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Wage inequality and employment polarisation in British cities

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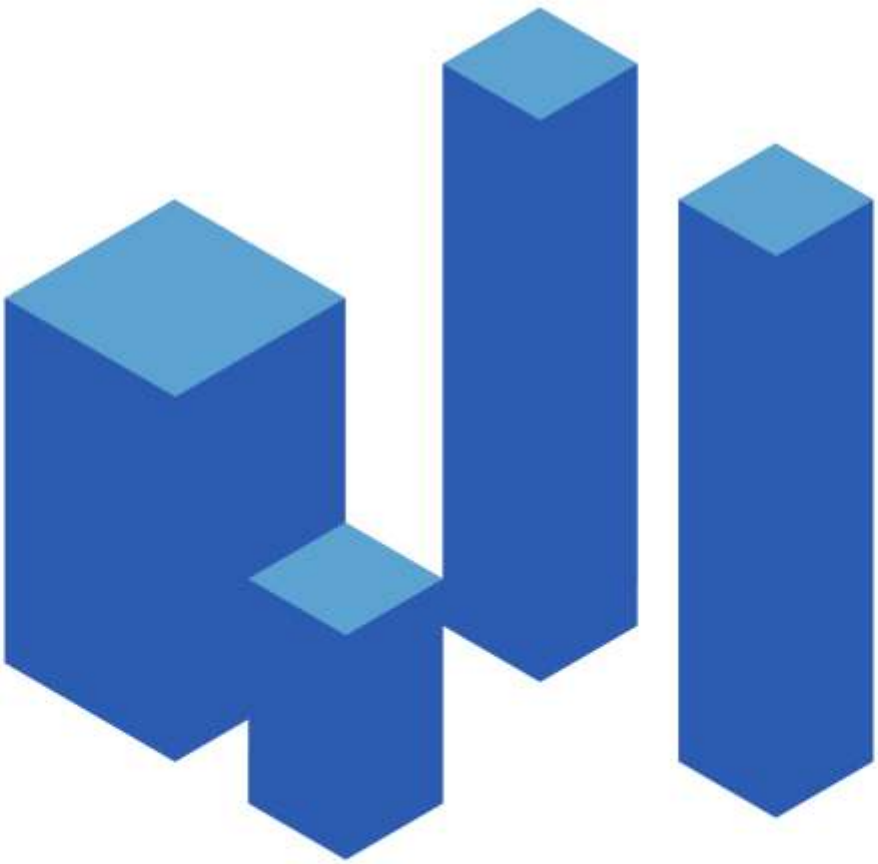

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Executive summary

There is concern about wage inequality and employment polarisation – the tendency for employment to polarise into low and high skilled work – in the UK. Over the long-term, the UK labour market has become increasingly polarised into high and low wage employment, and wage inequality has also increased. This is now seen as having harmful social consequences such as potentially reducing social mobility.

The link between cities and inequality is important for several reasons. Peer group comparisons are made locally, and cities are where the social problems associated with inequality may be most prevalent. Cities are also important for policy, and the government has given them powers over policy areas such as skills and housing. And a number of cities have launched commissions aimed at reducing inequality within their labour markets.

Yet there is little evidence on which cities are the most unequal and why. This report considers wage inequality and employment polarisation in the sixty largest British cities. It uses a combination of statistical analysis, case studies and interviews with both experts and practitioners. It also considers the policy implications of urban wage inequality and employment polarisation.

Cities with high levels of wage inequality or employment polarisation tend to be affluent and in the south of England, with London and nearby cities particularly unequal. Exact rankings of cities are sensitive to the measure of inequality used, but cities such as Reading or Crawley tend to be unequal across a range of measures. London is also both very unequal and has high levels of employment polarisation.

Cities with equal labour markets tend to have experienced post-industrial decline. Smaller proportions of their populations have high skill levels or work in knowledge-based industries. These cities are equal because few residents earn high wages, while most are relatively poorly paid. Lower urban wage inequality therefore tends to be associated with less successful economies.

The key driver of urban wage inequality or employment polarisation is affluence. Cities with higher average wages and those with more skilled populations are more unequal. Larger cities also tend to be more unequal as are those close to London, although again this is largely because they have higher average wages.

Our four case study cities – Bradford, Brighton, Edinburgh and Liverpool – differ in the extent to which they are unequal. In all four, inequality and employment polarisation was

seen as a problem. But often this reflected a concern about poverty, rather than inequality. And it was clear that the policy levers to address inequality and employment polarisation at a local level remain limited.

Our analysis also suggests that urban employment polarisation and wage inequality may worsen in the future. Three factors – economic change and the rise of the 'knowledge economy', the changing geography of those with high skill levels and public sector cuts – are all likely to have geographically uneven impacts. Increasing disparities between cities will be reflected in larger increases in wage inequality and employment polarisation in cities with stronger economies.

Increased cost of living – particularly the effect of higher housing costs - may worsen the real wages of low skilled workers in unequal or polarised cities. Yet in some ways those with few qualifications may be better off in unequal or polarised cities. Workers with qualifications below NVQ level 2 are more likely to be in work in unequal cities, and they are likely to earn higher wages.

Because urban inequality is driven primarily by the affluence of the local population, it is not clear that reducing local inequality directly is the right focus for urban policymakers. At an urban level, policymakers face a dilemma: they will be trying to attract highly skilled workers to their cities and increase their share in high value knowledge based industries. This may increase wage inequality locally, but also improve the labour market prospects of low skilled residents. Because of this, urban policymakers have little scope to address inequality at the top of the wage distribution. Policies to address inequality at the top of the distribution are national policies, in particular around taxation and wage setting.

Instead, urban policymakers should focus on improving conditions for deprived residents and minimising the negative consequences of inequality and polarisation. This means increasing the skills of the workforce – not just attracting graduates – and helping low skilled workers into medium skilled jobs.

Alongside this, policies at a local level should focus on the *consequences* of inequality and employment polarisation. In particular, our results suggest that costs are higher in unequal cities, with this effect worse for those on relatively low wages. Measures to reduce the cost of living for low wage residents - such as increasing the supply of housing - will be important in mitigating against the problems of inequality.

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Figures and tables

Chapter 1 Introduction

1.1 Research and policy context

Wage inequality in the UK is high relative to most developed nations, and inequality has been on a long-term upward trend (Hills et al, 2010). Alongside this, there have been concerns that the labour market is polarising into high and low wage jobs (Goos and Manning, 2007; Sissons, 2011). Shifts in the structure of the economy, new technology, the outsourcing of production and the changing distribution of skills have been important drivers of these changes. In the context of public sector cuts and continued economic change, rises in wage inequality and employment polarisation are likely to continue.

This has caused considerable concern amongst both the public and policymakers. The proportion of the UK population who thought that the gap between those with high incomes and those with low incomes was too large reached 78 per cent in 2010, an increase from 73 per cent six years before (NatCen, 2010). A number of high profile studies have suggested, that inequality may lead to worse outcomes for all, not just the poor (Marmot, 2010; Wilkinson and Pickett, 2007, 2010; Rowlingson, 2011).

Most studies of labour market inequality or polarisation focus at the national level. Yet there are good reasons to also consider inequality at the city level. First, the social problems many consider to be associated with inequality may be worse at a local level. For example, peer comparisons are made with neighbours, rather than those who are geographically distant. Second, there has long been concern that some cities, such as London, are developing 'two tier' labour markets (Hamnett, 1994; Green and Owen, 2006). Low skilled workers tend to look for work locally, and so local employment polarisation may remove the mid level jobs which support social wage mobility (Green and Owen, 2006; Sissons, 2011).

However, the evidence on urban inequality and employment polarisation in the UK is limited. Research considering sub-national inequality has focused on regions (e.g. Hills et al. 2010; Stewart, 2012). But cities are increasingly seen as important economic and political units. Under the Coalition's Localism agenda, much of the regional tier of government has been removed and replaced with local bodies such as Local Enterprise Partnerships. The government has put in place a 'Minister for Cities' and powers are increasingly being devolved to an urban level, with 'City Deals' giving cities greater control over areas such as transport to skills budgets (Cabinet Office, 2011). If policymakers have increased power at an urban level they

need evidence to help them to address the consequences and implications of urban inequality.

This report addresses this evidence gap with an analysis of the patterns and determinants of wage inequality and employment polarisation in British cities and the role of policy in addressing these problems.[1]

1.2 Methodology

The methodology is both quantitative and qualitative. First, we use the Annual Survey of Hours and Earnings (ASHE) and the Annual Population Survey (APS) to investigate which cities in the Britain have highest wage inequality and why this is the case. An important caveat is that we focus on wage inequality and employment polarisation, but cannot consider income or wealth inequality.

Quantitative research cannot explain the policy levers and decisions which create inequality at a local level. The second phase of the research attempts to do this through an analysis of patterns of inequality in four cities: Bradford, Brighton, Edinburgh and Liverpool. These cities each have varying patterns of inequality and yet drivers of inequality are common – including industrial change, the availability of different types of employment and the skills of the population.

Finally, we consider the likely drivers of change in the future. In particular, the impact of public sector cuts, the rising skills profile of the population and the continual shift to a 'knowledge economy'. We also describe what the implications of our work for national and local policymakers.

1.3 Structure

The report is structured as follows. Section two outlines why inequality and employment polarisation may be of concern, yet argues that there are gaps in the evidence on how this applies to cities. Section three sets out our empirical work and outlines which cities are most unequal, why this might be the case and some of the underlying labour market drivers. Section four sets out our case study cities. Section five considers how our results might change in the future, and section six sets out the implications for policy.

[1] An important point to note is that the focus is on wage inequality in wages and employment polarisation. The report does not consider other elements of incomes (non-wage household income such as returns on investments) or secondary distribution of income through the tax and benefits system.

Chapter 2 Background: The growth of inequality in the UK

Wage inequality in the UK has been rising for some time. Academics and policymakers have been increasingly concerned about this, particularly in the light of suggestions that it may lead to a range of negative social outcomes. In this section we consider national level concerns about inequality, why these might relate to inequality at an urban level, before considering the likely determinants of levels of urban inequality.

2.1 Why do inequality and employment polarisation matter?

The UK labour market is relatively unequal by international standards. Wage inequality in the UK grew rapidly during the 1980s and continued to increase during the 1990s, before slowing in the 2000s (Machin and Van Reenan, 2007). Great Britain's Gini coefficient of individual earnings inequality saw a steady increase from a low of around 0.30 in 1977 to 0.36 in 2006/7 (Brewer et al., 2009). Over the past three decades, wage gaps have increased more in the UK than in most other developed countries (National Equality Panel, 2010).

One reason for rising inequality has been the changing structure of employment in the UK. Employment has been slowly polarising into 'good' and 'bad' jobs (Goos and Manning, 2007; Sissons, 2011). Technological change has substituted computers for skilled but routine occupations such as bookkeeping or secretarial work. Alongside this, the economy has seen strong growth in high-skill, cognitive employment. Employment in personal service occupations such as security or catering has also grown, but to a lesser extent.

Wage inequality and employment polarisation are seen as important problems. Traditionally, wage inequality has been seen as a problem for ethical reasons, because it may have consequences for those on low incomes or restrict social mobility (Portes 2011). Yet more recent research has linked inequality to social problems affecting the whole of society, rather than simply those on low incomes (Wilkinson and Pickett, 2009). For example, Frank (2007) describes 'expenditure cascades' where increases in conspicuous consumption by the affluent raise the expectations and spending of those just below them in the wage distribution. As each successive income group consumes more, so do those below them. The results can include increased spending amongst groups with no additional income, increasing the incidence of psychological problems, stress and bankruptcy.

The seminal book in this area was Wilkinson and Pickett's (2009), The Spirit Level. Drawing on a range of international data, the authors argued that rising inequality was responsible for a number of negative social and health impacts. They argue that these negative outcomes reflect 'status anxiety' and 'status competition'.

The book subsequently generated considerable debate. A number of critiques were produced, and there were also a number of rebuttals (see critiques from Saunders, 2010; Snowden, 2010; Wilkinson and Pickett, undated A). In a previous Joseph Rowntree Foundation review piece, Rowlingson (2011) argues that while a number of studies have shown that inequality correlates with poorer health and social outcomes, there is less agreement about whether inequality is itself the *cause* of these outcomes (Ibid).

However, Rowlingson evaluates some evidence which suggests an independent effect of inequality on health and social problems. While the effect is relatively small, large numbers of people are affected (cf. Wilkinson and Pickett, undated B on the issue of effect size). Similarly, a number of studies have linked high inequality to worsening health outcomes (for example Friedli, 2009; Marmot, 2010; Wilkinson and Pickett, 2006). Other detrimental social outcomes have also been linked with high inequality, including lower trust, social capital and civic engagement (Putnam, 2000; Brown and Uslaner, 2002). It has also been argued that more inequality can lead to higher rates of some forms of crime (Daly et al., 2001; Fajnzylber et al., 2002; Elgar and Aitken, 2010; cf. Neumayer, 2005).

2.2 Why consider urban inequality?

Inequality is normally considered at the national level. There is now a general (but far from universal) consensus that national inequality can have damaging social impacts. Other work has considered inequality between places, such as the North-South divide (Stewart 2011). Yet few studies have considered the importance of inequality *within* cities.

However, there are good reasons why rising inequality within cities may have negative social impacts, beyond those at the national level. Comparisons are made with those nearby, and individuals are likely to compare their own (economic) position with those in the same city – Luttmer (2005) demonstrates the detrimental effect on individual well-being which is associated with an increase in income for a neighbour.

Work by Robert Frank has shown how individuals within urban labour markets may compete for positional goods such as housing, with those in the same city trying to outdo each other for the largest houses (Frank, 2007). Because such comparisons

are local, the wages of those in the same city may matter more for wellbeing than the wages of those elsewhere.

Evidence from the US has shown that in urban areas crime rates tend to increase with inequality (Glaeser et al., 2009). In the UK, increasing incidence of crime has been linked with lower wage areas (Machin and Meghir, 2004). For health outcomes the evidence is less strong. Wilkinson and Pickett (2006) found that the effect of inequality on health was more likely to be detected in larger areas. Their rationale for this finding was that it is in larger areas that income inequality is a truer expression of the 'scale of social stratification' (p1768).

Yet local inequality may also be more difficult to address than at a national level, as population mobility makes it hard for local actors to address high incomes (Glaeser et al., 2009). Reducing the incomes of high skilled residents in a particular city may lead to them moving somewhere with a different policy framework. Moreover, if local areas seek to improve the skills of lower-skilled residents, they may find that these residents move to other cities where they benefit more from improved skills. This makes it hard for urban policymakers to directly affect the wage distribution.

2.3 The possible drivers of urban wage inequality and employment polarisation

At a national level, wage inequality and employment polarisation may be caused by a number of factors. These include the tax and benefits system, the distribution and rewards to particular skills and the sectoral composition of the economy.

At a local level wage inequality and employment polarisation will fundamentally reflect two things – (1) the population characteristics of those in a local labour market (i.e. their skills or experience) and (2) the returns to those characteristics in a local area, which will be affected by factors ranging from industrial structure to the size of the city (Glaeser et al., 2009).

The key determinant of urban inequality is likely to be the distribution of skills of the population. Skills are rewarded differently in the labour market, with a premium to high skill levels which has been increasing over time (Michaels et al, 2010). Because the rewards to skills differ, the distribution of skills in a city's population is likely to be a key determinant of inequality (Lee and Rodriguez-Pose, 2013). Evidence for cities has tended to support this view (Glaeser et al, 2009; Lee, 2011a).

The differential reward to skills in the UK may also be influenced by city size. In particular, larger cities may offer higher rewards to skills as individuals are able to better match their skills to particular occupations or firms. This may raise the returns to living in cities for some groups, increasing inequality. However, the body of literature on city size and inequality is unclear. Stich (1999) finds no overall

relationship between city size and inequality in Germany (although he notes a small effect when West Germany is analysed alone). Korpi's (2008) analysis of Swedish local labour markets finds a positive relationship between labour market size and inequality, and that this inequality tends to be driven by increasing wages at the very top of the distribution.

The evidence on the link between migration, wages and inequality is controversial. A number of recent studies have suggested that international migration may have a positive effect on wages at the top of the distribution, while leading to small reduction in wages for those at the bottom (Dustmann et al., 2012). In practice, the effect of migration on the wage distribution may be principally driven by the occupations and skills of the migrants. While an influx of mid-earning migrants may reduce wage inequality in a city, most evidence suggests that migrants to the UK tend to be relatively polarised in terms of qualifications (Lee, 2011).

The sectors of a local economy may also increase or reduce urban inequality (Wessel, 2005). More polarised labour markets at the local level may serve to increase inequality, and in recent years there has been concern about increasing bifurcation in the labour market into good and bad jobs, with a growing polarisation in employment experiences (Goos and Manning, 2007; Autor and Dorn, 2009). These issues might matter more in some urban labour markets, where economic restructuring and an increasing dependence on service sector employment has created increasingly unequal labour market structures (Sassen, 1991; 2001; Hamnett, 1994; Doussard et al, 2009).

In the UK we know that there are significant variations in the performance of local labour markets (Green, 2009); and research by Jones and Green (2009) shows marked regional differences in average job quality between the UK regions, with this differential growing between 1997 and 2007. They attribute these regional differences to occupational rather than industry structure. Jones and Green (2009) also present evidence that employment polarisation increased *within* most regions between 1997 and 2007.

Chapter 3 Measuring wage inequality and employment polarisation in UK cities

While urban wage inequality and employment polarisation are seen as important issues, there have been few attempts to measure their extent in the UK. In this section we consider measures of inequality and employment polarisation for the 60 largest cities in Great Britain and the implications of inequality for urban labour markets.

The cities we use are the English cities from the Department for Communities and Local Government's (DCLG) 'State of the English Cities' database and the largest cities in Scotland and Wales: Edinburgh, Aberdeen, Glasgow, Cardiff and Swansea. Full methodological details are included in Appendix A.

3.1 Which cities are most unequal?

Measures of inequality

This paper focuses on inequality in wages and employment polarisation. This is important as wages are the most important source of income for most individuals, and employment polarisation is related to wages and the possibility of upward progression. It also means we focus on the labour market, with labour market interventions an important way of addressing inequality. Moreover, because wages are a large share of most people's income our results should be related to other measures of urban inequality.

However, using labour market measures of inequality does mean missing a number of potentially important policy areas. We do not consider other sources of household income, inequalities in wealth or the tax and benefits system. These are all important areas of research, but beyond the scope of this report.

Wage inequality

The standard measure of inequality is the Gini coefficient, which gives an overall measure of inequality based on the whole income distribution (it takes into account the relative position of every wage earner, rather than just those at the extremes – see Coulter, 1989).

The most unequal cities by this measure tend to be in London and the South East. London, Reading & Bracknell, Guildford & Aldershot and Luton & Watford all score

highly. However, Manchester and Warrington & Wigan also score highly on this measure, as does Portsmouth. Urban inequality is not purely a South-eastern issue.

Similarly, the most equal cities can be both in the north and south of the country. However, these tend not to be very affluent cities. Sunderland is the most equal city, and Peterborough and Cardiff are also relatively equal.

Table 1 Most and least unequal cities: Gini coefficient and 90 / 10 ratio of basic pay, 2010

	Gini coefficient			90 / 10 Ratio		
	Rank	City	Index	Rank	City	Ratio
Most unequal	1	London	0.34	1	London	4.27
	2	Aberdeen	0.32	2	Reading & Bracknell	4.10
	3	Portsmouth	0.32	3	Aberdeen	4.02
	4	Reading & Bracknell	0.31	4	Luton & Watford	3.86
	5	Guildford & Aldershot	0.31	5	Guildford & Aldershot	3.76
	6	Luton & Watford	0.31	6	Derby	3.67
	7	Milton Keynes & Aylesbury	0.30	7	Cambridge	3.66
	8	Southend & Brentwood	0.30	8	Edinburgh	3.59
	9	Warrington & Wigan	0.30	9	Milton Keynes & Aylesbury	3.56
	10	Manchester	0.30	10	Gloucester	3.54
	Rank	**City**	**Index**	**Rank**	**City**	**Ratio**
Least unequal	51	Bradford	0.25	51	Blackburn	2.98
	52	Plymouth	0.25	52	Peterborough	2.98
	53	Barnsley	0.25	53	Hastings	2.96
	54	Stoke	0.25	54	Barnsley	2.93
	55	Burnley	0.25	55	Bradford	2.92
	56	Wirral and Ellesmere	0.25	56	Bolton	2.89
	57	Maidstone & North Ken	0.25	57	Stoke	2.88
	58	Cardiff	0.25	58	Telford	2.88
	59	Peterborough	0.25	59	Cardiff	2.86
	60	Sunderland	0.24	60	Sunderland	2.77
Urban average			**0.31**			**0.36**

Source: ASHE, 2010. Data for 60 travel to work areas. Measure is Gini coefficient of basic pay and 90/10 ratio amongst full time workers.

The Gini coefficient is an overall measure of inequality, and can be influenced by wages in the entire wage distribution, particularly movements around the mode

income. A purer measure of inequality between top and bottom earners is the ratio of the 90th to the 10th percentile which simply gives the spread of incomes, without considerations of distribution of wages between them. A higher figure indicates a wider distribution.

As before, the city with the highest inequality on this measure is London, followed by Reading & Bracknell and Aberdeen. These are all affluent cities. In Luton & Watford and Guildford & Aldershot – both affluent cities near London – there are also high levels of inequality by this measure.

The most equal cities tend to be places with relatively low wages and which have experienced industrial decline. Sunderland has the lowest ratio, followed by Telford, Stoke and Bradford.

To test whether these patterns are driven by inequality at the top or bottom of the distribution, Table 4 gives the most and least unequal cities for the 90 / 50 and 50 / 10 ratios. Using the ratio between the 90th and 50th percentiles of the wage distribution, a measure of inequality at the top of the distribution (upper-tail inequality), Aberdeen has the most unequal wage structure, followed by Milton Keynes & Aylesbury and London.

The least unequal cities are also relatively low wage cities such as Stoke or Barnsley. Because of London's large population, the Gini coefficient amongst all urban dwellers is relatively high – more so than even Edinburgh.

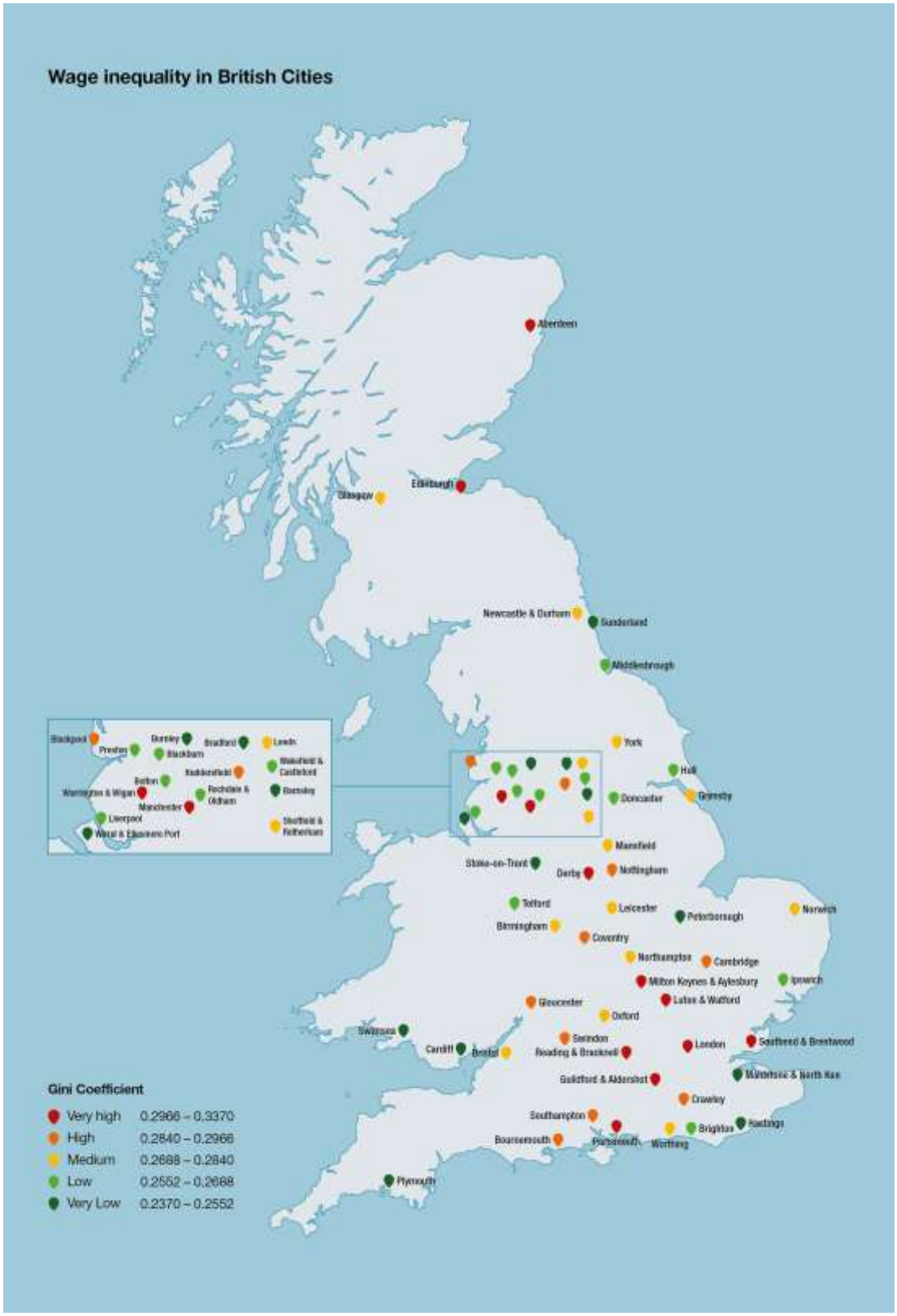
Finally, we consider the 50 / 10 ratio – the ratio between the 50th and 10th percentiles. Given that the minimum wage will limit wages at the bottom, most of the variation is likely to be due to changes in the median wage (the 50th percentile). Cities with relatively low median wages include Cardiff, Sunderland and Hastings. Those where the median wage is high include London, Derby and Reading & Bracknell.

Table 2 Most and least unequal cities: 90/50 and 50 / 10 ratios of basic pay, 2010

Gini Coefficient				90/10 ratio			
	Rank	City	Index		Rank	City	Skill
Most unequal	1	Aberdeen	2.23	**Most unequal**	1	London	1.95
	2	Milton Keynes & Aylesbury	2.20		2	Derby	1.94
	3	London	2.19		3	Reading & Bracknell	1.90
	4	Luton & Watford	2.19		4	Cambridge	1.82
	5	Reading & Bracknell	2.16		5	Aberdeen	1.80
	6	Bournemouth	2.12		6	Guildford & Aldershot	1.77
	7	Guildford & Aldershot	2.12		7	Huddersfield	1.77
	8	Edinburgh	2.07		8	Luton & Watford	1.76
	9	Warrington & Wigan	2.06		9	Crawley	1.75
	10	Southend & Brentwood	2.05		10	Oxford	1.75
	Rank	**City**	**Index**		**Rank**	**City**	**Skill**
Least unequal	51	Liverpool	1.87	**Least unequal**	51	Stoke	1.58
	52	Peterborough	1.86		52	Bolton	1.58
	53	Swansea	1.86		53	Plymouth	1.57
	54	Telford	1.85		54	Newcastle & Durham	1.57
	55	Sunderland	1.84		55	Mansfield	1.56
	56	Bradford	1.84		56	Telford	1.56
	57	Bolton	1.83		57	Blackburn	1.55
	58	Maidstone & North Ken	1.83		58	Hastings	1.51
	59	Barnsley	1.83		59	Sunderland	1.51
	60	Stoke	1.83		60	Cardiff	1.48
Urban average			2.08	**Urban average**			1.74

Source: ASHE, 2010. Data for 60 travel to work areas. Measure is 90/50 and 50/10 ratio of basic pay amongst full time workers.

Figure 1 Wage inequality in British Cities



Employment polarisation

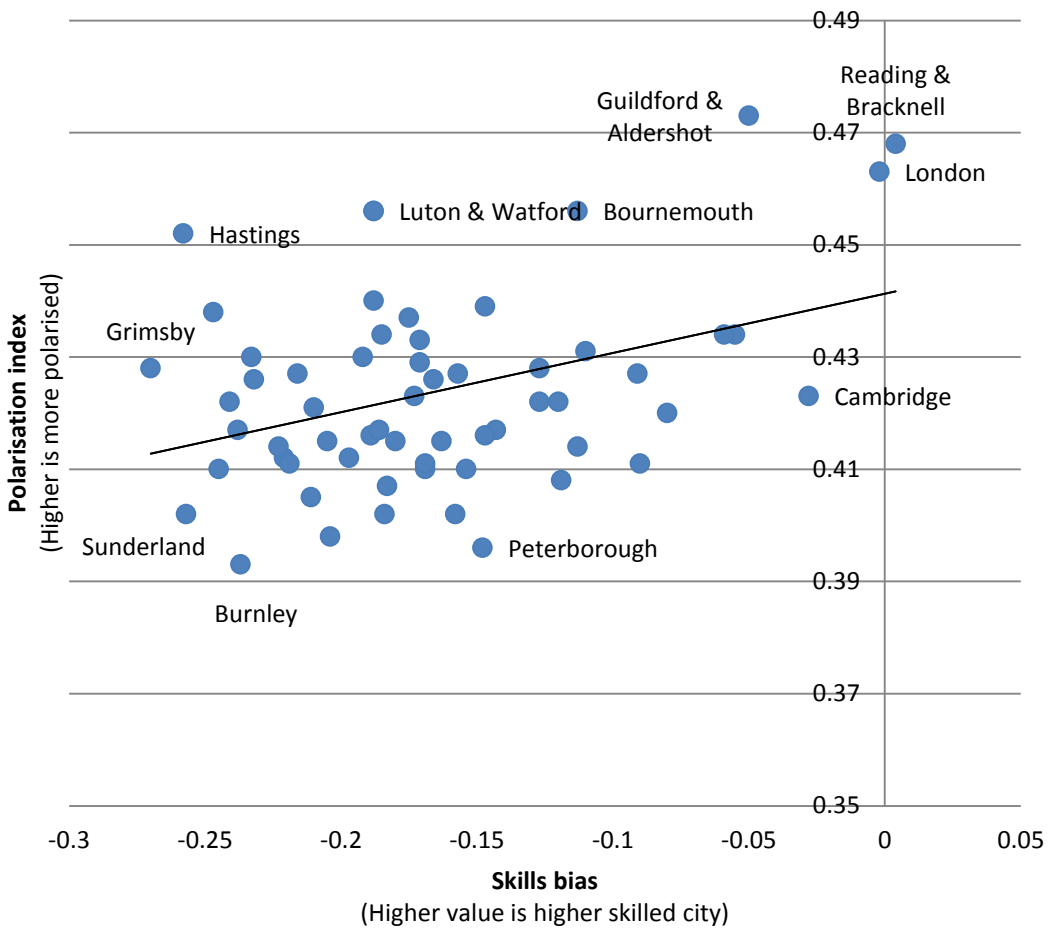
Wage inequality will be determined by conditions in the labour market. To test whether the labour market is relatively polarised, or biased towards those with high skill levels, we use two indicators adapted from Jones and Green (2009):

1. **Polarisation index** – this is a measure of how polarised the employment structure in each city is (i.e. the extent to which jobs are in low and high relative to medium wage occupations).[2] The value is higher in cities which are more polarised and is always between zero and one. A city with a lot of workers in high and low wage work would have a value closer to one, while one where workers were in medium level jobs would be closer to zero.
2. **Skill bias index** – this is a measure of how skewed the employment distribution is towards those with high wages. Values can range between -1 and 1 with higher values indicating increasing skills bias. For example, a city with a lot of residents in highly paid occupations would have an index value approaching 1 (although no city would ever actually approach this figure) while a city with fewer might be closer to – 1.

These two indicators are slightly different, but clearly related. As Figure 1 shows, cities with high levels of employment polarisation also have high levels of skills bias. But the relationship is relatively weak, and some cities will be more skill biased than they are polarised.

[2] In technical terms, this is a weighted relative distance from the median wage.

Figure 2 City skills polarisation and employment polarisation, 2010



Source: APS, 2010. Data for 60 travel to work areas. Skills bias and employment polarisation indices calculated following Jones and Green (2009).

A small number of cities have both high polarisation and skills bias – Guildford & Aldershot, Reading & Bracknell and London. In these cities there are both high wage jobs but lower waged employment also exists. This might indicate a more inclusive labour market, but may also show as inequality. Others have high levels of skills bias, but relatively lower polarisation – Cambridge in particular has a relatively high number of skilled jobs but also more mid-level employment.

At the lower end of the distribution there are a group of cities which have low skills bias, but also low polarisation. Sunderland and Burnley are in the category. A small number of cities are low skilled but also polarised, with Hastings in the extreme. These cities will have few high level jobs but an otherwise polarised wage structure, perhaps indicating few mid-level jobs.

Table 3 Most and least unequal cities: Polarisation and skill bias indices, 2010

Polarisation Index				Skills bias index			
	Rank	City	Index		Rank	City	Skill
Most unequal	1	Guildford & Aldershot	0.47	Most unequal	1	Reading & Bracknell	0.004
	2	Reading & Bracknell	0.47		2	London	-0.002
	3	London	0.46		3	Cambridge	-0.03
	4	Crawley	0.46		4	Guildford & Aldershot	-0.05
	5	Luton & Watford	0.46		5	Edinburgh	-0.05
	6	Bournemouth	0.46		6	Oxford	-0.06
	7	Hastings	0.45		7	Milton Keynes & Aylesbury	-0.08
	8	Worthing	0.44		8	Derby	-0.09
	9	Portsmouth	0.44		9	Aberdeen	-0.09
	10	Blackpool	0.44		10	Bristol	-0.11
	Rank	**City**	**Index**		**Rank**	**City**	**Skill**
Least unequal	51	Preston	0.41	Least unequal	51	Wirral	-0.23
	52	Gloucester	0.41		52	Doncaster	-0.23
	53	Northampton	0.41		53	Burnley	-0.24
	54	Wakefield & Castleford	0.41		54	Rochdale & Oldham	-0.24
	55	Leicester	0.40		55	Bolton	-0.24
	56	Sunderland	0.40		56	Cardiff	-0.25
	57	Newcastle & Durham	0.40		57	Blackpool	-0.25
	58	Swansea	0.40		58	Sunderland	-0.26
	59	Peterborough	0.40		59	Hastings	-0.26
	60	Burnley	0.39		60	Grimsby	-0.27
Urban average			**0.42**	**Urban average**			-0.17

Source: APS, 2010. Data for 60 travel to work areas. Skills bias and employment polarisation indices calculated following Jones and Green (2009).

Table 2 gives the results for the 10 most and 10 least polarised cities. The most polarised cities tend to be those around London and the South East: our measure highlights Guildford and Aldershot and Reading and Bracknell as being most polarised, along with London. The only Northern city in this group is Blackpool – this

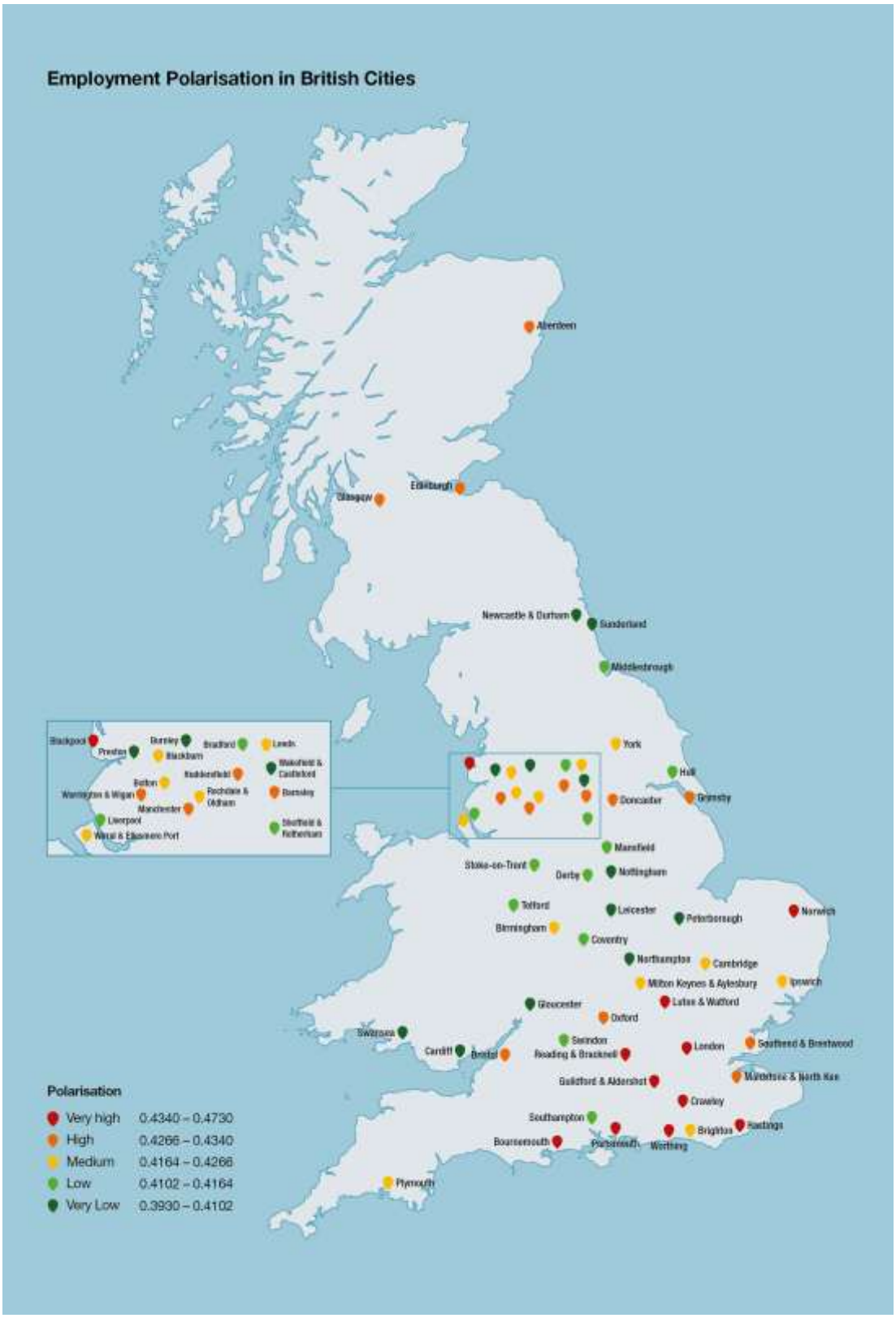
is due to workers in the Energy industry in the area who earn high wages, along with a core of low wage service workers.

In contrast, the least polarised cities tend to be less affluent. Burnley, Peterborough and Swansea all have relatively low levels of employment polarisation. There are fewer clear geographical patterns, with southern cities such as Peterborough and Northampton also having low levels of polarisation.

The table also gives details for the skills bias of the labour market. As before, the most skills biased cities are the more affluent ones in the South East – Guildford and Aldershot, Cambridge, Reading & Bracknell or London. Those which are least skills biased are in the North, including: Grimsby, Barnsley, Rochdale and Oldham and Burnley. The exception is Hastings, a Southern city with relatively lower wage levels in the population. As might be expected, patterns of skills bias seem to reflect patterns of affluence.

Overall, these results suggest a general pattern of inequality and employment polarisation predominantly in southern cities, but with some exceptions. London is consistently amongst the most unequal or polarised. A cluster of affluent smaller cities around London are common in the data: Guildford & Aldershot, Reading & Bracknell and Crawley. As suggested by other work, inequality is greatest in the South East (Stewart 2011).

Figure 3 Employment Polarisation in British Cities, 2011



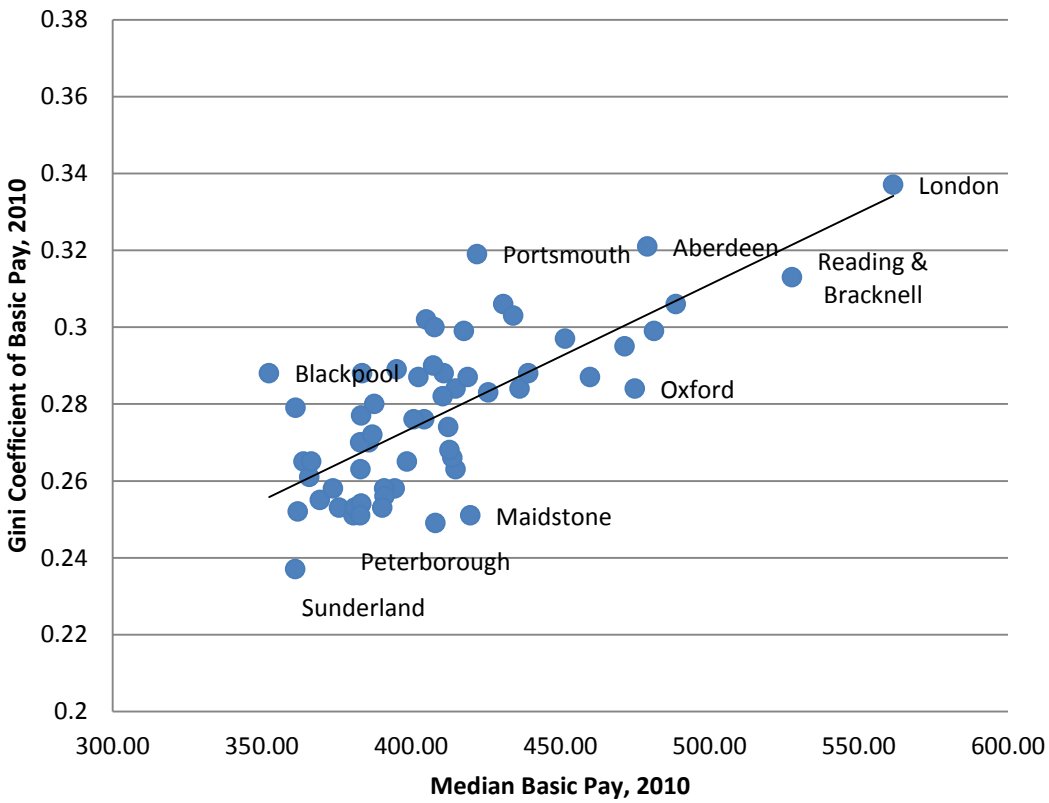
However, there are a few caveats to the data presented here. First, the data is based on surveys and so is subject to sampling error. There is a need for caution with results such as this. This will be particularly the case for outliers in the distribution and so bias measures using the 90th percentile of wages. However, using ASHE data which is the most reliable wage data will limit the problems of error.

Second, the differences between cities are relatively small when measured by the Gini coefficient, although the differences are more pronounced when we measure overall inequality using the 90/10th percentile differential.

Third, while it is clear that some cities tend to be relatively unequal or polarized, and others not, exact rankings tend to change subject to the measure used. It is not possible to identify a single 'most unequal' city, but different cities have levels of inequality which can be measured in different ways. It is important to be cautious about 'league tables' of cities, as these are highly dependent on methodology. However, our results do consistently suggest a set of relatively unequal or polarised cities.

3.2 City level determinants of inequality

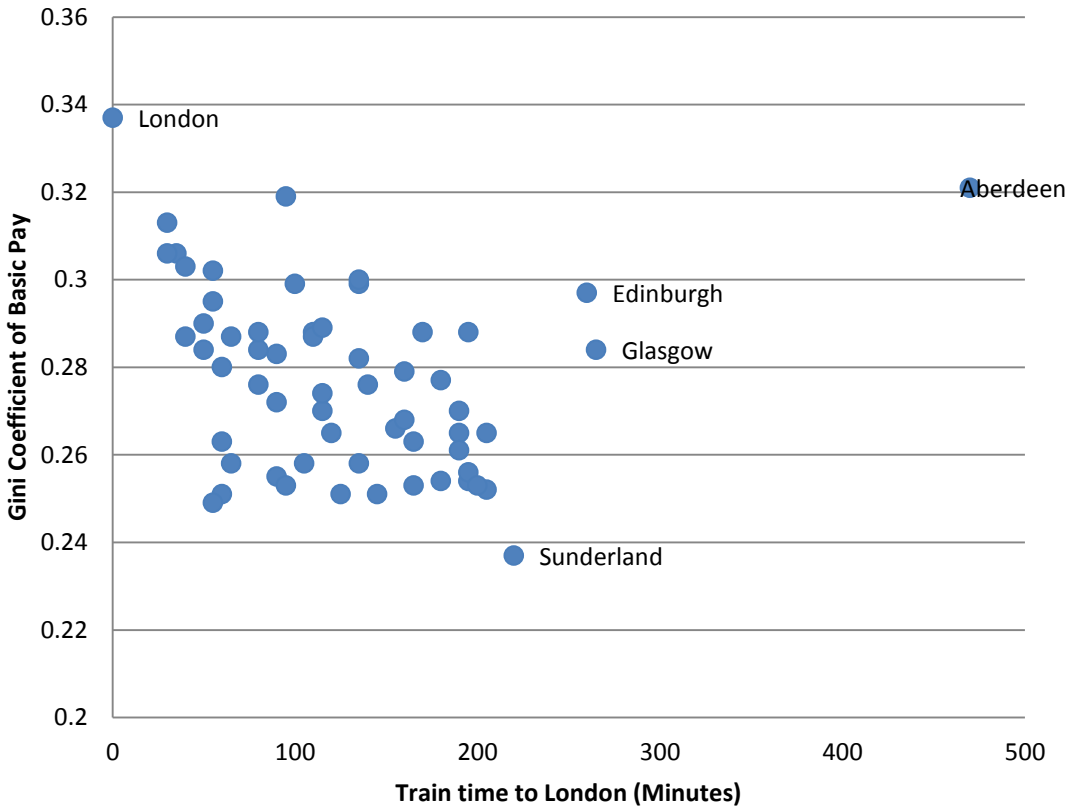
Figure 4 Gini coefficient of basic pay and median wage by city, 2010



Source: ASHE, 2010. Data for 60 travel to work areas. Measure: Gini coefficient and median basic pay amongst full time workers.

What is causing these patterns of inequality? In the remainder of this section we consider what determines inequality at a city level. Figure 4 shows the link between urban wage inequality and the median average wage. There is a clear, positive relationship between the two, with cities with higher median wages being more unequal. Moreover, there are few outliers – cities with high median wages almost always tend to have high inequality. Only a few cities with high wages, such as Oxford and Cambridge, present an apparent contrast to this. But these are not clear outliers and are still relatively unequal.

Figure 5 Gini coefficient of basic pay train time to London by city, 2010



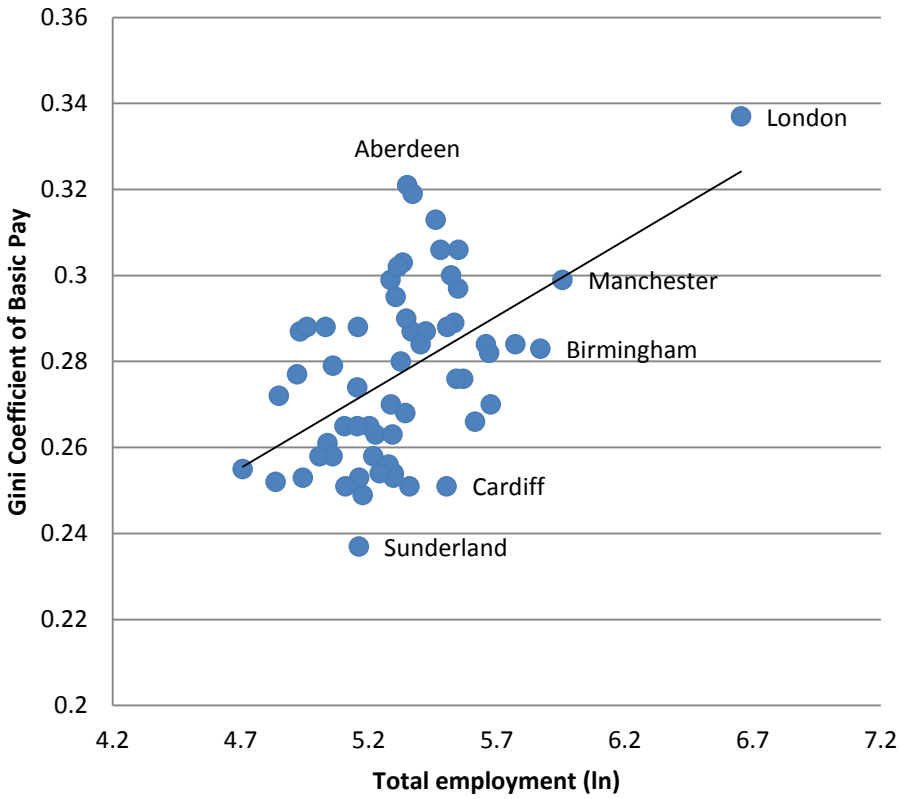
Source: ASHE. 60 Cities. Gini coefficient of basic pay and train travel time to London. Line of best fit given without Aberdeen (when excluding Aberdeen the relationship is statistically significant[3])

Figure 5 outlines the link between inequality and distance from London, measured as the train time from the capital. There is largely a negative but weak relationship,

[3] Including Aberdeen, the pairwise correlation = -0.18, p==0.1622. Excluding Aberdeen = -0.38, p==0.0029.

with inequality falling with distance from London. The exception is Aberdeen which is an outlier as the furthest city. It has a number of very well paid workers due to the oil industry, which mean it has high average wages despite being relatively far from other cities. Excluding Aberdeen, there is a clear positive relationship between inequality and proximity to London with cities nearer London more unequal.

Figure 4 Gini coefficient of basic pay and total employment (ln) by city, 2010



Source: ASHE / BRES. 60 Cities. Gini coefficient of basic pay. Total employment is the natural log of total employees.

Finally, figure 4 gives the relationship with city size, measured as total employment (with size given as a natural log – a way of transforming the data which compresses the distribution, meaning that large cities appear larger but by a relatively smaller amount than using the real data). Larger cities are more unequal.

Each of these results may be due to other factors, and so we also test using a multiple regression model (see Appendix B) which includes each of these factors in turn. The results suggest that the main factor driving inequality is the median wage of the local labour market, with this more important than either city size or distance from London. We also include some variables for different city industrial structures – of these, only the public sector appears significant. Cities with high proportion of employment in the public sector tend to have more equal labour markets.

3.5 Labour markets in more unequal cities

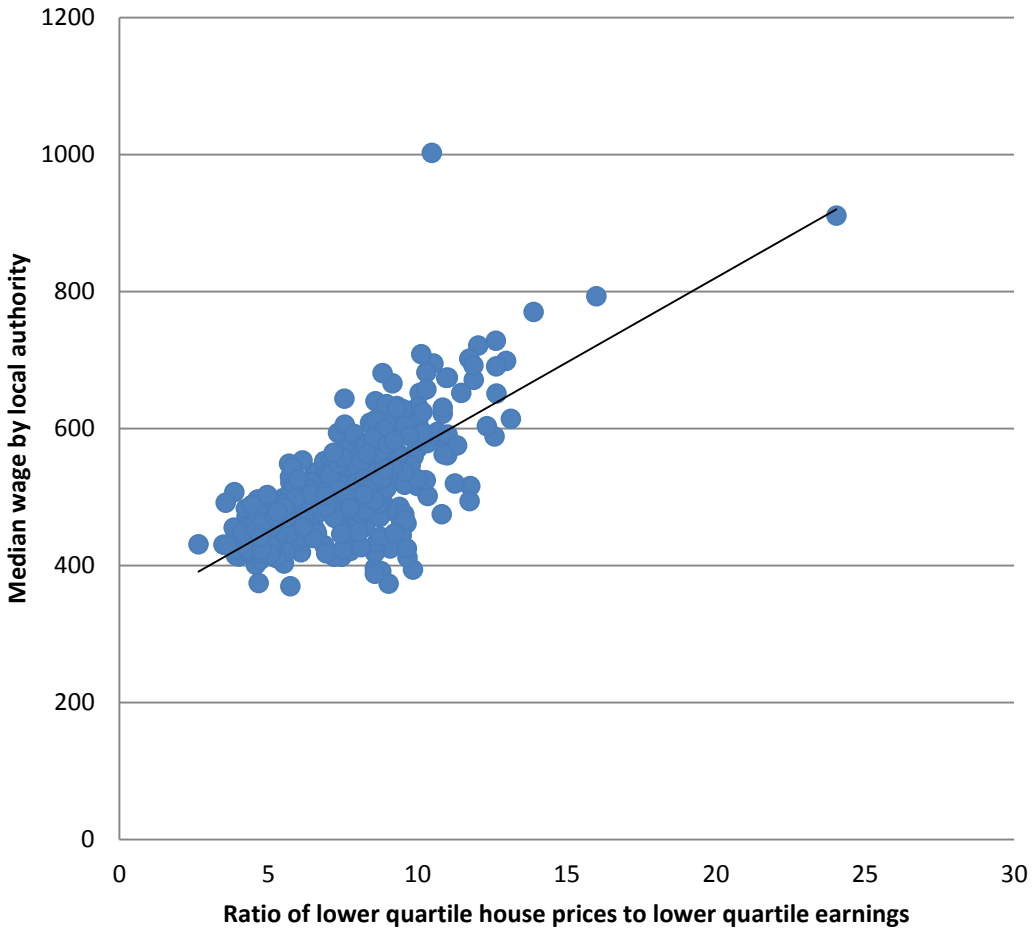
As average incomes increase in a city, that prosperity tends to be accompanied by an increasingly unequal distribution of income. An important question is whether this leads to worse labour market outcomes for those who are less affluent. To test this, we consider two outcomes: the link between living in an unequal city and employment chances and wages for people with few formal qualifications. We test this using regression models which allow us to see the relationships between one characteristic (i.e. the level of inequality in a city) and another (an individual's wages), controlling for other factors (such as experience in the labour market, qualifications). The detailed results are included in Appendix B.

In unequal cities, those with low skills tend to earn higher wages. The key determinant of urban inequality is the affluence of the population, and wage gains tend to be higher for all groups. In a relatively unequal city like Guildford, wages are also higher for those with low skill levels (i.e. NVQ level 1 or lower) than in more equal cities. In short, affluent cities are more unequal, but this affluence also raises wages for those with low skill levels.

An important caveat is that we cannot control for cost of living. However, we believe the cost of living is likely to be higher in cities with relatively high average wages. One reason for this may be from consumer prices, although outside of London these are subject to relatively little regional variation. In London consumer prices are around 7 per cent higher than the national average, with prices in the least expensive mainland region – Wales – 2.6 per cent lower (ONS, 2012).

The main issue however will be housing costs, which vary significantly between cities. As an illustrative example, we consider the ratio of house prices to lower quartiles earnings. While data is not available on comparative house prices at a travel to work level, it is available at the local authority level. Figure 5 shows the relationship between median income (used to proxy city affluence) and the price of housing at a local authority level. Here we show the ratio of lower quartile earnings to lower quartile house prices. There is a clear positive relationship: in local authorities with higher average wages, the ratio of house prices to lower quartile earnings are higher.

Figure 5 Lower quartile house price to wages ratio and median wage, 2010



Source: Department for Communities and Local Government (2012) and ASHE via NOMIS. Sample: 327 Unitary or District Local Authorities. Note wage measure differs from that used in previous sections.

In cities with higher median wages residents on low incomes face higher housing costs. One reason for this may be that housing supply is not responsive to changes in wages, meaning that house prices are a greater share of income for low wage workers in cites with better paid workers.

Our results also suggest that low skilled workers are more likely to be in employment, relative to being inactive, the more unequal a city is. Again, this result is driven by affluence.

One reason for this is that urban inequality may have labour market benefits. Affluence leads to inequality but also creates employment for low skilled individuals. This is likely to reflect higher demand for low skilled consumption activity, with affluent residents creating demand for employment in restaurants and bars, or in services such as security work (Gordon and Kaplanis, 2012). The factors

which are driving inequality are also having a positive effect on employment for those with low skill levels.

A related issue is the composition of the labour force. In cities with strong economies, labour demand may mean low skilled workers are more likely to enter the labour market. As our measure of inequality is only for those in work, this may increase inequality as there will be more workers on low wages. However, this may be a better outcome than unemployment for those in work. This is an important area for future research.

3.6 Summary

This section has considered patterns of urban inequality, the determinants of inequality at a city level and the consequences of inequality in urban labour markets. It finds that:

- **The most unequal cities are in the South East of England**. The most unequal cities or those with the highest levels of employment polarisation tend to be in the South East of England. Exact rankings of inequality are highly dependent on the measures of inequality used. However, cities such as London, Guildford and Reading are consistently ranked as highly unequal.
- **Urban inequality results from high average wages.** The main driver of urban inequality is affluence and so the skills composition of the population. Unequal cities tend to have affluent residents, with this driving inequality. Larger cities also tend to be more unequal.
- **Low skilled workers may benefit from unequal urban labour markets.** Solely in labour market terms, we find evidence that those with low skill levels (proxied by qualifications) are actually better off in unequal cities. They are more likely to be in employment and their wages are higher. But we also find that higher wages are likely to be offset by higher costs of living.

Chapter 4 Case studies of inequality in four cities

To investigate in more detail the local drivers of wage inequality, and the outcomes of, and policy responses to, local inequality, we conducted four case studies of cities across the UK. These were:

- **Bradford** – a city which has faced a difficult period of post-industrial decline and has had challenges associated with community cohesion.
- **Brighton** – a city area with lower levels of inequality than might be expected given its location and sector mix.
- **Edinburgh** – an affluent city with relatively high levels of wage inequality.
- **Liverpool** – a comparatively equal city which continues to face economic challenges.

In each city we conducted a literature review focusing on local contemporary and historical economic structure. We also interviewed local policymakers and experts, exploring local drivers and understandings of inequality, and actual and potential local responses.

We begin by providing a brief description of the economic histories of the case study areas, we then provide details about their current inequality measures and labour market and population characteristics, and finally we explore understandings inequality locally and any local policy response to inequality.

4.1 Background of the study areas

The economic histories of the case study areas differ significantly. Of particular significance is the history of manufacturing in each area, the scale of impact of job losses in this sector, and their ability to generate employment opportunities in new growth sectors. In this section we provide a short background to the study areas before going on to explore in more detail current local labour market and population characteristics, local understandings of inequality, and the potential for local measures to address inequality or ameliorate its impacts.

Bradford

Over the past few decades Bradford has experienced economic restructuring and a shrinking manufacturing base; as previous work for the Joseph Rowntree

Foundation has noted, 'poverty and social and economic division' remain key challenges for the city (Farnell, 2009: 1).

Bradford experienced waves of industrial growth and subsequent decline. From a small rural town it grew to become the 'wool capital of the world'. Benefitting from strong trade and communication links, its standing in the textile industry led Bradford to develop a solid engineering and manufacturing base (Hunter, 2005).

Manufacturing success in turn attracted successive waves of new immigrant communities from a range of countries (Hudson et al, 2011). Initially arriving from Ireland, Germany, and other areas in Europe, since the 1950s migrant workers increasingly came from South Asia and the West Indies (Darlow et al., 2005).

Economic restructuring in the 1970s and 1980s meant that Bradford, in common with other industrial centres, experienced the loss of large numbers of manufacturing jobs (Athwal et al, 2011). Rates of unemployment and economic inactivity remain high in Bradford. Bradford has some pronounced weaknesses in overall economic competitiveness and the city ranks poorly in terms of productivity, skills and business levels (Bradford Metropolitan District Council, 2010a).

Compared to both the wider region and the UK, the city has a younger age profile (Athwal et al, 2011). Bradford's South Asian population represents around 14 per cent of the city's total and the city has the second highest concentration of people of Pakistani origin in the UK. This group have been shown to suffer disproportionately from being out of work or in poor quality employment (Li and Heath, 2008).

Brighton

Brighton is a relatively affluent city on the south coast, with inequality below what might be expected. The city is not struggling like many other seaside resorts and has experienced relatively strong employment growth in recent years.

Brighton's initial growth came not as a result of industrialisation but because of its proximity to London and the city's amenities. When it became accessible by railway the new middle classes created by London's increasing wealth chose to spend their leisure time in the city (TWF, 2006) and, as with other seaside towns, this new tourist industry was key to its growth (Beatty and Fothergill, 2004). As consumption patterns changed from the 1960s onwards, with the growth of disposable incomes and overseas holidays becoming increasingly affordable and popular, many of Britain's seaside towns began to struggle. Brighton however, largely due to both its accessibility to London and good commuting routes as well as a growing higher education sector, with the University of Sussex opening in 1962, bucked this trend (TWF, 2006).

More recently Brighton's economy has performed robustly. The 2000s were a decade of considerable growth for the area, wherein it significantly diversified its economic base alongside physical regeneration (Webber, 2009). In consequence, total employment in Brighton grew by 19 per cent between 1998 and 2005 (compared to a national average of 8 per cent) (TWF, 2006), VAT registered businesses grew by 25 per cent and have had higher survival rates than national averages. Four key sectors now dominate the economy of Brighton and Hove - Financial and Business Services, the Public Sector, Hospitality and Retail, and Creative Industries.

Around 7,000 new graduates are produced every year from the city's two universities, of whom the city retains more than 30 per cent for six months or more (OCSI/EDuce Ltd, 2007). In 2007, 41 per cent of the workforce were graduates (Webber, 2009). Whilst on the one hand a highly skilled workforce has spurred the development of Brighton's high skill industries, on the other there are concerns about over-qualification and an insufficient number of graduate level jobs in the city to make the most of these talents.

Edinburgh

Scotland's capital has a history of economic success. Following the establishment of Edinburgh University and the Bank of Scotland, Edinburgh's reputation as a financial and educational hub was firmly cemented by the end of the 20th Century. As a result, Edinburgh grew a professional population whose demands, consumption habits and tastes for 'luxury' goods meant that a strong and varied service sector developed alongside Edinburgh's maturing economy (Rodger, 2001).

Throughout its history, Edinburgh has sustained its varied employment base. Without the reliance many areas of the UK had on heavy industry, Edinburgh did not suffer the decline felt so starkly elsewhere in the 1980s and 1990s.

The 1990s and 2000s saw Edinburgh grow its international reputation as a financial and business service centre. As the location of two major financial institutions (RBS and HBOS) the city enjoyed sustained output and jobs growth during this period. However, a reliance on the financial and business services sector meant that the city was heavily exposed to the recent financial crisis. The growth of newer firms including Virgin Money, Tesco Bank, and major foreign direct investment has however partly balanced this. A strong tourism offer has also helped to sustain the city through the recent recession.

Today Edinburgh's key sectors include financial and business services, consumer services, leisure and tourism, and the public sector (City of Edinburgh Council,

2011a). Public sector growth reflects Edinburgh's role in the provision of services to the wider city region and Scotland as a whole (Turok and Bailey, 2004).

Edinburgh is well known for this highly skilled and productive workforce. Over half of Edinburgh's working age population are employed in managerial, professional or associate professional roles (City of Edinburgh Council, 2011b).

Liverpool

Liverpool has a long history as an important port city. Benefitting from its west coast location it was able to build strong overseas trade links, trading products including coal, salt and agricultural goods (Behrens, 1991).

Since the end of the First World War however, Liverpool's fortunes declined. A restructure of UK trade away from the Commonwealth and towards European markets alongside the introduction of container ships favoured ports on England's South East coast (Wilks-Heeg, 2003).

Attempts to rebalance Liverpool's economic base fell in line with regional policy throughout the 1950s and 1960s aimed at encouraging the relocation of industry in the North of England. As a result, major car plant investments by Ford, Vauxhall and Standard Triumph in Kirby, Huyton, Ellesmere Port and Speke, provided a solid manufacturing base within the city (TWF, 2006). Manufacturing success was, however, short lived, with subsequent decline exacerbated by an overdependence on the branch plants of large national and multinational corporations (Munck, 2003).

Mass unemployment plagued the City throughout the 1980s, and economic decline was compounded by a lack of clear political and administrative leadership resulting in political instability (Parkinson and Bianchini, 1993). The need for regeneration attracted multiple rounds of funding and investment from both UK and European sources (including having Objective 1 status) leading to city centre improvements.

In 2008 Liverpool won its bid to host the European Capital of Culture (ECoC). Over six years the programme generated a total income of £130 million and the city centre became an attractive site for physical infrastructure investments. However some commentators have been critical of the impact of the ECoC, pointing to a shift in emphasis back towards city centre regeneration and away from outer marginalised communities (Kenyan, 2010).

4.2 Measures of inequality and labour market characteristics of case study areas

Table 4 provides some headline measures of current inequality. It shows several labour market and population indicators in the case study cities. Of the case study

cities, Edinburgh comes out as the most unequal across the measures detailed. Its overall Gini measure is higher; while the 90/10 ratio is significantly higher. Brighton and Liverpool score relatively similarly across the range of inequality measures, while Bradford comes out as being somewhat more equal than the other cities.

Table 4 Inequality and labour market measures in case study areas

	Bradford	Brighton	Edinburgh	Liverpool
Wage inequality measures				
Gini	0.254	0.263	0.297	0.266
90/10	2.920	3.131	3.586	3.097
80/20	2.079	2.163	2.336	2.150
90/50	1.835	1.902	2.074	1.871
50/10	1.591	1.647	1.729	1.655
Labour Markets				
Skills bias	-.0.189	-0.143	-0.055	-0.163
Employment polarisation	0.416	0.417	0.434	0.413

The city with the highest bias towards high skill jobs is Edinburgh, with Brighton, Bradford and Liverpool relatively lower. A similar pattern is clear with employment polarisation – Edinburgh has a more polarised labour market than the other cities.

4.3 Understanding inequality locally

Almost all the local stakeholders interviewed felt that local inequality was troubling in their cities. Widening inequality was generally felt to be associated with a range of negative individual and household outcomes (for example worse health, poor social mobility) as well as a number of negative wider social outcomes, in particular around community cohesion.

There are three important observations from interviews with stakeholders. Firstly, there was a tendency to see the concepts of inequality and poverty as the same thing. That poverty matters, stakeholders were very clear about and this was a core concern. Why inequality matters was often more difficult to explore. While the two are clearly linked concepts, expressions of concern about inequality were often actually concerns about poverty.

Secondly, where inequality was identified as problematic it was often spatial inequalities that were used to capture this. For example, interviewees were concerned about neighbourhoods with high levels of poverty rather than actual measures. Spatial measures such as this is most often reflect the geography of different types of housing in a particular city and the extent to which different groups are able to sort, or are sorted, into neighbourhoods (Gordon and Monastariotsis, 2006).

In Bradford for example, despite having comparably low levels of inequality, there was a sense locally that experiences are highly polarised by geography. This is true: gaps between Bradford's most and least deprived areas are the largest in the country and a large proportion (42 per cent) of the district's population live in the country's 20 per cent most deprived areas, while 5 per cent live in those that are 1 per cent most deprived (Bradford Metropolitan District Council, 2010a). But spatial segregation is a different concept to inequality.

Thirdly, stakeholders also described the inequality that exists between those who have work and those who do not, in particular they were concerned where such worklessness is entrenched among particular groups, families and communities.

These findings suggest that inequality is, if nothing else, a difficult concept to translate to a local level. While concerns about poverty are clearly valid, a focus on poverty may require different policy interventions than one on inequality.

4.4 Perceptions of the importance of local inequality

There were some notable differences in the extent to which inequality formed part of local policy concerns or responses, although in all four cities there was a wider policy concern around addressing poverty. In two of the cities, Brighton and Liverpool, specific policy measures had been adopted with the aim of addressing local inequality.

In Brighton inequality is relatively high on the policy agenda. The city's economic development department have highlighted concerns about growing polarisation in the labour market; the city has a living wage campaign; and, the city's school lottery system was a high-profile (and controversial) attempt to address inequality of opportunity.

There is a clear commitment among local policymakers to address economic inequality in Brighton. This has been demonstrated through the commissioning of a 'Reducing Inequalities Review' by a partnership made up of voluntary, private and statutory agencies. There are a number of strands to this approach. In part it is about addressing the spatial inequalities between the more affluent west of the city and the areas of deprivation in the east.

However policymakers have also attempted to address inequality through raising wages for those at the bottom of the wage distribution. Brighton has a local Living Wage Campaign set up by local residents, and local stakeholders felt this could help address inequality at the local level. The council has set an example by paying the living wage to its employees, and other large public sector employers such as City College have followed suit. But there is some concern whether this campaign can be successfully extended to the large numbers of comparatively low paying small employers in the retail, hospitality and tourism sectors, where firm profitability may prevent companies from participating.

Liverpool has also attempted to address inequality by establishing The Liverpool Fairness Commission, an 'independent body set up to look at ways of reducing social and economic inequality for those who live in Liverpool'. The Commission is in its early stages but one important element of what they are doing will be concerned with the living wage.

4.5 Local policy levers to address local inequality

Most stakeholders felt local actors had little power to address the causes of inequality. The big drivers of economic inequality - occupational structures, returns to skill, and tax and benefit policies - are hard to influence locally. Though they have sectors which they prioritise, local employment policy generally aims to get people into work rather than influence the employment type.

However, some interviewees felt they could influence positive change in the labour market which would help to begin to address the issues. In Bradford, local stakeholders were attempting to address poverty through encouraging improvements in the labour market. With a general focus on job creation but also, specifically, on creating or attracting more knowledge-intensive jobs. However more generally our interviews showed a concern that cuts in public sector employment and the potential outsourcing of services may worsen wages and conditions for those towards the bottom end of the wage distribution.

There was also a tension in policymaking between a narrative of economic success through increased specialisation in the knowledge economy and greater equity, given our results showing inequality was driven in large part by high wage jobs.

Local actors do exert some influence on wage setting in the labour market both directly and indirectly. The local public sector as an employer sets the wages of their lowest paid workers, as well as the ratios between lowest and highest earners. The public sector is also a large procurer of labour intensive services and through contractual arrangements can potentially influence the quality of some jobs locally (although in the current environment of austerity and efficiency it may be that

outsourcing of labour intensive services for lower wages becomes a more dominant arrangement).

Procurement decisions were one way which local stakeholders argued they could influence poverty and inequality. A central aim of Edinburgh council's economic strategy is to reduce poverty, primarily through its own services (such as through allowing these considerations to guide procurement decisions). It was also felt that the local labour market could be altered to reduce inequality through the use of local supply chains to generate opportunities, and through increasing academic achievement.

Local stakeholders attempting to address inequality in Liverpool believed that it could be tackled in three key ways: through the introduction of a local Living Wage, raising the skill levels of residents and creating good quality jobs through targeted investment and commissioning. The Liverpool Fairness Commission is placing great emphasis on the introduction of a local Living Wage, although an appropriate level is yet to be determined.

While local actors have relatively few powers to address the drivers of inequality they have a wider responsibility in mitigating the impacts of inequality locally. This includes ensuring the standard provision of good quality services. It may also include forms of redistribution through directing service provision and resources to the poorest areas or people.

One way in which local authorities can attempt to address the impacts of local inequality (at least over the longer-term) is through the schools system. This could be, for example, by encouraging schools which are more mixed and which do not simply replicate the social class sorting through the housing market. However, local authorities' ability to influence school social mix have been curtailed by recent admissions code reforms, though individual schools have some discretion. Another method would be through further disproportionately targeting resources at schools in lower income areas, however again local authorities' discretion over school budgets has been significantly reduced.

In Brighton, the local authority has attempted to address inequalities in education through a schools lottery system, designed to open up opportunities for students from less affluent areas to study at the city's better schools. The evidence however suggests that the school lottery was largely unsuccessful in meeting the aim of diluting socio-economic segregation in the city's schools (see Allen et al, 2010).

4.6 Conclusions from the case studies

This section has considered urban inequality and employment polarisation in four diverse cities: Brighton, Bradford, Liverpool and Edinburgh. It has focused on the

history of these cities, their labour markets, and how policy is addressing inequality locally.

The case studies highlight the importance of inequalities other than those in the labour market. In particular, the gap between those in and out of work was a significant issue, particularly in Liverpool and Bradford.

Interviewees were concerned about inequality, but often conflated inequality with poverty. Where they considered inequality is was often the spatial manifestation of inequality which stakeholders discussed and the contrast between affluent areas and those afflicted with significant physical and social deprivation.

In two of the case study cities there is a growing momentum behind policies which aim to reduce inequality. In Brighton a partnership of stakeholders in the public, private and third sectors in the city have undertaken a 'Reducing Inequalities Review' and the city has a Living Wage campaign. This policy follows on from a previous attempt to address the impact of inequality on educational outcomes through the schools lottery system. In Liverpool, the recently established Fairness Commission is also looking at issues around inequality in the city, and again establishing a Living Wage in the city is seen as an important aim.

Chapter 5 Drivers of future change

This section considers whether patterns of urban inequality are likely to change in the future. We focus on three of the main likely drivers of change in wage inequality - reductions in public sector employment, the shift to a knowledge economy and the continued upgrading of the education of the workforce - and how each may impact on inequality and employment polarisation in cities.

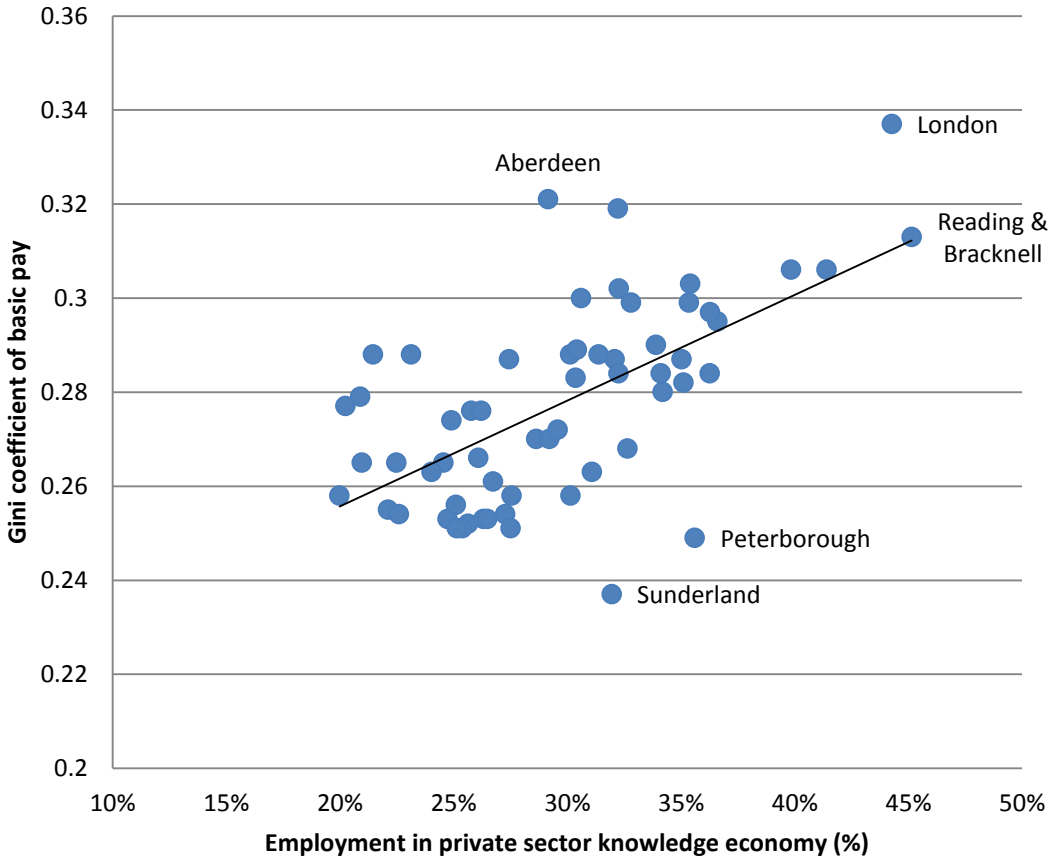
5.1 Economic change and the 'knowledge economy'

An underlying factor driving changes in inequality and employment polarisation in cities is long-term structural change in the UK economy. Driven by globalisation, technological innovation and an increasingly educated population, the UK has moved towards a 'knowledge economy' (Brinkley, 2007). The balance of output in the UK economy has shifted from industries based on manual labour and raw production to those based on the use, dissemination and production of knowledge. These patterns are likely to continue: UKCES expect private sector knowledge based industries to be the major driver of growth in the period to 2017 (UKCES, 2008).

This change has had implications both for particular cities and particular skill groups. Knowledge based industries have tended to locate in urban areas but are unevenly distributed between cities. Firms in these industries are often subject to agglomeration economies which mean that they benefit from close proximity. For example, financial services firms in the City of London benefit from a location near specialised legal firms. Because of this, the knowledge economy is relatively urbanised in the UK. In 2007, 47 per cent of employment in private knowledge-intensive services were located in London and the twelve largest regional cities (Morris, 2010).

The cities with the highest proportion of knowledge economy employment tend to be smaller cities in the South East (such as Guildford and Aldershot), large cities with successful economies (such as Leeds, Bristol or Edinburgh), cities with highly skilled populations (York) and London. Many of these cities, which have gained from the knowledge economy, are often also the most unequal by our measures. As Figure 6 shows, there is a clear relationship between employment in private sector knowledge industries and inequality.

Figure 6 Private sector knowledge economy employment and inequality, 2010



Source: BRES / ASHE. 60 Observations. For definitions of the private sector knowledge economy see Morris (2010). This is: Water transport; Air transport; Post and telecommunications; Financial intermediation; Insurance and pension funding; Activities auxiliary to financial intermediation; Real estate activities; Renting of machinery and equipment; Computer and related activities; Research and development; Other business activities; Recreational, cultural and sporting activities.

Similarly, the knowledge economy has been beneficial for particular skill groups. Increasing employment in knowledge based industries has often benefited those with high skill levels, while corresponding declines in manufacturing industries have had consequences for those who are less qualified (Brinkley, 2007).

These two factors – an increasing economic bias towards cities with knowledge based industries and towards workers with high skill levels – are likely to continue as a result of continuing globalisation and technological change. This will have consequences within particular cities. For example, affluent but unequal cities such

as Reading or London may continue to gain professional employment in knowledge based industries. This may worsen levels of inequality in these cities over time.

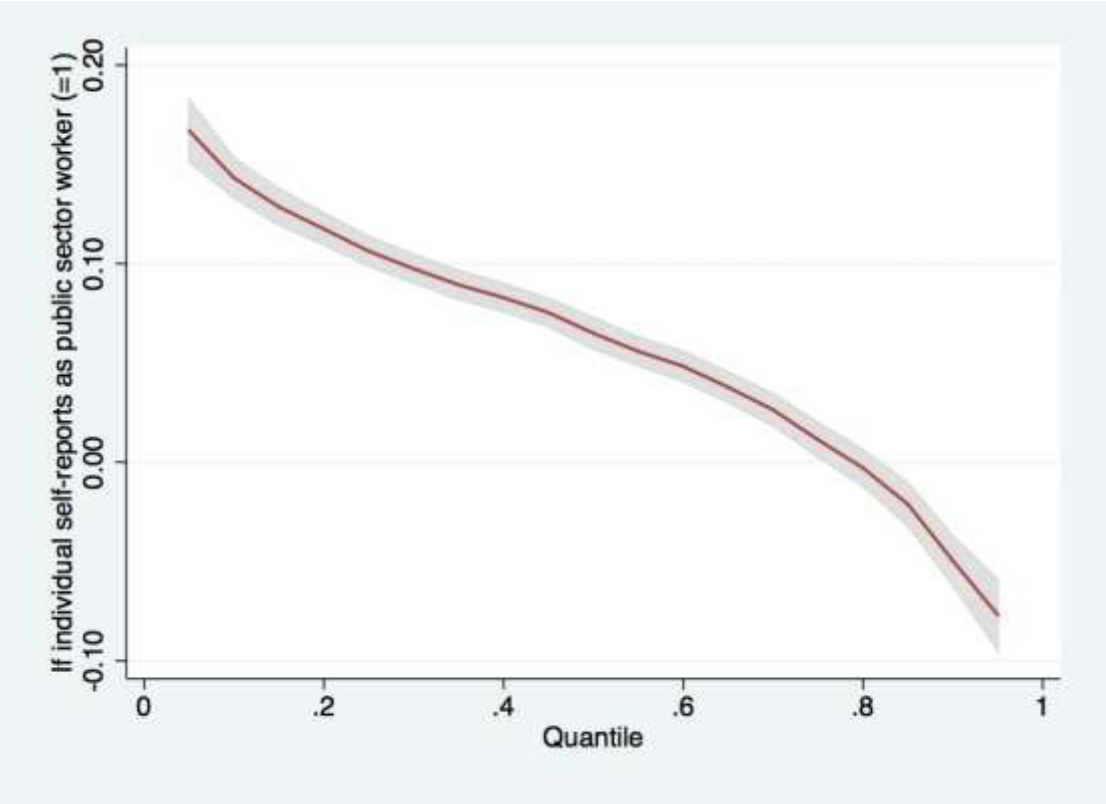
The impact of these factors on inequality in cities with lower average wages, and lower inequality, is less clear. Research suggests that two factors in particular are driving changes in the knowledge economy – larger cities tend to be seeing increasing shares in these industries, in line with the national average (Lee, 2012). And proximity to the economic mass of London is also likely to drive these changes going forward.

Yet knowledge-based industries are relatively diverse and while some may drive inequality, others will not. In a study of European regions, Lee (2011) found that the increase in knowledge based industries overall did not drive inequality in cities or regions. However, there was a significant effect from knowledge-intensive financial services in driving inequality.

5.2 Public sector cuts

A second future driver of change in city level inequality is likely to be reductions in public spending and the impact of public sector cuts. The Office of Budget Responsibility expect a fall of around 900,000 government jobs (excluding the impact of reclassifications) between 2011 and 2018 (OBR, 2012). This will have important implications for both wage inequality and employment polarisation for a number of reasons. Firstly, the wage distribution within the public sector is more compressed than within the private sector. Second, there is a wage premium associated with working in the public sector (after controlling for education, age, qualifications and region) (IFS, 2012). This premium is most important for lower earners, and is far less important (or even negative) for higher earners (ibid). Overall, the public sector is less unequal than the private sector: taking just public sector workers in cities the Gini coefficient of basic pay is 0.257, substantially lower than when the private sector is included.

Figure 9 The public sector pay premium in UK cities: Quantile regression estimates



Source: APS. Red line shows coefficient at each quantile, shaded area shows 5% confidence intervals. Estimated as a quantile regression. Controls for Gender, Experience, Experience^2, Qualifications, Part-Time, Public Sector, Non-White Ethnicity, whether UK born, regional fixed effects and city size. Note we use APS rather than ASHE to control for qualifications.

To test the likely impact at an urban level, we repeat Oakley's (2012) analysis on the public sector wage premium. In this case, to maintain consistency with our previous analysis we only use urban residents. Figure 9 outlines our results. Essentially this shows the impact of the public sector to each part of the wage distribution. There is a clear trend – the public sector wage premium is highest for those at the bottom of the distribution, and is negative beyond the 80th percentile, compressing the wage distribution. Assuming that public sector job losses are distributed evenly across the wage structure, it is likely that public sector cuts will increase inequality. In practice, the effect may be more complicated as those at different levels of the wage distribution will re-enter the labour market with different wage rates – but it is reasonable to assume that inequality will increase.4

[4] One complicating factor is that those towards the bottom of the distribution may be less likely to find alternative employment. This may reduce Gini wage inequality in cities, but increase other

Public sector cuts will not be evenly distributed between cities as, by definition, the public sector tends to be a larger share of employment in cities with weaker private sectors. Some older industrial cities will continue to struggle to create the jobs needed to mitigate the losses in the public sector. This will have particular implications for the distribution of graduates for whom, particularly in weaker labour markets, the public sector has been an important source of employment (Wright, 2011). In some of these cities wage inequality may even decrease as graduate employment is reduced. But this reduction in wage inequality is likely to be associated with a less successful urban economy.

5.3 An increasingly educated population

A third factor likely to change our results is the growing share of graduates in the economy. Over the long-term the UK population has become increasingly highly educated, with the share of graduates in the population increasing. As the graduate wage premium has also been increasing, the rise in skill levels will be one factor driving inequality (Machin and McNally, 2007).[5]

The distribution of graduates generally will remain an important driver of inequality in cities. Graduates are a diverse group, and particular types of graduates are likely to be increasingly important in city level inequality; with the wage return being significantly higher for those with a maths, computing, engineering or technology degrees (Walker and Zhu, 2005; O'Leary and Sloane, 2006; Machin and McNally, 2007). For those at the other end of the skills distribution there is a significant and growing employment penalty associated with poor qualifications, and those with no qualifications are increasingly likely to be outside the labour market (Berthoud, 2003; Sissons, 2011).

The location of graduates will be an important driver of inequality at a local level, and patterns of graduate location are highly uneven. Over the period 1981 – 2001 the key predictor of whether cities gained graduate shares was the share of graduates in their population in 1981 (Lee, 2013). For example, in 1981 nine per cent of Middlesbrough's working age population were qualified to degree level, increasing

measures. Another is if relatively high earners leave the public sector and find (higher paid) private sector workers – this would increase inequality, if they cannot find employment it would reduce inequality.

[5] There is however some evidence to suggest that the wage premium is beginning to decline among recent cohorts of graduates. See Walker, I. and Zhu, Y (2005)

to 15 per cent by 2001 – a rise of 6 percentage points. In contrast, Oxford started from 14 per cent and saw its share double to 28 per cent (DCLG, 2006). Such patterns tailed off during the 2000s, but this was mainly due to the expansion of the public sector (Wright, 2011). Similar patterns of diverging graduate shares amongst cities have been visible in the United States (Berry and Glaeser, 2005).

Disparities in the share of graduates between cities are likely to increase, and this will drive inequality in already successful cities more than in those with lagging economies. One plausible scenario is that the private sector continues to recruit graduates in affluent cities, driving up inequality in already successful cities. Cities with weak economies will create fewer new graduate jobs, and inequality in those cities will not increase to the same degree.

5.4 Conclusion: Changes in inequality over time

The three factors outlined above are likely to lead to increases in inequality over the long-term. They may also mean inequality increases most in those cities with already high levels of inequality. However, the impact of the financial crisis may lead to a reduction in inequality as wages at the top of the wage distribution see their incomes fall (Resolution Foundation, 2013). This may lead to a short-term reduction in inequality, but without wider structural change in the economy the long-term patterns are unlikely to change.

Chapter 6 Conclusions and implications for policy

This report has considered patterns of wage inequality and employment polarisation in Britain's cities, the determinants of these patterns and their implications. In this chapter we summarise the key findings of the report and consider their implications for policy.

6.1 Conclusions

There has been a wide and often polemic debate about the causes and consequences of income inequality. Discussion has largely been confined to the influence of national inequality, and there is a general (though not universal) consensus that too much inequality is associated with a number of negative social outcomes. In this paper we have focused on inequality in urban labour markets, specifically wage inequality and employment polarisation. These are two specific forms of inequality, and an important caveat is that we do not look at inequality in wealth or income.

Inequality in cities differs from inequality at a national level. Whereas national wage inequality can often be analysed with reference to the tax system and the rewards to different forms of work, inequality between cities also reflects the spatial sorting of people with different characteristics into different places.

Wage inequality or employment polarisation in UK cities is the result of successful urban economies. At a local level, wage inequality or employment polarisation is driven by the skills of the population, the wage returns to these skills, and the inclusion of different groups in the labour market. Because of this, cities with the most polarised or unequal labour markets are those with the most skilled residents. In contrast, relatively equal cities are often associated with industrial decline and a comparatively poorly educated population. These cities are not equal because all residents earn good wages; they are equal because very few do.

Because unequal cities often have the strongest economies, their labour markets tend to provide more employment opportunities and higher wages for those with low skill levels. One caveat to this is that higher housing costs to a greater or lesser extent offset the benefit of this wage differential. While this paper cannot investigate the link between urban inequality and social problems such as crime or poor mental health, it does suggest that local policymakers should focus on those at the bottom

of the wage distribution, rather than attempts to limit high wages. The drivers of urban wage inequality are also the drivers of urban economic success.

6.2 Implications for city governments

The challenge for cities is to address the consequences of inequality, without affecting the economic success which may make cities unequal. However, the ability of cities to address inequality is limited. As taxation is largely decided nationally, the levers available to local policymakers are mainly those that can support individuals towards the lower end of the wage distribution - targeted interventions on skills, housing and other policy areas.

Some policies lowering wage inequality in a city may actually reduce the welfare of residents – and vice versa. A hypothetical city pursuing a successful economic development strategy to attract the highly skilled or create more professional jobs may actually increase inequality. Similarly, cities which manage to get lower skilled residents into work may increase employment polarisation or wage inequality, by including residents in these figures – however this is still a positive outcome for such cities.

City governments still have a role related to inequality. Cities may want to focus on three things:

- Ensuring all residents are able to enter the labour market
- Focusing on wage increases and skill upgrading for low skilled workers
- Addressing the consequences of inequality – in particular by reducing the cost of living

Ensuring all residents are able to access the labour market

Our results suggest that labour markets in unequal cities provide more employment opportunities for those with low skill levels. In such cities, local government needs to focus on ensuring all residents have access to the available employment opportunities.

This is not, of course, an original or simple suggestion. But, there are a number of barriers to work which could be addressed at a local level. One of the key issues is likely to be childcare, with expensive or inconvenient childcare a particular issue for those on low incomes. The report of the Islington Fairness Commission suggested one way of dealing with this, a Childcare Coalition to coordinate between major

public and private sector employers working together at a local level to break down barriers.

Second, there are issues around ensuring that residents have the skills required for entry level jobs. Unequal cities are likely to be more expensive, and with more highly skilled residents have fewer jobs in low skilled tradeable sectors (Manning 2004). However, they are likely to have more employment in personal service occupations. Policymakers may want to tailor skills policies to ensure individuals are able to access employment in these areas.

Upgrading low wage work

Cities can aim to improve working conditions for residents in a number of ways: by improving the supply and demand for skills, through policies to boost wage progression, and by growing the number of 'good jobs'. Skills are clearly critical to economic success for both individuals and cities. Skills improvements increase potential earnings power and can facilitate social mobility. Improving the skills of existing residents can help to attract investment and may also support greater enterprise locally.

The supply of skills is however only part of the story. There must also be employer demand to make use of these skills. There is scope for cities to work more effectively with local employers to find ways to improve the utilisation of the skills of residents through better job design. Better use of skills has the potential to improve the quality of employment, as well as to facilitate more material gains to wages and to boost progression (Wright and Sissons, 2012).

Cities can also work with employers and sectors to facilitate wage progression for residents who are in work through, for example, career ladder schemes – which enable residents to progress through internal labour markets or within sectors. There may also be greater scope for them to influence job quality through procurement and through the planning system (for example see Osterman's, 2008, work on 'Good Jobs America').

Alongside this, cities with strong labour demand may want to use this success to increase wages. One example is London's Living Wage (which is now a national campaign). London is a highly unequal city and its affluence makes it very expensive for many residents. The living wage campaign has attempted to address low wages in a number of sectors – often those such as Hospitality and Catering which are reliant on co-location with the affluent (Pennycock, 2012). The Living Wage is a voluntary scheme, and it may prove challenging to persuade firms who have low

profit margins or operate in competitive industries to participate. Public sector organisations should, as a minimum, take the lead.

Addressing the consequences of inequality

There are also a number of ways in which cities can act to address the consequences of inequality, but these will often vary by city. Cities need to be aware of problems on a local level caused by high levels of wage inequality. Problems might include spatial segregation in the housing market, with this restricting access to both high quality public services and employment opportunities. Cities such as Brighton have attempted to put in place measures to ensure that access to the best schools are evenly allocated. But such issues will need to be addressed on a city by city basis.

Our research suggests that the cost of living is likely to be a key issue in addressing the consequences of inequality. Given the difficulty of raising wages for those with low skill levels this will be an important way of improving welfare. Reducing costs for low wage residents is one of the key ways cities can help to mitigate the negative impacts of low earnings. The most important intervention is probably in the housing market where supply is relatively fixed and constrained by an inflexible planning system. This is a particularly acute problem in successful and growing cities, which are often those with the most restrictive policies (Cheshire and Sheppard, 2002). Because of this, house prices are higher as a ratio of low wage rates in more unequal cities. This is an area with some, and growing, local control with the potential to significantly address the impacts of being on low wages. More work is needed to consider how local areas can reduce the cost of living for low skilled residents around areas such as housing and transport.

Areas for further research

Our research suggests three important areas for future study:

- **Urban inequality beyond the labour market.** Our paper has considered the labour markets of cities, and so has looked at inequality in wages and employment polarisation. While wage income is the main determinant of income inequality, related processes of the accumulation of housing wealth, for example, may also be important. Similarly, we cannot consider the complexities of the benefits system and how this may relate to our overall measures of inequality.

- **The impact of inequality on the cost of living.** Our research has considered purely wages, and has not considered cost of living. Yet in many cities wage gains for particular groups will be outweighed by relatively larger cost of living. In particular, our finding that low skilled workers are more likely to be

in employment and earn more in unequal cities may be outweighed by increased cost of living in these cities. This should be an important area of further research.

- **The social consequences of urban inequality.** Our findings suggest that inequality at an urban level may be related to improved labour market prospects for those with low skill levels. However, this does not mean that there are not harmful social effects – such as worse mental health or subjective wellbeing outcomes – associated with inequality. Testing whether these effects exist would be an important step towards designing policies to address them.

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Annex A: Methodology

Defining Cities

There is no standard definition of a 'city' in the UK. To reflect other policy work in this area, we use the cities from the Department for Communities and Local Government's (DCLG) 'State of the English Cities' database. This includes the 54 largest cities in England by population, and we also include the largest cities in Scotland and Wales: Edinburgh, Aberdeen and Glasgow and the Welsh cities of Cardiff and Swansea. As the Annual Population Survey does not include Local Authority identifiers for Northern Ireland we cannot, unfortunately, include Belfast.

To reflect local labour markets, we use the travel to work area (TTWA) boundaries for each city. This is the closest standardized measure to a functional economy in the UK, and is used by other similar research (e.g. Gibbons et al., 2011). TTWAs are defined by the Office of National Statistics (ONS) to be as self-contained as possible: at least 75 per cent of the population of each one both lives and works in the same area. More details are available from the ONS website (or see Coombes and Bond 2007).

The strength of using TTWAs is that they reflect commuting patterns, and so functional economies, rather than administrative boundaries or the physical extent of the city. However, they have a number of limitations:

- TTWAs are only a reflection of a wider series of overlapping local labour markets in a particular city,
- Different groups will have different willingness to travel to work, and they cannot reflect this. For example, people with higher qualifications (and wages) are often willing to make longer commutes than those with fewer qualifications (Green and Owen, 2006),
- They do not always reflect perceptions of the 'city' and so do not always seem intuitive boundaries.

The State of the Cities Database uses TTWAs defined using the 1991 boundaries (Smith et al, 2010), and so we update them to the more recent 2001 definitions. This requires a small number of changes to be made in the data, as the TTWA boundaries both expand and contract in the period in question. The final sample is of the 60 largest 'cities' in Great Britain. However, low sample sizes in the income data means we do not always include Worthing in our analysis.

Measuring inequality and employment polarisation

Previous work on inequality in cities has used measures such as the variation in unemployment rates between different wards in a city. However - as a wide academic literature points out - this is simply a measure of segregation at an urban level and is vulnerable to spatial structure, the boundaries used for cities and is vulnerable to the level of population sorting and so city size (see Gordon and Monastiriotis, 2006). Our analysis focuses on two related concepts – wage inequality in cities and employment polarisation.

We use two main data sets:

- **The Annual Survey of Hours and Earnings (ASHE)** – to develop our measures of inequality at a city level we use ASHE.
- **The Annual Population Survey** – a sample of around 300,000 individuals across the UK, which we allocate from Local Authority to Travel to Work Area using a share-based method (Nathan 2011).

The most common measure of inequality is the Gini coefficient (Coulter, 1989; Glaeser et al, 2009). This is the main measure we use here. It is directly comparable between units of different size, and it is unchanging if all variables are multiplied by a positive constant. It is also widely used, and so requires relatively little explanation. However, it is sensitive to changes around the mode of the distribution – this may mean it is less sensitive to outliers and so measurement error in the extremes.

The Gini is an overall measure of inequality. To give information on the shape of the distribution, we use three further measures:

- **90 / 50 Ratio.** The ratio between the incomes of the 90th percentile and the 50th percentile. This gives a measure of inequality in the upper tail of the distribution.
- **50 / 10 Ratio**. The ratio between the incomes of the 90th percentile and the 50th percentile. This gives a measure of inequality in the lower tail of the distribution.
- **90 / 10 Ratio.** This gives a measure of overall inequality, or the spread of the distribution, but does not account for variations in the middle of the distribution.

We also use two measures of employment polarisation and skills bias, as taken from Jones and Green (2009). Our measure of polarisation is essentially a weighted

relative employment distance from the median wage.[6] It takes a higher value in cities which are more polarised and is always between zero and one. We also use a measure of skill bias, also taken from Jones and Green (2009). This is essentially a measure of the proportion of employment in each wage percentile at a national level, weighted or local employment levels. Values range from negative to positive, with higher values indicating increasing skills bias.

Annual Population Survey

The Annual Survey of Hours and Earnings

The Annual Survey of Hours and Earnings (ASHE) is based on PAYE records of a 1 per cent sample of employee jobs. This makes it highly accurate. However, it does not cover the self-employed. We use ASHE for almost all measures of wages or wage inequality, with the exception of regressions at an individual level, where we use the Annual Population Survey. This is because ASHE does not contain information on the qualifications of the workforce.

Following previous work in this area, the variable we use is basic pay amongst full time employees. Of course, this has some limitations. We do not include bonus income or other non-basic pay, as it is unclear how these will be included in the variable. Moreover, we do not include those in part time work. However, the use of this variable is standard in the literature (e.g. Gibbons et al., 2010). Despite these problems, the accuracy of the measure makes it the best available wage indicator at a local level.

The Annual Population Survey

The second source of data for this report is the Annual Population Survey (APS) special license Microdata. The APS is a sample survey of around 300,000 individuals across the UK. It has a local authority identifier which shows which local authority individuals live or work in.

In contrast to ASHE, the APS does not include a travel to work (TTWA) area identifier. To allocate individuals from a particular local authority (LA) into each TTWA, we use a share-based method (see Nathan, 2011). Individuals are allocated from LAs into TTWAs, depending on the probability of an individual living in each LA being in each TTWA.

[6] Following Jones and Green (2009) we use the hourly pay measure of wages. However, as we have smaller sample sizes we use two digit SIC codes to calculate our measures

The methodology works as follows. For each LA we estimate the overlap between TTWAs using the GeoConvert service at the University of Manchester, e.g. if 60% of the population of an LA are in TTWA 1 and 40% are in TTWA2. Next, we allocate random numbers to each individual and then assign them at random to the TTWAs, i.e. an individual living in the LA has a 60% chance of being allocated to TTWA 1 and 40% of being allocated to TTWA2.

To ensure sample sizes are large enough we amalgamate different years of APS data for each periods. The APS is available from 2004 to 2010. This gives eight years of data. We mainly use data from 2008, 2009 and 2010 and we limit our sample to city residents aged 16 – 64.

Wage data in the APS

The APS has two main wage variables, *hrrate* (the reported hourly rate) and *hourpay* (a reported level of income divided by hours worked). Research shows that hrrate is more reliable for low wage earners (Dickens and Manning, 2002). However, hourpay has wider coverage at all wage levels we use that. This is a derived wage variable, which is the reported annual / weekly wage and hourly wage variables divided by the relevant hours. This leads to a relatively large measurement error, but it has a relatively larger sample size. More importantly, respondents for hrrate are significantly biased towards the lower end of the distribution. While limited, hourpay at least covers the full distribution.

As with any such data, there are a number of limitations to the measure of wages. There may be natural approximation of answers, as individuals give vague answers to save time or out of ignorance (Dickens and Manning, 2002). A significant number of responses are answered by proxy, typically by a family member. This presents a particular problem for income questions. Finally, our results may over- or under-sample certain groups.[7] However, the APS is one of the few datasets we can use to measure inequality at a local level.

City Definitions

Cities included in our data (where parenthesis detail changes from the States of the Cities data). The English cities are: Barnsley; Birmingham; Blackburn; Blackpool; Bolton; Bournemouth; Bradford; Brighton; Bristol; Burnley, Nelson & Colne (for Burnley); Cambridge; Coventry; Crawley; Derby; Doncaster; Gloucester; Grimsby; Guildford & Aldershot (for Aldershot); Hastings; Huddersfield; Hull; Ipswich; Leeds;

[7] We remove those who earn at the very top extreme of the distribution and those who earn the very lowest (lower than £1 an hour).

Leicester; Liverpool; London; Luton & Watford; Maidstone & North Kent (for Chatham); Manchester; Mansfield; Middlesborough & Stockton (for Middlesborough); Milton Keynes & Aylesbury (for Milton Keynes); Newcastle & Durham (for Newcastle); Northampton & Wellingborough (Northampton); Norwich; Nottingham; Oxford; Peterborough; Plymouth; Portsmouth; Preston; Reading & Bracknell; Rochdale & Oldham; Sheffield & Rotherham (for Sheffield); Southampton; Southend & Brentwood (Southend); Stoke; Sunderland; Swansea Bay; Swindon; Telford & Bridgnorth; Wakefield & Castleford; Warrington & Wigan (for Warrington and Wigan); Wirral and Ellesmere Port (for Birkenhead); Worthing; York. In addition we add the following Welsh and Scottish cities: Aberdeen, Cardiff, Edinburgh, Glasgow and Swansea Bay.

Appendix Table A1. Basic inequality measures by city, 2010

	90 / 10	80 / 20	90 / 50	50 / 10	Polarisation Index	Skills Bias	Mean Wage	Gini Coefficie
90 / 10	1.000							
80 / 20	0.893 0.000	1.000						
90 / 50	0.835 0.000	0.668 0.000	1.000					
50 / 10	0.873 0.000	0.853 0.000	0.464 0.000	1.000				
Polarisatio	0.570 0.000	0.541 0.000	0.552 0.000	0.425 0.000	1.0000			
Skills Bias	0.815 0.000	0.752 0.000	0.574 0.000	0.811 0.000	0.3810 0.0027	1.000		
Mean	0.923 0.000	0.828 0.000	0.718 0.000	0.849 0.000	0.5632 0.0000	0.904 0.000	1.000	
Gini	0.879 0.000	0.838 0.000	0.800 0.000	0.716 0.000	0.5399 0.0000	0.699 0.000	0.838 0.000	1.0000

Source: ASHE, 2010. Data for TTWAs. 60 Observations. Significance underneath correlations

Table A2. Descriptive statistics: Sample size and occupational structure by city, 2010

	Obs.	Obs (FT)	Median Pay	Polarisation	Skills Bias
Aberdeen	1,465	1,009	479.13	0.427	-0.091
Barnsley	524	360	375.93	0.427	-0.216
Birmingham	4,644	3,241	425.86	0.422	-0.12
Blackburn	737	521	364.00	0.421	-0.21
Blackpool	619	404	352.45	0.438	-0.247
Bolton	722	468	365.93	0.422	-0.241
Bournemouth	888	584	383.59	0.456	-0.188
Bradford	1,309	865	383.30	0.416	-0.189
Brighton	1,000	635	414.92	0.417	-0.143
Bristol	3,191	2,239	436.40	0.431	-0.11
Burnley	381	260	362.04	0.393	-0.237
Cambridge	1,435	1,033	471.54	0.423	-0.028
Cardiff	446	284	380.68	0.41	-0.245
Coventry	1,672	1,119	402.46	0.416	-0.147
Crawley	1,529	1,049	459.96	0.456	-0.113
Derby	1,192	892	481.42	0.411	-0.09
Doncaster	817	554	394.54	0.43	-0.233
Edinburgh	2,546	1,883	451.64	0.434	-0.055
Glasgow	4,108	2,900	414.88	0.427	-0.157
Gloucester	603	403	418.97	0.408	-0.119
Grimsby	490	307	383.30	0.428	-0.27
Guildford & Aldershot	2,351	1,672	488.71	0.473	-0.05
Hastings	300	191	369.46	0.452	-0.258
Huddersfield	660	441	410.98	0.43	-0.192
Hull	1,387	896	383.12	0.412	-0.197
Ipswich	1,190	716	390.97	0.423	-0.173
Leeds	3,059	2,245	410.65	0.422	-0.127
Leicester	2,503	1,695	404.42	0.402	-0.158
Liverpool	2,757	1,917	413.85	0.415	-0.163
London	27,847	21,025	561.55	0.463	-0.002
Luton & Watford	2,172	1,395	430.87	0.456	-0.188
Maidstone & North	1,546	1,042	419.89	0.433	-0.171
Manchester	5,823	4,156	417.76	0.428	-0.127
Mansfield	996	744	361.26	0.412	-0.221
Middlesborough	1,271	848	391.07	0.414	-0.223
Milton Keynes &	1,503	1,063	434.28	0.42	-0.08
Newcastle & Durham	3,390	2,366	395.91	0.402	-0.184
Northampton	1,392	981	387.71	0.407	-0.183
Norwich	1,303	857	382.95	0.437	-0.175
Nottingham	2,170	1,454	395.21	0.41	-0.169
Oxford	1,663	1,109	475.00	0.434	-0.059
Peterborough	1,063	762	408.20	0.396	-0.148
Plymouth	961	624	390.34	0.417	-0.186
Portsmouth	1,582	1,022	422.15	0.439	-0.147
Preston	1,403	980	412.91	0.41	-0.154
Reading & Bracknell	1,776	1,270	527.61	0.468	0.004
Rochdale & Oldham	843	606	366.55	0.417	-0.238
Sheffield &	2,449	1,628	400.83	0.415	-0.18
Southampton	2,197	1,494	439.26	0.414	-0.113
Southend &	1,380	876	405.09	0.434	-0.185
Stoke	1,298	918	381.13	0.411	-0.219
Sunderland	952	680	361.22	0.402	-0.257
Swansea	1,191	815	383.30	0.398	-0.204
Swindon	1,485	995	407.42	0.411	-0.169
Telford	704	498	373.85	0.415	-0.205
Wakefield &	1,029	703	398.60	0.405	-0.211
Warrington & Wigan	2,256	1,553	407.88	0.429	-0.171
Wirral and Ellesmere	779	494	382.99	0.426	-0.232
Worthing	437	297	387.07	0.44	-0.188
York	884	597	412.41	0.426	-0.166

Source: ASHE, 2010. Data for TTWAs. 60 Observations.

Table A3. Inequality measures by city, 2010

	Gini Coefficient	90 / 10 Ratio	80 / 20 Ratio	90 / 50 Ratio	50 / 10 Ratio
Aberdeen	0.321	4.016	2.452	2.228	1.803
Barnsley	0.253	2.926	2.196	1.830	1.599
Birmingham	0.283	3.297	2.211	1.939	1.700
Blackburn	0.265	2.980	2.179	1.920	1.552
Blackpool	0.288	3.025	2.182	1.910	1.584
Bolton	0.261	2.891	2.105	1.833	1.577
Bournemouth	0.288	3.371	2.089	2.122	1.589
Bradford	0.254	2.920	2.079	1.835	1.591
Brighton	0.263	3.131	2.163	1.902	1.647
Bristol	0.284	3.362	2.269	2.013	1.670
Burnley	0.252	3.038	2.006	1.902	1.597
Cambridge	0.295	3.655	2.285	2.005	1.823
Cardiff	0.251	2.858	2.012	1.934	1.478
Coventry	0.287	3.336	2.240	2.018	1.653
Crawley	0.287	3.424	2.250	1.958	1.748
Derby	0.299	3.667	2.431	1.895	1.935
Doncaster	0.258	3.098	2.083	1.916	1.617
Edinburgh	0.297	3.586	2.336	2.074	1.729
Glasgow	0.284	3.251	2.190	1.984	1.638
Gloucester	0.287	3.538	2.305	2.041	1.734
Grimsby	0.277	3.142	2.130	1.943	1.617
Guildford & Aldershot	0.306	3.757	2.486	2.120	1.772
Hastings	0.255	2.962	2.083	1.956	1.514
Huddersfield	0.288	3.369	2.318	1.901	1.772
Hull	0.263	3.130	2.214	1.895	1.651
Ipswich	0.258	3.095	2.107	1.942	1.594
Leeds	0.282	3.357	2.198	2.037	1.648
Leicester	0.276	3.152	2.231	1.903	1.656
Liverpool	0.266	3.097	2.150	1.871	1.655
London	0.337	4.269	2.473	2.193	1.947
Luton & Watford	0.306	3.857	2.416	2.192	1.759
Maidstone & North Ken	0.251	3.060	2.122	1.833	1.669
Manchester	0.299	3.326	2.250	1.965	1.692
Mansfield	0.279	3.111	2.190	1.991	1.563
Middlesborough & Stoc	0.256	3.041	2.183	1.918	1.586
Milton Keynes &	0.303	3.564	2.264	2.203	1.618

Ayles					
Newcastle & Durham	0.270	3.095	2.119	1.967	1.574
Northampton	0.280	3.046	2.090	1.926	1.581
Norwich	0.270	3.235	2.126	2.040	1.586
Nottingham	0.289	3.228	2.204	1.961	1.647
Oxford	0.284	3.333	2.228	1.909	1.746
Peterborough	0.249	2.976	2.124	1.862	1.598
Plymouth	0.253	3.060	2.073	1.944	1.574
Portsmouth	0.319	3.374	2.287	2.035	1.658
Preston	0.268	3.341	2.250	1.950	1.714
Reading & Bracknell	0.313	4.100	2.539	2.155	1.902
Rochdale & Oldham	0.265	2.995	2.107	1.882	1.591
Sheffield & Rotherham	0.276	3.292	2.236	1.970	1.671
Southampton	0.288	3.403	2.233	2.006	1.696
Southend & Brentwood	0.302	3.338	2.243	2.048	1.630
Stoke	0.253	2.883	2.084	1.827	1.578
Sunderland	0.237	2.774	1.880	1.838	1.509
Swansea	0.254	3.015	2.115	1.858	1.623
Swindon	0.290	3.237	2.194	2.032	1.593
Telford	0.258	2.879	2.145	1.848	1.558
Wakefield & Castleford	0.265	3.030	2.117	1.873	1.618
Warrington & Wigan	0.300	3.387	2.309	2.064	1.641
Wirral and Ellesmere	0.251	3.117	2.143	1.953	1.596
Worthing	0.272	3.190	2.262	1.959	1.629
York	0.274	3.115	2.162	1.882	1.655

Source: ASHE, 2010. Data for 60 travel to work areas.

Annex B: Regression Results

Simple bivariate relationships between two drivers of urban inequality may be related. For example, larger cities may also have higher wages and this will have an independent impact on inequality. Simple relationships such as those presented in scatter graphs do not account for these control variables. We use ordinary least squares (OLS) regressions to overcome this problem.

Determinants of inequality at a city level

Table B1 gives the results of a series of simple multivariate regressions which consider the determinants of inequality at a city level. There is an important modelling consideration as we have relatively few observations (there are only 60 cities in our sample). Because of that we have to be cautious about including a large number of observations in the data.

There are three important results from these regressions. First, they affirm the relationship between urban inequality and affluence. The median income is positively and significantly related to inequality in each of our models (the same relationship can be found when using the mean income). At a city level, this is a useful reminder that inequality is related to affluence.

The second result is that larger cities, as measured by employment, are significantly more unequal than other cities. This relationship is robust to the inclusion of controls. Other research has tended to find this is the case, with research on similar areas in Sweden showing that it is the case particularly because of changes around the top or bottom of the distribution (Korpi, 2008).

Third, the results for train time from London are less clear. Without controls, cities nearer London are significantly more unequal (column 3). However, when controls are included this relationship turns positive. This is mainly explained by Aberdeen.

The results for population characteristics and industrial structure are less clear. Controlling for average income, employment, and train time from London none of these are significant. One reason for this may be the small number of cities in the model.

Table B1. Regression model for inequality at a city level

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
VARIABLES	Gini Coefficient						
Average wage	0.171***			0.178***	0.189***	0.171***	0.178***
	(0.0121)			(0.0167)	(0.0202)	(0.0176)	(0.0166)
Total		0.0153***		0.00103	0.000170	0.000316	0.00127
		(0.00214)		(0.00244)	(0.00184)	(0.00169)	(0.00266)
Traintime			-0.00912***	0.00281*	0.00181	0.00267*	0.00264
			(0.00235)	(0.00154)	(0.00111)	(0.00132)	(0.00150)
Average Age				0.00165			0.00149
				(0.00210)			(0.00211)
% Not UK				0.0229			0.0227
				(0.0304)			(0.0302)
%					0.000312		
					(0.000448)		
% Public						-	
						(0.000217)	
% Finance							-0.000443
							(0.000682)
Constant	-0.778***	0.0895***	0.319***	-0.911***	-0.908***	-0.769***	-0.907***
	(0.0751)	(0.0254)	(0.00909)	(0.124)	(0.119)	(0.0974)	(0.127)
Observations	60	60	60	60	60	60	60
R-squared	0.714	0.268	0.217	0.723	0.722	0.742	0.724

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Labour markets in unequal cities

If urban inequality appears to be the price of urban economic success, a related question is whether this leads to worse labour market outcomes for particular groups. To test this, we estimate two sets of individual level regressions.

Are the low skilled better paid in unequal cities?

In these regressions we use individual level data and estimate a dependent variable (wages or chances of employment) as a probability of the a set of individual characteristics (gender, experience, experience squared, part time working, whether they work in the public sector, ethnicity and whether they were UK born)

and a series of other city characteristics (proportion of the population with NVQ4 or above and above, median wage, and city size). The variable of interest is the Gini coefficient of wages. The results are given in Table B2 below.

Table B2. Wages for the low skilled in unequal cities

	(1)	(2)	(3)
VARIABLES	Hourly pay for normally working people (ln)		
Gini Coefficient	3.055***	1.841***	0.311
	(0.343)	(0.496)	(0.267)
Male		0.0992***	0.0999***
		(0.00888)	(0.00905)
Experience		0.0372***	0.0370***
		(0.00145)	(0.00136)
Experience^2		-0.000646***	-0.000641***
		(2.63e-05)	(2.43e-05)
Part-Time		-0.232***	-0.229***
		(0.0261)	(0.0263)
Public Sector		0.0787***	0.0778***
		(0.00897)	(0.00894)
Non White		-0.150***	-0.151***
		(0.0329)	(0.0321)
Not UK Born		0.0158	0.0113
		(0.0173)	(0.0171)
Employment (ln)			-0.00234
			(0.00530)
NVQ 4/5 (% of pop.)			-0.0825
			(0.208)
Median wage			0.0668***
			(0.00428)
Constant	1.215***	1.142***	1.032***
	(0.0967)	(0.138)	(0.0639)
Observations	28,314	26,875	26,875
R-squared	0.032	0.203	0.207

Where individual controls are: Gender, Experience, Experience2, Part-Time, Public Sector, NonWhite Ethnicity, UK birth. City controls: Total employment, % of workforce with NVQ4+, median wage.
Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

They show that wages for those with low skill levels are higher in more unequal cities. In columns 1 and 2 the Gini coefficient is positive and statistically significant,

indicating that this effect remains even when controlling for characteristics such as ethnicity or experience in the labour market.

However, in column 3 we also control for other characteristics of these cities. There is no statistically significant relationship between inequality and wages for the low skilled once we control for the average level of affluence in the city. In short, more affluent cities are more unequal, but this affluence – on average – leads to wage gains for those with low skill levels.

Are the low skilled more likely to be in employment in unequal cities?

Model B3. Urban inequality and employment chances for the low skilled

	(1)	(2)	(3)	(4)
VARIABLES	Employment (=1, relative to inactive / in education = 0)			
Male	0.149***	0.150***	0.149***	0.149***
	(0.0156)	(0.0155)	(0.0156)	(0.0156)
Experience	0.0209***	0.0209***	0.0209***	0.0209***
	(0.000892)	(0.000894)	(0.000898)	(0.000890)
Experience^2	-0.000433***	-0.000434***	-0.000434***	-0.000433***
	(1.63e-05)	(1.63e-05)	(1.65e-05)	(1.63e-05)
Non White	-0.173***	-0.171***	-0.173***	-0.174***
	(0.0270)	(0.0261)	(0.0267)	(0.0270)
Not UK Born	0.0393**	0.0394**	0.0387**	0.0387**
	(0.0190)	(0.0190)	(0.0188)	(0.0187)
Gini Coefficient	1.036**	1.498***	0.881**	0.398
	(0.409)	(0.468)	(0.387)	(0.444)
Total		-0.0271**		
		(0.0123)		
% with NVQ 4 / 5			0.228	
			(0.148)	
Average Wage				0.000395*
				(0.000235)
Region	YES	YES	YES	YES
Observations	27,188	27,188	27,188	27,188
Pseudo R2	0.0454	0.0458	0.0455	0.0455

Marginal effects presented. Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Next, we consider the same results but for employment chances: are low skilled individuals in unequal cities more likely to be in employment, controlling for their observable characteristics? We use the probability of them being in employment (as opposed to unemployed or inactive, removing full time students). As we cannot include variables relating to occupation (which are closely related to the

employment decision), we only use a basic set of individual characteristics – gender, experience and experience squared, ethnicity, whether an individual is born in the UK. Model B3 presents the results.

Column 1 includes only one city variable – the Gini coefficient of inequality – and the full set of personal dummies. There is a positive and significant relationship between inequality and an individuals chances' of employment: in more unequal cities, a given individual is more likely to be in employment.

This might also be related to the other characteristics of unequal cities – size, the proportion of highly skilled residents or average income. As these tend to be closely correlated, we cannot put them in the same regression.[8] Instead, we try each of the three most likely variables in sequence – total employment, the proportion of the population with NVQ4 + and the median wage. The measure of inequality remains significant controlling for each of these different factors.

There are two obvious interpretations of this. One is that inequality in cities may have labour market benefits, with the affluence which leads to inequality also creating employment for low skilled individuals.

A second relates to the measure of inequality used here. We consider inequality within the labour market. It might be that the inclusion of those with low skills in the labour market is driving inequality by extending the wage distribution down – in less equal cities there are fewer low skilled people in employment. In this case, urban inequality would in part reflect a composition effect.

To test this result we check whether our results hold if we use an alternative measure of inequality which is less subject to the lower end of the labour market. Table 8 gives the basic results using the ratio of the 90th to the 50th percentiles in the wage distribution.

[8] Diagnostic tests confirm that there is strong collinearity between the city variables when entered together.

Table 8. Probability of employment and upper tail inequality

	(1)	(2)	(3)	(4)
VARIABLES	Probability of employment (Employment = 1; unemployed or inactive = 0)			
90 / 50 Ratio	0.193**	0.232***	0.153**	0.0725
	(0.0753)	(0.0728)	(0.0754)	(0.0974)
Employment (ln)		-0.0166		
		(0.0115)		
NVQ 4/5 (%)			0.225	
			(0.158)	
Mean Pay				0.000443*
				(0.000266)
Individual Controls	YES	YES	YES	YES
GOR Dummies	YES	YES	YES	YES
Observations	27,188	27,188	27,188	27,188
Pseudo R2	0.0452	0.0454	0.0453	0.0455

Marginal effects presented. Estimated as probit with robust standard errors. All models include controls for gender, ethnicity, experience, experience squared, country of birth, region dummies and year dummies. Full results presented in Appendix.
*** p<0.01, ** p<0.05, * p<0.1

As before, the results suggest both a composition effect and an employment chances effect. Inequality is significant in almost every regression, albeit only at the 10% significance level. Only in one regression, where the median wage is included as a control, is the result not significant. Even then, it is close to significance at standard levels (p = 0.109). In short, these suggest that our results are not entirely driven by a composition effect – there seems to be an independent effect on employment chances in unequal cities.

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