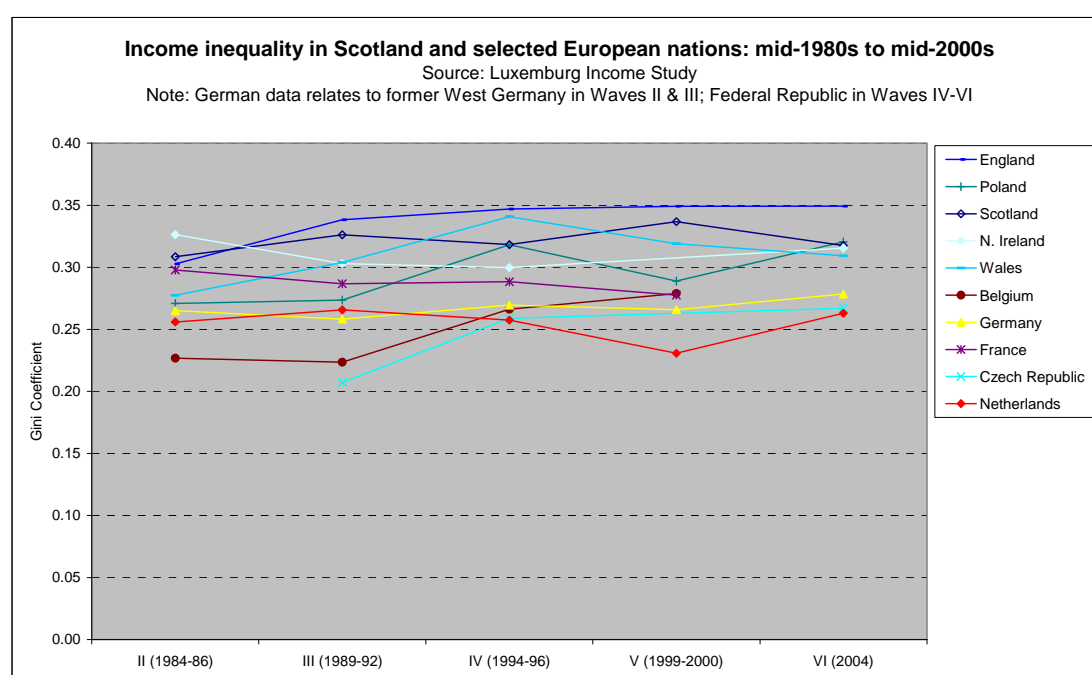
- Most of the nations saw income inequality increase between the mid-1980s and 2004. The exceptions were France (where the Gini coefficient fell slightly) and the Netherlands (where it fluctuated without much overall change).
- The 'rank order' of countries by income inequality changed little between the mid-1980s and 2004. The UK nations maintained the highest levels of income



inequality over time, while the Benelux countries and the Czech Republic had the lowest. France, Germany and Poland remained in the middle of the ranking.

- Income inequality in Scotland was consistently higher than all the mainland European nations except Poland throughout the period.
- Levels of income inequality in Scotland, Wales and Northern Ireland were fairly similar to each other at all four time points. Inequality in England was a little higher than the Celtic UK nations from wave III onwards (1988-92), but again this may reflect the influence of Greater London and South East England.

Figure 3



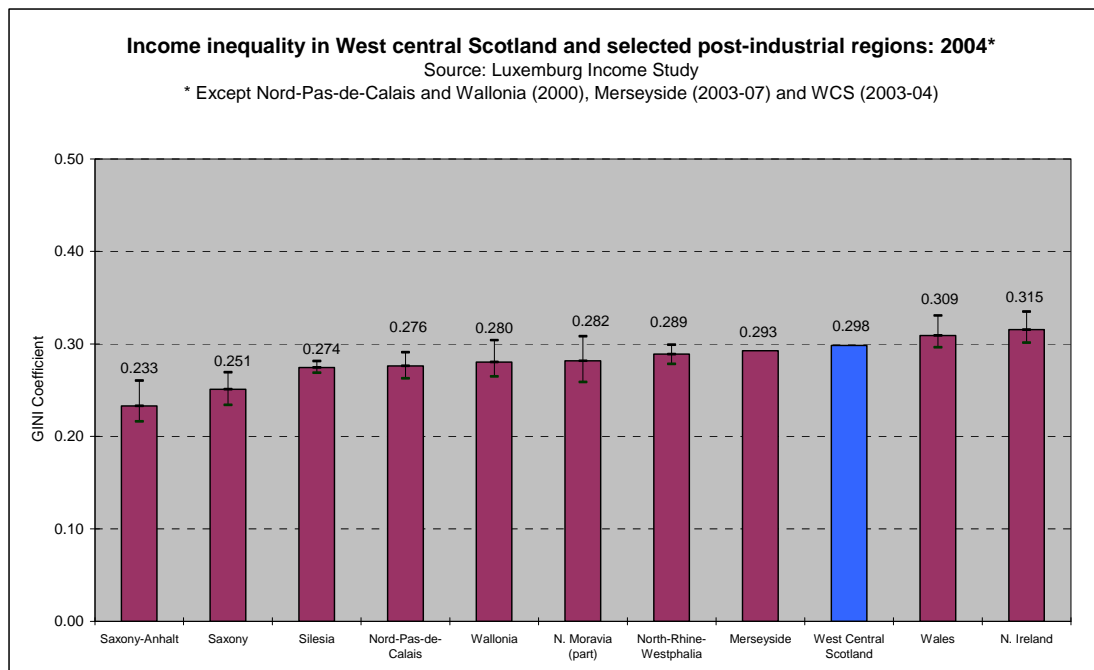
The context is also important. As noted elsewhere, income inequality has increased in most (though not all) middle- and upper-income countries over the last 30-40 years.<sup>xi</sup> It is, however, important to note that the UK was exceptional among West European nations: not only did it experience the sharpest increase in income inequality, but this polarisation was driven much more by movement from the middle to the bottom of the income distribution than by movement from the middle to the top (in other words by proportionately more households shifting to the bottom of the income distribution than shifted to the top).<sup>xii</sup> Furthermore, Scotland's experience was very similar to other UK regions outside of London, both in terms of the growth in inequality and the levels of inequality experienced at any point in time.<sup>xiii</sup>

## **Regional analysis**

It was also possible to calculate income inequality measured by the Gini Coefficient for 11 regions (excluding Limburg: no regional breakdown was available for the Netherlands). The sources used were: the LIS database for the mainland European regions, N. Ireland and Wales; the Family Resources Survey (Merseyside) and the Scottish Household Survey (WCS). In all cases the same LIS methodology was employed.

Figure 4 shows the results of this analysis. Around 2004, the estimated Gini coefficient for West Central Scotland was 0.298. This was high compared to all the mainland European regions (including Silesia), with the gap striking in relation to East German regions. It is much less clear whether income inequality is high in WCS compared to other post-industrial areas, with the Gini coefficient for the Scottish region very similar to that seen for Merseyside.

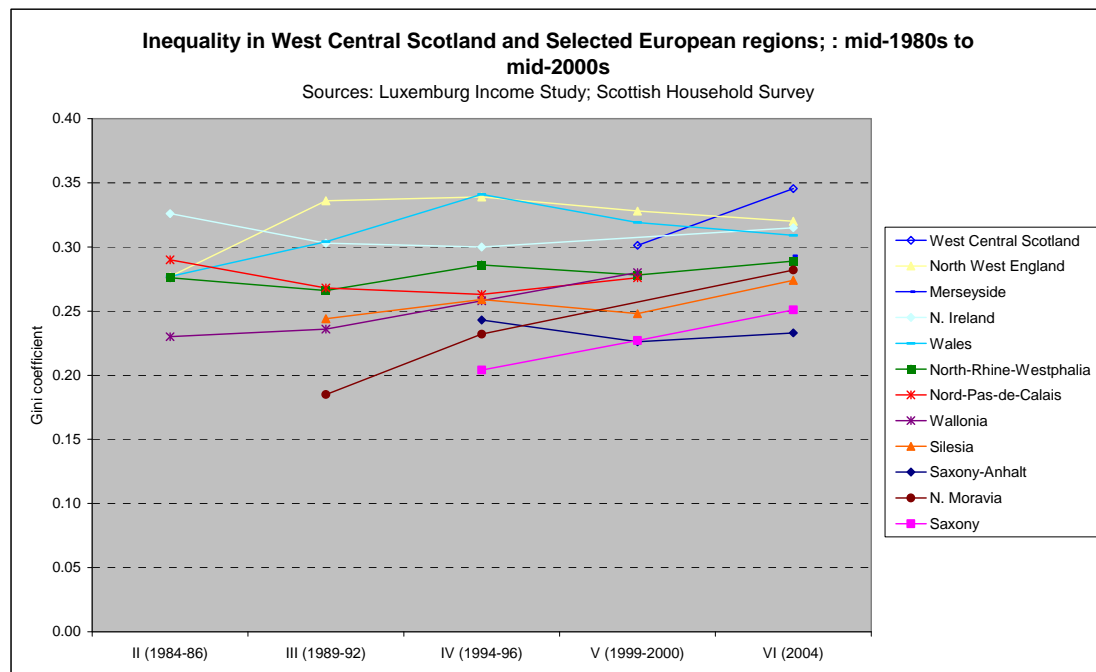
Figure 4



*Sample sizes: Saxony-Anhalt=473; Saxony=818; Silesia=4237; Nord-Pas-de-Calais=675; Wallonia=676; N. Moravia=602; North-Rhine Westphalia=2379; Merseyside=692; Wales=1224; N. Ireland=1911; West Central Scotland=11030.*

Time trends analysis suggests income inequality in WCS has been high relative to other mainland European regions since at least 1999-2000. Again, however, it is much less clear whether levels of income inequality were consistently higher than those in the UK post-industrial regions (Figure 5).

Figure 5



Note: Silesia data relates to S. Poland (Wave III), Katowice region (Wave IV) and Silesia (waves V and VI). North West England used as proxy for Merseyside.

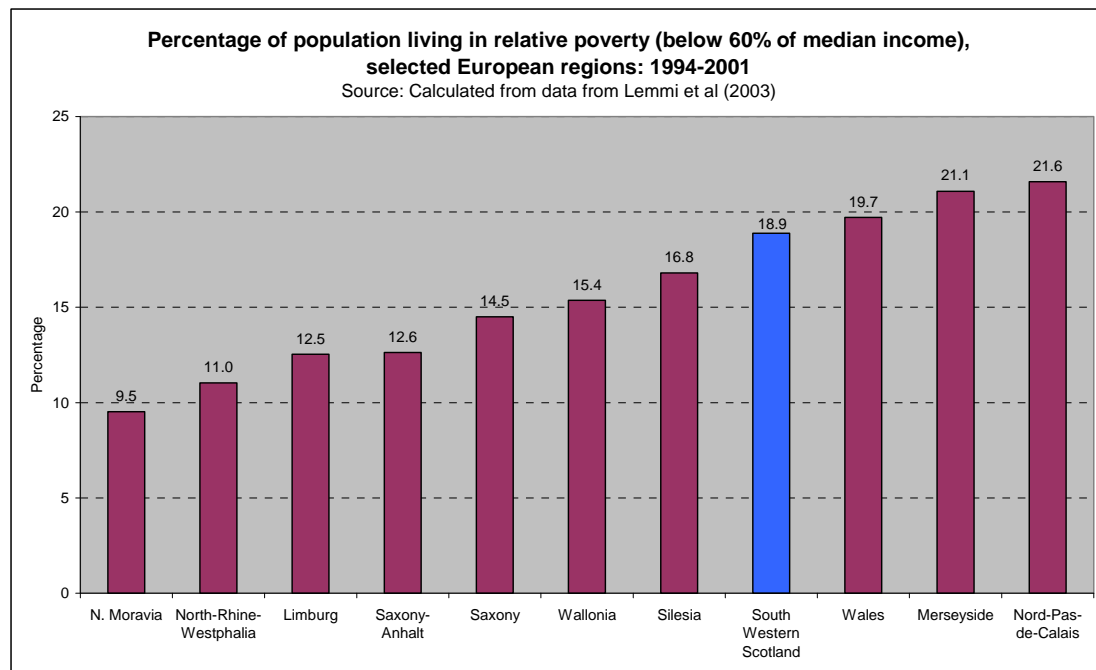
## Relative poverty

In the European Union, poverty is usually measured in relative terms: that is, showing income levels relative to national income standards. The most common indicator used is the percentage of people living in households with an income less than 60% of the median income. Lemmi *et al*<sup>xiv</sup> have published methods and data that can be used to estimate relative poverty rates for a large number of NUTS II regions, averaged over the period 1994-2001. Figure 6 below shows estimates of the population living in relative poverty across 11 relevant European regions. Note that South West Scotland is used here as a proxy for WCS.

It suggests that relative poverty is high in South Western Scotland compared to the Benelux, German and East European regions, but not compared to the GB areas and Nord-Pas-de-Calais.

However, note that as the data cover a seven year period (1994-2001) measures of relative poverty may well have fluctuated, especially in Eastern European regions.

Figure 6



Sample sizes: NRW=2164; Saxony-Anhalt=586; Saxony=396; Wallonia=10490; Silesia=563; South Western Scotland=1279; Wales=2090; Merseyside=844; Nord-Pas-de-Calais= 3125. Sample sizes not available for N. Moravia or Limburg.

### **CASE STUDY: SPATIAL POLARISATION IN UK POST-INDUSTRIAL REGIONS**

The final aspect of inequality considered here is the spatial inequality in wealth and poverty. One way to examine this is through the ‘index of dissimilarity’.

Originally developed by Duncan and Duncan<sup>xv</sup> to study racial segregation in US cities, the index of dissimilarity measures how evenly two groups are distributed across small areas that make up a larger geography.<sup>7</sup> Scored between 0 and 1, higher scores on the index indicate greater spatial dissimilarity for particular measures. Here the index of dissimilarity is applied to Dorling *et al*’s<sup>xvi</sup> estimates of the number of people who were classed as being ‘breadline poor’<sup>8</sup> in three UK regions (WCS,

$$\text{Dissimilarity Index} = \frac{1}{2} \left| \frac{\text{group}_i}{\text{group}_{\text{total}}} - \frac{\text{non-group}_i}{\text{non-group}_{\text{total}}} \right|$$

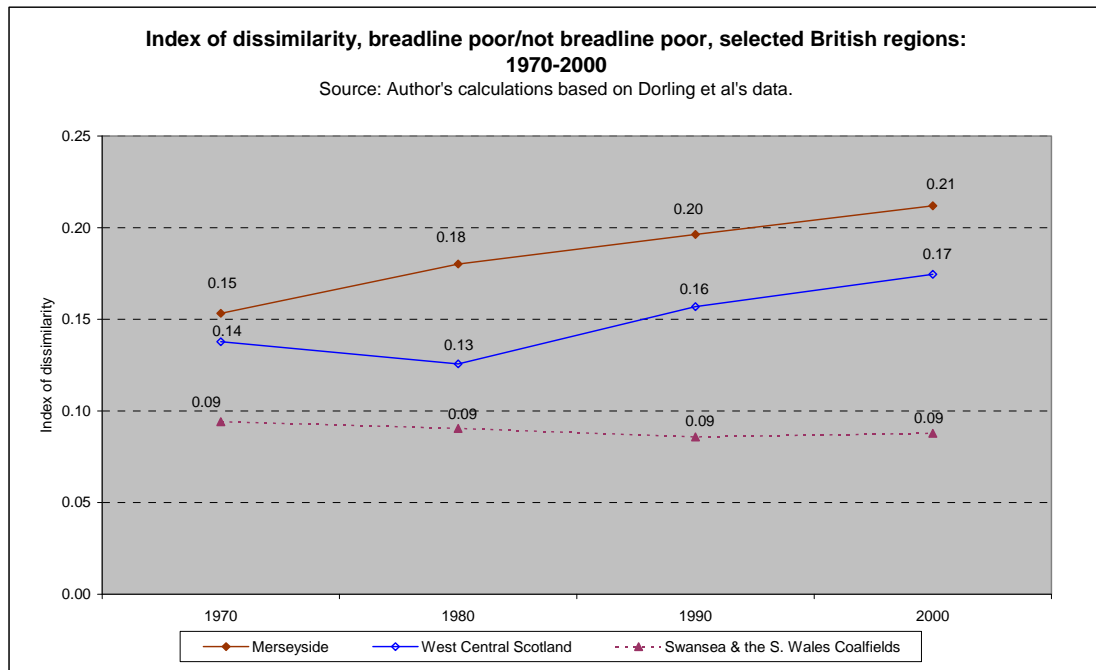
<sup>7</sup> The formula for calculating the Index is: where  $\text{group}_i$  denotes the number of people/households with a certain characteristic living in neighbourhood  $i$ ,  $\text{group}_{\text{total}}$  the number living in the entire region, and  $\text{non-group}_i$  and  $\text{non-group}_{\text{total}}$  are similarly defined for people/households without that characteristic.<sup>7</sup>

<sup>8</sup> ‘Breadline poor’ include all those whose income was below 70% of median income. It also includes the ‘core poor’ (defined as those breadline poor who were also materially deprived (could not afford certain material assets, holidays or were in rent/mortgage arrears) and considered their household to be poor ‘sometimes’ or ‘all the time’. Further details are available in Appendix X.

Merseyside and Swansea and the South Wales Coalfields) between 1970 and 2005 compared to those who were not.

Results are presented in Figure 7. This shows that Merseyside had the highest index of dissimilarity for breadline poverty over time and the Welsh region the lowest, with WCS in-between the two. Furthermore, levels of spatial polarisation into 'breadline poor' and 'not breadline poor' areas increased over time in Merseyside and West Central Scotland, but were stable in Swansea and the South Wales Coalfields.

Figure 7



This suggests that the spatial polarisation of poverty is not uniquely high in West Central Scotland, and that this is less plausible as an explanation for the slower improvement in life expectancy seen in the region.

### **Summary: income inequality, relative poverty and spatial segregation**

- At the national level, **income inequality** in Scotland is high in European terms (although it is also comparable to that seen in – for example - Ireland, Northern Ireland and, Wales, and it is lower than in England). Trend data show that it has been higher in Scotland than in Germany, France, Belgium, the Netherlands and the Czech Republic since the early 1980s, but lower than in England, and similar to Wales, Poland and Northern Ireland, at least since the mid-1990s.
- At the regional level, levels of income inequality in WCS are high compared to all the mainland European post-industrial regions; this is especially true in relation to the East German regions. There is less certainty over whether it is high compared to other UK post-industrial regions.
- These higher levels of income inequality feed through into high levels of **relative poverty**. Based on data from 1994-2001, relative poverty in WCS was high compared to levels found in the East European, German and Benelux regions (but similar to levels observed in Nord-Pas-de-Calais, Merseyside and Wales).
- However, **spatial inequalities in relative poverty** in WCS appear to be lower than in Merseyside.



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<sup>xiv</sup> Lemmi et al. Regional Indicators to reflect social exclusion and poverty VT/2003/43. Final Report. Brussels: European Commission; 2003.

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